FINAL REPORT

SITE-SPECIFIC SAFETY AND HEALTH PLAN

Mowing of Areas for Access to Groundwater Monitoring Wells, Obtaining Water Level Elevations and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

Contract DACW69-03-F-0027

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1. Purpose 1
1.2. Visitors 1
1.3. Safety Policy Enforcement 1
2.0 PROJECT DESCRIPTION 2
2.1. Site History 2
2.2. Purpose 2
2.3. Project Objectives 2
2.3.1. Mowing 2
2.3.2. Maintenance of Monitoring Wells 3
2.3.3. Gauging of Monitoring Well Water Elevations 3
3.0 HAZARD/RISK ANALYSIS 4
3.1. Activity Hazard Analysis 4
3.2. Chemical Hazards 4
3.2.1. 2,4,6-Trinitrotoluene (TNT) 5
3.2.2. Dinitrotoluene (DNT) 6
3.2.3. Pentaerythritol Tetranitrate (PETN) 8
3.2.4. Gasoline 10
3.2.5. Diesel Fuel (#2) 11
3.2.6. Ingestion 13
3.2.7. Hydrogen Sulfide 13
3.2.8. Lead 15
3.3. Physical Hazards 17
3.3.1. Walking and Working Surfaces 17
3.3.2. Lifting Techniques 17
3.3.3. Inclement Weather Conditions 18
3.3.4. Harmful Plants, Animals, and Insects 19
3.3.5. Mowing Hazards 20
3.4. Accident Prevention 22
4.0 CONTRACTOR PROJECT ORGANIZATION AND TRAINING 22
4.1. Project Organization 22
4.2. Training 22
4.2.1. Site-Specific Training 23
4.2.2. Safety Meetings 23
5.0 SAFETY PROCEDURES/PPE PROGRAM 23
5.1. Personal Protective Equipment (PPE) 23
5.2. Safety Equipment 24
5.3. Exposure Monitoring 24
5.4. Standard Orders for Work Zone 24
5.5. Illumination 25
5.6. Sanitation 25

6.0 SITE CONTROL MEASURES 25
6.1. Buddy System 25
6.2. Site Communication Plan 25
7.0 DECONTAMINATION PLAN 26
7.1. Personal Hygiene And Decontamination 26
7.2. Equipment Decontamination 26
8.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN 26
8.1. Pre-Emergency Planning 26
8.2. Personnel Roles and Lines of Authority 27
8.3. Emergency Recognition 27
8.4. Evacuation Procedures 27
8.5. Emergency Contacts 27
8.6. First Aid Response 28
8.7. Fire or Explosion 28
8.8. Accident Reporting 28
8.8.1. Investigation and Reporting 29
8.8.2. Supervisor's Responsibility 29
8.9. Emergency Equipment 29
9.0 RECORD KEEPING 29
10.0 REFERENCES 30

APPENDICES

Appendix A – Activity Hazard Analysis
Appendix B – Training Certificates
Appendix C – PPE Checklist and Miscellaneous Forms
Appendix D – Hospital Location Map
Appendix E – QC Documentation

Definitions and Acronyms

ACGIH	American Conference of Government Industrial Hygienists
AEC	Atomic Energy Commission
ANSI	American National Standards Institute
CFR	Code of Federal Register
DNT	Dinitrotoluene
DoD	Department of Defense
EPA	United States Environmental Protection Agency
GSA	General Service Administration
ICI	International Consultants Incorporated
IDLH	Immediately Dangerous to Life and Health
NASA	National Aeronautical and Space Administration
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety & Health Administration
PETN	Pentaerythritol Tetranitrate
PEL	Permissible Exposure Limit
PBRF	Plum Brook Reactor Facility
PBOW	Plum Brook Ordnance Works
POC	Point of Contact – technical point of contact for the U.S. Army Corps
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
QA & QC	Quality Assurance/Quality Control
SSHO	Site Safety and Health Officer
SSHP	Site-Specific Safety and Health Plan
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TNT	Trinitrotoluene
TWA	Time Weighted Average
USACE	United States Army Corps of Engineers

SITE-SPECIFIC SAFETY AND HEALTH PLAN

Mowing of Areas for Access to Groundwater Monitoring Wells, Obtaining Water Level Elevations and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

1.0 INTRODUCTION

1.1. Purpose

The purpose of this site-specific health and safety plan (SSHP) is to establish mandatory safety practices and procedures for all work conducted for the United States Army Corps of Engineers (USACE). Applicability extends to all employees, subcontractors, and visitors. This plan assigns responsibilities and establishes standard operating procedures for field personnel working on this project. During development of this plan, consideration was given to safety standards as defined by the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the United States Army Corps of Engineers (USACE) Manual (EM 385-1-1, September 1996).

1.2. Visitors

All non-project related personnel are considered visitors. Due to the nature of the work under this contract, visitors will not be present in the work areas and therefore are not addressed as part of this SSHP.

1.3. Safety Policy Enforcement

Field personnel are required to familiarize themselves with this plan so that they may adhere to its safety provisions. The provisions of this site-specific safety policy will be enforced. Failure to comply with the SSHP will result in the non-compliant employee(s) required to leave the project site. ICI will perform monitoring well maintenance and gauging of monitoring well elevations, Streamborn Environmental, under contract to ICI will provide mowing services. The ICI Project Manager has overall responsibility for the project. The ICI Project Manager or the ICI designee will oversee all site work, including when Streamborn Environmental is on-site.

2.0 PROJECT DESCRIPTION

2.1. Site History

The former Plum Brook Ordnance Works (PBOW) site is located approximately four (4) miles south of Sandusky, Ohio, near Lake Erie. Nitroaromatic explosives previously produced at the site included trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. The plant operated for approximately four years. Possession of the property was transferred to the Ordnance Department in 1946 and then to the War Assets Department and in 1949 to the General Service Administration (GSA). The National Aeronautical and Space Administration (NASA) acquired the property in 1963 and is presently maintaining and utilizing approximately 6,500 of the original 9,009 acres. In 1956, an agreement was made to lease 500 acres of the north portion of the site to construct and operate the Plum Brook Reactor Facility (PBRF). NASA operated the PBRF from 1963 until 1973 under a license agreement with the Atomic Energy Commission (AEC). NASA currently has a license agreement with the Nuclear Regulatory Commission (NRC) for the safe protective storage of the PBRF. NASA acquired an additional 6,000 acres of the former PBOW on March 15, 1963 for the purpose of conducting various aerospace research activities. NASA continues to use the site today.

2.2. Purpose

The United States Army Corps of Engineers (USACE) is currently conducting studies of the environmental impact of suspected hazardous waste sites at properties previously owned by the U.S. Department of Defense (DoD). Numerous investigations have been conducted on the PBOW site; approximately 100 groundwater-monitoring wells were installed. These wells are located within the sixteen (16) areas currently under investigation.

2.3. Project Objectives

The project objectives under this Scope of Work (SOW) include mowing of areas for access to groundwater monitoring wells, obtaining water level elevations of the monitoring wells, and well maintenance activities at the former Plum Brook Ordnance Works.

2.3.1. Mowing

This contract requires that the areas surrounding the wells be mowed four times during 2003. The mowing is tentatively scheduled for May, June/July, August, and November 2003. Streamborn Environmental personnel shall perform the mowing activities. In keeping with past efforts, an approximate 10-foot radius around each well shall be mowed to an approximate height of at least four inches. Additionally, a 10-foot wide path from the nearest road to the well will be mowed. All wells are to be cleared with hand tools (weed trimmers), and portable weed cutters (i.e. 30" walk behind brush hog type mowers). All field activities shall be coordinated with the USACE prior to mobilization and all mowing shall be completed prior to November 30, 2003.

ICI shall utilize existing access paths, roads, gates, and shall limit mowing activities to the areas specified by the USACE. No existing hedgerows, brush, or other vegetation that restricts vehicular traffic shall be cleared, mowed or driven over. Such barriers are to be left undisturbed since they act to control public access. ICI/Streamborn shall exercise extreme caution at all areas of the site. Concrete rubble, miscellaneous debris, possible open manholes, exposed tank cradles, hidden stumps, and other physical hazards are present throughout the mowing area. Care will be taken not to damage warning signs within the various areas under investigation.

There are approximately 10 monitoring wells within the perimeter of the plum Brook Reactor Facility (PBRF) which will not be mowed around as part of this scope. Accessing the PBRF requires the personnel to be RAD certified, and this scope does not require RAD certified personnel. Mowing activities will not be conducted within the perimeter of the PBRF.

2.3.2. Maintenance of Monitoring Wells

All wells may require some level of maintenance effort. These activities may involve painting the well numbers on the wells, purchasing and replacing caps, loosening hinges, purchasing and placing locks on the wells, and so forth. Currently, the wells are labeled with the designated number using high-performance black vinyl lettering with each letter or number at least two inches high. If a well riser is painted, the label will be removed and replaced after painting. Any maintenance efforts shall be performed during the 2003 mowing activities.

2.3.3. Gauging of Monitoring Well Water Elevations

ICI will perform the monitoring well water elevation measurements. ICI shall obtain the water elevations from each of the approximate 90 wells located at the site. Water level elevation measurements will be limited to the approximately 90 wells located outside the perimeter fence of the reactor facility (PBRF). Accessing the PBRF requires the personnel to be RAD certified, since this scope does not require RAD certified personnel, level measurement activities will not be conducted within the perimeter of the PBRF.

The elevation shall be measured from the tic mark on the top of the PVC riser. The data shall be compiled in MS Excel and provided to USACE on a virus-free CD ROM. The information collected during the level measurements will include:

- Monitoring well number
- Water elevation in feet to the nearest tenth
- Other pertinent field observations

3.0 HAZARD/RISK ANALYSIS

3.1. Activity Hazard Analysis

Appendix A summarizes field activities from mowing that may create or contribute to a hazard and the actions that can be taken to eliminate or minimize each of those hazards.

3.2. Chemical Hazards

Based upon previous analytical data from the site, the primary chemical hazard associated with this investigation is exposure to nitroaromatic compounds and fuels (gasoline, diesel) that will be used for mowing equipment. Specific compounds of concern are gasoline, diesel, trinitrotoluene (TNT), dinitrotoluene (DNT), hydrogen sulfide, and pentolite. Pentolite is a mix of TNT with pentaerythritol tetranitrate (PETN). During the water level monitoring activities, there is a potential for exposure to hydrogen sulfide. Additionally, lead is a concern throughout the site. Overall, exposure to chemicals at the site is expected to be very low due to the relatively non-intrusive nature of the project. Exposure itself to a chemical is not necessarily hazardous. The degree of hazard is a function of the chemical compound's toxicity or action on the body, the rate or intensity of exposure, the duration or time of exposure, and the susceptibility of the person. Therefore, it should be noted that the symptoms a worker may exhibit when exposed to a particular chemical might vary significantly. The extent of contamination and possible concentration range of contaminants that may be encountered is not completely known. All personnel entering the site must be briefed by the SSHO prior to entry to the site. The briefing shall include information concerning the site hazards and egress from the site in case of an emergency. All personnel entering the site must meet the medical surveillance requirements specified under 29 CFR 1910.120. The following standard safety precautions shall be adhered to for this project.

- Keep work areas clean & well ventilated.
- Clean up spills quickly and carefully.
- Personnel in the work zone shall not eat, drink, smoke or apply cosmetics.
- Only personnel meeting the training requirements of 29 CFR 1910.120 may perform this work. Personnel shall wear PPE as listed in Section 5.1.
- Any unnecessary contact with potentially contaminated substances shall be avoided.
- No horseplay.
- No matches or lighters shall be used in the work zone.
- During activities that present a risk to personnel, the buddy system as described in Section 6.1 will be implemented.

3.2.1. 2,4,6-Trinitrotoluene (TNT)

TNT presents danger from the formation of methemoglobinemia, which is the oxidation and inactivation of hemoglobin in the blood. Some of the chemical and physical properties of trinitrotoluene (TNT) are as follows:

- TNT has a molecular weight of 227.1 g/mol.
- TNT is a colorless to pale yellow, odorless solid.
- TNT has a boiling point (it explodes) of 464 °F.
- TNT has a vapor pressure of 0.053 mm Hg at 68 °F.
- TNT has a solubility of 0.013 grams per 100 grams of water.
- TNT is a Class A explosive. Rapid heating may cause an explosion.
- TNT may affect the ability of blood to carry oxygen.
- TNT is incompatible with strong oxidizers, ammonia, strong alkalies, and combustible materials.

Specific routes of exposure are:

- Skin absorption
- Eye contact
- Ingestion
- Inhalation

Symptoms a worker may exhibit when exposed to TNT include, but are not limited to the following:

- Skin irritation
- Irritation to the eyes, throat, and nose
- Jaundice (skin, hair, and nails)
- Cyanosis
- Sneezing
- Coughing
- Sore throat
- Muscular pain
- Weakness
- Drowsiness
- Shortness of breath
- Heart irregularities
- Unconsciousness
- Cataracts

The target organs affected are:

- Skin
- Eyes

- Respiratory system
- Blood
- Cardiovascular system
- Liver
- Kidneys
- Central nervous system

Emergency First Aid procedures are:

Eye Contact

- Wash eyes immediately with large amounts of water, lifting the lower and upper eyelids occasionally.
- Get medical attention immediately.
- Contact lenses should not be worn when working with this chemical.

Skin Absorption

- Promptly wash contaminated skin using soap or a mild detergent and water.
- If TNT has penetrated through clothing, remove the clothing immediately and wash the skin with soap and water.
- Get medical attention immediately.

Inhalation

- Immediately move exposed person to fresh air.
- If breathing has stopped, perform artificial respiration.
- Keep the affected person warm and at rest.
- Get medical attention immediately.

Ingestion

- If conscious, give affected person large quantities of water immediately. Induce vomiting after water consumption for conscious persons. *(Do not induce vomiting if affected person loses consciousness.)*
- Get medical attention immediately.

3.2.2. Dinitrotoluene (DNT)

Dinitrotoluene presents danger from the formation of methemoglobinemia, which is the oxidation and inactivation of hemoglobin in the blood. Dinitrotoluene has been shown to be a carcinogen and neoplastigens in laboratory experiments with animals. Some of the chemical and physical properties of DNT are as follows:

- DNT has a molecular weight of 182.2 g/mol.
- DNT is an orange-yellow crystalline solid.

- DNT has a boiling point of 572 °F.
- DNT has a vapor pressure of 1 mm Hg at 68 °F.
- DNT has a solubility of 0.03 grams per 100 grams of water.
- DNT is incompatible with strong oxidizers, caustics, and metals such as tin and zinc.

Specific routes of exposure are:

- Skin absorption
- Eye contact
- Ingestion
- Inhalation

Symptoms a worker may exhibit when exposed to DNT include, but are not limited to the following:

- Skin irritation
- Cyanosis
- Irritability
- Drowsiness
- Nausea
- Rapid pulse
- Headache
- Shortness of breath
- Heart irregularities
- Weakness
- Dizziness
- Unconsciousness

The target organs affected are:

- Skin
- Blood
- Cardiovascular system
- Liver
- Reproductive system

Emergency First Aid procedures are:

Eye Contact

- Wash eyes immediately with large amounts of water, lifting the lower and upper eyelids occasionally.
- Get medical attention immediately.
- Contact lenses should not be worn when working with this chemical.

Skin Absorption

- Promptly wash contaminated skin using soap or a mild detergent and water.
- If DNT has penetrated through clothing, remove the clothing immediately and wash the skin with soap and water.
- Get medical attention immediately.

Inhalation

- Immediately move exposed person to fresh air.
- If breathing has stopped, perform artificial respiration.
- Keep the affected person warm and at rest.
- Get medical attention immediately.

Ingestion

- If conscious, give affected person large quantities of water immediately. Induce vomiting after water consumption for conscious persons. *(Do not induce vomiting if affected person loses consciousness.)*
- Get medical attention immediately.

3.2.3. Pentaerythritol Tetranitrate (PETN)

Pentaerythritol Tetranitrate presents danger from the formation of methemoglobinemia, which is the oxidation and inactivation of hemoglobin in the blood. Pentaerythritol Tetranitrate has been shown to be a tetratogen in laboratory experiments with animals. Some of the chemical and physical properties of PETN are as follows:

- PETN has a molecular weight of 316.17 g/mol.
- PETN is a white crystalline solid.
- PETN has a melting point of 138-140 °F and explodes at 205-215 °F.
- PETN is incompatible with strong oxidizers and organic acids.

Specific routes of exposure are:

- Skin absorption
- Eye contact
- Ingestion
- Inhalation

Symptoms a worker may exhibit when exposed to PETN include, but are not limited to the following:

- Decrease in blood pressure
- Skin irritation
- Cyanosis
- Irritability
- Drowsiness
- Nausea
- Sweating
- Headache
- Shortness of breath
- Weakness
- Dizziness
- Unconsciousness

The target organs affected are:

- Skin
- Blood
- Cardiovascular system

Emergency First Aid procedures are:

Eye Contact

- Wash eyes immediately with large amounts of water, lifting the lower and upper eyelids occasionally.
- Get medical attention immediately.
- Contact lenses should not be worn when working with this chemical.

Skin Absorption

- Promptly wash contaminated skin using soap or a mild detergent and water.
- If PETN has penetrated through clothing, remove the clothing immediately and wash the skin with soap and water.
- Get medical attention immediately.

Inhalation

- Immediately move exposed person to fresh air.
- If breathing has stopped, perform artificial respiration.
- Keep the affected person warm and at rest.
- Get medical attention immediately.

Ingestion

- DO NOT induce vomiting. Transport immediately to a medical facility.

3.2.4. Gasoline

Gasoline will be used to power the mowing equipment. Some of the chemical and physical properties of gasoline are as follows:

- Gasoline has an approximate molecular weight of 72.
- Gasoline is a clear liquid with a characteristic odor.
- Gasoline has a boiling point of 102 °F and a closed cup flash point of -45 °F.
- Gasoline has a vapor pressure of 38-49 psi @ 38 °F.
- Gasoline has an upper explosive limit (UEL) or 7.6% by volume at room temperature.
- Gasoline has a lower explosive limit (LEL) of 1.4% by volume at room temperature.
- Gasoline is incompatible and/or reactive with strong oxidizers.

Specific routes of exposure to gasoline is:

- Inhalation
- Dermal absorption
- Ingestion

Symptoms a worker may exhibit when exposed to gasoline include, but are not limited to the following:

- Eye and skin irritation
- Mucous membrane irritation
- Headache
- Fatigue
- Blurred vision
- Disorientation
- Dizziness
- Slurred speech
- Confusion
- Convulsions

The target organs affected by gasoline are:

- Eyes
- Skin
- Respiratory system
- Central nervous system
- Kidneys
- Liver

A PEL of 300 parts per million (ppm) and a short term exposure limit (STEL) of 500 ppm will be acceptable exposure limits that will be adhered to for this project.

Emergency First Aid procedures are:

Eye Contact

- Wash eyes immediately with large amounts of water, lifting the lower and upper eyelids occasionally.
- Seek medical attention immediately.

Skin Absorption

- Promptly wash contaminated skin using soap or a mild detergent and water.
- Seek medical attention immediately.

Inhalation

- Immediately move exposed person to fresh air.
- If breathing has stopped, perform artificial respiration.
- Keep the affected person warm and at rest.
- Seek medical attention immediately.

Ingestion

- Seek medical attention immediately.

3.2.5. Diesel Fuel (#2)

Diesel fuel will be used to power the mowing equipment. Some of the chemical and physical properties of #2 diesel fuel are as follows:

- Diesel fuel is a clear to light amber liquid with a petroleum oil odor.
- Diesel fuel has a flash point greater than 125 °F.
- Diesel fuel has a lower explosive limit (LEL) of 0.7% and an upper explosive limit (UEL) of 7.0%.
- Diesel fuel has a vapor density greater than the vapor density of air.

- Diesel fuel is incompatible and/or reactive with strong oxidizers, oxygen rich air, and hypochlorites.

The specific routes of exposure for diesel fuel are:

- Inhalation
- Skin absorption
- Skin and/or eye contact
- Ingestion

Symptoms a worker may exhibit when exposed to diesel include, but are not limited to the following:

- Eye and skin irritation
- Headache
- Nausea
- Weakness
- Fatigue
- Dermatitis
- Dizziness
- Drowsiness
- Diarrhea (if ingested)
- Chemical pneumonitis (if inhaled)

The target organs affected by fuel oil are:

- Eyes
- Skin
- Gastrointestinal tract
- Respiratory tract

Diesel fuel is highly flammable and is a moderate explosion hazard when exposed to heat or flame. No OSHA permissible exposure limits (PELs) have been established for diesel fuel. No American Conference of Government Industrial Hygienists (ACGIH) threshold limit values (TLV) have been established for diesel fuel.

Emergency First Aid procedures are:

Eye Contact

- Wash eyes immediately with large amounts of water, lifting the lower and upper eyelids occasionally.
- Seek medical attention immediately.
- Contact lenses should not be worn when working with this chemical.

Skin Absorption

- Promptly wash contaminated skin using soap or a mild detergent and water.
- If petroleum products have penetrated through clothing, remove the clothing immediately and wash the skin with soap and water.
- Seek medical attention immediately.

Inhalation

- Immediately move exposed person to fresh air.
- If breathing has stopped, perform artificial respiration.
- Keep the affected person warm and at rest.
- Seek medical attention immediately.

3.2.6. Ingestion

- Seek medical attention immediately.

3.2.7. Hydrogen Sulfide

Hydrogen sulfide is a highly toxic gas. Some of the chemical and physical properties of hydrogen sulfide are as follows:

- Hydrogen sulfide has a molecular weight of 34.08.
- Hydrogen sulfide is a colorless, flammable gas with an offensive odor. The odor is frequently characterized as smelling like rotten eggs. *(NOTE: The sense of smell becomes rapidly deadened and cannot be relied upon to warn of the continuous presence of hydrogen sulfide).*
- Hydrogen sulfide has a boiling point of -77°F.
- Hydrogen sulfide has an upper explosive limit (UEL) or 44% and a lower explosive limit (LEL) of 4.0%.
- Hydrogen sulfide is heavier than air and may accumulate in low areas and may travel a considerable distance to an ignition source.
- Hydrogen sulfide is a poison. Exposures of 800-1000 ppm may be fatal in 30 minutes, and higher concentrations can be instantly fatal.
- Hydrogen sulfide is an irritant. Low concentrations of 20-150 ppm causes irritation to the eyes and slightly higher concentrations may cause irritation to the upper respiratory tract.
- Hydrogen sulfide is an asphyxiant. Hydrogen sulfide in very high amounts can paralyze the respiratory system.
- Hydrogen sulfide is a very dangerous fire hazard when exposed to heat, flame, or oxidizers. Also, it is a moderate explosion hazard when exposed to heat or flame.

Specific routes of exposure to hydrogen sulfide is:

- Inhalation
- Absorption through eyes and mucous membrane

Symptoms a worker may exhibit when exposed to hydrogen sulfide include, but are not limited to the following:

- Eye irritation
- Conjunctivitis
- Photophobia
- Corneal bullae
- Mucous membrane irritation
- Upper respiratory irritation
- Rhinitis
- Bronchitis
- Pulmonary edema
- Headache
- Dizziness
- Confusion
- Depression (when exposed to small concentrations)
- Excitement (when exposed to large concentrations)
- Irritability
- Gastrointestinal disturbances
- Staggering gait
- Diarrhea
- Dysuria
- Paralysis of the respiratory system
- Coma
- Death

The target organs affected by hydrogen sulfide are:

- Eyes
- Respiratory system
- Central nervous system

OSHA has set an acceptable ceiling concentration limit of 20 ppm and a 10-minute peak concentration of 50 ppm, if no other exposure to hydrogen sulfide has occurred. The IDLH value for hydrogen sulfide is 100 ppm.

Emergency First Aid procedures are:

- Flush contaminated eyes with large amounts of water for at least 15 minutes and seek medical attention. (*Note: The wearing of contact lenses by personnel is strictly prohibited when the potential exists for hydrogen sulfide exposure.)*
- Obtain medical attention immediately for inhalation exposure.

3.2.8. Lead

Some of the chemical and physical properties of lead are as follows:

- Lead has a molecular weight of 207.2 and a molecular formula of Pb.
- Lead is a heavy, gray solid, which is ductile and soft.
- Lead begins to melt 621 °F.
- Lead is incompatible and/or reactive with strong oxidizers, hydrogen peroxide and acids.

Specific routes of exposure to lead is:

- Inhalation
- Ingestion
- Skin contact

Symptoms a worker may exhibit when exposed to lead include, but are not limited to the following:

- Eye irritation
- Insomnia
- Nausea
- Malnutrition
- Constipation
- Colic
- Anemia
- Tremors
- Abdominal pain
- Hypotension
- Paralysis of wrist and/or ankles
- Pallor
- Gingival lead line
- Encephalopathy

The target organs affected by lead are:

- Eyes
- Gastrointestinal tract
- Central nervous system
- Kidneys
- Blood
- Gingival tissue

Lead can cause diseases of the central and peripheral nervous system, the kidney and the blood. The OSHA PEL is 0.050 milligrams per cubic meter (mg/m^3) or 50 ug/m^3.

Emergency First Aid procedures are:

Eye Contact

- Wash eyes immediately with large amounts of water, lifting the lower and upper eyelids occasionally.
- Seek medical attention immediately.
- Contact lenses should not be worn when working with this chemical.

Skin Absorption

- Promptly wash contaminated skin using soap or a mild detergent and water.
- If petroleum products have penetrated through clothing, remove the clothing immediately and wash the skin with soap and water.
- Seek medical attention immediately.

Inhalation

- Immediately move exposed person to fresh air.
- If breathing has stopped, perform artificial respiration.
- Keep the affected person warm and at rest.
- Seek medical attention immediately.

Ingestion

- Seek medical attention immediately.

3.3. Physical Hazards

Field activities performed during the project present inherent dangers from physical hazards such as falls, inclement weather, strains from lifting activities, cold/heat stress, and cuts. Employee training and experience in the use of field equipment and their awareness of potential hazards will reduce risk. In cases where the situation is found to be a potential danger, field workers will cease operations until site entry can be made safely.

3.3.1. Walking and Working Surfaces

Due to the location (forested area) of this project, the walking and working surfaces present inherent dangers. Personnel performing sampling will be working in areas of uneven terrain that may be densely vegetated, which present a hazard from slips, trips, and falls. Additionally, the presence of concrete rubble, miscellaneous debris, possible open manholes, exposed tank cradles, and hidden stumps present throughout the area presents walking hazards. Furthermore, the possibility of inclement weather (such as rain and snow) will present obvious walking and working surface hazards. Personnel will adhere to the following safety rules concerning walking and working surfaces:

- Personnel shall wear steel-toed boots.
- Personnel shall ensure that equipment not in use will be put in a place where it will not create a tripping hazard.
- Personnel shall be alert to tripping hazards from vines and other vegetation when performing field activities.
- Personnel shall not climb over debris.
- Personnel shall perform a walk through of an area prior to performing work in the area in order to locate potential tripping hazards.

3.3.2. Lifting Techniques

Lifting and moving equipment improperly can place a great deal of stress on the back, possibly resulting in severe injury. Lifting objects is inherent in performing field investigations and in mowing operations; therefore, it is important to use good lifting techniques. Proper lifting techniques shall be covered in the personnel's 8-hour HAZWOPER refresher class and then prior to beginning work, personnel shall review the rules below for proper lifting.

- Personnel shall utilize a mechanical device to lift very heavy objects.
- If a load is heavy or bulky, seek help.
- Remember to lift with your legs and keep your back straight.
- Keep the load as close to your body as you can.
- Do not jerk the load. Lift slowly and carefully.
- Make sure the area you will be carrying the load through is clear of obstacles.
- Do not twist or turn your spine when lifting or carrying the load.
- Be sure to have a good grip on your load at all times.

- Be careful when lowering your load (seek help, if necessary).

3.3.3. Inclement Weather Conditions

Work shall not be scheduled when inclement weather (heavy rains, strong winds, tornado, floods, extreme temperatures, and so forth) is predicted that could cause or contribute to an accident or exposure incident. If a change in the weather poses a health or environmental threat, the site shall be secured, and work shall cease. Extremes in temperature can pose serious physical hazards to personnel. Personnel shall be aware of appropriate steps that can be taken to minimize the effects of temperature extremes.

Cold Stress

Personnel who work outdoors during winter months are subject to cold stress. Exposure to extreme cold can result in severe injury or even death. Areas of the body that are most susceptible to the effects of cold stress are the fingers, toes, nose, and ears. The cold stress management requirements as outlined in Section 6 of the EM 385-1-1 Safety and Health Requirement Manual will be followed. Precautions a worker may take to prevent injury from the cold includes, but is not limited to the following:

- Extremities shall be protected from extreme cold by protective clothing.
- The work area shall be shielded or employees shall be given an outer windbreak garment when the wind chill is a factor during field operations.
- Outer garments must provide ventilation to prevent wetting of inner clothing by sweat.

The weather conditions shall be monitored and work halted if the temperature drops to levels that present a danger to worker safety.

Heat Stress

Heat stress may occur when protective clothing decreases natural body ventilation and/or when working in areas having elevated temperatures. The heat stress work/rest standards as outlined in the heat stress section of the 1996 ACGIH Threshold Limit Values (TLV) & Biological Exposure Indices (BEI) Handbook, and Section 6 of the EM 385-1-1 Safety and Health Requirement Manual will be followed.

Heat stress is any series of conditions where the body is under stress from overheating. It can include heat cramps, heat exhaustion, heat rash, or heat stroke. The victim often overlooks the signs of heat stress. The employee may at first be confused or unable to concentrate. Heat stress can produce bodily symptoms, which may include profuse sweating, dizziness, cessation of sweating, and collapse. Refer to the following table for common forms of heat stress.

Heat Stress

Condition	Signs/Symptoms	First Aid
Heat cramps	Heavy sweating Painful muscle spasms	Sport drink intake (Gatorade) Rest in cool environment Salt water intake (0.5% solution)
Heat Syncope	Brief fainting Blurred vision	Water intake Lie down in cool environment
Dehydration	Fatigue and reduced movement	Fluid and salted food intake
Heat Exhaustion	Pale and clammy skin, possible fainting, weakness, fatigue, nausea, dizziness, heavy sweating, blurred vision, body temperature slightly elevated	Lie down in cool environment, water intake, loosen clothing
Heat Stroke	Skin hot and dry, red face, high body temperature, unconsciousness, collapse, convulsions, confusion or erratic behavior	Immediate total cooling Transport to hospital

The following precautions will be taken to prevent injury from heat stress:

- The work schedule will be adjusted, if possible, to schedule heavy work during the cooler part of the day.
- The work will be paced to include adequate rest periods. Five to fifteen minute rest periods will be scheduled hourly or every 2 hours depending upon the workload, temperature, and relative humidity. The frequency and time of rest periods will be increased, if the SSHO believes that it is necessary to protect the workers' safety.
- Drinking water and ice will be provided and personnel will be encouraged to drink plenty of water.
- The weather conditions shall be monitored and work halted if the temperature (including humidity) rises to levels that present a danger to worker safety.

3.3.4. Harmful Plants, Animals, and Insects

Personnel working in the field must be aware of the physical hazards posed by coming into contact with harmful plants, animals, and insects. Of the potential exposures to poisonous plants, field personnel are likely to be most affected by exposure to poison ivy and poison oak, which are very common in this area. Both of these plants have greenish white flowers with berries that grow in clusters. The leaves are composed of three (3) leaflets each. These plants can cause a severe rash, which is characterized by redness, blisters, swelling, intense burning, and itching. If these plants are to be removed from the work area, personnel shall wear appropriate PPE to prevent dermal exposure.

Copperheads and rattlesnakes are the predominant poisonous species of snakes in this area. Rattlesnakes have horny sheaths towards the end of the tail, which make a rattling sound. Copperheads are brown in color with a V-shaped head characteristic of poisonous snakes. Bees, mosquitoes, and ticks are the predominant insects that will be of concern. Insect repellants can be used since volatile organic compound (VOC) sampling is not to be performed. Personnel that have known allergies shall report this to the Project Manager and SSHO. These personnel need to keep medicine available to counteract their specific allergy.

The following steps shall be considered in preventing exposure to these hazards.

- Field personnel are required to wear PPE at all times while performing work in heavily vegetated areas. This should be helpful in limiting skin exposure to plants and insects.
- Insect repellants may be used to reduce potential contact with insects.
- A 16-unit first aid kit shall be available at the site and shall contain a variety of ointments for skin afflictions.
- When practical, poisonous plants (such as poison ivy) shall be removed or destroyed.
- Water and soap shall be provided on-site for personnel to wash affected skin areas.
- Personnel shall report all known allergies to plants, insects, and medications to the Project Manager or SSHO prior to work.

3.3.5. Mowing Hazards

The following precautions shall be taken to prevent injuries associated with the grass mowing activities.

- Perform a pre-site walk through and pick up any items that might be thrown by the mowing equipment.
- Do not allow site visitors or the general public to operate any mowing equipment.
- Stop mowing operations if bystanders approach within one hundred feet of the mower/tractor.
- When mowing near roadways, make sure that the mowing equipment is operated such that any flying objects from the mower blades will be directed back away from where people are.
- Before starting any mowing equipment make sure that bystanders are a safe distance away. For a weed trimming equipment, push lawn mower, and a riding lawn mower a distance of 25 feet should be sufficient. At least 100 feet should be considered a safe distance when starting a tractor.
- Perform a check of all mowing equipment daily prior to use. The pre-operation check should be performed in accordance with the manufacturers recommendations.
- Never allow passengers on a riding lawn mower or tractor/brush hog.
- Do not operate a lawn mower, weed trimmer, or tractor/brush hog with bystanders nearby.

- Ensure that all guards and shields provided by the manufacturer are in place prior to beginning work. Do not remove any safety devices that were provided by the manufacturer.
- Never modify the equipment in any way.
- Ensure that all guards and shields are installed and inspected in accordance with the manufacturers recommendations. (Missing guards or shields are to be replaced immediately).
- Do not operate brush hog cutter in a raised position.
- Never place hands, feet, any other body part, or clothing, under the mower or near moving parts of the mower while the engine is running. Ensure that all motion has stopped prior to checking moving parts.
- Ensure that blades are in good condition and can swing freely.
- Perform routine maintenance of mowing equipment prior to beginning work to ensure that all nuts, bolts and other fasteners are properly tightened.
- For riding lawn mowers and tractors, place all controls in neutral, stop engine, set brake, remove ignition key, and wait for all removing parts to stop before servicing, adjusting, repairing, or unplugging.
- Prior to mowing, check for entangled material in all rotating parts and remove as appropriate.
- Loose and frayed clothing, loose long hair, and dangling jewelry shall not be worn while working with any mowing equipment.
- Personnel should wear gloves and use care when performing fueling operations.
- Do not fuel any mowing equipment when the equipment is hot. Let mowing equipment cool prior to refueling.
- Do not store fuel in the open sun. Store fuel in a protected area away from heat sources and away from the public.
- Remove mowing equipment and fuels from access by the public when these items are not in use or intended for immediate usage.
- Do not operate the power take off (PTO) of a tractor/brush hog at speeds faster than the speed recommended by the manufacturer.
- For tractors, always wear the seat belt provided as part of the roll over protection system (ROPS).
- Do not remove ROPS system from the tractor and do not modify the ROPS.
- If a ROPS component becomes damaged, replace it immediately and do not attempt repairs.
- Do not drive the tractor close to the edges of ditches or banks, which may break under the weight of the tractor, especially when the ground is loose or wet.
- Always slow the tractor prior to turning. Turning at a high speed may tip the tractor over.
- Personnel shall wear personal protective equipment as specified in Section 5.1 of this plan.

3.4. Accident Prevention

ICI is committed to ensuring the safety of its employees and contractors. The company believes that occupational injuries and illnesses can be prevented, that exposures to hazardous materials, and hazardous work situations can be controlled, and that prevention of injuries and illnesses is equal in importance to production, quality, cost, and morale. Before each new phase of a job, a safety meeting is to be held to review the activity hazard analysis for that specific job. The Activity Hazard Analysis for this project can be found in Appendix A. The hazard analysis provides a description of potential hazards and the actions to be taken to eliminate or minimize each of these hazards.

4.0 CONTRACTOR PROJECT ORGANIZATION AND TRAINING

4.1. Project Organization

The collection of quality data and the completion of any given project are strongly affected by the project organization. A project that is properly organized with personnel responsibilities results in a successful project. A listing of functional areas and qualified personnel are given for this project.

Government Technical POC - Technical point of contact (POC) representing the USACE who will serve as a liaison between the USACE and the contractor.		
Lisa Humphreys	*(304) 529-5953*	*(304) 617-1461 Cell*
Contractor Project Manager – Responsible for accomplishing the goals of this project.		
Helen Owens	*(937) 252-0341*	*(937) 478-2322 Cell*
Site Safety and Health Officer (SSHO) - Person responsible for safety on-site.		
Helen Owens	*(937) 252-0341*	*(937) 478-2322 Cell*
Field Personnel - Personnel responsible for completing the tasks required under this contract.		
Aaron Parker (as required) *Matthew Fraley* *(Streamborn Environmental)*	*(937) 252-0341* *(513) 726-4344*	

4.2. Training

All field personnel performing work on this project have received forty-hour HAZWOPER training and the associated 8-hour refresher training annually. Additionally, all field personnel have actual field experience gained under the direct guidance of a trained and experienced supervisor. All field personnel meet the training requirements as cited in 29 CFR 1910.120. At

least two personnel on-site have received first aid and CPR training. Appendix B contains copies of all training certifications and dates of refresher training for employees that may work on this project.

4.2.1. Site-Specific Training

All field personnel shall receive training and guidance concerning the provisions of this SSHP. Training will specifically address the activities, procedures, monitoring, equipment, and hazard analysis for site operations. This training will allow personnel to ask questions, clarify misunderstandings, and reinforce their previous safety and health training.

4.2.2. Safety Meetings

The Project Manager/ SSHO shall brief field personnel prior to field operations, and on an as needed basis. Additional briefings will be performed when work practices change, if site conditions change, or if a deficiency has been found. The SSHO/Project Manager conducting the meeting shall record the following information on a Daily Safety Meeting form. A copy of this is located in Appendix C. This form, to be filled out daily and signed by the SSHO/Project Manager, will include the following:

- Personnel attending the safety meeting shall be recorded.
- The date of the safety meeting shall be recorded.
- The SSHO/Project Manager shall list the topics discussed in the safety meeting.
- The SSHO/Project Manager shall discuss work conditions and task expected to be completed that day.
- The Project Manager/SSHO shall record notes and comments concerning the safety meeting.
- The Project Manager/SSHO shall record any safety-related incidents noticed by field personnel.

5.0 SAFETY PROCEDURES/PPE PROGRAM

5.1. Personal Protective Equipment (PPE)

Personnel will wear protective equipment meeting appropriate American National Standards Institute (ANSI) standards when their activities involve known or suspected contaminated materials. Level D PPE will be used for all site activities. Based upon the project activities, it is not anticipated that an upgrade of PPE will be necessary.

Level D PPE will consist of:

- Steel toe safety shoes
- Safety glasses with side shields to protect against flying debris, or
- Safety goggles for increased protection against chemical splash,
- Chemical resistant gloves when checking monitoring well elevations and leather gloves are optional for well maintenance and mowing activities
- Hard hat
- Sleeved shirt and long trousers

Appendix C contains a sample PPE inspection form. These inspection forms will be included in the daily safety inspection logs.

5.2. Safety Equipment

At a minimum, a basic first aid kit shall be available on-site in the work zone. The Project Manager or the designee will perform a daily check to assure that the safety equipment is present and in good working condition. Appendix C contains a copy of the safety equipment checklist to be used.

5.3. Exposure Monitoring

ICI does not anticipate a need to perform personnel exposure monitoring for this project.

5.4. Standard Orders for Work Zone

Level D PPE will be utilized for all field activities. General safety procedures to be followed by all field personnel are:

- All workers entering the work area shall sign that they have read and will comply with the SSHP.
- All site workers shall follow the contents of this SSHP.
- Personnel will not be allowed to work on-site during periods of inclement weather that would endanger their lives.
- Personnel in the work zone shall not eat, drink, smoke, or apply cosmetics.
- Only personnel meeting the training requirements of 29 CFR 1910.120 may enter into the work area. Personnel shall adhere to the PPE requirements as listed in Section 5.1.
- Any unnecessary contact with potentially contaminated substances shall be avoided.
- No horseplay.
- No matches or lighters shall be used in the work areas.
- During activities that present a risk to personnel, the buddy system as described in section 6.1 will be implemented.

5.5. Illumination

Work will be performed during daylight hours only.

5.6. Sanitation

Potable water will be carried on-site. Water, soap, and towels will be available on-site for personnel decontamination.

6.0 SITE CONTROL MEASURES

Site control is an essential component in the implementation of the site-specific health and safety program. This section defines the procedures for maintaining site control.

6.1. Buddy System

When conditions present a risk to personnel, the implementation of the buddy system is mandatory. A buddy system requires that at least two people work as a team; each looking out for the other. People utilizing the buddy system are required to use the same level of PPE. Those activities requiring the use of the buddy system are as follows:

Site reconnaissance – requires minimum of two people keeping each other in a line of sight.
Mowing activities- requires a minimum of two people keeping each other in a line of sight.
Monitoring well activities- requires a minimum of two people keeping each other in a line of sight.

6.2. Site Communication Plan

Successful communications between field personnel and support personnel is essential. The following hand signals shall be used during field activities at the site.

SIGNAL	DEFINITION
Hands clutching throat	Out of air/cannot breath
Hands on top of head	Need assistance
Thumbs up	OK/I am alright/I understand
Thumbs down	No/Negative

In the event of an emergency, the signal for personnel to evacuate will be by sounding three blasts on a vehicle horn. If this occurs, personnel shall stop work immediately, evacuate the site and report to a predetermined offsite location so that all personnel may be accounted for. All personnel shall proceed with their buddy to a safe distance from the work area. Personnel will remain in the predetermined safe meeting area until the Project Manager provides them with

further instructions. Appendix E contains and a map showing the route to the nearest hospital and general routes of evacuation from the area.

7.0 DECONTAMINATION PLAN

7.1. Personal Hygiene And Decontamination

Decontamination will consist of exercising good hygiene practices because no sampling will be performed under this work order. Soap and water shall be provided in the event personnel come into contact with gasoline, diesel, and motor oil used for the mowing devices. Additionally, personnel should wash with soap and water if they come into contact the groundwater at the site or potentially contaminated soil at the site.

Personnel shall practice good personal hygiene at all times. Field workers are required to wash their hands prior to eating, drinking, or smoking after engaging in field mowing/clearing operations and activities associated with the monitoring wells. Field workers are required to wash their hands following any exposure to contaminated soils, groundwater, equipment, or other materials and also remove soil/mud from boots.

7.2. Equipment Decontamination

Equipment used during the mowing and clean up operation shall be limited to clipboards, cameras, weed removal tools, and mowing tractors. Equipment decontamination should not be necessary during the mowing and clearing operations since direct contact with contamination is not anticipated during this work.

Equipment used during the well level monitoring and maintenance will include an oil/water interface meter. The level measurement tape will be rinsed with deionized water and wiped dry with a paper towel after each use. In the event the instrument probe contacts product in the well, the decon procedures shall include washing the product-contaminated surfaces of the probe with Alconox® and rinsing thoroughly with deionized water. The water used to wash/rinse will be kept to a minimum (< 5 gallons) and disposed properly.

8.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

This section describes contingencies and emergency planning procedures to be implemented at the site. The provisions of this emergency response plan will be reviewed with all field personnel prior to beginning work at the site.

8.1. Pre-Emergency Planning

Field personnel will be briefed concerning emergency response procedures, contingency plans, lines of authority as well as their role in the plan. The plan will be reviewed by the Project Manager on a regular basis and revised, if necessary. This will ensure that the plan is adequate and consistent with site conditions.

8.2. Personnel Roles and Lines of Authority

The Project Manager has the primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the general public. Possible actions may involve stopping operations and evacuating personnel from the site. The Project Manager is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports have been completed and filed with appropriate agencies. All personnel are responsible for reporting potential safety hazards and shall assist the Project Manager within the scope of their training and knowledge. A SSHO may be on-site or called on to the site to assist the Project Manager in dealing with personnel safety issues and/or emergency situations, which exceed the training and/or knowledge of the Project Manager.

8.3. Emergency Recognition

Personnel will be familiar with techniques of hazard recognition from pre-assignment training and site-specific briefings. Emergency situations include, but are not limited to, chemical release, fire, serious injury or illness. Conditions that may lead to such events will be identified and preventive measures will be implemented prior to an emergency occurring. The Project Manager will brief the personnel concerning the hazard assessment associated with this project.

8.4. Evacuation Procedures

In the event of an emergency, the signal for personnel to evacuate will be by sounding the vehicle horn. If this occurs, personnel shall stop work immediately, evacuate the site and report to a predetermined offsite location so that all personnel may be accounted for. Personnel will be expected to proceed with their buddy to a safe distance from the work area. Personnel will remain in the predetermined safe meeting area until the Project Manager provides them with further instructions.

8.5. Emergency Contacts

In the event of a medical emergency, the Project Manager will notify the appropriate emergency organization. The Project Manager will notify the appropriate local, state, and federal agencies in the event of a fire or spill. Emergency contact numbers will be posted at the site. Emergency contact numbers are listed below:

CONTACT	ORGANIZATION	TELEPHONE
Police/Ambulance/Fire		911
Hospital	Perkins Medical Clinic	(419) 625-0606
Poison Control	Poison Control Center	(800) 642-3625
Lisa Humphreys	USACE	(304) 529-5953; (304) 360-2558 (cell); (304) 617-1461 (cell)
Helen Owens	International Consultants, Inc.	(937) 252-0341; (937) 478-2322
Bob Lallier	NASA	(416) 621-3234

The Perkins Medical Clinic is located at 6015 Milan Road, Sandusky, Ohio. All field personnel shall become familiar with the route to the hospital. Appendix E contains a map showing the location of the hospital and evacuation routes for this area.

8.6. First Aid Response

Each employee attempting to render first aid is performing the service as a Good Samaritan. To minimize contact with body fluids, personnel shall use disposable gloves when rendering first aid and use mouth guards when performing CPR.

The Project Manager shall be contacted for all emergencies. Victims of medical emergencies will be transported to the hospital. Upon entering the area to set up for work, field personnel shall familiarize themselves with the route to the hospital and general evacuation routes.

8.7. Fire or Explosion

In the event of a fire or explosion, the local fire department shall be called immediately. The Project Manager will advise the fire chief of the location, nature, and identification of hazardous materials on-site. Due to the nature of this project, the only hazardous material that will be in the work zone will be a small quantity (< 5 gallons) of gasoline for use in the weed trimmer and diesel fuel for the tractor. If the fire is minor and it is safe to do so, site personnel may:

- Use fire-fighting equipment available on-site to control and/or extinguish the fire.
- Remove or isolate flammable or other hazardous materials, which may contribute to the fire.

8.8. Accident Reporting

In the event of an accident, employees are responsible for reporting all injuries or illnesses as soon as possible to the SSHO/Project Manager. The Project Manager/SSHO is responsible for investigating and reporting accident information and maintaining exposure data. The SSHO shall report his findings to management along with a plan to correct whatever deficiency resulted in the accident. Any accident resulting in a serious injury or a fatality must be reported to OSHA within 24 hours and the accident scene shall not be disturbed until it has been released by the investigating authority, except for rescue and emergency measures. The Project Manager will

notify the POC immediately in the event of an accident or incident and they will file form ENG 3394 with the USACE within 2 working days for all reportable accidents.
An ENG 3394 will be submitted any time there is an occupational illness/injury resulting in lost workdays, a fatality, permanent disability, or 3 or more persons are hospitalized. Also, a copy of ENG Form 3394 will be completed for property damage of $2,000.00 or more. A copy of form ENG 3394 is located in Appendix C.

8.8.1. Investigation and Reporting

Report all accidents immediately to the Point of Contact. Additionally, the contractor shall thoroughly investigate the accident and submit the findings of the investigation along with appropriate corrective actions to the Point of Contact on ENG Form 3394 as soon as possible but no later than two (2) working days following the accident. Corrective actions will be implemented as soon as is reasonably possible.

8.8.2. Supervisor's Responsibility

For job related injuries which require medical treatment, a supervisor of the injured employee shall accompany the injured employee to the medical treatment facility and explain the employee's regular duties and the availability of "Light Duty" so that the injured employee can return to work as soon as medically possible.

8.9. Emergency Equipment

The Project Manger or SSHO will check emergency equipment daily. The following emergency equipment shall be used on-site:

- Fire Extinguishers
- 16-unit first aid kit
- Eye wash bottle
- Eye wash solution
- Cellular phone

9.0 RECORD KEEPING

Implementation of the provisions of this SSHP shall be documented. The SSHO/Project Manager will be responsible for documenting steps taken to be in full compliance with this plan. The SSHO/Project Manager shall keep the following records:

- Copy of this SSHP
- ENG Form 3394 (USACE Accident Investigation Report Form)
- Records of safety violations and remedial actions taken
- OSHA Log 300 for reporting accidents
- Maintain records of all exposure and accident experienced incidental to the work; employee exposure, worker's compensation reports and project man hours

- Records of safety meetings
- PPE checklist
- Other pertinent safety and health related observations or documents

10.0 REFERENCES

The following reference material was used in compiling the information contained in this SSHP.

- Occupational Safety and Health Standards for General Industry, 29 CFR 1910
- Army Corps of Engineers, Safety and Health Requirements Manual, EM 385-1-1, 3 September 1996
- USEPA/Environmental Response Team, Health and Safety Planner (HASP), Version 3.0/4.0
- NIOSH/OSHA/USCG/EPA, "Occupational Safety and Health, Guidance Manual for Hazardous Waste Site Activities", October 1985
- ACGIH, "TLVs and BEIs Handbook", 1996

APPENDIX A

Activity Hazard Analysis and OSHA 300 Log

SEVERITY CATEGORIES

Description	Category	Definition
Catastrophic	I	Death, system loss, or severe environmental damage
Critical	II	Severe injury or illness, major system or environmental damage
Marginal	III	Minor injury or illness, minor system or environmental damage
Negligible	IV	Less than minor injury or illness, or less than minor system or environmental damage

HAZARD PROBABILITY CATEGORIES

Description	Level	Specific Individual Item	Fleet or Inventory
Frequent	A	Likely to occur frequently	Continuously experienced
Probable	B	Will occur several times in the life of an item	Will occur frequently
Occasional	C	Likely to occur some time in the life of an item	Will occur several times
Remote	D	Unlikely but possible to occur in the life of an item	Unlikely but can reasonably be expected to occur
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced	Unlikely to occur but possible

DECISION AUTHORITY MATRIX

		HAZARD PROBABILITY				
		A	B	C	D	E
HAZARD SEVERITY		Frequent	Probable	Occasional	Remote	Improbable
I	Catastrophic					
II	Critical					
III	Marginal		MEDIUM			
IV	Negligible					LOW

A summary of the risks and their categories is provided below as part of the Activity Hazard Analysis.

Mowing of Areas for Access to Groundwater Monitoring Wells
Obtaining Water Level Elevations and Well Maintenance

Former Plum Brook Ordnance Works
Sandusky, Ohio

ACTIVITY HAZARD ANALYSIS **Mowing Activities**			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
B-IV	Construction debris or uneven surfaces	Be alert and observe terrain while walking to minimize slips and falls. Wear appropriate footwear.	Hard hat, steel-toed shoes, safety glasses with side shields, sleeved shirt, long trousers, ear plugs may be appropriate when mowing using a tractor with brush hog attachment
D-III	Snakes, rodents, dogs, bees and ticks	Avoid wildlife when possible. In case of animal bite, seek medical attention immediately. Do not attempt to pet or catch animals. In case of animal bite, seek medical attention immediately. Check skin and clothes for ticks. Do not mow over or near areas suspected of containing bee or wasp nests.	Hard hat, steel-toed shoes, safety glasses with side shields, sleeved shirt, long trousers, ear plugs may be appropriate when mowing using a tractor with brush hog attachment

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
D-III	Heat stress	Precautions a worker may take to prevent injury from the heat includes, but is not limited to the following: The work schedule will be adjusted, if possible, to schedule heavy work during the cooler part of the day. The work will be paced to include adequate rest periods. Five to fifteen minute rest periods will be scheduled hourly or every 2 hours depending upon the workload, temperature, and relative humidity.	
D-III	Heat stress	Personnel performing mowing will be encouraged to drink plenty of water. Work should be halted if the temperature (including humidity factor) rises to levels that present a danger to worker safety.	

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
B-IV	Sun Exposure	Sunscreen will be provided and workers will be encouraged to apply the lotion at regular intervals. Workers will wear hats, bandannas and long sleeves as appropriate to protect from sunburn.	

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
B-IV	Sun Exposure	Sunscreen will be provided and workers will be encouraged to apply the lotion at regular intervals. Workers will wear hats, bandannas and long sleeves as appropriate to protect from sunburn.	
C-IV	Injuries caused by equipment or flying debris	Operate all mowing and landscape equipment in accordance with manufacturer's instructions. Ensure that all guards and shields provided by the manufacturer are in place prior to beginning work. Do not remove any safety devices that were provided by the manufacturer. Perform a pre-site walk through and pick up any items that might be thrown by the mowing equipment.	Hard hat, steel-toed shoes, safety glasses with side shields, sleeved shirt, long trousers, ear plugs may be appropriate when mowing using a tractor with brush hog attachment

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
C-IV	Injuries caused by equipment or flying debris (Continued)	Perform a check of all mowing equipment daily prior to use. The pre-operation check should be performed in accordance with the manufacturers recommendations. Ensure any bystanders are a safe distance from the area before starting or operating equipment. Lock brake pedals together, use warning lights, and use a slow moving vehicle emblem when traveling on the roadway	

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
C-IV	Injuries caused by equipment or flying debris (Continued)	Lock brake pedals together, use warning lights, and use a slow moving vehicle emblem when traveling on the roadway	Hard hat, steel-toed shoes, safety glasses with side shields, sleeved shirt, long trousers, ear plugs may be appropriate when mowing using a tractor with brush hog attachment
D-III	Runaway or rolling over of a tractor	Do not operate the power take off (PTO) at speeds faster than the speed recommended by the manufacturer Always wear the seat belt provided as part of the roll over protection system (ROPS). Do not remove ROPS system from the tractor. Do not modify the ROPS.	

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
D-III	Runaway or rolling over of a tractor (Continued)	If a ROPS component becomes damaged, replace it immediately do not attempt repairs Do not drive the tractor close to the edges of ditches or banks which may break under the weight of the tractor, especially when the ground is loose or wet Always slow the tractor prior to turning. Turning at a high speed may tip the tractor over.	

ACTIVITY HAZARD ANALYSIS Mowing Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
D-III	Injury from the use of hand tools to perform repairs	All tools designed to accommodate guards shall be equipped with such guards. Reciprocating, rotating, and moving parts of tools shall be guarded if exposed to contact by employees or if it otherwise creates a hazard. Loose and frayed clothing, loose long hair, dangling jewelry shall not be worn while working with any power or hand tool.	Safety glasses
C-IV	Exposure to petroleum products	Do not fuel any mowing equipment when the equipment is hot. Let mowing equipment cool prior to refueling. Do not store fuel in the open sun. Store fuel in a protected area away from heat sources and away from the public.	Personnel should wear gloves and use care when performing fueling operations.

ACTIVITY HAZARD ANALYSIS Well Monitoring Activities			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
B-IV	Surfaces may be uneven or contain construction debris creating a tripping hazard	Be alert and observe terrain while walking to minimize slips and falls. Wear appropriate footwear.	Hardhat, steel-toed shoes, safety glasses with side shields, sleeved shirt, and long trousers.
D-III	Snakes, rodents, dogs, bees and ticks present the hazard of potential bites from poisonous or disease carrying animals.	Avoid wildlife when possible. In case of animal bite, seek medical attention immediately. Do not attempt to pet or catch animals. In case of animal bite, seek medical attention immediately. Check skin and clothes for ticks. Do not mow over or near areas suspected of containing bee or wasp nests.	
D-III	Heat stress can occur.	Precautions a worker may take to prevent injury from the heat includes, but is not limited to the following: The work schedule will be adjusted, if possible, to schedule heavy work during the cooler part of the day.	

ACTIVITY HAZARD ANALYSIS Well Level Monitoring Activities (Continued)			
Residual Risk	**Hazards**	**Safe Work Procedure**	**Protective Clothing and Equipment**
D-III	Heat stress can occur (continued).	The work will be paced to include adequate rest periods. Five to fifteen minute rest periods will be scheduled hourly or every 2 hours depending upon the workload, temperature, and relative humidity. Personnel performing mowing will be encouraged to drink plenty of water. Work should be halted if the temperature (including humidity factor) rises to levels that present a danger to worker safety.	Hardhat, steel-toed shoes, safety glasses with side shields, sleeved shirt, and long trousers.
D-III	Sun Exposure	Sunscreen will be provided and workers will be encouraged to apply the lotion at regular intervals. Workers will wear hats, bandannas and long sleeves as appropriate to protect from sunburn.	
C-IV	Injuries from lawn mowing equipment (e.g. tractor, weed trimming tools, etc.)	Personnel shall not perform well maintenance or well elevation measurement activities while personnel are still performing mowing in close proximity to the well.	

OSHA's Form 300
Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year _____

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an injury and illness incident report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name _____

City _____ State _____

Identify the person			Describe the case			Classify the case										
(A) Case No.	(B) Employee's Name	(C) Job Title (e.g., Welder)	(D) Date of injury or onset of illness (mo./day)	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	Using these categories, check ONLY the most serious result for each case:				Enter the number of days the injured or ill worker was:		Check the "injury" column or choose one type of illness:				
						Death	Days away from work	Remained at work		On job transfer or restriction (days)	Away from work (days)	(M) Injury	Skin Disorder	Respiratory Condition	Poisoning	All other illnesses
						(G)	(H)	(I) Job transfer or restriction	(J) Other record-able cases	(K)	(L)	(1)	(2)	(3)	(4)	(5)
					Page totals	0	0	0	0	0	0	0	0	0	0	0

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Injury (1) | Skin Disorder (2) | Respiratory Condition (3) | Poisoning (4) | All other illnesses (5)

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

APPENDIX B

Training Certificates

THE NATIONAL ENVIRONMENTAL TRAINERS

certify that

Helen Owens

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals.

NATIONAL ENVIRONMENTAL TRAINERS

December 24, 2002

Signature of Instructor

Clay Bednarz, MS, CHMM (No. 3482)

APPENDIX C

PPE Checklist
Miscellaneous Forms

PPE CHECKLIST

All personnel shall perform an inspection of their PPE prior to performing activities on-site. The following items shall be checked.

____ Determine that the clothing material is that which has been designated for this project.

____ Visually inspect clothing for: Imperfect seams, non-uniform coatings, tears, malfunctioning closures

____ Hold up to light and check for pinholes

____ Flex product and make observations for cracks or other signs of shelf deterioration

____ If the product has been used before, inspect inside and out for signs of chemical attack, discoloration, swelling, or stiffness.

____ Visually inspect gloves for imperfect seams, tears, and non-uniform coating

____ Pressurize gloves with air; listen for pinhole leaks

____ Check hardhat for cracks or other signs of stress

____ Check the suspension of your hardhat. Look for loose or torn cradle straps, loose rivets, broken sewing lines or other defects.

____ If using earmuffs, check the muffs for cracks, cuts or missing gaskets.

____ Check safety glasses for scratches

____ Check for cracks or scratches on the facepiece of the respirator

____ Check for loss of elasticity or tears in the straps of the respirator

____ Check for the general cleanliness of the respirator

____ Check for proper fit of the respirator by performing the positive-pressure and negative pressure tests

Daily Safety Meeting

Project:_____ Date: _____

Discussion of work conditions and task expected to be completed today:

Topics to be discussed: (list below) **Task related to Safety Topic:** (list below)

Comments from Project Manager or SSHO concerning the meeting:

Notes concerning any safety related incidents that occurred:

Safety Meeting attendance:

I have attended the daily safety meeting. I have been briefed on today's job tasks and fully understand the safety issues associated with each task.

Name (printed)	**Signature**	**Date**
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Signature (Project Manager or SSHO) _____

SITE-SPECIFIC SAFETY AND HEALTH PLAN
Field Certification Form

Mowing of Areas for Access to Groundwater Monitoring Wells, Obtaining Water Level Elevations and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

This document is provided to certify that field personnel have reviewed the Site-Specific Safety and Health Plan and will comply with its contents.

Print Name	Signature	Date

Emergency Equipment List

The Project Manger or SSHO will check emergency equipment daily. The following emergency equipment shall be used on-site:

_____ Fire Extinguisher

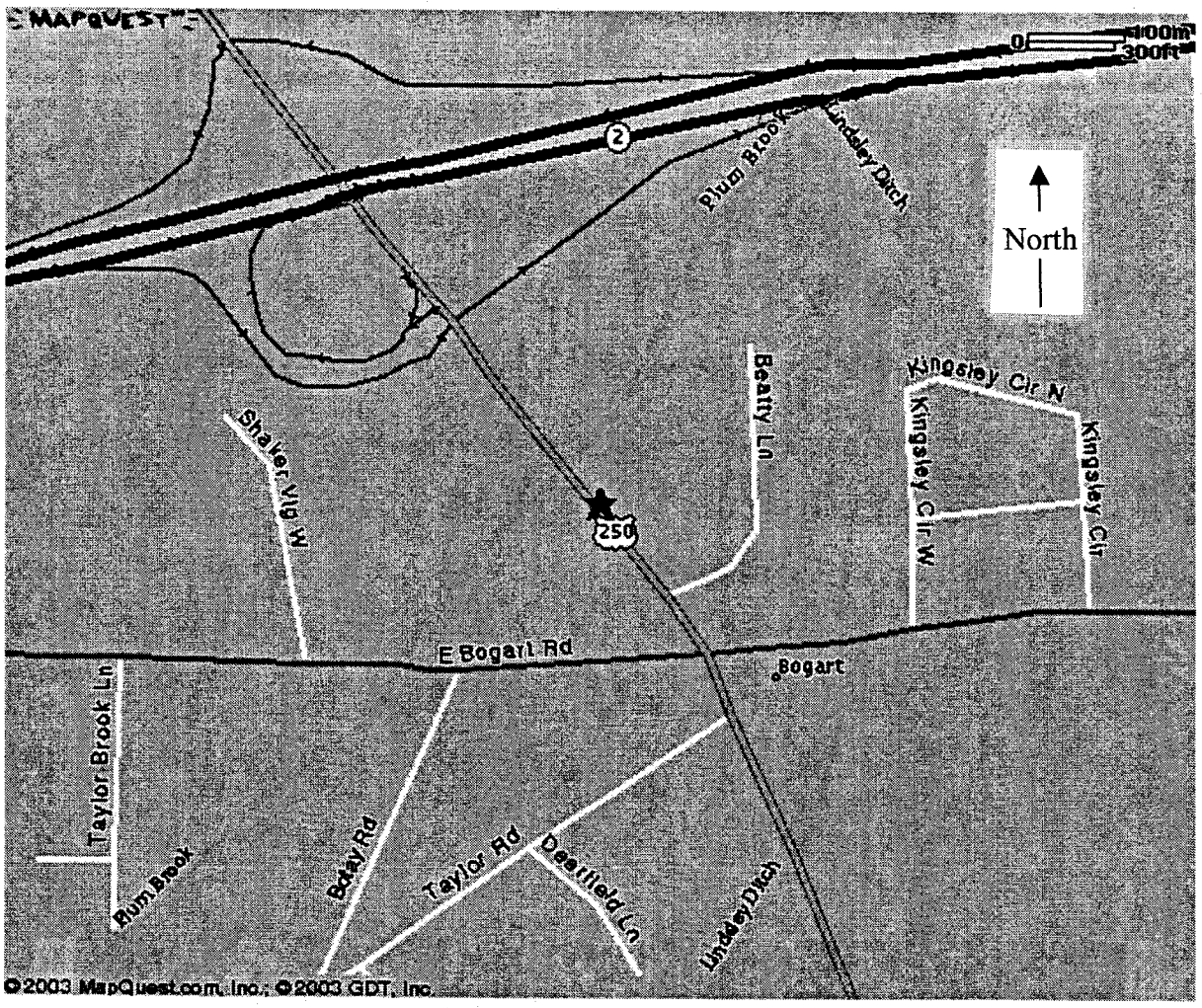
_____ 16-unit first aid kit

_____ Eye wash bottle and solution

_____ Cellular phone

APPENDIX D

HOSPITAL LOCATION MAP



Location of Perkins Medical Clinic

APPENDIX E

QC Documentation

QUALITY CONTROL REVIEW CHECKLIST
Site-Specific Safety and Health Plan

Mowing of Areas for Access to Groundwater Monitoring Wells, Obtaining Water Level Elevations and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

The following checklist is provided for QC review of the SSHP for this project. Checklists are provided for guidance and shall not substitute for sound judgement in completion and review of QA/QC procedures.

1.	Introduction	___✓__
2.	Project Description	___✓__
3.	Hazard/Risk Analysis	___✓__
4.	Contractor Project Organization and Training	___✓___
5.	Safety Procedures/PPE Program	___✓___
6.	Site Control Measures	___✓____
7.	Decontamination Plan	___✓___
8.	Emergency Response and Contingency Plan	___✓___
9.	Record Keeping	___✓___
10.	References	___✓___

Appendix A	**Activity Hazard Analysis**	___✓___
Appendix B	**Training Certificates**	___✓___
Appendix C	**PPE Checklist, Misc. Forms**	___✓___
Appendix D	**Map**	___✓___
Appendix E	**QC Documentation**	___✓___

Quality Assurance Certification
Site-Specific Safety and Health Plan

Mowing of Areas for Access to Groundwater Monitoring Wells, Obtaining Water Level Elevations and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

This document is provided to certify that the members of the internal Independent Quality Control Team (IQCT) have reviewed the Site-Specific Safety and Health Plan in accordance with the Quality Control Plan. All comments resulting from the various reviews have been resolved and/or incorporated.

Assignment	Name	Signature	Date
Senior Review			
	Mike Henry	Mike Henry	5-16-03
Peer Review			
	Aaron Parker	Aaron Parker	5-16-03

SITE-SPECIFIC SAFETY AND HEALTH PLAN

Mowing of Areas for Access to Groundwater Monitoring Wells,
Obtaining Water Level Elevations
and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

INTERNAL REVIEW COMMENTS – DRAFT REPORT

1. Comment: Section 2.2 – After "United States Army" insert "Corps of Engineers (USACE)".

   Response: Concur. Insertion has been made.

2. Comment: Section 2.2 – This paragraph indicates 95 wells and later a paragraph in Section 2.3.1 indicates 100 wells. Please verify the number of wells to be mowed around and measured.

   Response: Concur. Clarified there are 90 wells to be mowed around and measured.

3. Comment: Section 2.3.1, first paragraph – Clarify the restricted access to the reactor area and how it related to the activities of this scope.

   Response: Concur. Revised text to read "There are approximately 10 monitoring wells within the perimeter of the plum Brook Reactor Facility (PBRF) which will not be mowed around as part of this scope. Accessing the PBRF requires the personnel to be RAD certified, and this scope does not require RAD certified personnel. Mowing activities will not be conducted within the perimeter of the PBRF.

4. Comment: Section 2.3.1, second paragraph, fourth sentence – Change "moved" to "mowed".

   Response: Concur. Change has been made.

5. Comment: Section 3.2, third to last sentence – Change "hazardous" to "hazards".

   Response: Concur. Change has been made.

CELRH-SO 3985-10i May 5, 2003

MEMORANDUM FOR Engineering Division, ATTN: Lisa Humphreys

Subject: Site-Specific Safety and Health Plan, Mowing Areas for Access to Groundwater Monitoring Wells, Obtaining Water Level Elevations and Well Maintenance at Plum Brook Ordnance Works, Sandusky, OH, Contract No. DACW69-03-F-0027

1. A complete review of the above plan was accomplished on the above date. The plan was reviewed by Helma E. German of the Huntington District Safety Office.

2. The plan was quite specific in the layout of how the mowing would be accomplished under this contact. However, some discrepancies were noted and are listed with recommendations for your review and consideration below.

a. On page 1, under section 1.3, disciplinary action for employees is mentioned but there is not indication exactly what this action will be. Clarity is needed so that all parties will know. Also, in the same section it is stated that "non-compliant visitors will be required to leave the work zone" when in section 1.2 it is indicated that visitors will not be on this project? Meaning is unclear here and needs to be further explained.

b. On page 24, under Level D PPE., there is no mention of goggles as being made available to employees. Anytime even the remote possibility of a chemical splash or dust, trash etc. is noted, the use to safety glasses with side shields is not adequate protection and goggles shall be available.

c. On page 28, under 8.7, Fire or Explosion, it is stated that " the Fire Chief will be advised of location, nature and identification of hazardous materials on site", under NFPA and AR 420-90, Fire Departments will be told in advance of an incident what hazardous materials are at a location so that they can make a proper response.

d. Page 29, section 8.9 list "eye wash bottle", and please note that any attempt to rinse eyes must be for a period of **15 minutes**. Ensure that enough solution is present to accomplish this.

e. Same page, section 9.0, the OSHA log 300 is the document of choice for listing first aid injuries. (included)

f. Appendix A, Activity Hazard Analysis. Exposure of employees to heat in excess of 90 degrees F for an extended length of time is

considered "hazardous heat" and precautions will be implemented. Also there was no mention of sunscreen/block during times of extreme sun exposure.

3. No other deficiencies were detected at this time. This was one of the better plans that I have had the pleasure of reviewing and International Consultants, Inc. is to be congratulated. However, future Activity Hazard Analysis sheets must reflect the use of a risk assessment matrix. Document is located in Form Flow.

4. None of the above comments are sufficient to hold up this contract, however, review and comments should be forwarded to this office as soon as complete but NLT 30 days from receipt of this memorandum. Point of contact this review is the undersigned at 304-529-5673.

/s/
HELMA E. GERMAN
Chief, Safety and Occupational Health

CF:
EC-CE, Lisa Humphreys

SITE-SPECIFIC SAFETY AND HEALTH PLAN

Mowing of Areas for Access to Groundwater Monitoring Wells,
Obtaining Water Level Elevations
and Well Maintenance

Plum Brook Ordnance Works
Sandusky, Ohio

USACE Huntington District
REVIEW COMMENTS – DRAFT REPORT

1. A complete review of the above plan was accomplished on the above date. The plan was reviewed by Helma E. German of the Huntington District Safety Office.

2. The plan was quite specific in the layout of how the mowing would be accomplished under this contact. However, some discrepancies were noted and are listed with recommendations for your review and consideration below.

a. Comment:
On page 1, under section 1.3, disciplinary action for employees is mentioned but there is not indication exactly what this action will be. Clarity is needed so that all parties will know. Also, in the same section it is stated that "non-compliant visitors will be required to leave the work zone" when in section 1.2 it is indicated that visitors will not be on this project? Meaning is unclear here and needs to be further explained.

Response:
Concur. Text has been revised to clarify the non-compliant employee will be asked to leave the project site and the reference to "visitors" has been deleted.

b. Comment:
On page 24, under Level D PPE., there is no mention of goggles as being made available to employees. Anytime even the remote possibility of a chemical splash or dust, trash etc. is noted, the use to safety glasses with side shields is not adequate protection and goggles shall be available.

Response:
Concur. The required PPE list has been revised to include goggles for eye protection.

c. Comment:
On page 28, under 8.7, Fire or Explosion, it is stated that " the Fire Chief will be advised of location, nature and identification of hazardous materials on site", under NFPA and AR 420-90, Fire Departments will be told in advance of an incident what hazardous materials are at a location so that they can make a proper response.

Response:
Concur. Text has been revised to include a description of the hazardous material that will be at the location. The material will include small quantities of gasoline and diesel fuel. These materials are being used in the mowing equipment (gasoline-powered weed trimmer and diesel tractor)

d. Comment:
Page 29, section 8.9 list "eye wash bottle", and please note that any attempt to rinse eyes must be for a period of **15 minutes**. Ensure that enough solution is present to accomplish this.

Response:
Concur. The list has been revised to include "eye wash solution" as part of the equipment required on-site.

e. Comment:
Same page, section 9.0, the OSHA log 300 is the document of choice for listing first aid injuries.

Response:
Concur. The OSHA Log 300 has been included in the appendix.

f. Comment:
Appendix A, Activity Hazard Analysis. Exposure of employees to heat in excess of 90 degrees F for an extended length of time is considered "hazardous heat" and precautions will be implemented. Also there was no mention of sunscreen/block during times of extreme sun exposure.

Response:
Concur. The Activity Hazard Analysis has been revised to include measures to prevent or reduce sunburn.

g. Comment:
No other deficiencies were detected at this time. This was one of the better plans that I have had the pleasure of reviewing and International Consultants, Inc. is to be congratulated. However, future Activity Hazard Analysis sheets must reflect the use of a risk assessment matrix. Document is located in Form Flow.

h. None of the above comments are sufficient to hold up this contract, however, review and comments should be forwarded to this office as soon as complete but NLT 30 days from receipt of this memorandum. Point of contact this review is the undersigned at 304-529-5673.