ADDENDUM TO SITE WIDE SAFETY AND HEALTH PLAN

REMEDIAL INVESTIGATION, PART 1
RESERVOIR NO. 2 BURNING GROUND
FORMER PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

Prepared for:

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
NASHVILLE, TENNESSEE
CONTRACT DACW62-03-D-0004-0002

Prepared by:

JACOBS ENGINEERING®
Engineers and Constructors

JACOBS ENGINEERING GROUP, INC.
125 BROADWAY
OAK RIDGE, TN 37830

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COMPLETION OF INDEPENDENT TECHNICAL REVIEW

Jacobs Engineering Group, Inc. has completed the **Site-wide Safety and Health Plan Addendum** for the **Reservoir No. 2 Burning Ground Remedial Investigation Part 1: Site Characterization at the Former Plum Brook Ordnance Works, Sandusky, Ohio.** Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.

Virgil W Janssen — 3/5/04
(Signature) (Date)
Independent Technical Review Team Leader and Team Members

Sid McNair by Jim Healy — 3/5/04
(Signature) (Date)
Independent Technical Review Team Leader and Team Members

Bl Hardesty — 3/5/04
(Signature) (Date)
Independent Technical Review Team Leader and Team Members

(Signature) (Date)
Independent Technical Review Team Leader and Team Members

CERTIFICATION OF INDEPENDENT TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows (Describe the major technical concerns, possible impact, and resolution):

Comment:
Add: direct push drilling, surface water and sediment sampling, IDW management to the task list and global safe plans of action. Items were added as noted.

Comment:
Utilize specific PPE references in the global safe plans of action. Specific PPE items were added.

Comment:
Maintain consistent terminology and wording throughout the global safe plans of action. Terminology was changed to maintain consistency.

Comment:

Comment:

All concerns resulting from independent technical review of the project have been considered.

Virgil W Jansen (Signature) 3/5/04 (Date)

(Project Manager)

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1.0 INTRODUCTION

1.1 Scope and Applicability

No change

1.2 Site Description/Scope of Work

The activities being performed for this investigation will occur in the area of Reservoir #2 Burning Ground.

The field activities can be summarized as follows:

Site preparation
Exploratory trenching
Monitoring well installation
Direct push soil boring and sampling
Monitoring well development
Groundwater sampling
Surface water and sediment sampling
Equipment decontamination
IDW management
Surveying

2.0 RESPONSIBILITIES

No change.

3.0 SAFETY PROGRAM AND PROCEDURES

No change.

4.0 HAZARD ANALYSIS

No change

4.7 Task Hazard Analysis

Global Safe Plans of Action have been developed for each activity listed in section 1.2 of this document. Refer to Appendix I for task specific Global Safe Plans of Action.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment levels have not changed from the SWSHP, the following table provides specific types of PPE to be worn by field personnel. Task-specific requirements are outlined in the global SPAs.

Item	Type(s)
Hard hats	Type I, Class E minimum; ANSI Z89.1 approved
Safety glasses	Impact resistant, fixed side shields, ANSI Z.87 approved
Steel-toe boots	Leather or equivalent, ankle height minimum, ANSI Z41 approved
Work boots	Leather or equivalent, ankle height minimum
Chemical resistant boots	Chemical resistant overboots or chemical resistant steel-toe
Hearing protection	Minimum NRR of 25 dB, ANSI S3.19 approved
Face shields	Impact resistant, ANSI Z.87 approved
Gloves- general purpose	Leather or equivalent, work gloves
Gloves- chemical resistant	Inner: Form fitting nitrile Outer: Nitrile, 12" minimum
Cut resistant chaps	Chain-saw chaps, per U.S. Forest Service Spec. 6170-4E
Coveralls, chemical resistant	Dupont Pro-Shield 2 or equivalent
Respirator	Full-face air purifying respirator, NIOSH approved
Respirator cartridges	Organic vapor, acid gas, P-100 combination cartridge

6.0 SITE CONTROL

No change.

7.0 DECONTAMINATION

No change.

8.0 SITE MONITORING

No change.

9.0 MEDICAL SURVEILLANCE

No change.

10.0 EMERGENCY SERVICES

No change.

11.0 APPROVALS

Virgil Jansen, PE
Program Manager
Jacobs Engineering Group, Inc.

Date

Sean Healey, CSP
Health, Safety and Environment Manager
Jacobs Engineering Group, Inc.

Date

APPENDIX I GLOBAL SAFE PLANS OF ACTION

SITE: PBOW

SAFE PLAN OF ACTION

PROJECT NO. _____

Site Preparation- Clearing and Grubbing

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading/unloading	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, etc. prior to moving equipment.	Brooms, adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible.	Lift gates, hand trucks
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing work location.	Four wheel drive vehicles as necessary
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
	Towing equipment	Vehicle accident, equipment damage	Utilize proper towing equipment and pins, connect safety chains	Towing equipment, safety chains
Setting up work area, preparing equipment	Uneven ground, fallen trees, brush	Slips, trips and falls	Be aware of footing and surroundings, do not carry running saws while walking through the woods, flag obvious trip hazards with caution tape	Caution tape
	POL spills, fires	Environmental damage, contact dermatitis with repetitive skin exposure	Use proper mixing cans and gas cans with spouts appropriately sized to fill saws, maintain spill equipment in vehicle, avoid refilling hot equipment	Spill equipment, proper gas and mixing cans, 20 lb ABC fire extinguisher
	Sharp chains and blades	Hand lacerations, eye injury	Wear leather gloves when sharpening chains and saw blades, wear safety glasses even when sharpening manually	Leather gloves, safety glasses
Clearing brush	Noise, flying debris, rotating equipment on brush saws	Hearing loss, severe injury	Wear proper PPE any time operating brush saws or in the vicinity of anyone who is operating brush saws	Hearing protection, chip screens and safety glasses, steel toe boots
	Sharp branches, briars etc.	Hand lacerations	Wear leather gloves when removing cut brush	Leather work gloves
	Biological hazards: ticks, spiders, bees, wasps, poison ivy/oak/sumac	Allergic reaction	Check area for obvious signs of poison ivy, oak, sumac Also be aware of areas that are likely to contain bees/wasp nests, use DEET as necessary to prevent exposure to ticks, tape pant legs to boots if necessary and wear light colored clothing	DEET, duct tape, light colored clothing, ivy-bloc
Felling trees	Noise, flying debris, rotating equipment on chain saws	Hearing loss, severe injury	Wear proper PPE any time operating chain saws or in the vicinity of anyone who is operating chain saws	Hearing protection, chip screens and safety glasses, steel toe boots, cut resistant chaps, properly maintained chainsaws

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
	Falling trees	Crushing injury	Trees should be felled in proper fashion by creating a directional cut wedge and a felling cut. A wedge and sledge hammer should be used in the felling cut if circumstances require one. Have adequate escape area to move if tree falls in an unexpected direction, be sure to move away from tree at 45 degree angle, never directly behind the tree, keep all other workers 1.5 tree lengths away from area and maintain stringent site control,	Caution tape, cones, markers
	Overhead hazards	Electrocution, injury	Check work area for overhead utilities prior to felling trees, avoid felling trees into areas where they are likely to become snagged or entangled by existing obstructions	
Limbing and bucking felled trees	Noise, flying debris, rotating equipment on chain saws	Hearing loss, severe injury	Wear proper PPE any time operating chain saws or in the vicinity of anyone who is operating chain saws	Hearing protection, chip screens and safety glasses, steel toe boots, cut resistant chaps, properly maintained chainsaws
	Falling tree limbs	Crushing injury	Use extreme caution when cutting limbs off trees, work slowly and deliberately, be aware the main trunk may rotate and shift as the limbs are removed, only one person should work on each tree, keep the saw from striking the ground when limbing or bucking (cutting up) the main tree, proceed in a manner that will prevent the saw from getting bound in the tree as it is cut	Caution tape, cones, markers
Chipping trees, limbs and brush	Moving heavy limbs and tree sections	Back and muscle strain, slips, trips and falls	Cut limbs in sizes that are easy to handle, use proper lifting technique, position wood chipper in an easily accessible area, be sure area around chipper is free of tripping hazards	Heavy equipment for moving large items
	Noise, flying debris, rotating equipment on wood chipper	Hearing loss, severe injury	Wear proper PPE any time operating wood chipper or in the vicinity of anyone who is operating wood chipper, position discharge chute so flying debris will not impact other personnel in the area, flag or mark discharge area so no one inadvertently walks through "danger zone", do not wear loose clothing around chipper, do not reach into chipper feed chute and be sure feed reverse bar is working properly	Hearing protection, chip screens and safety glasses, steel toe boots, properly maintained wood chipper
Stumping area, debris load-out	Working around heavy equipment	Crushing injury, being struck with bucket, being run over by equipment	Properly control work area and use a spotter for the equipment operator, make eye contact with equipment operator prior to walking into swing radius of backhoe/excavator	Caution tape, spotter
	Falling debris	Head injury, crushing injury	Stay away from trucks being loaded with stumps, do not stand on the blind side of a truck being loaded, do not walk into swing radius of equipment	Spotter

SITE: PBOW

SAFE PLAN OF ACTION
Exploratory Trenching

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading/unloading	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, etc. prior to moving equipment.	Brooms, adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible.	Lift gates, hand trucks
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing work location.	Four wheel drive vehicles as necessary
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
	Towing equipment	Vehicle accident, equipment damage	Utilize proper towing equipment and pins, connect safety chains	Towing equipment, safety chains
Site set-up and control	Overhead utilities	Electrocution, equipment damage	Verify overhead equipment clearances from utilities are adequate for existing conditions. In any circumstances, a minimum of 20' must be maintained from overhead power lines.	Spotter
	Pedestrians, vehicles etc.	Injury or exposure to passer-by, vehicle damage, workers being struck by vehicles	Properly secure work area and establish EZ, CRZ and SZ using caution tape, barricades and other appropriate hazard markings. In some instances fencing may be necessary. If working near or on public roadways obtain a police detail.	Hazard markings, barricades, fencing
Equipment operation	Heavy equipment usage	Workers being struck by or caught in heavy equipment	Properly control work area around operating equipment. All workers must remain outside of swing radius of operating equipment and be sure the equipment operator is aware before entering within the swing radius. Licensed and/or designated competent operators are to run heavy equipment.	Spotter, licensed and/or designated competent operator, hazard markings
	Heavy equipment failure	Crushing injury, death, equipment damage	Inspect equipment prior to use, maintain per manufacturer's recommendations	Equipment inspection checklist or daily log

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
	Soil contaminants	Exposure to personnel, fire, deflagration	Monitor soil visually and with appropriate air monitoring equipment- PID with a 10.2 bulb, real-time aerosol monitor. Be aware of changing soil conditions and continuously check ground for visible signs of TNT and manufacturing by-products. If action levels, 1.0 ppm and 1.0 mg/m3 above background are recorded consistently in the breathing zone, suspend activities and upgrade PPE to level C. All personnel inside exclusion zone during intrusive activity will wear at least modified D PPE.	PID with a 10.2 bulb Real-time aerosol monitor Modified D PPE Respiratory protection as needed
	Trench cave-in, collapse.	Crushing injury, structure and equipment damage.	No personnel are to enter trenches. All personnel, spoils and equipment are to be placed at least 3' back from edges of trenches. Trenches will not be excavated in areas where they may undermine nearby building foundations, roads, railroad tracks, etc. Unattended open excavations must be fenced with orange hi-vis fencing. Barricades must be maintained and checked at least once per day whenever the trench is left open. Backfill trenches as soon as possible. Trenches in areas readily accessible to children must be backfilled prior to departing the site each day.	Fencing, caution tape, stakes, fence posts, rope.

SITE: PBOW

SAFE PLAN OF ACTION

Monitoring Well Installation - Rotosonic

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Site mobilization	Loose equipment	Equipment shifting in/falling from vehicles	Secure equipment; Position equipment	Straps; bungee cords
Site set up / break down	Vehicle positioning	Hitting people, vehicles, trees, rocks, etc.;	Use spotters; Chock Tires	Vehicles; tire chocks
	Slips, trips, falls	Falling	Survey site; Mark hazards w/ caution tape; Establish and maintain exclusion zone	Caution tape
	Falling / shifting equipment	Suspended equipment falling on crew members: injury or death	Stand clear from equipment suspended from crane; Only approved personnel operate crane; crane must have current annual certification; Use proper hand signals when communicating to crane operator; Use tag lines	Certified crane; casing; generators; soil drums; crew members; hand signals; tag lines
	Overhead hazards	Electrocution; falling debris; injury; death	Wear hard hat, safety glasses, and steel toe boots; Survey overhead hazards before raising rig mast, and operating crane; Position rig no closer to "live" power lines than 1.5 mast lengths	Rig; crane; hard hat; safety glasses; safety boots
Drilling	Underground utilities	Electrocution; broken gas and water lines; injury	Utilize utility clearance service; Research site maps; Perform field recon prior to starting activity, hand auger top 7 feet	Clearance paperwork, hand auger; site maps, PBOW support staff
	Rig and generator noise	Loss of hearing	Wear ANSI-approved hearing protection	Ear plugs; ear muffs
	Rig and generator exhaust	Breathing rig/generator exhaust	Monitor Air Quality; Position Generators >20 feet downwind of Breathing zone (especially sampling port)	PID with 10.2 bulb; generator; vehicles
	Chemicals in soil	Illness, irritation	Wear PPE; Monitor soil headspace	Modified Level D PPE, PID with 10.2 bulb
Water and sampling	Handling samples w/ preservative (acids)	Acid burns	Wear PPE	Nitrile gloves; safety glasses
	Exposure to chemicals in groundwater: Exposure to gasoline, diesel, and motor oil	Skin and eye exposure to carcinogens	Wear PPE; Berm polyethylene under rig, water truck, generators, casing, etc.	Nitrile gloves; safety glasses; rig; water truck; generator; casing; poly
	Exposure to chemicals in soil	Illness	Wear PPE; Monitor soil borehole and breathing zone	Nitrile gloves; safety glasses; aluminum foil; glass jars; PID with 10.2 bulb
Decontamination	Water slip hazard	Falling	Walk slowly and deliberately; Use sump if water accumulates	Sump, footwear appropriate for the conditions
	Exposure to groundwater contaminants, gasoline; diesel; motor oil	Skin and eye exposure to carcinogens	Wear PPE	Modified Level D PPE, PID with 10.2 bulb
	Falling equipment	Suspended equipment falling on crew members: injury or death	Stand clear from equipment suspended from crane; Operate crane only w/ crane operators license; Use proper hand signals when communicating to crane operator; Use tag lines	Crane; casing; hard hat; safety glasses; steel toe boots; tag Lines
	Pressurized spray water	Eye damage, lacerations, equipment damage	Utilize proper spray nozzles on equipment, wear appropriate PPE, control work area during decontamination	Spray nozzles, face shield, safety glasses.

SITE: PBOW

SAFE PLAN OF ACTION

Direct-Push Soil Boring and Sampling

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Site mobilization	Loose equipment	Equipment shifting in/falling from vehicles	Secure equipment; Position equipment	Straps; bungee cords
Site set up / break down	Vehicle positioning	Hitting people, vehicles, trees, rocks, etc.;	Use spotters; chock tires	Vehicles; tire chocks
	Slips, trips, falls	Falling	Survey site; Mark hazards w/ caution tape; Establish and maintain exclusion zone	Caution Tape
	Falling/shifting equipment	Suspended equipment falling on crew members: injury or death	Stand clear from suspended equipment, Use tag lines	Generators; tag lines; augers
	Overhead hazards	Electrocution; falling debris; injury; death	Wear hard hat, safety glasses, and steel toe boots; Survey overhead hazards before raising equipment or pipe; Position equipment no closer to "live" power lines than 20 feet	Rig; hard hat; safety glasses; safety boots
Rig operation	Underground utilities	Electrocution; broken gas and water lines; injury	Utilize utility clearance service; Research site maps; Perform field recon prior to starting activity, hand auger top 7 feet	Clearance paperwork, hand auger; site maps, PBOW support staff
	Rig and generator noise	Loss of hearing	Wear ANSI-approved hearing protection	Ear plugs; ear muffs
	Rig and generator exhaust	Breathing exhaust	Monitor air quality; position generators >20 feet downwind of Breathing zone (especially sampling port)	PID with 10.2 bulb; generator; vehicles
	Rotating equipment	Becoming entangled in machinery; Injury	Do not wear loose clothing around machinery; know where emergency shut-off switches are located	Emergency shut off switches
Water and sampling	Handling samples w/ preservative (acids)	Acid burns	Wear PPE	Nitrile gloves; safety glasses
	Exposure to chemicals in soil	Illness, skin/respiratory irritation	Wear modified Level D PPE; monitor breathing zone, upgrade to level C if action levels are exceeded	Modified Level D PPE, PID with 10.2 bulb
Decontamination	Water slip hazard	Falling	Walk slowly and deliberately; use sump if water accumulates	Sump
	Exposure to chemicals in soil/water; gasoline; diesel; motor oil	Skin and eye exposure to chemical contaminants	Wear modified level D PPE; monitor breathing zone, upgrade to level C if action levels are exceeded	Modified Level D PPE, PID with 10.2 bulb
	Falling equipment	Suspended equipment falling on crew members: injury or death	Stand clear from equipment suspended from hoisting line; use tag lines	Hard hat; safety glasses; steel toe boots; tag lines; hoisting lines; augers

SITE: PBOW

SAFE PLAN OF ACTION
Monitoring Well Development

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading / unloading	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, etc. prior to moving equipment.	Brooms, adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible.	Lift gates, hand trucks
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing sample location.	Four wheel drive vehicles as necessary
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
Setting up site/exclusion zone	Uneven ground, holes, stumps, extension cords	Slips, trips and falls	Recon site, flag potential trip hazards, organize site to minimize walking areas	Flagging, cones
	Site visitors/unauthorized site entrants	Chemical exposure to unaware, unprotected personnel, distraction to authorized personnel	Establish suitable exclusion zone and exercise control over work area	Caution tape, rope
	Electrical hazards	Shock/electrocution from generator	Use GFCI and grounding rods if necessary	GFCI, grounding rod
	Generator: noise hazard, POL spill hazard	Hearing loss, environmental damage from POL, sample compromise from POL	Place generator at extension cord length distance down wind of site and place generator on bermed poly sheeting	Extension cord, poly sheeting
Water level measurement	Winding of meter/repetitive motion, probe recoiling too quickly striking personnel, hunching over well	Ergonomic injury, cuts/contusions from water meter probe	Share physical aspects of job with partner, recoil meter slowly as the probe reaches meter	Partner
Water parameter measurement	Chemical contaminants in ground water	Inhalation, contact hazards from contaminants in water.	Conduct PID monitoring at least every 30 minutes. Wear appropriate PPE, avoid skin contact with water.	Modified Level D PPE, PID with 10.2 bulb
Material handling, drum movement	Moving drums and other heavy equipment	Pinch points, muscle strain	Use appropriate equipment when moving drums, set up site to minimize any material handling requirements.	Drum dollies, lift gate, extra personnel, leather gloves

SITE: PBOW

SAFE PLAN OF ACTION
Groundwater Sampling

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading/unloading	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, etc. prior to moving equipment.	Brooms, adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible.	Lift gates, hand trucks
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing sample location.	Four wheel drive vehicles as necessary
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
Accessing and opening well	Over tightened bolts, rusty locks	Slipping causing cuts/abrasions to hands	Know the limitations of all hand tools. If necessary use bolt cutters to remove old, rusty locks	Socket wrenches, bolt cutters
	PID readings > 1 ppm	Exposure to chemical contaminants, possibly carcinogens	Allow well to vent, if readings continue over 1 ppm then recap and advise management.	Direct reading instruments such as PID with a 10.2 bulb
	Contact with potentially contaminated water.	Exposure to chemical contaminants, possibly carcinogens	Wear appropriate PPE	Nitrile gloves, PID with 10.2 bulb
Setting up site/exclusion zone	Uneven ground, holes, stumps, extension cords	Slips, trips and falls	Recon site, flag potential trip hazards, organize site to minimize walking areas	Flagging, cones
	Site visitors/unauthorized site entrants	Chemical exposure to unaware, unprotected personnel, distraction to authorized personnel	Establish suitable exclusion zone and exercise control over work area	Caution tape, rope
	Electrical hazards	Shock/electrocution from generator	Always use GFCI Utilize grounding rods if necessary	GFCI, grounding rod
	Generator: noise hazard, POL spill hazard	Hearing loss, environmental damage from POL, sample compromise from POL	Place generator at extension cord length distance down wind of site and place generator on bermed poly sheeting	Extension cord, poly sheeting
Water level measurement	Winding of meter/repetitive motion, probe recoiling too quickly striking personnel, hunching over well	Ergonomic injury, cuts/contusions from water meter probe	Share physical aspects of job with partner, recoil meter slowly as the probe reaches meter	Partner
Sample collection	Placing or removing pump from well	Pinch points, muscle strain	Be aware of hands as pump is lowered and recoiled, don't allow pump head to fly out of well	Nitrile gloves
	Sample preservatives splashing on skin	Corrosive burns	Hold sample containers away from face when filling and wear proper PPE	Portable eyewash, nitrile gloves, safety glasses
Site breakdown	Moving drums of purge water	Pinch points, muscle strain	Use partner and lift gate to move drums from ground to truck bed	Partner, lift gate

SITE: PBOW

SAFE PLAN OF ACTION

Surface Water and Sediment Sampling

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading/unloading	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, ice, frost etc. prior to moving equipment.	Brooms, adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible.	Lift gates, hand trucks
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing sample location.	Four wheel drive vehicles as necessary
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
Sample collection	Steep banks, grass, brush, and running or pond water	Slipping, tripping and drowning.	Carefully assess easiest path to sample location. Utilize waders, or over-boots. Use a safety line for stream sampling.	Waders, over-boots, rope, anchor points
	Site visitors/unauthorized site entrants	Worker distraction	Establish suitable exclusion zone.	Caution tape, rope
	Sample preservatives splashing on skin	Corrosive burns	Hold sample containers away from face when filling and wear proper PPE	Portable eyewash, nitrile gloves, safety glasses
Site breakdown	Moving drums of purge water	Pinch points, muscle strain	Use partner and lift gate to move drums from ground to truck bed	Partner, lift gate

SITE: PBOW

SAFE PLAN OF ACTION
Equipment Decontamination

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading/unloading, equipment movement	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, etc. prior to moving equipment.	Adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment. Use trucks with lift gates whenever possible, use hand trucks.	Lift gates, hand trucks
	Unsecured equipment or drums	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing sample location, use a spotter when driving/backing in tight areas.	Four wheel drive vehicles as necessary, spotter
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
Equipment decon	Using electrical equipment in wet environments	Electrocution, equipment damage	Keep all cords out of water and be sure cords have three prong plugs and in are good condition, use outlets with GFCI, test GFCI prior to using	Three prong extension cords, outlets with GFCIs
	Contact with potentially contaminated water	Exposure to contaminants via inhalation, absorption and ingestion	Conduct air monitoring as necessary, wear PPE appropriate for specific contaminants	Modified Level D PPE, PID with 10.2 bulb
	Contact with decon solvents and solutions	Exposure to solutions via inhalation, absorption and ingestion, contact dermatitis from strong soaps	Conduct air monitoring as necessary, wear PPE appropriate for specific contaminants	Modified Level D PPE, PID with 10.2 bulb
	Pressurized spray water	Eye damage, lacerations, equipment damage	Utilize proper spray nozzles on equipment, wear appropriate PPE, control work area during decontamination	Spray nozzles, face shield, safety glasses.

SITE: PBOW

SAFE PLAN OF ACTION
IDW Management

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Identify work area	Slippery surfaces on and around work area.	Slipping, falling while carrying or moving equipment or materials.	Check work area and intended path for water, oil, ice, frost etc. prior to handling or moving equipment/materials.	Brooms, adsorbent towels for petroleum
	Inadequate space	Pinched/crushed fingers, damaged equipment	Be sure intended pathways are adequate to accommodate material being moved, utilize alternate routes if necessary, wear hand protection	Leather gloves
	Blind corners	Running into other personnel with hand trucks or while carrying loads	Be sure all personnel working in immediate area are aware of activity, mark blind corners or announce your presence as blind corners are approached	Hazard markings such as temporary signs
Material movement	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible. Use proper lifting technique.	Lift gates, hand trucks, leather gloves
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
	Falling loads, sliding, rolling material	Crushing injury	Properly secure loose material, properly block and crib all stockpiled material. Do not stack material too high.	Cribbing, blocking
	Repetitive movement	Ergonomic injury, strains	Be aware of personal movement, even with light loads. Avoid repetitive tasks, alter activities whenever possible	Adequate number of personnel, equipment to minimize ergonomic stress

SITE: PBOW

SAFE PLAN OF ACTION
Surveying

PROJECT NO. _____

WORK AREA: Reservoir #2 Burning Ground

DATE: _____

Steps of Task	Hazard	Reaction to Failure	Safe Plan	Resources
Vehicle loading/unloading	Slippery surfaces on and around vehicle.	Slipping, falling while carrying or moving equipment.	Check loading area and vehicle surfaces for water, oil, etc. prior to moving equipment.	Adsorbent towels for petroleum
	Moving heavy or awkward equipment.	Muscle strains, back injuries.	Utilize adequate number of personnel to move equipment, use hand trucks if available. Use trucks with lift gates whenever possible.	Lift gates, hand trucks
	Unsecured equipment	Equipment flying out of vehicle, sliding forward in pick-up truck beds or bouncing around inside enclosed vehicles	Properly secure all equipment with rope and anchor points on trucks. Load heaviest equipment farthest forward in vehicle.	Rope, anchor points
Travel to/from Site	Unfamiliarity with location distracting driver	Vehicle accidents	Map out travel route and destination prior to departing, utilize a passenger to act as the navigator	Maps
	Difficult terrain	Vehicle getting damaged by trees, rocks, ruts etc.	Use proper vehicles for accessing work locations.	Four wheel drive vehicles as necessary
	General traffic hazards	Vehicle accidents	Drive defensively, use seatbelts	Seat belts for all passengers
Control point location, general surveying	Uneven ground, holes, stumps,	Slips, trips and falls	Be aware of surroundings, wear appropriate boots	Proper work boots
	Motor vehicle traffic	Pedestrian being struck by vehicle	Access vehicle and equipment from passenger side, not road side of vehicle. Wear reflective vests, set up traffic warnings as appropriate, particularly on blind corners and hills.	Reflective vests, traffic markers
	Overhead and eye hazards	Eye punctures, head lacerations, bumps	Avoid walking through wooded areas. Whenever possible, stay out of active work areas such as drill sites and areas where heavy equipment is operating. Wear hard hats and eye protection.	Hard hats, eye protection.

SPA Sign-Off Sheet

INSTRUCTIONS:
1. Prior to beginning work each day, review the global safe plan of action.
2. Conduct a walk-through survey of the proposed work area.
3. Verify potential hazards which have been identified in the global SPA are applicable, adjust accordingly.
4. Verify controls and resources are appropriate and available, adjust accordingly
5. Ask each team member, who helped review and develop this SPA, to sign in the spaces provided.

NOTE: Work shall stop when conditions change, the job changes, or a deficiency in the plan is discovered, and the current SPA will be modified or a new SPA created.

TEAM MEMBERS' SIGNATURES

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

The signature of the supervisor confirms the completion of the hazard assessment and Safe Plan of Action by the crew.

Supervisors Signature: _____ Date_____

APPENDIX II FIELD FORMS

Orientation, SWSHP and Site Specific Addendum Acknowledgement

Orientation/Training

I have been given a health and safety orientation for work to be performed during the project activities. I understand and hereby agree to abide by the general policies and procedures discussed during the orientation I received. Furthermore, I understand that failure to comply with the policies and procedures described may result in disciplinary action up to and including termination of employment or removal from the site.

Date: _____

Printed Name: _____

Signature: _____

Employee Certification

By my signature, I certify that I have been briefed, understand and will abide by the SWSHP and Site Specific Addendum for the PBOW Reservoir No. 2 Burning Ground Site.

Date: _____

Printed Name: _____

Signature: _____

Daily Tailgate Form

FACILITY
DATE TIME:
CLIENT Job Number:
SPECIFIC LOCATIONS

TYPE OF WORK

SAFETY TOPICS PRESENTED

P.P.E.
ADDITIONAL P.P.E.
CHEMICALS USED
CHEMICAL HAZARDS /SITE
EMER. PROCEDURES **Contact Site Manager or JE HSO**
HOSPITAL/CLINIC **Dial (419) 621-7100 or 911 for emergency services**
GENERAL HAZARDS:

WEATHER

SITE SPECIFIC HAZARDS

MEETING CONDUCTED BY:
MANAGER REVIEW:

Name Printed	Signature	Time Reviewed	Company

Safety Observation Report

Date: Time: Supervisor of Observer:

Observation:

Was immediate corrective action taken? Yes ☐ No ☐

Describe Immediate Corrective Action:

Describe Action to Prevent Recurrence:

Describe Indirect Cause:

Lack of Training ☐ Lack of Belief ☐ Lack of Resources ☐

Describe Suggested/Recommended Corrective Action For Indirect Cause:

Observers

Name Printed: Signature:

Name Printed: Signature:

Name Printed: Signature:

Description and Verification of Corrective Action Taken To Address Indirect Cause:

Supervisor/Manager

Name Printed: Signature: Date Completed: