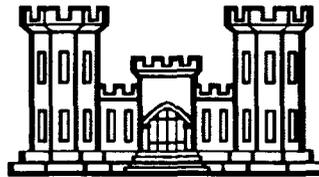


FINAL ADDENDUM TO SITE WIDE SAFETY AND HEALTH PLAN

**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:



Engineers and Constructors

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

May, 2004

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.

Sid McNeil HSE Regional Mgr
(Signature) (Discipline)
Independent Technical Review Team Member

5/5/04

(Date)

(Signature) (Discipline)
Independent Technical Review Team Member

(Date)

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(Date)

J. H. Healy HSE Manager
(Signature) (Discipline)
J&E Site Wide Safety and Health Plan Addendum Author

5/5/04

(Date)

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: All items have been addressed and incorporated into the final document as appropriate. Refer to Appendix V for the complete response to comments.

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

Virgil W. James
(Signature)
(Project Manager)

6/5/04
(Date)

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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.

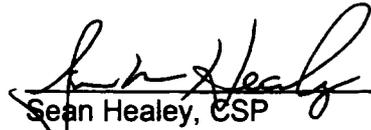
11.0 APPROVALS



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

5/5/04

Date



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

5/5/04

Date

APPENDIX I GLOBAL SAFE PLANS OF ACTION

SITE: PBOW

SAFE PLAN OF ACTION

Site Preparation- Clearing and Grubbing

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
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	<p>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.</p>	<p>PID with a 10.2 bulb Real-time aerosol monitor Modified D PPE Respiratory protection as needed</p>
	Trench cave-in, collapse.	Crushing injury, structure and equipment damage.	<p>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.</p>	<p>Fencing, caution tape, stakes, fence posts, rope.</p>

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.

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: _____

APPENDIX III

EMERGENCY INFORMATION

Emergency Numbers

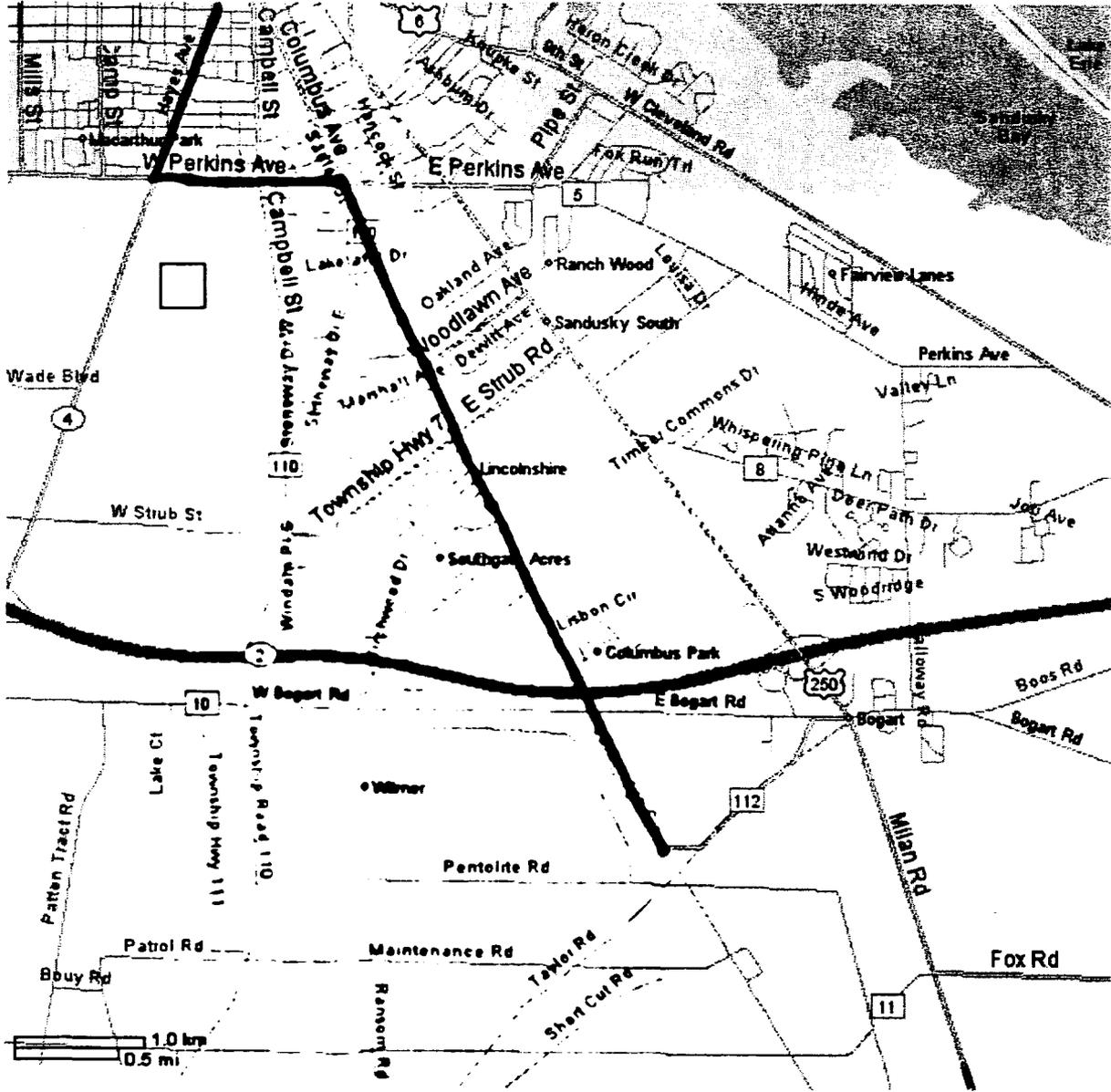
Communications Center Emergency		(419) 621-3222
NASA Guard Station		(419) 621-3226
Police Department		(419) 627-5863
Fire Department		(419) 627-5837
Hospital (Emergency Center)		(419) 626-7455
National Response Center		(800) 424-8802
Poison Control Center		(419) 626-7423
Ohio EPA Emergency Response		(614) 644-2924
Project Manager	Virgil Jansen	(865) 220-4933
Regional HSE Manager	Sid McNair	(865) 220-4829
HSE Manager	Sean Healey	(865) 220-4923

Route to hospital:

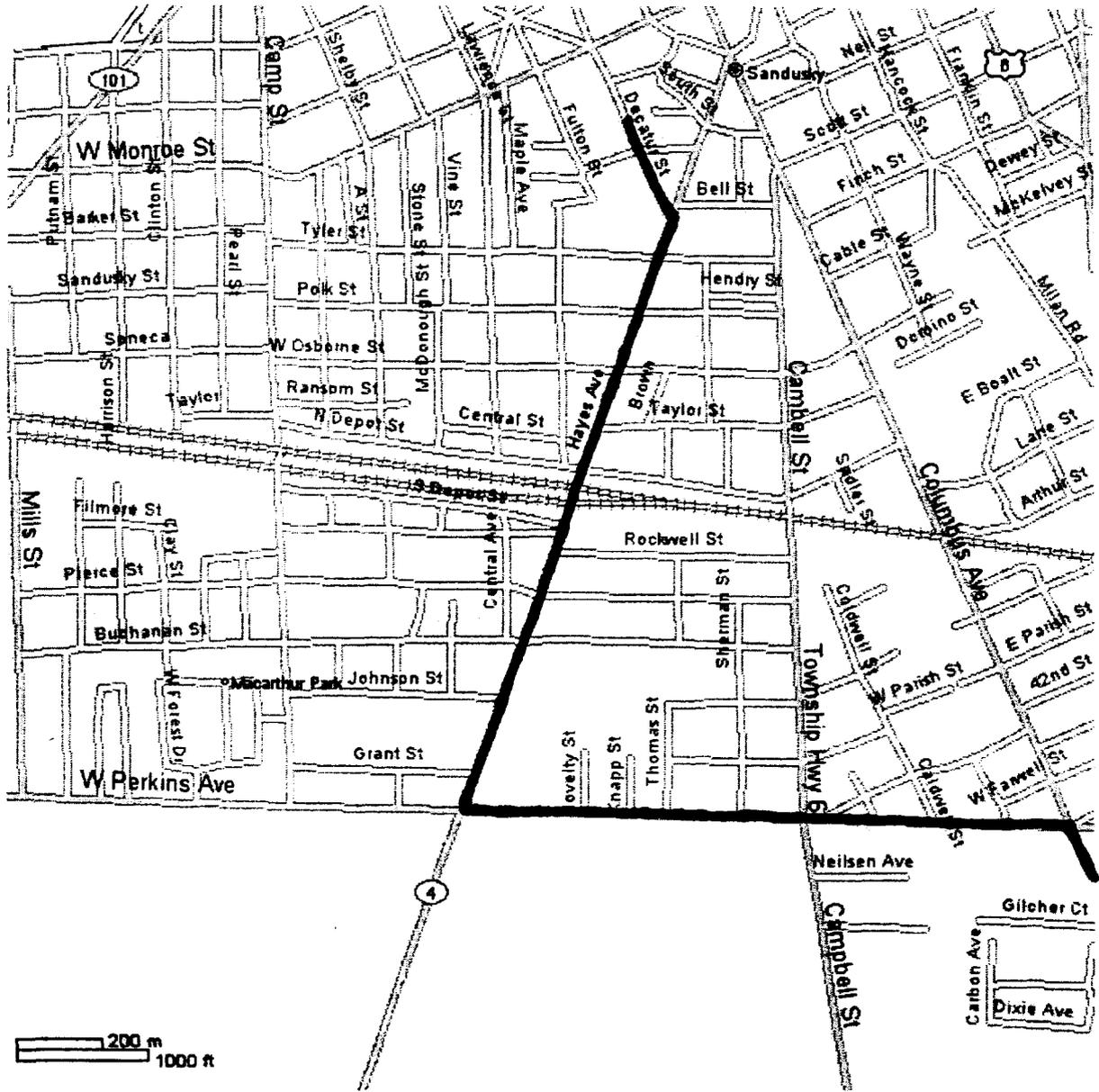
Firelands Regional Medical Center
1101 Decatur Street
Sandusky, Ohio 44870

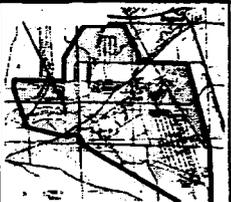
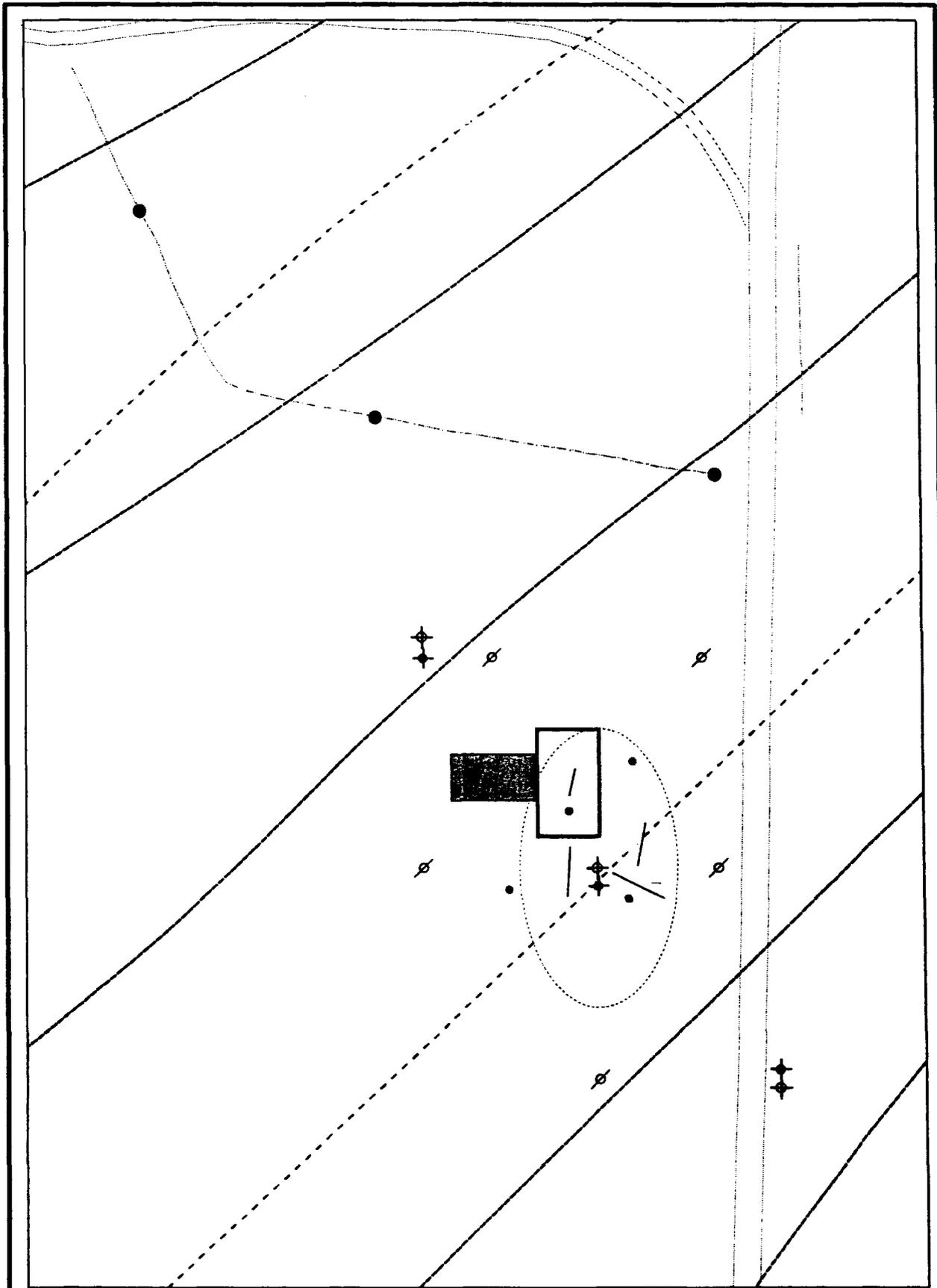
Exit from the main gate of Plum Brook Station to Taylor Road
Turn left onto Columbus Avenue
Turn left onto Perkins Avenue
Turn right (west) onto Hayes Avenue
Travel north on Hayes Avenue to Decatur
The Firelands Regional Medical Center will be on the left side.

Map from PBOW to Firelands Regional Medical Center



Map from Columbus Ave to Firelands Regional Medical Center





Typical Exclusion Zone

Typical Contamination Reduction Zone
 Note: Will be upwind or crosswind of EZ



JACOBS

Typical EZ,
 CRZ and SZ Set-up

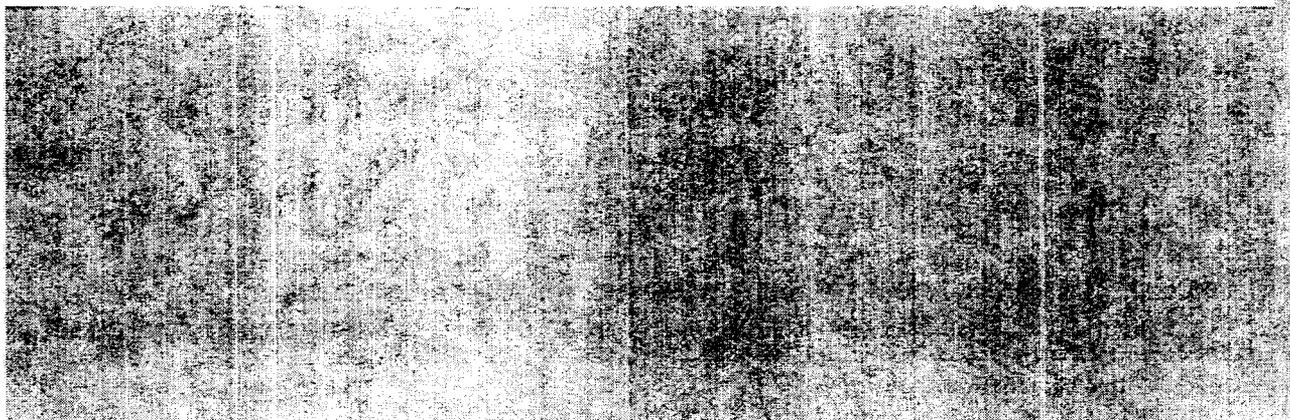
APPENDIX IV

USACE FORM 3394

1 S ty S (only)	REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT <i>(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)</i>			REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)
1. ACCIDENT CLASSIFICATION						
PERSONNEL CLASSIFICATION		INJURY/ILLNESS/FATAL		PROPERTY DAMAGE		
GOVERNMENT <input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		
<input checked="" type="checkbox"/> CONTRACTOR		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		
<input type="checkbox"/> PUBLIC		<input type="checkbox"/> FATAL <input type="checkbox"/> OTHER		<div style="border: 1px solid black; width: 100%; height: 100%; display: flex; align-items: center; justify-content: center;"> X </div>		
2. PERSONAL DATA						
a. Name (Last, First, MI)		b. AGE	c. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE		d. SOCIAL SECURITY NUMBER	
e. GRADE						
f. JOB SERIES/TITLE		g. DUTY STATUS AT TIME OF ACCIDENT		h. EMPLOYMENT STATUS AT TIME OF ACCIDENT		
		<input type="checkbox"/> ON DUTY <input type="checkbox"/> TDY <input type="checkbox"/> OFF DUTY		<input type="checkbox"/> ARMY ACTIVE <input type="checkbox"/> ARMY RESERVE <input type="checkbox"/> VOLUNTEER <input type="checkbox"/> PERMANENT <input type="checkbox"/> FOREIGN NATIONAL <input type="checkbox"/> SEASONAL <input type="checkbox"/> TEMPORARY <input type="checkbox"/> STUDENT <input type="checkbox"/> OTHER (Specify)		
3. GENERAL INFORMATION						
a. DATE OF ACCIDENT (month/day/year)		b. TIME OF ACCIDENT (Military time)		c. EXACT LOCATION OF ACCIDENT		
		hrs				
d. CONTRACTOR'S NAME						
(1) PRIME:						
(2) SUBCONTRACTOR:						
e. CONTRACT NUMBER		f. TYPE OF CONTRACT		g. HAZARDOUS/TOXIC WASTE ACTIVITY		
<input type="checkbox"/> CIVIL WORKS <input type="checkbox"/> MILITARY <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> SERVICE <input type="checkbox"/> A/E <input type="checkbox"/> DREDGE <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> SUPERFUND <input type="checkbox"/> DERP <input type="checkbox"/> IRP <input type="checkbox"/> OTHER (Specify)		
4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see help menu)						
a. CONSTRUCTION ACTIVITY (CODE)			b. TYPE OF CONSTRUCTION EQUIPMENT (CODE)			
#			#			
5. INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items e, f & g - see help menu)						
a. SEVERITY OF ILLNESS/INJURY (CODE)		B. ESTIMATED DAYS LOST		C. ESTIMATED DAYS HOSPITALIZED		
#						
D. ESTIMATED DAYS RESTRICTED DUTY						
e. BODY PART AFFECTED (CODE)		g. TYPE AND SOURCE OF INJURY/ILLNESS				
PRIMARY #		TYPE (CODE) #				
SECONDARY #		SOURCE (CODE) #				
f. NATURE OF ILLNESS / INJURY (CODE)						
#						
6. PUBLIC FATALITY (Fill in line and correspondence code number in box - see help menu)						
a. ACTIVITY AT TIME OF ACCIDENT (CODE)		b. PERSONAL FLOATATION DEVICE USED?				
#		<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A				
7. MOTOR VEHICLE ACCIDENT						
a. TYPE OF VEHICLE		b. TYPE OF COLLISION		c. SEAT BELTS		
<input type="checkbox"/> PICKUP/VAN <input type="checkbox"/> AUTOMOBILE <input checked="" type="checkbox"/> TRUCK <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> SIDE SWIPE <input type="checkbox"/> HEAD ON <input type="checkbox"/> REAR END <input type="checkbox"/> BROADSIDE <input type="checkbox"/> ROLL OVER <input type="checkbox"/> BACKING <input type="checkbox"/> OTHER (Specify)		(1) FRONT SEAT <input type="checkbox"/> USED <input type="checkbox"/> NOT USED <input type="checkbox"/> NOT AVAILABLE (2) REAR SEAT <input type="checkbox"/> USED <input type="checkbox"/> NOT USED <input type="checkbox"/> NOT AVAILABLE		
8. PROPERTY/MATERIAL INVOLVED						
a. NAME OF ITEM		B. OWNERSHIP		C. \$ AMOUNT OF DAMAGE		
(3)						
9. VESSEL/FLOATING PLANT ACCIDENT (Fill in line and correspondence code number in box from list - see help menu)						
a. TYPE OF VESSEL/FLOATING PLANT (CODE)			b. TYPE OF COLLISION/MISHAP (CODE)			
#			#			
10. ACCIDENT DESCRIPTION (Use additional paper, if necessary)						

See attached page.

11. CAUSAL FACTOR(S) (Read Instruction Before Completing)			
a. (Explain YES answers in item 13) DESIGN: Was design of facility, workplace or equipment a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO OPERATING PROCEDURES: Were operating procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred? <input type="checkbox"/> YES <input type="checkbox"/> NO HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO		a. (CONTINUED) CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task? <input type="checkbox"/> YES <input type="checkbox"/> NO PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO	
12. TRAINING			
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? <input type="checkbox"/> YES <input type="checkbox"/> NO	b. TYPE OF TRAINING. <input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB	c. DATE OF MOST RECENT FORMAL TRAINING. (Month) (Day) (Year)	
13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)			
a. DIRECT CAUSE See attached page.			
b. INDIRECT CAUSE(S) See attached page.			
14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S). DESCRIBE FULLY: See attached page.			
15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.			
a. BEGINNING (Month/Day/Year)		b. ANTICIPATED COMPLETION (Month/Day/Year)	
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT CORPS _____ CONTRACTOR _____		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div, Br, Sect)
f. OFFICE SYMBOL			
16. MANAGEMENT REVIEW (1st)			
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS			
SIGNATURE		TITLE	DATE
17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)			
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS			
SIGNATURE		TITLE	DATE
18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW			
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS			
SIGNATURE		TITLE	DATE
19. COMMAND APPROVAL			
COMMENTS			
COMMANDER SIGNATURE			DATE



10.

ACCIDENT DESCRIPTION *(Continuation)*

13a.

DIRECT CAUSE *(Continuation)*

13b.

INDIRECT CAUSES *(Continuation)*

14.

ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

APPENDIX V

RESPONSE TO COMMENTS

Site Wide Health and Safety Plan Addendum Comments

Review Number 69051

Date: 19 Mar 04

1. Page A-II Site Preparation – Clearing and Grubbing and Page A-XIII Surveying. See my first comment on the Site Wide Safety and Health Plan. If these activities are managed properly they will not cause workers to be exposed to contaminant-related hazards and as a result do not require workers to be enrolled in a 29 CFR 1910.120 compliant medical surveillance program or meet 29 CFR 1910.120 training requirements. Look into hiring local subcontractors with the technical qualifications to do the work if it is practical and cost effective for this project.

The addendum does not require those workers not "...entering designated contamination reduction zones, exclusion zones or any areas where potential chemical hazards associated with the site exist" to meet the requirements of 29 CFR 1910.120.

2. Page A-V Exploratory Trenching, Page A-VI Monitoring Well Installation, Page A-VIII Monitoring Well Development, Page A-IX Groundwater Sampling. See my second comment on the Site Wide Safety and Health Plan. USACE expects the safety and health manager (SHM) (Sean Healey) to specify monitoring equipment and develop action levels that are protective and as much as possible, cost effective for the tasks to be performed. The action levels and monitoring equipment specified here are the generic ones specified in the Site Wide Safety and Health Plan and may (or may not) be protective and cost effective for trenching, monitoring well installation and development and groundwater sampling activities in the Reservoir No. 2 Burning Ground. Mr. Healey is supposed to provide a site specific review to assure that specified monitoring equipment will detect the chemicals that may volatilize from the activities in the burning ground (if there are chemicals that will volatilize) and that the action levels are protective but don't require Level C upgrades until it is necessary. It is not appropriate to apply generic site-wide action levels across the board even if they are conservative. They must also be cost effective and efficient.

A task-by-task, site specific review was done by the HSM. Requirements for each task have been outlined in the applicable Safe Plans of Action. In some instances the requirements mirror those specified in the SWSHP, however they have been deemed appropriate by the HSM.

As many of these activities are investigative, the HSM feels it is appropriate occupational health and safety practice to start personal protective equipment and action levels conservatively and adjust requirements as the site becomes better characterized. Cost and efficiency considerations will be addressed as soon as possible, but only after adequate worker protection has been verified.

As this is a fixed price contract, Jacobs accounted for these considerations when planning the activity.

Review dated 26 March 04

1. Cover: Please indicate draft or final on each document, and include a copy of the cover letter with each copy.

The appropriate document markings (Draft, Final, etc.) will be included on future documents.

The appropriate document markings (Draft, Final, etc.) will be included on future documents.

2. Completion of Independent Technical Review. It might be more appropriate to have Virgil Jansen sign the review page as Project Manager Review, rather than the independent technical review. Also, it may be appropriate to have the author sign with his/her discipline.

Reviewers discipline will be added to the ITR form.

3. General: There needs to be an "easy access" page in every site-specific safety and health plan which contains a map with route clearly marked to the hospital and emergency contact information. Included in the emergency phone numbers should be the NASA Guard Station 419-621-3226.

A route map to the hospital will be included with the written directions currently present.

4. General Map: In every SSHP, include a map of the facility that shows accessible roads and clearly marked NASA Guard Station, so in an emergency, the on-site workers will know how to exit the facility quickly.

A general area map will be added to the plan.

5. Chemical Hazard: Add a Res. #2 BG site-specific chemical hazard list.

All chemicals which exceeded the RBC in the initial site investigation of the Reservoir No. 2 Burning Ground were included in the SWSHP.

6. PPE selection: It might be appropriate to add the same table as it appears in the Site-Wide SHP Section 5.2.6 Selection of PPE, or a site-specific table, to let field workers know what level is appropriate in which task. For example, it is unclear whether respirators are needed for each task or not.

PPE requirements are identified on a step-by-step, task level basis on the Safe Plans of Action for each planned activity. Workers will be required to review these Safe Plans of Action prior to starting each activity and sign-off on the document stating they have understood the requirements.

7. Include a drawing and supporting text for the work zones specific to this site. EZ and CRZ should be clearly marked, and the support zone must be off the roadways.

A drawing and supporting text of proposed work areas, EZ, CRZ and SZ will be included in the addendum.

8. Accident Report Form: The USACE accident report form should be attached as an appendix to every SSHP.

The USACE accident form will be added as an appendix to the document.