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PHILIP ENVIRONMENTAL

Environmental Services Group
North Central Region

October 1, 1997
Project 17246

Mr. Andy Frierdich
Project Manager
Illinois Environmental Protection Agency
Bureau of Land
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

RECEIVED
OCT 0 2 1997
IEPA/BOL

Dear Andy:

Subject: Planning Documents for Champaign MGP IRMs

At the request of Brian Martin of Illinois Power Company, six copies of the Work Plan and the Ambient Air Monitoring Plan for the Interim Remedial Measures (IRMs) at the Champaign former manufactured gas plant (MGP) are enclosed for your review. Also enclosed for your information are six copies of the Health and Safety Plan for this project.

The purpose of the IRMs is to remove the source of coal tar contamination from the underground structures at the site, to plug the abandoned storm sewer that crosses the property, and to remove the purifier waste from the subsurface. Exploratory backhoe pits may be excavated to locate potential underground structures and to improve our understanding of subsurface conditions.

Illinois Power is seeking the Agency's approval for this phase of the project before the waste excavation begins. The enclosed documents are for the IRMs only. They are not intended to meet the requirements of a remedial action plan under 35 IAC 740.450. Follow-up documents for this project will address the Site Remediation Program's requirements for a No Further Remediation letter.

Please provide your comments to Brian Martin, Illinois Power Company, 500 South 27th Street, Decatur, Illinois 62525 at your earliest convenience. If you have any questions during your review, please direct them to Brian Martin at (217) 424-7525.

ORIGINAL

SCREENED MM

PHILIP ENVIRONMENTAL SERVICES CORPORATION
210 West Sand Bank Road • P.O. Box 230 • Columbia, IL 62236-0230
(618) 281-7173 • (800) 733-7173 • Fax (618) 281-5120

Thank you for your assistance.

Sincerely yours,
PHILIP SERVICES CORPORATION

Darrel E. Wolff, P.E.

/vgc/WPCVRLTR.DOC

Enclosure: Six Copies of Champaign MGP IRMs Source Removal Work Plan, Ambient Air Monitoring Plan, and Health and Safety Plan

cc: Brian H. Martin

PHILIP SERVICES CORP.

HEALTH & SAFETY PLAN
Illinois Power Company
Interim Remedial Measures, Source Removal and Demolition
Champaign, Illinois

PLAN APPROVAL NUMBER: COL -097-020 **DATE:** September 16, 1997
PROJECT NUMBER: 17246

1.0 PURPOSE

The purpose of this Health and Safety Plan (HASP) is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during site operations. This Plan must be read prior to going into the field to ensure proper planning (e.g., availability of equipment, etc.) and the "Plan Acceptance Form" must be signed by applicable PSC-ISG employees.

In addition to this Health and Safety Plan, the following additional documents must be included in this Plan prior to the start of field work:

Training/Medical records for all on-site employees:

- HAZWOPER 8 Hour Refresher Certificate (Current - i.e, within last 12 months);
- HAZWOPER 8 Hour Supervisor Certificate (If applicable);
- Medical Clearance Certificate (e.g., from last annual/biennial physical);
- First Aid/CPR Certification (Current).

For those who may be required to wear an air purifying respirator:

- Current Respirator Fit Test Record;
- Medical Clearance to wear a respirator (this is normally noted on the Summary Profile for the annual physical).

Other training requirements are as follows:

_____Hydrogen Sulfide (TRC Rule 36)
_____DOT Hazardous Materials Shipping
_X_ Excavation - Competent Person
_____Confined Space Entry
_____NORM Certification

ORIGINAL

2.0 APPROVALS

Project Manager: _____ Date: _____
EH&S Director: Karlene Mentink for Thomas McGill Date: 9/17/97

3.0 FIELD PERSONNEL

The field team will consist of the following persons:

Project Manager:	Darrel Wolff (Columbia)
Site Safety Coordinator:	Buck Tomasko (Columbia)
PSC-ISG Field Personnel:	Gary Schnell (Air monitoring) Buck Tomasko (Remediation Supervisor/SSO) Irv Van Zummeren (Columbia) Stu Cravens (Columbia) Others to be named later and listed below: _____ _____ _____ _____
PSC-ISG Subcontractors:	Grantham and Beelman Trucking Companies

PSC-ISG subcontractors will be required to comply with all applicable local, state, and federal environmental health & safety regulations. The subcontractor must sign the Subcontractor Statement of Compliance Form for all onsite employees before site work begins.

4.0 PROJECT DESCRIPTION

The site is located at 308 North Fifth Street (East of Intersection at Hill Street and Fifth Street), Champaign, Illinois. Refer to Figure 1 for a site/hospital location map.

Specifically, PSC-ISG will perform the following tasks:

- Excavate coal-tar contaminated fill;
- Excavate several exploratory trenches;
- Blend and solidify coal tar waste with quick lime on site;
- Load solidified coal-tar waste onto trucks;

- Pump contaminated water into above ground storage tanks to await testing and subsequent disposal;
- Backfill with clean fill;
- Site restoration.

5.0 HAZARD EVALUATION

ENTRY INTO THE GAS HOLDER OR TAR WELLS MAY BE REQUIRED TO TEST THE BACKFILL. NO ENTRY IS PERMITTED UNTIL ALL CONTAMINATED MATERIALS HAVE BEEN REMOVED. THESE EXCAVATIONS WILL BE TREATED AS NON-PERMIT CONFINED SPACES; SEE THE ATTACHED CONFINED SPACE ENTRY PROCEDURE IN THE APPENDIX. PRIOR TO ENTRY, IF THE WALLS OF THE EXCAVATION ARE NOT STABLE AS DECIDED BY A QUALIFIED ENGINEER, THE SIDE WILL BE SLOPED OR SHORED TO ALLOW SAFE ENTRY. REFER TO "EXCAVATION SAFETY" IN THE APPENDIX.

Tool and/or equipment decontamination will be conducted in accordance with standard decontamination procedures described in the Philip Environmental Health & Safety Manual.

Excavation activities will be conducted in accordance with Excavation Safety Procedures which are included in the Appendix.

In general, field work will be conducted during daylight hours only. At least two personnel will be in the field at all times. The Project Manager or PSC-ISG Health & Safety Director must grant special permission for any field activities conducted beyond daylight hours.

5.1 WASTE TYPES POTENTIALLY ENCOUNTERED

The primary contaminants of concern (COCs) are listed below:

- Benzene
- Ethylbenzene
- Xylene
- Toluene
- Polynuclear aromatic hydrocarbons [PAHs]

Strong Irritant:	__X__	Ignitable:	__X___	Radioactive:	_____
Volatile:	__X___	Toxic:	__X___	Reactive:	_____
Unknown:	_____				

The primary route(s) of exposure are __Inhalation, Skin/Eye Contact, Skin Absorption__

The exposure limits, recognition qualities, acute and chronic effects, and first aid treatments for hazardous chemicals expected to be found at the site are presented in Table 1 (Exposure Limits and Recognition Qualities) and Table 2 (Health Hazards and First Aid).

5.2 EXPOSURE MONITORING

Exposure monitoring __X__ will ____ will not be required for this project. If required, the type,

frequency, and details related to this monitoring are provided in Table 3. Instrumentation required for this monitoring is as follows:

_____	Explosimeter
_____	Oxygen Meter
_____	Hydrogen Sulfide Meter
__X__	Lasr Dust Monitor
__X__	Photoionization Detector (PID)
_____	Flame Ionization Detector (FID)
__X__	Detector Tube: Capable of reading < 1 ppm benzene; Recommend 'Benzene in Aromatics' Sensidyne tube 121SL

Exposure monitoring will be performed only by personnel who are familiar with the proper use and limitations. Instruments will be calibrated prior to use in accordance with manufacturer's recommendations. A log of this calibration shall be maintained on the "Equipment Calibration Log Form" provided in the "FORMS" section of this HASP. Air monitoring results will either be logged in the field log book or using the "Air Monitoring Data Form" provided in the "FORMS" section.

5.3 INITIAL LEVEL OF PROTECTION

This project will be initiated using the following initial level of protection (changes will be made as appropriate by the SSO when action levels dictate - see Table 3):

Level A _____ Level B _____ Level C _____ Level D __X__

Level of Protection	Protective Equipment Ensemble
D	*Coveralls or work clothes* • Impermeable coveralls required when in contact with waste materials: - **PVC**, or - **Polycoated Tyvek** *Work gloves (as needed)* • Impermeable gloves and inner gloves required when in contact with waste materials: - **PVC** (inner) - **Nitrile** (outer) *Safety boots, leather, steel toe* • **Rubber (latex) overboots** for incidental contact with waste materials to protect leather work boots -or- • **16 inch PVC boots** with steel toe and shank for

extended contact

Safety glasses
- **Splash goggles** required for incidental eye contact with liquid chemicals or contaminants

Hard hat

Hearing protection (when in proximity to heavy equipment or other noise generating sources)

Orange safety vest

C

Air purifying respirator (half face or full face) with **HEPA, Organic Vapor/Acid Gas** cartridges

Chemical resistant coveralls
- **PVC,**
- **Polycoated Tyvek** or
- **Saran** disposables

Hard hat

Inner and outer chemical resistant gloves (**PVC** inner and **Nitrile** outer)

16 inch PVC boots with steel toe and shank, or
- Leather boots, steel toe with rubber outer boots

Hearing protection (when in proximity to heavy equipment or other noise generating sources)

Orange safety vest

The types of monitoring instruments used, as well as the action levels to upgrade personal protection are shown on Table 3, Hazard Monitoring Methods, Action Levels, and Protective Measures.

5.4 SITE CONTROL

To prevent the accidental spread of contaminants, as a minimum, three zones will be delineated on the site:

Exclusion Zone (EZ) The exclusion zone will encompass the construction area and will be

demarcated with red "DANGER - DO NOT ENTER" barrier tape. Only authorized personnel may enter this area wearing the specified level of protection.

Contamination Reduction Zone (CRZ) The contamination reduction zone will consist of a lane into and out of the EZ which will adequately accommodate decontamination station(s) as necessary. Access and egress for each EZ will only be allowed through the CRZs. Only authorized personnel wearing the specified level of protection may enter this area.

Support Zone (SZ) The support zone will be located beyond the CRZ and will include the remaining portions of the site. No specific project-related personal protective equipment (PPE) is required in this zone.

5.5 HAZARDS ANALYSIS FOR SITE TASKS

5.5.1 Chemical Hazards

Varying levels of contaminants listed in section 5.2 and 5.3 may be present in soils. Coal tar is very irritating to the skin and eyes; direct skin contact should always be avoided. Constituents in coal tar have also been linked to certain types of cancer - in particular, skin cancer and leukemia. Refer to Tables 1 and 2 for additional information.

5.5.2 Fire and Explosion Hazards

The potential for encountering soils saturated with product (i.e., coal tar) exists; consequently, a fire hazard also exists for this project. Gasoline and LP gas are very flammable and, if used, must be handled safely. Most fuel gases and vapors are heavier than air and may accumulate in low lying areas under certain conditions. All possible sources of ignition should be eliminated in the exclusion zone.

Based on the preceding information, a "Hot Work Permit"_____will _X_will not be required on this project. Instrumentation/Action Level guidelines as specified in Table 3 must be followed.

5.5.3 Physical Hazards

Physical hazards such as slips, trips, and falls may occur. Workers must walk cautiously at a site to avoid tripping, especially when uneven terrain is present. Falls are more serious when they occur from heights. Extra precautions must be taken if guardrails or railings are absent. Ladders used for access to a high place should be securely lashed or otherwise fastened at the top to prevent sliding and the feet must be on a firm and level base. Workers can be struck by vehicles used at a site. While driving in reverse, the operator usually has a more limited field of view than while driving forward and must observe extra caution. Such vehicles must be equipped with a backup alarm to warn workers that the vehicles are moving in reverse.

Material Handling: Accidents in manual handling of materials are primarily the result of unsafe working habits--improper lifting, carrying too heavy a load, incorrect gripping, or failing to wear personal protective equipment. These may be avoided by testing the weight of an object before

attempting to lift and carry it. If it is too heavy, get help, and if possible, use mechanical lifting aids.

The proper method for lifting is:

- Get a good footing
- Place feet about shoulder width apart
- Bend knees to pick up load; Never bend from waist
- Keep back straight
- Get a firm hold. Grasp opposite corners of the load, if possible
- Keep the back as upright as possible
- Lift gradually by straightening the legs– don't jerk the load
- Keep the weight as close to the body as possible
- When changing directions, turn the entire body, including the feet
- Don't twist the body

5.5.4 Biological Hazards

Biological hazards may include venomous snakes, insects, animals (rabid) and allergenic plants. Information on biological hazards found in the PSC-ISG Health & Safety Manual should be reviewed by site personnel prior to beginning work.

5.5.5 Electrical Hazards

Utility clearance will be performed prior to any soil penetration activities. The "Utilities and Structures Checklist" form in the Appendix shall be completed prior to soil penetration activities. The work area will be inspected to verify no possibility of contact with overhead utilities. A buffer zone of at least 20 feet from overhead utilities must be maintained.

Any electrical power tools must be connected to GFCI (ground fault circuit interrupter) protected circuits. All power cords must be inspected for damage prior to use.

5.5.6 Heat/Cold Stress

Exposure to high/low temperatures may occur during field activities. Precautions will be implemented by the SSO as described in the procedure found in the PSC-ISG Environmental Health & Safety Manual. Monitoring procedures as described in this procedure shall be implemented as required.

5.5.7 Noise Hazards

Hearing protection is required for work performed adjacent to operating heavy equipment or other noise generating sources.

5.5.8 Permits

Based on the type of work being performed, no special health & safety permits are required.

5.5.9 Other Hazards

PSC-ISG staff shall stay out of the operating range of any heavy equipment on site. The "operating range" is defined as the swing zone plus 25 feet. Entry into the operating range is allowed only after the operator's attention has been gained and all buckets or extensions have been grounded.

PSC-ISG employees will not enter any excavations or confined spaces for the duration of this project. Any sampling of soils within areas which have been excavated deeper than 4 feet will be done from the excavator bucket after the operator has grounded the bucket and given authorization for personnel to approach his machine.

PSC-ISG employees will be required to wear orange reflective safety vests when in close proximity to roadways and operating heavy equipment.

5.6 HAZARD COMMUNICATION

The following chemicals will be used on site for this project. Material Safety Data Sheets (MSDSs) are attached to this plan.

Alconox	X
Diesel	X
Gasoline	X
Isobutylene Span Gas	X
Quick Lime	X

5.7 HAZARDOUS MATERIALS SHIPPING

The shipping of identified hazardous materials shall be done in accordance with applicable DOT regulations, as appropriate.

6.0 EMERGENCY INFORMATION

6.1 EMERGENCY CONTACTS

Contact	Person or Agency	Telephone No.
Police		911
Fire		911
Ambulance		911
Hospital	Covenant Medical Center	337-2000
PSC-ISG Project Manager	Darrell Wolff	618-281-7173
PSC-ISG Environmental Health & Safety Director	Thomas M. Covilli, CIH (Columbia, IL)	(618) 281-7173 ext. 7413 (Sky Pager) 800-759-8888 Pin #249-8278

6.2 LOCATION OF SITE RESOURCES

Water Supply: Hauled on-site if not available.

Telephone: Mobile cellular telephone required if onsite access is not available.

Toilet: Local, readily available toilets will be used if facilities on-site are not available.

6.3 LOCATION OF HOSPITAL/CLINIC

The Hospital is located at 1400 W. Park, Urbana, Illinois 61801

A Hospital Location Map is attached as Figure 1.

6.4 EMERGENCY MEDICAL TREATMENT PROCEDURES AND BLOODBORNE PATHOGEN EXPOSURES

6.4.1 Emergency Medical Treatment

Any person who becomes ill or injured in the Exclusion Zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and

redressing in clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics. First aid kits will have gloves and artificial airways to protect against bloodborne pathogens, and personnel who have come into contact with bodily fluids such as blood or saliva will immediately confer with the PSC-ISG Environmental Health & Safety Director to determine whether inoculation or other action is necessary. All injuries and illnesses must be reported immediately to the Project Manager.

Personnel who are transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to at the site. This information is included in Table 1, Exposure Limits and Recognition Qualities.

Any vehicle used to transport contaminated personnel will be treated and cleaned, as necessary.

6.4.2 Bloodborne Pathogens

For purposes of this health and safety plan, employees have jobs where required tasks normally do not but could involve exposure to blood, bodily fluids, or tissues--for example, in the event first aid or CPR is required. If exposure to blood, bodily fluids, or tissues occurs, Universal Precautions, as described in the PSC-ISG Health & Safety Manual, should be followed to minimize the chance of contracting disease and the "Bloodborne Pathogens Incident Evaluation Form" must be completed and submitted.

7.0 MISCELLANEOUS

POSTING OF OSHA POSTER FOR PRIVATE INDUSTRY FORM

Required _____ Not Required __X__

ADDITIONAL REQUIRED EQUIPMENT TO BE TAKEN INTO FIELD

- First aid kit (with eye wash)
- OSHA-required Bloodborne Pathogens Infection Protection Packs
- Instrumentation as specified in Section 5.5
- Equipment calibration gas/supplies
- Orange reflective vests
- Barricade tape
- Fire extinguisher - 5lb ABC
- Decon supplies (Alconox, wash tubs, brushes, containers for waste)

7.3 WORKER TRAINING RECORDS

Worker Training Records are required on site. They are also on file in the PSC-ISG Columbia, Illinois office.

7.4 SITE SAFETY MEETINGS

Site safety meetings will be conducted prior to each shift by the SSO and documented using the "Site Safety Meeting Record" (FORMS section).

7.5 FIELD FORMS TO BE USED

Copies of the following forms will be completed in field:

- Subcontractor Statement of Compliance Form
- Equipment Calibration Log
- Air Monitoring Data Log
- Site Safety Meeting Record
- Utilities and Structures Checklist

Copies of the following forms will be available with the HASP and used, if applicable:

- Bloodborne Pathogens Incident Evaluation Form
- Supervisor's Accident/Injury Investigation Report

TABLES

TABLE 1
EXPOSURE LIMITS AND RECOGNITION QUALITIES

COMPOUND	EXPOSURE STANDARDS			SKIN ABSORBED	RECOGNITION QUALITIES		
	TLV/PEL (ppm)	STEL ((ppm)	IDLH (ppm)		ODOR THRESHOLD (ppm)	LEL (%)	IONIZATION POTENTIAL (ev)
Benzene	1.0	–	3,000	–	12	1.30	9.24
Coal tar pitch volatiles	0.2 *	–	700	–	varies	–	–
Ethyl benzene	100.0	125	2,000	–	2.3	1.00	8.76
Toluene	100.0	150	2,000	–	2.9	1.20	8.82
Xylenes	100.0	150	1,000	–	1.1	1.00	8.56

TLV/PEL = The more stringent of either the American Conference of Governmental Industrial Hygienist' (ACGIH) threshold limit value or the Occupational Safety and Health Administration (OSHA) permissible exposure limit.
STEL = Short term exposure limit based on a 15 minute time weighted average.
IDLH = Immediately dangerous to life and health.
ppm = Parts per million
LEL = Lower explosive limit
* = Milligrams per cubic meter

TABLE 2
HEALTH HAZARDS AND FIRST AID

COMPOUND	SYMPTOMS	TARGET ORGANS
Benzene	Irritated nose & respiratory system, giddy, headache, nausea, staggered gait, fatigue, anorexia, lassitude, dermatitis, bone marrow depression, carcinogen	Blood, central nervous system, skin, bone marrow, eyes, respiratory system
Coal tar pitch volatiles	Dermatitis, bronchitis, carcinogen	Respiratory system, bladder, kidneys, skin
Ethyl benzene	Irritated mucous membranes, headache, dermatitis, narcosis, coma	Eyes, upper respiratory system, skin, central nervous system
Toluene	Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, muscle fatigue, insomnia, dermatitis	Central nervous system, liver kidneys, skin
Xylenes	Dizziness, excitement, drowsiness, incoherent staggering gait, irritated nose & throat, anorexia, nausea, vomiting, abdominal pain, dermatitis	Central nervous system, eyes, gastrointestinal tract, blood, liver, kidneys, skin

NOTE: General First Aid Treatment

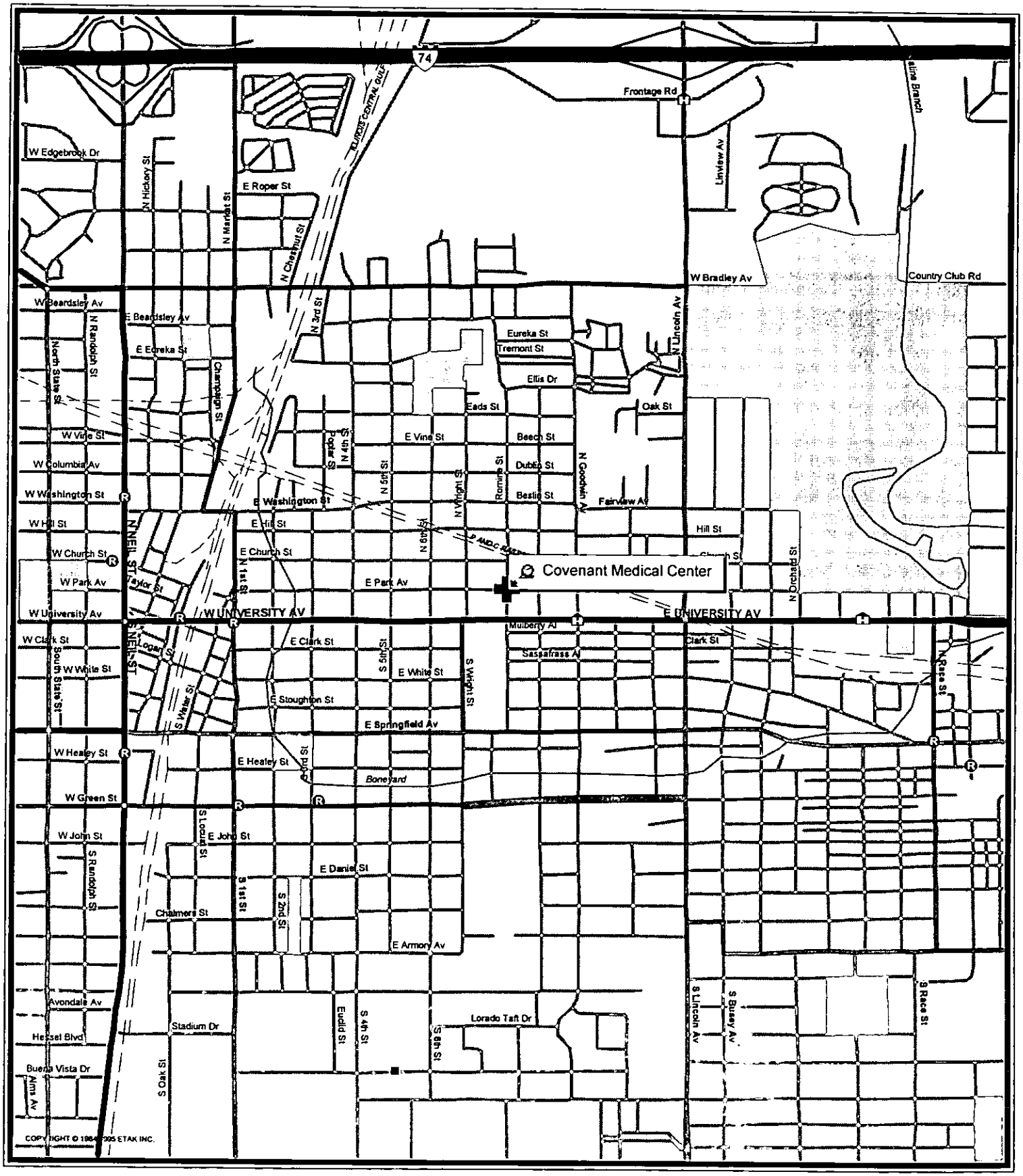
Eye:	**IRRIGATE IMMEDIATELY**
Skin:	**SOAP WASH PROMPTLY**
Inhalation:	**MOVE TO FRESH AIR**
Ingestion:	**GET MEDICAL ATTENTION**

TABLE 3
HAZARD MONITORING METHODS, ACTION LEVELS, AND PROTECTIVE MEASURES

HAZARD	MONITORING METHOD	ACTION LEVEL	MONITORING SCHEDULE	PROTECTIVE MEASURES
Organic vapors	PID (with 10.2ev lamp)	Up to 5 ppm above background in the breathing zone	Periodically (every 30 minutes) during invasive field activities	Level D
		5-50 ppm	Periodically (every 30 minutes) during invasive field activities	Level C
		>50 ppm	Periodically (every 30 minutes) during invasive field activities	Level B or EVACUATE AREA
Dust	Laser Dust Monitor	< 5 mg/m^3	Periodically during blending activities using quick lime	Level D
		5-10 mg/m^3		Level C
		> 10 mg/m^3		STOP BLENDING OPERATIONS; IMPLEMENT DUST SUPPRESSION MEASURES
Explosion	CGI	< 5% LEL	Continue investigation	
		> 5% LEL	Explosion hazard. Ventilate until levels fall below 5% or inert tank in accordance with attached Confined Space Entry Procedure.	

FIGURES

Current Map



FORMS

BLOODBORNE PATHOGENS INCIDENT EVALUATION FORM

Employee Name: _____
Office/Location: _____
Date: _____ Time: _____ a.m./p.m.

Circumstances: Supervisor's Assessment of the Following Control Measures Used at the Time of the Exposure (see definition below):

Route of Exposure: _____
_____
_____

Engineering: _____
_____
_____

Work Practice: _____
_____
_____

Personal Protective Equipment: _____
_____
_____

Reason for Failure of the Control Measures or Failure to Comply with Recommended Protective Measures:
_____
_____
_____

Measures Taken to Minimize Reoccurrence of Incident: _____
_____
_____
_____

Supervisor's Signature: _____

Definitions:

Exposure Incident: a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that result from the performance of an employee's duties.
Engineering Controls: controls (e.g., sharps, disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.
Work Practice Controls: controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).
Personal Protective Equipment is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes not intended to function as protection against a hazard are <u>not</u> considered to be personal protective equipment.

PHILIP ENVIRONMENTAL

HEALTH & SAFETY PLAN ACCEPTANCE FORM

INSTRUCTIONS: This form is to be completed by each PSC-ISG employee to work on the subject project work site.

Project Name: _____

Project Number: _____

Date: _____

I represent that I have read and understand the contents of the above Plan and agree to perform my work in accordance with it. I further more acknowledge that I have been made aware of OSHA Hazard Communication Requirements for this project and Department of Labor Postings.

Name (Print)	Signature	Date

PHILIP ENVIRONMENTAL SERVICES CORPORATION
SUPERVISOR'S ACCIDENT/INJURY INVESTIGATION REPORT

ACCIDENT TYPE: INJURY _____ VEHICLE _____ PROPERTY _____ NEAR MISS _____

NAME OF INJURED PERSON:

_____

DEPARTMENT TO WHICH INJURED PERSON IS ASSIGNED:

_____

LENGTH OF EMPLOYMENT:

_____

LENGTH OF TIME ON JOB ON WHICH PERSON WAS INJURED:

_____

LOST TIME: YES: _____ NO: _____

DATE OF ACCIDENT:_____ DATE INJURY REPORTED: _____

TIME OF ACCIDENT: _____ AM OR PM DAY OF WEEK: _____

DOCTOR TREATED: _____ FIRST AID ONLY: _____

NAME OF HOSPITAL OR CLINIC:

_____

EXACT LOCATION AT WHICH ACCIDENT OCCURRED:

_____

SUPERVISOR OF INJURED EMPLOYEE:

_____

WITNESS:

_____

WAS THE SCENE OF THE ACCIDENT INVESTIGATED BEFORE COMPLETING THIS REPORT?

YES: _____ NO: _____

EMPLOYEE'S DESCRIPTION OF ACCIDENT AND SUPERVISOR'S COMMENTS: _____

_____

_____

_____

_____

_____

Body Part Affected

_____ Head, Face
_____ Eye(s) R L
_____ Neck, Shoulder
_____ Arms, Elbows R L
_____ Wrist, Hands R L
_____ Thumbs, Fingers R L
_____ Back
_____ Chest, Lower Trunk
_____ Ribs
_____ Hips
_____ Legs/Knee R L
_____ Foot/Toes R L

Type of Injury

_____ Burn
_____ Cut
_____ Strain, Sprain
_____ Fracture
_____ Amputation
_____ Bruise
_____ Foreign Body
_____ Abrasion
_____ Glass Cut
_____ Other _____

DESCRIBE UNSAFE ACT OR UNSAFE CONDITION INVOLVED. IDENTIFY BY CHECKING (✔) APPROPRIATE LINES BELOW. **CHECK ALL UNSAFE ACTS INVOLVED (CHECK ONE OR MORE).**

_____ Working without Authority
_____ Assuming Hazardous Position
_____ Failure to Lock Out Equipment
_____ Making Safety Devices Inoperative
_____ Unsafe Piling of Materials
_____ Unsafe Material Handling
_____ Horseplay
_____ Using Improper

Tools/Appliances

_____ Violation of Instructions
_____ Failure to use Personal Protective Equipment
_____ Failure to Follow Safety Rules
_____ Other

CHECK ALL UNSAFE CONDITIONS INVOLVED (CHECK ONE OR MORE).

_____ Improperly Guarded Equipment
_____ Improper Illumination
_____ Failure of Machinery, Equipment or Materials
_____ Equipment Not Locked Out
_____ Poor Housekeeping
_____ Other

CHECK SPECIFIC INJURY CAUSES (ONE OR MORE).

_____ Struck by Falling Objects
_____ Struck by Splashing Material
_____ Struck Against Material
_____ Caught in Equipment
_____ Struck Against Stationary Object or Equipment
_____ Struck Against Moving Object or Equipment
_____ Caught Between Material
_____ Caught Between Equipment
_____ Caught Between Material & Equipment
_____ Slipping, Tripping, Falling
_____ Exploding Container
_____ Struck by Tool or Equipment
_____ Struck by Flying Object
_____ Struck Against Tool
_____ Fire
_____ Caught Between Tool
_____ Caught Between Tool & Equip
_____ Other

AS A SUPERVISOR, WHAT CORRECTIVE ACTION DO YOU RECOMMEND OR HAVE YOU TAKEN TO PREVENT A RECURRENCE OF THIS INJURY? _____

DATE OF REPORT: _____
SUPERVISOR: _____
PLANT MANAGER: _____
SAFETY DEPARTMENT: _____

PHILIP ENVIRONMENTAL SERVICES CORPORATION
SAFETY MEETING RECORD

GENERAL INFORMATION

PERSON CONDUCTING MEETING _____

LOCATION/DEPARTMENT _____

DATE _____ TIME _____ TO _____ NUMBER ATTENDING _____

MEETING CONTENT

WHAT WERE THE TOPICS? _____

WHY WERE THESE TOPICS CHOSEN? _____

_____

_____

WHAT VISUAL AIDS, IF ANY, WERE USED? _____

_____

WHAT SIGNIFICANT QUESTIONS OR CONCERNS WERE EXPRESSED? _____

_____

_____

_____

_____

_____

_____

FOLLOW UP RECOMMENDATIONS _____

_____

_____

SAFETY MEETING ATTENDANCE RECORD

PLEASE PRINT NAME	EMPLOYEE NUMBER

SUBCONTRACTOR STATEMENT OF COMPLIANCE FORM (FOR HAZARDOUS WASTE OPERATIONS)

This is to confirm that the employees listed below are qualified by virtue of training and experience to engage in field activities at _____ _____ located in _____, _____, in connection with the applicable Subcontract Agreement between Philip Environmental and _____
Further, all said employees have been determined to be properly trained and medically fit to perform those activities prescribed by said subcontract and to use the respiratory protective equipment necessary to perform the job safely in accordance with 29 CFR 1910 and 1926 and any other Federal, State, or local requirements.

Employee Names

1. _____ 6. _____

2. _____ 7. _____

3. _____ 8. _____

4. _____ 9. _____

5. _____ 10. _____

_____
Name of Subcontractor

_____
Signature of Authorized Subcontractor Representative

_____
Printed Name of Authorized Subcontractor Representative

UTILITIES AND STRUCTURES CHECKLIST

Project: _____ Prepared by: _____
Location: _____ Date: _____

Instructions: This checklist has to be completed by a Philip Environmental staff member as a safety measure to ensure that all underground utility lines, other underground structures as well as above-ground power lines are clearly marked out in the area selected for boring or excavation. **DRILLING OR EXCAVATION WORK MAY NOT PROCEED UNTIL LINES ARE MARKED AND THIS CHECKLIST HAS BEEN COMPLETED.** Arrangements for underground utility markouts are best made at the time of the preliminary site visit to allow client and/or utility company sufficient time. Keep completed checklist and maps onsite; send copy to Project Manager.

Client Approval: Client is responsible for having underground utilities and structures located and marked. Preferably, the utilities themselves should mark out the lines.

Name: _____
Signature: _____
Date: _____

Drilling or Excavation Sites: Attach a map of the property showing the proposed drilling or excavation site (or if sites are widely separated, several maps) clearly indicating the area(s) checked for underground utilities or underground structures and the location of above-ground power lines.

UTILITIES AND STRUCTURES

TYPE	NOT PRESENT	PRESENT	MARKED [1]
Petroleum product line			
Natural gas line			
Steam line			
Water line			
Sewer line			
Storm drain			
Telephone cable			
Electric power line			
Product tank			
Septic tank/drain field			
Overhead power line			

[1] Flags, paint on pavement, wooden stakes, etc.

Name and affiliation of person who marked out underground lines or structures.

_____ _____ _____
(Name) **(Organization)** **(Phone)**

Emergency Procedures
Person at site or facility to contact in case of emergency:

1. _____ Phone: _____
2. _____ Phone: _____
Fire Department Phone: _____ Ambulance Phone: _____
Utility Phone: _____ Utility Phone: _____

Directions to nearest hospital (describe on back or attach map).

PHILIP ENVIRONMENTAL SERVICES CORPORATION
AIR MONITORING DATA FORM

PROJECT NAME: _____ INSTRUMENT USED: _____ PROJECT
NUMBER: _____ SAMPLES BY: _____
DATE: _____ CALIBRATION DATE: _____

FIELD ACTIVITIES:
_____

BACKGROUND LEVEL: _____ LOCATION: _____

SAMPLE NUMBER	TIME	DURATION (MINUTES)	LOCATION	READING (PPM)	COMMENTS
1					
2					
3					
4					
5					
6					
7					

PHILIP ENVIRONMENTAL SERVICES CORPORATION
EQUIPMENT CALIBRATION LOG FORM

PROJECT NAME: _____ INSTRUMENT: _____
PROJECT NUMBER: _____ SERIAL NUMBER: _____

DATE	CALIBRATED BY	HOURS USED	CALIBRATION STANDARD *	INITIAL READING *	CORRECTED READING *	BATTERY CHECK (Y/N)	MAINTENANCE AND REPAIR

*Specify Units

APPENDICES

CONFINED SPACE ENTRY

OVERVIEW:

OSHA defines a confined space as a space that is large enough and so configured that an employee can bodily enter and perform assigned work but has limited or restricted room for entry or exit and is not designed for continuous human occupancy.

Examples of confined spaces include tanks, vessels, bins, silos, vats, pits, boilers, hoppers, vaults, excavations, and sewers.

OSHA has further defined a permit required confined space as any confined space that presents any recognized safety or health hazard to the entrant.

For the purposes of this plan, all confined spaces will be regarded as permit required confined spaces.

Confined space entry is potentially the most dangerous procedure routinely conducted by Philip Environmental. For this reason, extra care must be taken at every step of the entry procedure.

WARNING SIGNS:

Warning Signs must be posted at all entrances to noting that special permits are required to enter the confined space. A suggested wording of the signs might be; "Danger, confined space entry by permit only."

A space (such as a tank) that requires tools and labor to gain entrance need not have a sign posted until entry access work begins but a space that is accessible without tools or key must have a sign permanently posted.

Prior to removal of the entry cover, any condition making it unsafe to remove the entry cover shall be eliminated. Some examples of eliminating these unsafe conditions are transferring hazardous material to another tank and insuring that pressure has been removed from the system.

Prior to removal of the entry cover, all valves, electrical controls, or other power activated devices that might affect the safety of persons entering the tank will be locked, tagged, and tried. Valves will also be rendered safe by either totally disconnecting the piping, blank flanging, or using the double block and bleed system.

The double block and bleed system consists of locking and tagging shut two valves on the same line with a open bleed line between the two in order to drain off any possible leakage. The drain line must be as large as the main line.

Select flange(s) as close to the confined space as possible. Loosen the flange bolts on the side away from you first in case hazardous material is still in the line. Insert a slip blank in each flange in each feed line and re-secure each such flange.

Vessels under pressure or vacuum that will be entered must be at atmospheric pressure before

entry preparations proceed further. If a pressure gauge exists, it must read "0" PSIG.

Flush until the confined space is clean enough to enable ventilation and protective equipment, as described in this chapter, to be used to assure safe entry.

TESTING OF ALL HIGH, MID-lEVEL, AND LOWER ACCESS POINTS FROM OUTSIDE SPACE USING PROBES:

Each confined spcase entry project will have a combustible gas and oxygen deficiency detector, and will be responsible for its operation and calibration. Test the space for oxygen content before using the combustible gas sensor. The combustible gas meter will give false readings in oxygen deficient or oxygen enriched atmosphere. Normal atmospheric oxygen is 20.8%. Levels below 19.5% or above 23% oxygen may yield erroneous readings.

Test the confined space for the existence of combustible gas/vapor. Entry will not proceed unless five(5)% of the Lower Explosive Limit (LEL) or less is achieved.

This instrument will be calibrated prior to each use.

Health & Safety will provide instrument training and retraining as frequently as necessary. All employees who use monitoring equipment must be knowledgeable about the use and limitations of the equipment.

Test confined space for toxic levels above the lowest permissible exposure limit. Check with the Safety and Health Division if you are in doubt. Each location already has its own multi-gas detector which uses Colorimetric Tubes to screen or check for specific chemicals. Safety and Health will train in their use where necessary.

VENTILATION:

If initial testing indicates that the confined space has less than 5% flammable gases or vapors, oxygen levels between 19.5 and 23% oxygen, and no toxic hazards, exhaust ventilation will not be required.

If any one of the required tests (flammability, oxygen or toxicity) is outside of set limits, the space must be ventilated.

If the contaminant is heavier than air and if the space to be entered has more than one opening, vent fans or blowers should force/pull air down through the space. If the contaminant is lighter than air, blowers should force air up through the space.

If the space has only one opening, force clean air into the space rather than venting contaminated air out.
If the LEL cannot be brought below 5%, entry is not permitted, and an inerting process must be used (See "Inerting" section).

If oxygen is above 23%, entry is not permitted. Additional ventilation or inerting may be needed to reduce oxygen levels to normal. Only when oxygen is reduced to normal will entry be allowed.

If the oxygen levels cannot be brought between 19.5 - 23%, or if toxicity levels remain high, entry is permitted only with supplied air (either Self Contained Breathing Apparatus--SCBA, or air line with 5 minute escape bottle) and protective clothing suitable to the hazard. (Either level "B" or level "A").

PROTECTIVE CLOTHING:

It is company policy that all confined space entries will be conducted in Supplied Air equipment (SCBA or air line with resuce bottle) and level "B", or above, protective clothing.

The only exception to this policy will be a request, approved in writing by the Health & Safety Department, to deviate for the particular confined space in question.

INERTING:

If LEL levels cannot be reduced to 5% or lower by ventilation, the space must be inerted with a non flammable gas (such as nitrogen or carbon dioxide) before entry. Once the space has been inerted, and oxygen levels are below 2% by volume, entry is permitted.

It is company policy that if a confined space must be inerted, a marine chemist or other qualified outside agent must be called in. (Some local and state laws require this.)

Remember that the process of inerting makes the confined space immediately dangerous to life and health (IDLH) and extra care should be exercised on these operations.

VERTICAL ENTRY:

Confined spaces involving Vertical entry will require use of a tripod and hand wench system. Lines are attached to the person entering the space by D-ring to a harness. One line is secured in front of the harness and one line is secured in back of the harness, both at about shoulder level. Once in the confined space, the front line is detached. If any problem should occur and rescue be necessary, the person in the confined space can be retrieved without another person entering the tank.

NOTE: If over-head obstructions or other problems preclude the use of the tripod, the hand wench may be attached to some solid structural member.

HORIZONTAL ENTRY:

In a horizontal entry, harnesses and retrieval lines are recommended but not required. Interior space obstructions may make retrieval lines useless.

THE ENTRY PERMIT:

An entry permit is required for every confined space entry. The permit must contain the following information:

- The permit space to be entered
- The purpose of the entry
- The date and authorized duration of the permit
- The name and signature of all authorized entrants
- The names and signatures of all standbys (See standby)
- The names and signatures of the supervisors
- The hazards of the permit space
- The measures used to isolate or control the hazards prior to entry
- The name and phone number of rescue service or rescue procedure
- Acceptable entry conditions
- Results of initial and periodic (or continuous) tests
- Communication procedures used by the attendants and standby
- Any equipment needed to comply with this section
- Any other information needed to ensure employee safety

A copy of Philip Environmental's confined space permit is included at the end of this procedure. The Company's confined space permits are issued to work centers in a booklet form, consecutively numbered with two self duplicating copies, a hard copy, and a soft copy. The hard copy will be posted conspicuously outside the confined space until the permit expires (8 hours) or the job is completed. If the confined space must be vacated (at lunch, overnight) it must be barricaded to prevent entry. The Supervisor must ensure that the permit remains legible and is not weathered such that it becomes illegible.

At the completion of the job, all permits will be sent to Health & Safety Department in Columbia, IL.

CANCELING THE PROJECT:

The entry permit is good for eight (8) hours maximum. Additionally, it will be canceled if:

- The space is left unattended for a period of time (for example, lunch),
- Anyone must leave the space because of health distress
- The LEL exceeds 5% during subsequent measurements
- An unauthorized person enters the space
- A rescue must be initiated
- Any other changes occur that impact the safety of those in the space.

If a permit is canceled, all atmospheric testing, venting, etc. must be done before a new permit is issued.

THE STANDBY (OR ATTENDANT OR MONITOR):

The Standby or attendant must have no other duties than to maintain communication with those inside the confined space. The Standby must be trained in confined space procedures, the specific hazards involved, signs and symptoms of distress for those hazards, and procedures to handle outside problems that might impact those persons inside the confined space.

Additionally, it is Company policy that the Standby be fully trained and equipped to act as the first responder in the event a rescue be required. The Standby must be fully suited in the required PPE and have an SCBA ready should an emergency occur.

It is critical that under no circumstances should the Standby enter the confined space or attempt a rescue requiring entry until additional help has arrived on the scene.

CONFINED SPACE RESCUE:
All Standbys, supervisors, and persons designated for confined space entry will receive specific training in confined space entry and rescue. The permit will state whether the rescue service to be utilized is an inplant team or local emergency response, fire department, etc. A local fire department or even an implant team cannot respond as rapidly as a properly trained Standby with required back up. For this reason, the Standby will be considered the first link in the rescue chain whenever possible.

CONTINUOUS VERSUS PERIODIC MONITORING:
Continuous monitoring means that the combustible gas oxygen indicating instrument will be run continuously for the duration of the entry. Readings will be recorded at 15 minute intervals. Periodic monitoring means that the LEL and oxygen readings will be taken at designated intervals (normally 2 hours) during the entry. Toxic levels may be checked continuously or at intervals depending on the nature of the monitoring instrument.

TRAINING:
All persons involved with the confined space entry (Entrants, Standbys, Supervisors, and Rescue), will be trained commensurate with their particular responsibilities. Specifics on training are provided in the PSC-ISG Health & Safety Manual.

UPON COMPLETION OF THE JOB:
All protective clothing and equipment will be cleaned or properly disposed. Air tanks and extinguishers will be recharged and tagged immediately to prepare for the next entry or emergency use. Instruments will be stored or put on electrical charge. Colorimetric tubes used during the entry will be replaced.

The permit is then sent to Health & Safety. It will record the same information listed under the "Entry Permit" section:

A copy of the Confined Space Entry Permit will be retained by the plant\department involved.

Send or take any cassettes, sorbent tubes, etc. requiring lab analysis to Health & Safety. All pumps used for any form of industrial hygiene monitoring must be calibrated before and after use to validate both long duration direct read and/or lab results.

REQUEST TO DEVIATE:

If the situation warrants a manager/supervisor may request a deviation from a particular requirement outlined in the Company's Health and Safety Policy. A copy of the request to deviate form is included at the end of this manual.

For example:

Entry is planned into a cylindrical tank 10' high and 15' in diameter that has never held hazardous (or other) material. Oxygen is 20.9%, LEL is 0%, and toxic material is 0. A force draft blower has been attached to a 20' man way on top of the tank and is supplying 10 air changes an hour to the space. Reason for entry is to check the weld inside the tank. There are three (3) 24" man ways around the perimeter of the tank, two feet from the floor. The tank has been open and venting for 24 hours. Tank will be continuously vented and monitored during entry. A properly trained and equipped Standby is present. No other toxic or hazardous material is in the area. Request to deviate from the requirement to wear SCBA or airline to enter confined space.

This request would be submitted to Health and Safety by mail, phone, or fax, evaluated then approved or disapproved as soon as possible. The approved request to deviate would then be posted next to the entry permit on the confined space.

Requests to deviate can also be submitted for other reasons than confined space entry.

Include:

- Responsibilities
- Training

EXCAVATIONS

General Requirements

The following general requirements should be followed for excavation:

- Excavations shall be conducted in strict accordance with OSHA 29CFR 1926.650 Subpart P regulations, which cover open excavations and define excavation to include trenches.

- The regulations require protection of employees in excavations against cave-ins, except when the excavation is in stable rock, less than five feet deep, or deemed safe by a competent person.

- Workers must be protected from loose rock or soil and material or equipment that may fall into the excavation.

- Underground utility installations must be identified and located.

- Inspection of the site by a competent person is required daily, or following a natural or man-made event that may alter conditions. If there is evidence of possible cave-ins, protective system failure, hazardous atmospheres, or other hazardous conditions, employees at risk must be removed until corrective steps have been taken.

- Safe and accessible means of access and egress must be provided.

- Warning systems for mobile equipment are required, such as barricades, hand or mechanical signals, or stop logs.

- The regulations require testing for hazardous atmospheres and controls, including daily inspection by a competent person.

- Any of four options for sloping and benching systems may be implemented for stability of adjacent structures. These include:

  - A slope of 34 degrees or less in lieu of soil classification.
  - Maximum allowable slopes according to Appendices A and B of the OSHA standar
  - Sloping or benching designs in accordance with stated criteria.
  - Excavations designed by a registered professional engineer.

- Any of four options may be implemented for support and shield systems. These include:

  - Designs for timber shoring in trenches in accordance with set criteria.
  - Designs using manufacturers' tabulated data in accordance with set criteria.

- Designs using other tabulated data.
- Other designs approved by a registered professional engineer.

• Excavation shall stop during inclement weather, such as high winds, heavy rainfall, lightning, etc.

• The attached table, A Guide to Selection of Protective Systems, contains guidance on selection of protective systems per the OSHA standard.

Preliminary Inspection

Prior to excavation, the site should be thoroughly inspected to determine conditions that require special safety measures. The location of underground utilities, such as sewer, telephone, gas, water, and electric lines, must be determined and plainly staked. Necessary arrangements must be made with the utility company or owner for the protection, removal, or relocation of the underground utilities. In such circumstances, excavation will be done in a manner that does not endanger the employees engaged in the work or the underground utility. Utilities left in place should be protected by barricading, shoring, suspension, or other measures, as necessary.

Protection of the Public

Necessary barricades, walkways, lighting, and posting should be provided for the protection of the public prior to the start of excavation. Excavation operations on or near state, county, or city streets, accessways, or other locations where there is extensive interface with the public and/or motorized equipment will not start until all of the following actions have been taken:

• The contractor has contacted the authority having jurisdiction and obtained written permission to proceed with protective measures required.

• The contractor, using the authority's instructions and these standards, has developed an extensive and detailed standard operating plan.

• The plan has been discussed with affected employees, and applicable protective measures are in place and functioning.

Access and Lighting

Safe access will be provided for employees, including installation of walkways, stairs, ladders, etc. When operations are conducted during hours of darkness, adequate lighting will be provided at the excavation, borrow pits, and waste areas.

Where employees are required to enter excavations over 4 feet in depth, stairs, ladders, or ramps must be provided, so as to require no more than 25 feet of lateral travel. When access to excavations exceeds 20 feet vertically, ramps, stairs, or personnel hoists should be provided. Ladders extending from the bottom of the trench to at least 3 feet above the top must be placed within 25 feet of workers in the trench.

Personal Protective Equipment

PPE will be provided and used in accordance with the specific requirements set forth in the plan.

Removal of Trees and Brush

Prior to excavation, trees, brush, boulders, and other surface obstacles that present a hazard to employees should be removed.

Slide Prevention and Trenching Requirements

All trench excavations over 5 feet in depth must be sloped to the angle of repose from the bottom of the trench, but never less than 3/4 horizontal to 1 vertical (i.e., 37 degrees from vertical), or supported by structures designed by a professional engineer. Excavations should be inspected following rainstorms or other hazardous events. Additional protection against possible slides or cave-ins shall be provided, as necessary.

Angle of Repose

The determination of the angle of repose and design of supporting systems should be based on a thorough evaluation of all pertinent factors, including depth of cut; possible variation in water content of the material; anticipated changes in the material from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, or overlying or stored material; and vibrations from sources such as traffic, equipment, and blasting. The angle of repose for all excavations, including trenching, should be determined by a professional engineer, but in no event should the slope be less than 3/4 horizontal to 1 vertical (i.e., 37 degrees from vertical) from the bottom of the excavation.

Support Systems

Materials used for support systems, such as sheeting, piling, cribbing, bracing, shoring, and underpinning, should be in good serviceable condition, and timbers should be sound and free of large or loose knots. The design of support systems should be based on calculations of the forces and their directions, with consideration for surcharges, the angle of internal friction of materials, and other pertinent characteristics of the material to be retained.

When tight sheeting or sheet piling is used, full loading due to the ground water table should be assumed unless relieved by weep holes, drains, or other means. Cross braces and trench jacks should be placed in true horizontal position and secured to prevent sliding, falling, or kickouts. Additional stringers, ties, and bracing should be provided to allow for any necessary temporary removal of individual supports. Support systems should be planned and designed by a professional engineer competent in the field.

Backfilling and removal of trench support systems should progress together from the bottom of the trench. Jacks or braces should be released slowly. In unstable soil, ropes

or other safe means will be used to remove the braces from the surface after workers have left the trench.

Special precaution must be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation or fill area. The use of compacted backfill as backforms on slopes that are steeper than the angle of repose of the compacted material in its natural state is prohibited.

Structural Foundations and Footings

Except in hard rock, excavations below the level of the base of any foundation, footing, or retaining wall will not be permitted unless the wall is underpinned and all necessary precautions are taken to ensure the stability of adjacent walls. If the excavation endangers the stability of adjacent buildings or structures, shoring, bracing, or underpinning designed by a qualified person will be installed. Such supporting systems must be inspected at least daily by qualified persons to ensure that protection is adequate and effectively maintained.

Small diameter footings that workers are required to enter, including bell-bottomed footings over 4 feet deep, must be provided with a steel casing or support system of sufficient strength to support the earth walls and prevent cave-ins. The casing or support system shall be provided for the full depth, except for the bell portion of bell footings.

Fixed or portable ladders must be provided for access. A lifeline, securely attached to a shoulder harness, should be worn by every employee entering the footing. The lifeline should be manned from above and should be separate from any line used to raise or lower materials.

Vertical Cuts and Slopes

Before a slope or vertical cut is undercut, the residual material must be adequately supported and the undercutting method and support system must be inspected.

When exposed to falling, rolling, or sliding rocks, earth, or other materials, employees working below or on slopes or cuts should be protected in the following manner:

- By effective scaling performed prior to exposure and at intervals necessary to eliminate the danger.

- By the installation of rock bolting, wire mesh, or equivalent support if the material continues to ravel and fall after scaling.

- By the installation of protective timber or wire mesh barricades at the slope of the cut and at necessary intervals down the slope. Wherever practical, benching sufficient to retain falling material may be used in lieu of barricades.

- By ensuring that personnel do not work above one another where there is danger of falling rock or earth. Personnel performing work on vertical cuts or slopes where balance depends on a supporting system must wear appropriate safety equipment.

Ground Water

Ground water should be controlled. Freezing, pumping, draining, and other major control measures should be planned and directed by a competent professional engineer. Full consideration should be given to the existing moisture balance in surrounding soil and the effects on foundations and structures if it is disturbed. When continuous operation of ground water control equipment is necessary, an emergency power source should be provided.

Surface Water

The accumulation of surface water in excavations must not be permitted and should be controlled by diversion ditches, dikes, dewatering sumps, or other effective means.

Excavated Materials

Excavated materials should be placed and retained at least 2 feet from the depth of the excavation, or at a greater distance when required to prevent hazardous loading on the face of the excavation.

Protective Devices

Guardrails, fences, barricades, and warning lights or other illumination systems will be maintained from sunset to sunrise on excavations adjacent to walkways, driveways, and other pedestrian or vehicle thoroughfares. Walkways or bridges that are protected by standard guardrails should be provided where employees are required or permitted to cross over excavations.

Wells, calyx holes, pits, shafts, and all similar hazardous excavations must be effectively barricaded or covered and posted. All temporary excavations of this type should be backfilled as soon as possible. When mobile equipment is permitted adjacent to excavations with steep slopes or cuts, substantial stoplogs or barricades should be installed.

Equipment Operation

Equipment that is operated on loading or waste areas must be equipped with an automatic backup alarm. Additionally, when employees are on foot or otherwise endangered by equipment in dumping or waste areas, a competent signalman should be used to direct traffic. The signalman must have no other assignment that interferes with signaling duties. If the equipment or truck cab is not shielded, the operator should stand clear of the vehicle during loading. Excavating or hoisting equipment should not be allowed to raise, lower, or swing loads over workers unless effective overhead protection is provided.

HEAT STRESS/COLD STRESS

Cold Stress

If site work is to be conducted during the winter, cold stress is a concern to the health and safety of personnel. With regard to the wearing of Tyvek suits, because such disposal clothing does not "breathe," perspiration does not evaporate and the suits can become wet. Wet clothes combined with cold temperatures can lead to hypothermia. If the air temperature is less than 40 degrees Fahrenheit (°F) and an employee perspires, the employee must change to dry clothes. The attached table, Signs and Symptoms of Cold Stress, describes the signs and symptoms of cold stress.

Heat Stress

Wearing PPE also puts a worker at a considerable risk of developing heat stress. The attached table, Signs and Symptoms of Heat Stress, describes the signs and symptoms of heat stress. This can result in health effects ranging from heat fatigue to serious illness or death. Consequently, regular monitoring and other precautions are vital.

For workers wearing standard work clothes, recommendations for monitoring and work/rest schedules are those approved by ACGIH and NIOSH. Workers wearing semipermeable PPE or impermeable PPE should be monitored when the temperature in the work area is above 70°F. To monitor the worker, the following should be measured:

- Heart rate--The radial pulse should be counted during a 30-second period as early as possible in the rest period.

  - If the heart rate exceeds 110 beats per minute at the beginning of the rest period, the next work cycle should be shortened by one third and the rest period should be kept the same.

  - If the heart rate still exceeds 110 beats per minute at the next rest period, the following work cycle should be shortened by one third.

- Oral temperature--A clinical thermometer (3 minutes under the tongue) or similar device should be used to measure the oral temperature at the end of the work period (before drinking).

  - If the oral temperature exceeds 99.6°F (37.6 degrees Celsius (°C)), the next work cycle should be shortened by one third, without the rest period being changed.

  - If the oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, the following work cycle should be shortened by one third.

  - A worker should not be permitted to wear a semipermeable or impermeable garment when his/her oral temperature exceeds 100.6°F (38.1°C).

Initially, the frequency of monitoring depends on ambient temperature (see attached table, Suggested Frequencies of Physiological Monitoring for Fit and

Acclimatized Workers). The length of the work cycle is determined by the frequency of physiological monitoring described above.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important, because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries. To avoid heat stress, the following steps should be taken:

- Work schedules should be adjusted.

- Shelter (air-conditioned, if possible) or shaded areas should be provided to protect personnel during rest periods.

- Workers' body fluids should be maintained at normal levels to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat--i.e., 8 fluid ounces (0.23 liter) of water must be ingested for approximately every 8 ounces (0.23 kilogram) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, the worker should be encouraged to drink more. The following strategies may be useful:

  - Water temperature should be maintained at 50°F to 60°F (10° to 15.6°C).

  - Small disposable cups that hold about 4 ounces (0.1 liter) should be provided.

TABLE

SIGNS AND SYMPTOMS OF COLD STRESS

Incipient frostbite is a mild form of cold stress characterized by sudden blanching or whitening of the skin.

Chillblain is an inflammation of the hands and feet caused by exposure to cold moisture. It is characterized by a recurrent localized itching, swelling, and painful inflammation of the fingers, toes, or ears. Such a sequence produces severe spasms, accompanied by pain.

Second-degree frostbite is manifested by skin with a white, waxy appearance and the skin is firm to the touch. Individuals with this condition are generally not aware of its seriousness, because the underlying nerves are frozen and unable to transmit signals to warn the body. Immediate first aid and medical treatment are required.

Third-degree frostbite will appear as blue, blotchy skin. The tissue is cold, pale, and solid. Immediate medical attention is required.

Hypothermia develops when body temperature falls below a critical level. In extreme cases, cardiac failure and death may occur. Immediate medical attention is warranted when the following symptoms are observed:

- Involuntary shivering
- Irrational behavior
- Slurred speech
- Sluggishness.

TABLE

SIGNS AND SYMPTOMS OF HEAT STRESS

Heat rash may result from continuous exposure to heat or humid air.

Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

- Muscle spasms
- Pain in the hands, feet, and abdomen.

Heat exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool, and moist skin
- Heavy sweating
- Dizziness, fainting, and nausea.

Heat stroke is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained. Signs and symptoms are:

- Red, hot, and unusually dry skin
- Lack of or reduced perspiration
- Dizziness and confusion
- Strong, rapid pulse, and coma.

Have workers drink 16 ounces (0.5 liter) of fluid (preferably water or diluted drinks) before beginning work. Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight. Weigh workers before and after work to determine if fluid replacement is adequate.

Encourage workers to maintain an optimal level of physical fitness. Where indicated, acclimatize workers to site work conditions.

Provide cooling devices to aid natural body heat exchange during prolonged work or severe heat exposure.

Train workers to recognize, identify, and treat heat stress.

TABLE

SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING FOR FIT AND ACCLIMATIZED WORKERS[b]

Adjusted Temperature[a]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 minutes of work	After each 120 minutes of work

[a]Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent of the time the sun is not covered by clouds that are thick enough to produce a shadow (100% sunshine = no cloud cover and a sharp, distinct shadow; 0% sunshine = no shadows).

[b]For work levels of 250 kilocalories/hour.

[c]A normal work ensemble consists of cotton overalls or other cotton

DECONTAMINATION

Standard Procedures

1. A decontamination area should be located between the Hot Line (upwind boundary of the Exclusion Zone) and the Support Zone boundary.

2. A personnel decontamination station (PDS) should be established.

3. All personnel should proceed through the appropriate contamination reduction sequence upon leaving the contamination area.

4. All protective gear should be left on site during any lunch break following decontamination procedures.

5. Material Safety Data Sheets for chemicals used during decontamination procedures should be made available to those who are potentially exposed to these chemicals and should be attached to this health and safety plan.

Decontamination of Equipment

To the extent possible, measures should be taken to prevent contamination of sampling and monitoring equipment. Sampling devices may become contaminated; however, monitoring instruments, unless they are splashed, usually do not become contaminated. Once contaminated, it is difficult to clean instruments without damaging them. Any delicate instrument that cannot be decontaminated easily should have a bag taped and secured around it. Openings should be made in the bag for sample intake.

Sampling Devices

Sampling devices require special cleaning. Decontamination of all sampling equipment should be performed using an appropriate solvent or detergent followed by a clean water rinse.

Tools

Wooden tools are difficult to decontaminate because they absorb chemicals. They should be kept on site and handled only by protected workers. After use in a contaminated area, wooden tools should be discarded. For decontaminating other tools, an appropriate detergent or solvent should be used followed be a clean water rinse.

Respirators

Certain parts of contaminated respirators, such as the harness assembly and cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush. Persons responsible for decontaminating respirators should be thoroughly trained in respirator maintenance.

Heavy Equipment

Bulldozers, trucks, backhoes, bulking chambers, and other heavy equipment are difficult to decontaminate. Generally, they are washed with water under high pressure and/or accessible parts are scrubbed with detergent/water solution under pressure, if possible. In some cases, shovels, scoops, and lifts have been sand blasted or steamed. Particular care must be given to those components in direct contact with contaminants, such as tires and scoops.

Sanitizing of Personal Protective Equipment

Respirators, reusable protective clothing, and other personal articles not only must be decontaminated before being reused, but also must be sanitized. The inside of masks and clothing becomes soiled because of exhalation, body oils, and perspiration. The manufacturer's instructions should be followed to sanitize the respirator mask. If practical, protective clothing should be machine washed after a thorough decontamination; otherwise, it must be cleaned by hand.

Persistent Contamination

In some instances, clothing and equipment will become contaminated with substances that cannot be removed by normal decontamination procedures. A strong detergent (industrial grade) may be used to remove such contamination from equipment if it does not destroy or degrade the protective material. If persistent contamination is expected, disposable garments should be used.

Disposal of Contaminated Materials

All materials and equipment used for decontamination must be disposed of properly. Clothing, tools, buckets, brushes, and all other equipment that is contaminated must be secured in drums or other containers and labeled. Clothing not completely decontaminated on site should be secured in plastic bags before being removed from the site. Contaminated wash and rinse solutions should be contained by using step-in-

containers (e.g., child's wading pool) to hold spent solutions. Another containment method is to dig a trench about 4 inches deep and line it with plastic. In both cases, the spent solutions should be transferred to drums, which should be labeled and disposed of with other substances on site.

Minimal Decontamination

Less extensive procedures for decontamination can be subsequently established when disposable clothing and equipment are used, the type and degree of contamination become known, or the potential for transfer is judged to be minimal by the Site Safety Coordinator in consultation with the Project Manager.

Closure of the Personnel Decontamination Station

All disposable clothing and plastic sheeting used during the operation should be double bagged, labeled, and either contained on site or removed to a client-approved disposal facility. Grossly contaminated protective clothing should be disposed of on site with the permission of the property owner. Cloth items should be bagged and removed from the site for final cleaning. All wash tubs, pails, containers, etc., should be thoroughly washed, rinsed, and dried prior to removal from the site.

MAXIMUM MEASURES FOR LEVEL C DECONTAMINATION

(OPTIONAL - This method will be specified in the HASP if required)

The maximum decontamination layout for Level C is given below.

Station 1: Drop	Segregated Equipment	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in plastic-lined containers. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
Station 2: Wash	Boot Cover and Glove	2. Scrub outer boot covers and gloves with decon solution or detergent and water.
Station 3: Rinse	Boot Cover and Glove	3. Rinse off decon solution from Station 2 using as much water as necessary.
Station 4:	Tape Removal	4. Remove tape around boots and gloves and deposit it in the plastic-lined container.
Station 5:	Boot Cover Removal	5. Remove boot covers and deposit them in the plastic-lined container.
Station 6:	Outer Glove Removal	6. Remove outer gloves and deposit them in the plastic-lined container.
Station 7:	Suit and Boot Wash	7. Wash splash suit, gloves, and safety boots. Scrub with long-handled scrub brush and decon solution.
Station 8: Rinse	Suit, Boot, and Glove	8. Rinse off decontamination solution using water. Repeat as many times as necessary.
Station 9: Change	Cartridge or Mask	9. If worker leaves the Exclusion Zone to change cartridges (or mask), this will be the last step in the decon procedure. After worker's cartridges are exchanged, new outer gloves and boot covers donned, and joints taped, worker returns to duty.
Station 10:	Safety Boot Removal	10. Remove safety boots and deposit them in the plastic-lined container.

Station 11.	Splash Suit Removal	11. With assistance from the helper, remove splash suit. Deposit it in the plastic-lined container.
Station 12:	Inner Glove Wash	12. Wash inner gloves with decon solution.
Station 13:	Inner Glove Rinse	13. Rinse inner gloves with water.
Station 14:	Facepiece Removal	14. Remove facepiece and deposit it in the plastic-lined container. Avoid touching face with fingers.
Station 15:	Inner Glove Removal	15. Remove inner gloves and deposit them in the plastic-lined container.
Station 16:	Inner Clothing Removal	16. Remove clothing soaked with perspiration and place it in the plastic- lined container. Do not wear inner clothing off site because there is a possibility that small amounts of contaminants might have been transferred in removing the fully encapsulating suit.
Station 17:	Field Wash	17. Shower if highly toxic, skin corrosive, or skin absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Station 18:	Redress	18. Put on clean clothes.

Interim Remedial Measures Work Plan
Source Removal
Champaign Former Manufactured Gas Plant

October 1, 1997

Prepared for:
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Decatur, Illinois

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Project 17246

TABLE OF CONTENTS

1 INTRODUCTION

At the request of Illinois Power Company (IP), Philip Services Corporation (Philip) prepared this work plan for the interim remedial measures (IRM) source removal at the former manufactured gas plant (MGP) in Champaign, Illinois. The site-specific Health and Safety Plan and Ambient Air Monitoring Plan are provided under separate cover. IP is working in cooperation with the Illinois Environmental Protection Agency (IEPA) under the Site Remediation Program.

The primary objective of this IRM is to remove the sources of contamination and prevent future potential releases of coal tar or coal-tar constituents in the subsurface from the original source areas. This source removal is part of the overall site management plan. A risk evaluation will be performed subsequent to the source removal. Institutional controls or engineered barriers are options that may be considered to mitigate any remaining risk at the site.

This work plan addresses excavation and treatment/disposal of source material in Gas Holder 1 (GH-1), tar wells and a tar separator, and purifier waste. Coal tar and saturated cinders from GH-1 will require on-site blending to render the material non-hazardous. Purifier waste, which is non-hazardous, will be blended with the source material in GH-1. Lightly impacted material from tar wells and a tar separator will also be blended into the material in GH-1. Concrete purifier pads will be demolished and used as backfill. The site will be restored to its present grade following backfill of the excavations.

In addition to the source removal, the following activities will be conducted during the IRM:

- a test trench will be excavated to a depth of approximately 20 feet along the northern fence to assess methods for containing the off-site movement of coal tar and/or coal-tar impacted groundwater;
- a test trench will be excavated approximately 80 feet east of GH-1 to attempt to locate unidentified below-ground structures;
- an abandoned storm sewer traversing the site will be capped at its west and east termini at Fifth Street and the Sixth Street right-of-way, respectively; and,
- approximately 120 clean empty drums, two dozen wooden pallets, miscellaneous pipes, hoses and fencing will be crushed, placed in dumpsters or directly into trucks, and transported to a landfill designated by IP.

1.1 Site Location and History

The Champaign MGP site is located in east-central Illinois, at 308 North Fifth Street, at the intersection of Hill and Fifth streets. The site, occupying approximately 2.6 acres, is located in a residential area within the city limits of Champaign in Champaign County. This site was the former location of a manufactured gas plant.

A below-ground gas holder (GH-1), later converted to a tar separator, four tar wells, and a smaller tar separator are located in the northern portion of the site. Two above-ground gas holders, GH-2 and GH-3, were located at the north-central and south-central portions of the site. Three purifier pads are located west of the former Booster House, which is the only building that remains from the former gas plant. The northwestern corner of the site is underlain by the basement and foundation of the gas plant building.

IP currently owns the entire area occupied by the former manufactured gas plant site. The entire site is fenced and relatively level. Adjacent properties include residences on the north and south, residences on the west side of North Fifth Street, and an abandoned section of North Sixth Street (called the Sixth Street right-of-way), used by foot traffic, on the east. East of the Sixth Street right-of-way is a parking lot for the Covenant Medical Center.

Access to the site is through a gate at the west side of the site, off of North Fifth Street. A site plan is presented as Figure 1.

1.2 Previous Studies

A preliminary Phase I site assessment was conducted by Warzyn Engineering, Inc., in 1986. Subsequently, Phase IC and ID RECON investigations were performed in 1990 by Burlington Environmental, Inc. (now Philip) to obtain subsurface data, followed by a more comprehensive Phase II site investigation. Investigation activities conducted at the Champaign MGP site from 1990 through 1992 are presented in detail in the two-volume remedial investigation report, "Phase II Site Investigation, Champaign Former Manufactured Gas Plant, Champaign, Illinois," dated March 4, 1994, and prepared by Burlington Environmental, Inc. An additional investigation was conducted during March, 1997 to assess the extent of coal-tar impact east of the former MGP site and further characterize the contents of GH-1. The report of that investigation, conducted by Philip, is described in "Supplemental Site Investigation, Champaign Former Manufactured Gas Plant, Champaign, Illinois," dated July 30, 1997.

The results of the previous investigations indicated on-site impacts to fill, soil and groundwater from coal-tar residues. Off-site impact to soil and

groundwater by coal-tar residues has also been identified to the east, north, and west of the site. In addition, some impact to soils by fuel oil was identified along the south boundary of the site.

Quarterly groundwater monitoring was initiated at the Champaign MGP in February, 1996 to monitor groundwater quality both on and off site.

1.3 Proposed IRM

This IRM addresses excavation and treatment/disposal of the contents of GH-1, the tar wells and tar separator, and purifier waste. Heavily impacted materials from GH-1 will require on-site blending to render the materials non-hazardous prior to transport to the Baldwin Thermal Treatment Facility (BTT) for disposal as special waste.

The contents of the upper portion of GH-1 consists of coal-tar impacted water. Prior to excavation at GH-1, the water will be pumped out of the holder for treatment, storage, and testing prior to disposal to the sanitary sewer system.

The material contained within the lower part of GH-1 is classified as characteristic hazardous waste for toxicity by TCLP because of benzene. Blending ratios and methods have been developed based on previously successful ratios used at other MGP sites and bench-scale treatability testing. Soil, purifier waste, coal, and quicklime will be blended with the hazardous materials within GH-1. Material excavated from the tar wells and separator may also be added to the blend within GH-1. The blended mixture will be stockpiled and tested, and reblended if necessary, to meet BTT acceptance criteria.

The walls of GH-1 will be left in place to facilitate contents removal, blending and backfilling. Backfilling will be completed with clean granular material from off site and concrete demolition debris from the purifier pads, building foundation slabs, and the GH-1 lid.

Historic site drawings indicate as many as four tar wells and a tar separator may exist at the site. An attempt will be made to locate the tar structures in the areas indicated on the drawings. If the structures are located and contain coal-tar impacted materials, the material will be excavated and blended with the materials within GH-1. Depending on their condition, the walls and floors of the tar structures will be removed completely or partially along with the contents to facilitate excavation. Backfilling of tar-handling structure excavations will be completed with clean granular material from off site.

Purifier wastes occur at a depth of one to three feet, east of the former Booster House. The material to be excavated in this area, identified on Figure 1, is composed primarily of wood shavings, coal, cinders, and brick. The purifier wastes are non-hazardous. The large amount of wood shavings, coal, and cinders within this material, in addition to the low pH, make this a suitable material for blending with the contents of GH-1. Following dewatering of GH-1, the stockpiled purifier wastes will be placed into the gas holder for blending.

Upon completion of excavation and backfilling, equipment will be decontaminated and temporary structures and safety barriers will be removed. Grades will be restored to the original elevations, and the excavations and areas disturbed by the construction activities will be covered with either gravel or topsoil. The purifier waste area west of the Booster House will be backfilled with clean soil and covered with gravel. A final grading and seeding for grass cover at other portions of the site will be completed in the spring of 1998.

1.4 Permits

IP has prepared an application for a permit to discharge treated wastewater from remedial activities to the City of Champaign's sanitary sewer system and the Urbana-Champaign Sanitary District. This application has been submitted to the IEPA, and a permit will be issued prior to discharge of any wastewater.

2 PROJECT ORGANIZATION

2.1 Project Team

Philip will perform IRMs at the Champaign site under the IP/Philip MGP Alliance Agreement, and in accordance with this work plan pending IEPA approval. IP has contracted with Monti Communications (Monti) to prepare and implement an IEPA-approved community relations plan.

The IEPA Project Manager is Mr. Andy Frierdich, the IP Project Manager is Mr. Brian Martin, and the Monti Project Manager is Ms. Gretchen Monti. Brian Martin will be IEPA's primary contact.

2.2 Philip Personnel

The roles of various Philip personnel are defined as follows for the IRMs:

Program Manager:	Darrel Wolff, P.E. Overall responsibility, Engineer of Record Illinois Power contact
Project Manager:	Irv Van Zummeren, Jr. P.G. Field activities coordination and management Contact with Program Manager and Site Superintendent
Site Superintendent:	Russell Tomasko Daily operations Quality control Health and safety Implementation of Work Plan
Site Manager:	Stuart J. Cravens, CGWP Sampling Work Plan compliance Photo-documentation

2.3 Subcontractors

In the performance of this remedial action, Philip will utilize subcontractors and suppliers for the following:

- Transportation to BTT
- Furnish and deliver backfill
- Transport and storage of granular quicklime
- Heavy equipment rental - excavators, front-end loader, back-hoes, temporary liquid storage tanks, rolloff containers
- Material supply - liners and geotextile fabrics, granular quick-lime, backfill material

3 WASTE CHARACTERIZATION

3.1 Sample Collection and Analysis

Samples of source material were collected from GH-1 and from the purifier waste area in 1997. A representative sample of coal tar from GH-1 was analyzed for parameters listed in Table 1, taken from BTT's Preacceptance Procedures and Rationale for WSN 1 - Nonhazardous Coal Tar and Coal Oil, and Soil and Debris Contaminated with Coal Tar and Coal Oil, Revision 1. The purifier waste sample was analyzed for a subset of the parameters listed in Table 1. Analytical results for the coal tar and purifier waste samples are summarized in Tables 2 and 3, respectively

As shown on Figure 2, GH-1 contains coal-tar impacted water from near land surface to about 7 feet below land surface (BLS). A transition zone from water to coal tar occurs from about 7 to 10 feet BLS. Coal tar and coal-tar impacted materials (i.e., cinders) occur from 10 feet to the base of GH-1 at 16.5 feet BLS.

The coal tar and coal-tar impacted materials within GH-1 are hazardous by toxicity characteristic for TCLP benzene. Sample GH1-12 (Table 2) is estimated to be representative of the upper horizon of this material, which is a viscous coal tar containing variable amounts of water. The bottom of the holder is estimated to be 16.5 feet deep at the outer edges and 13 feet deep in the center, forming a conical base.

The tar wells and separator are expected to contain a variety of fill material, most of which is expected to be impacted with coal tar. Based on the earlier studies, this material will include soil, rubble, brick, cinders, clay, sand, and gravel with variable amounts of coal-tar impact.

A composite soil sample containing purifier waste was collected south and north of the purifier pads and analyzed for a subset of the parameters in Table 1; this sample was found to be non-hazardous.

3.2 Treatability Procedures

Blending ratios that are expected to render the waste streams non-hazardous have been developed based on experience gained from blending similar materials during previous IRMs at MGP sites, and bench-scale testing. The blending ratios will be adjusted in the field as necessary under the direction of the site superintendent. Blended material will be stockpiled on site and a composite sample from the stockpile will be analyzed for

TCLP benzene. A sample will be taken for every 1,000 tons of blended material. If the analysis does not demonstrate that the blended material is non-hazardous, it will be reblended under the direction of the treatability engineer.

The following blending ratio for the coal tar and coal-tar impacted materials within GH-1, which occur from approximately 7 to 16.5 feet BLS, are considered starting points. All portions are expressed as weights:

	Depth	Source Material	Clean Soil*	Coal	Quicklime
GH-1	7-16.5 feet	1 part	3 parts	2 parts	5 percent

* Non-hazardous soil from the purifier waste area and tar structures may also be added to the blend as a partial substitute for clean soil. Additional clean soil will be brought in from off-site as necessary.

The materials will be blended to produce a reasonably homogeneous mixture. Previous treatability studies and field experience have shown that curing time (24 hours minimum) following blending is also effective in reducing benzene concentrations.

3.3 Waste Stream Acceptance

Analytical results of the unblended waste and waste profile sheets will be submitted to BTT for acceptance prior to waste shipment.

4 MOBILIZATION AND SITE PREPARATION

Figure 1 shows site features, stockpile locations, and planned locations of the support facilities to be utilized during the IRM. The location of the test trench at the northeast corner of the site is also shown. These facilities are discussed in the following sections.

4.1 Project Support Facilities

In order to effectively manage and perform the proposed construction activities, Philip intends to place an office/storage trailer north of the gate inside the west fence. The office trailer or an auxiliary trailer will also be used to store small field equipment and tools.

One temporary, 240-volt, 100-amp single-phased electrical service drop has been located in the area of the office trailer. Four additional 120-volt, 100-amp electrical service drops have been located around the perimeter of the site for ambient air monitoring equipment. A night light with photo cell control will be placed at the northwest corner of the Booster House for site security and background lighting during low light conditions.

Portable sanitary facilities will be located near the office trailer. A dumpster will be provided to store general trash generated by the work activities.

A windscreen will be installed along sections of the north, south and west fence as an aesthetic and protective barrier between the surrounding residential area and the construction site.

Upon completion of the project, Philip will remove all temporary structures and temporary connections from the project site.

4.2 Stockpiles

Stockpiles will be constructed for blended source material. Source material storage areas will be lined and covered according to Figure 3. Plastic sheeting (6-mil) will be placed over the stockpiles whenever stockpiling or loading activities are not being performed. The storage facilities will be monitored and the covers will be replaced as required. A one-foot high earthen berm will be used around the perimeter of the stockpiles.

The stockpiles of blended material will be located east of the construction area and across the central portion of the site. Gravel will be placed in soft areas (if necessary) to allow truck access to the stockpile.

Clean backfill (granular material and demolition debris) may be placed directly on the ground. Quicklime will be stored on site in a tanker truck to minimize airborne dust and allow for controlled addition into GH-1 during blending.

Debris that has been separated from the source material will be stockpiled on plastic sheeting or stored in roll-off containers until approved for disposal.

4.3 Water Treatment System and Wastewater Storage

A water treatment system, portable storage tanks, and associated pumps, piping and connections, will be provided for the following wastewater streams:

- upper layer of coal-tar contaminated water in GH-1;
- stockpile and excavation run-off;
- seepage water collected from dewatering the lower layer in GH-1 or any of the tar structures during excavation;
- decontamination water; and,
- any other wastewater streams within the site.

It has been estimated that the volume of coal-tar impacted water in GH-1 is approximately 134,000 gallons. Additional coal-tar impacted water may be encountered in the deeper tar wells or tar separator.

The initial water treatment system to be utilized at the site will consist of a sediment tank with baffles, oil/water separator, and portable storage tanks. Other treatment system equipment will be added as necessary to meet discharge permit requirements.

Tanks will be steel "Baker Tanks" or equivalent. Three 21,000 gallon tanks will initially be staged inside the western fence of the site. The water treatment system will also be located on the western side, adjacent to the storage tanks.

4.4 Decontamination Pad

A temporary decontamination pad will be constructed on site as shown on Figure 4. The pad will be lined and bermed, and will contain a sump pit to collect wash liquids. The pad will be constructed near the north gate.

4.5 Environmental Protection

Stormwater runoff from stockpiles will be controlled using perimeter berms around the stockpiles. No other runoff control is expected to be necessary.

Ambient air monitoring will be performed and operations will be suspended if action levels (see Ambient Air Monitoring Plan) are exceeded.

5 EXCAVATION AND BLENDING

5.1 Excavation Plans

The materials to be excavated for disposal are the contents of GH-1, the tar wells and tar separator, and purifier waste (Figure 1). The sequence of excavation at the site will be the purifier waste first, followed by GH-1 and then the tar wells and separator. The material will be blended within GH-1. Purifier waste and lightly impacted material from the tar wells and separator may be used as a partial substitute for clean soil for blending with material in GH-1.

Historic maps of the site indicate the potential for four tar wells located across the northern portion of the site. These tar wells have not been located during previous investigations. If located during the IRM, any impacted material within the tar wells will be excavated and managed appropriately. Based on the results of previous site investigations, it is expected that most of the material from the tar wells and tar separator will be lightly impacted.

Debris, consisting of wood, metal, and other materials not accepted at BTT, will be segregated from the materials found in the excavations and stored in a covered rolloff box for ultimate disposal at an IP-approved landfill.

Pneumatic diaphragm pumps will be used for dewatering GH-1 and the excavations when required. The excavations will be covered each night.

Equipment used for source removal and blending will include a tracked excavator, a tracked excavator with long-stick, rubber-tired front-end loader, dump trucks, and a tanker truck to store and place the granular quicklime.

5.2 Purifier Waste

There are approximately 480 cubic yards (CY) of soil containing purifier waste at a depth of one to three feet southwest of GH-1. This material, consisting primarily of wood shavings from the former purifiers, coal, cinders, and brick, is non-hazardous. The area of purifier waste will be excavated and blended with the hazardous material in GH-1, along with additional clean soil, coal and quicklime. The large amount of wood shavings, coal, and cinders within this material, in addition to the low pH, make this a suitable material for blending with the contents of GH-1.

The estimated 240 CY of clean soil and gravel overlying the purifier waste to a depth of one foot will be removed and stockpiled for blending with the contents of GH-1 or reused as final grading material following backfilling of the purifier waste area.

Three concrete purifier pads, with diameters of 20, 22, and 30 feet, will be removed prior to excavation and stockpiled as backfill material for GH-1.

5.3 Tar Wells and Separator

Four tar wells, a tar separator, and other unidentified below-ground structures have been identified on historical maps of the site. The tar wells and separator are expected to contain a variety of fill material of unknown volume. Based on earlier studies, this material will include soil, rubble, brick, cinders, clay, sand, and gravel with minor impact by coal tar. The materials within the tar structures may not be hazardous by toxicity characteristic for TCLP benzene. All lightly impacted material from tar wells or other structures will be excavated, temporarily stockpiled and tested. During blending of hazardous materials within GH-1, the stockpiled tar well material may be added to the blend as a partial substitute for clean soil.

Excavated material that is heavily impacted with coal tar will be segregated from the lightly impacted material and blended with clean soil, coal, and quicklime to render the material non-hazardous, and stockpiled.

Water encountered in any of the tar wells or separator will be pumped to the treatment system and temporary storage tanks. The walls and floor of the tar wells and separator may be partially or totally demolished in the excavation process.

5.4 GH-1

There are an estimated 800 CY of coal-tar, coal-tar impacted cinders, and debris within GH-1. A cross section illustrating the material to be excavated from GH-1 is shown on Figure 2. GH-1 material will be blended and solidified using the ratios outlined in Section 3.2, using clean soil from off site, purifier waste, coal, and granular quicklime. Lightly impacted tar well and separator material may also be added to the blend. The blended mixture will then be stockpiled and sampled.

Larger debris, such as concrete or metal, will be manually separated during the excavation process and stockpiled or loaded into rolloff containers.

Additional equipment may be required to excavate around and remove metal "liners," if present, or gas holder walls.

The upper 7 to 10 feet of GH-1 is occupied by water lightly impacted with dissolved-phase constituents of coal tar. Prior to excavation activities, the concrete lid to GH-1 will be removed/demolished and the holder will be dewatered with pumps. As more solid materials are encountered below a depth of 7 feet, Philip may attempt to excavate a sump within the excavation, if necessary, to continue to pump free liquids from the excavation into the water treatment system and wastewater storage tanks.

From 7 to 10 feet below the surface to the bottom of the holder, the dewatered material will be blended and solidified in the holder using the materials and ratios discussed earlier. To minimize the generation of airborne dust, quicklime will be pumped into GH-1 using a tanker truck, while the excavation cover is in place.

Once the GH-1 material has been blended, it will be excavated and stockpiled in the area shown on Figure 1.

5.5 Post-Excavation Actions

A sample will be collected from the blended material stockpile for laboratory analysis of TCLP benzene, pH, reactivity, and moisture content as discussed in Section 6.1. If the initial process fails to sufficiently reduce the concentration of benzene, the blended material will be moved back to GH-1 and reblended in accordance with the procedures presented above.

Once approval has been received for disposal, the blended material will be loaded onto trucks for transport to BTT as described in Section 8. Prior to release of a truck for transport, the blended material will be field-tested for pH, and a tarp will be placed over the trailer of the truck. Testing for pH may be discontinued if the results are consistently below the 12.5 limit.

Gas holder or tar well and separator walls will not be manually scraped or cleaned prior to the start of backfilling operations, other than removing free liquids and contaminated material using the excavator. Philip anticipates that any free liquids contained in GH-1 or the tar wells and separator will be absorbed in the blending process. Backfilling will begin immediately upon completion of the excavation of each structure, or when all blending and sample verification is complete in the case of GH-1. Backfilling is described in Section 10.

6 WASTE MANAGEMENT

A stockpile for blended material will be constructed in the central portion of the site. A rubber-tired front-end loader will construct the stockpile after blended material is transported from the holder by dump truck. Upon completion of work each day, the stockpile will be covered with 6-mil plastic sheeting, and sand bags will be placed at all overlaps and around the perimeter.

6.1 Sampling

The purpose of this section is to define a method for collecting representative samples from the blended material for confirmatory analysis. BTT requires analytical confirmation that the blended material is non-hazardous at the rate of one sample per every 1000 tons delivered to the facility. The total volume of blended coal/soil/lime is estimated to be 2100 tons; therefore, at least three samples will need to be collected from the stockpile.

A composite sample will be collected from the blended material stockpile. Aliquot sample locations will be chosen by dividing the stockpile into ten parts of approximately equal volume. A backhoe or hand shovel will be used to expose the blended material one to three feet below the surface for sampling. A stainless steel spoon will be used to collect aliquots, approximately 200 grams in mass. The ten aliquots will be mixed in a stainless steel bowl in a manner sufficient to achieve homogeneity of the composite sample. The stainless steel sampling spoon and bowl will be decontaminated according to Philip standard field practices, which include ASTM D 5088-90.

Sample containers will be filled, labeled, and manifested in a manner consistent with Philip standard field practices. The sample container for TCLP benzene, pH and reactivity will be a 250-ml glass jar provided by the laboratory. The sample jar will be filled to the top with the blended soil material; voids are to be eliminated as much as possible. Sample jars will be labeled and placed in a cooler following collection and cooled to 4 degrees C. No other preservative is required for these samples. Samples will be wrapped in bubble wrap or similar cushioning material and packed in the cooler in such a way as to prevent movement or breakage during shipment. Sufficient ice will be double bagged in sealed plastic bags and placed in the cooler adjacent to sample containers to cool the samples to the necessary temperature until delivery to the laboratory. The maximum holding time prior to extraction is seven days.

Laboratory chain-of-custody forms will be completed and signed by the sample collector in the field, or by trained personnel upon return to the of-

fice. The chain-of-custody procedure will follow ASTM D 4840-88 (Reapproved 1993). The chain-of-custody form will be placed inside a sealed plastic bag and then inside the cooler prior to shipment to the laboratory. The cooler will be sealed with strapping tape and shipped to the laboratory by Federal Express overnight delivery or similar service. The shipping documents will be utilized to document chain-of-custody by the selected delivery service. Upon receipt of the samples by the laboratory, the laboratory sample custodian will open the cooler, inspect and verify the condition of the samples, and sign the chain-of-custody form.

6.2 Analysis

The source area materials were initially tested for BTT acceptance criteria. Materials from two to six feet in the source area were found to be hazardous for the toxicity characteristic of benzene (action level 0.5 mg/L). Soil from the lower part of the source area (13-15 feet) tested not hazardous for TCLP benzene. As previously discussed, the remainder of the material to be excavated is lightly contaminated, but is expected to be not hazardous as well.

The use of five percent quicklime in the mixture has historically increased pH to near 12.0. Higher percentages of lime could cause the mixture to be classified hazardous (pH greater than 12.5) or reactive. Therefore, the confirmation analysis of the blended material will be for TCLP benzene, pH and reactivity. The laboratory will conduct the tests with an expected turnaround time of two days. Field testing of pH will also be conducted.

ARDL, the designated analytical laboratory, is an IEPA contract laboratory in the CLP program, and follows all IEPA guidelines for quality assurance and control.

A quality assurance review will be conducted for the analytical results received from the laboratory. Laboratory data will be reviewed in accordance with the guidelines set forth in the USEPA "Laboratory Data Validation Functional Guidelines for Evaluating Organic and Inorganic Analyses", 1994, and the method-specific quality requirements. The review will consist of checking holding times, method blank data, system blank data, spike data, and replicate data.

Upon confirmation that the blended material is non-hazardous, the material will be loaded into trucks for transport to BTT. In the event that analysis of a sample shows a TCLP benzene concentration in excess of 0.5 mg/L, pH greater than 12.5, or that the sample is reactive, the stockpile will be resampled following additional curing time to verify the analytical results. The sample will be collected from the stockpile in the same manner out-

lined above, and analyzed for TCLP benzene, pH and/or reactivity. If the second analysis shows that the material is non-hazardous and not reactive, the stockpile will be considered non-hazardous and non-reactive, and will be loaded for transportation off site to BTT.

If the analysis of the second sample confirms that the material is hazardous for toxicity characteristic from TCLP benzene, the stockpile will be re-mixed in the mixing boxes with coal and/or additional clean soil in sufficient amount to reduce the TCLP benzene concentration to 0.5 mg/L or less. If pH reduction is required, a solution to neutralize the lime will be employed (such as phosphate). The blended material will then be stockpiled and retested. The reblended cinders/soil/lime mixture will be sampled and analyzed in the same manner as the initial stockpile.

7 WASTEWATER DISPOSAL

Wastewaters will initially be phase separated by pumping through an oil/water separator, followed by a sediment tank with baffles. The phase-separated water will be collected in the temporary storage tanks and sampled and analyzed for the chemical parameters required by the discharge permit. Coal-tar oil collected by the oil/water separator will be pumped back into GH-1 and mixed with blending material.

Subsequent to permit approval, and following receipt of the water analyses, the water may undergo additional treatment such as activated carbon filtration, if necessary, and will be discharged into the local sanitary sewer system. Permit applications have been submitted by IP. The treatment system design was included in the permit application and will be adjusted and finalized in the field. The treatment system will be manually operated under the direction of an Illinois certified wastewater operator.

Following disposal, the temporary storage tanks will be decontaminated and cleaned. The decontamination water will be discharged into the local sanitary sewer system, and residual oil and sludges will be properly disposed of off site or blended with soil and transported to BTT.

8 TRANSPORTATION

All soils will be transported as special waste to the BTT facility at Baldwin, Illinois. Blended material will be loaded upon receipt of analytical testing results that indicate the TCLP benzene toxicity characteristic has been eliminated. All soils mixed with lime must first pass a laboratory or field determination that pH is less than 12.5.

8.1 Transporter

A licensed transporter for special waste will be used to transport material to BTT.

8.2 Vehicle Loading

The blended soils will be transported in covered aluminum end dump trailers. Each load will contain approximately 24 tons of material. Philip will be responsible for preparing documentation and manifests to permit transportation of the blended material as a special waste. IP will be identified on the documentation as the generator of the special waste.

Philip has assumed that a maximum of ten to fifteen truckloads can be delivered to BTT per day. Should the BTT facility be able to handle more truckloads, Philip will make arrangements to place additional vehicles in service in order to reduce the amount of time to deliver the material to BTT.

9 DISPOSAL

The following disposal facilities have been selected by IP for non-liquid wastes.

9.1 Special Waste Disposal

All soils will be disposed of as special waste at:

Baldwin Thermal Treatment Facility
10901 Baldwin Road, PO Box 146
Baldwin, Illinois 62217
Illinois Facility ID# 1578510001

Other special wastes, including trash and debris not accepted at BTT and segregated from the holder contents, and other solid wastes such as material scraps, disposable protective clothing, used pad materials (including liners), etc., will be collected in an on-site dumpster and transported to a landfill designated by IP.

9.2 Manifesting

State of Illinois manifests will be used at the site. Proper DOT classification will be utilized. The waste manifest will accompany shipment to the final destination.

10 BACKFILLING

Granular material such as sand, gravel, or limestone fines will be used as backfill. Demolition debris from the concrete purifier pads, any near-surface building foundations, and the GH-1 concrete lid, will also be placed in the excavations as backfill. Based on past experience and specific knowledge of this site, all demolition concrete is anticipated to be non-hazardous and suitable for use as on-site fill. If significant amounts of coal tar are visible on the concrete rubble, it may be cleaned before use as backfill, or sorted out and sent to BTT or an approved landfill for disposal.

Backfilling of each area or structure will begin immediately upon completion of excavation and stockpiling of the excavated or blended material from that area/structure. Since the purifier waste area is within the middle of the circular drive around the Booster House, it will be excavated and backfilled first. Approximately 12 inches of gravel, both from the surface of the purifier waste excavation and from off site, will be placed at the surface and compacted as necessary to allow use by tractor trailers.

A backfill profile of GH-1 is shown on Figure 2. GH-1, tar wells, and the tar separator will be backfilled with granular fill to one foot below the existing grade. The majority of the backfill will be dumped directly in each excavation. The upper few feet of backfill will be compacted by driving across it using the excavator and rubber-tired loader. Compaction testing will not be performed and there are no compaction requirements. The final layer will be 6 to 12 inches of topsoil, as described in Section 11, Site Restoration.

11 SITE RESTORATION

Site restoration will consist of restoring the approximate original grades, placement of topsoil if necessary, site takedown, and demobilization. Topsoil will be stockpiled at the site to allow for a final grading and seeding for grass cover in spring, 1998. Although the majority of the work for this task will be performed at the end of field activities, the dismantling and removal of storage facilities and storage containers will be completed when their use is no longer required.

Upon completion of backfilling, approximately 6 to 12 inches of topsoil will be placed over the excavation areas with the exception of the purifier waste area. The purifier waste area is within a circular drive and is to be restored to a gravel surface immediately upon completion of excavation. Restored areas will be graded to generally conform to the grades and elevations present prior to the work. Additional topsoil will be applied as necessary during spring, 1998, the surface will be final-graded, and grass seed will be applied to establish grass cover conforming with pre-IRM conditions at the site.

Prior to final departure from the site, a general policing of the site will be conducted.

12 PROJECT COMPLETION REPORT

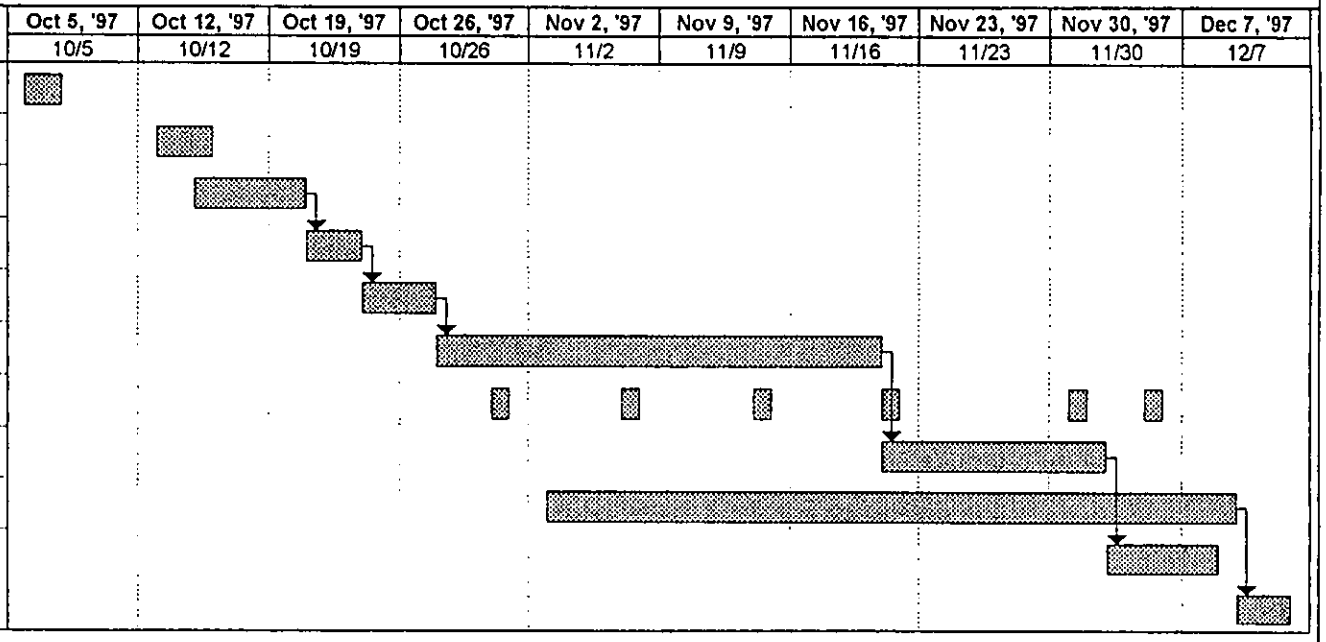
The project completion report will summarize the IRM activities, and will include photo documentation, waste blending and disposal records, and appendices containing analytical reports. Results of field decisions and deviations from the work plan will be documented. A general discussion of air monitoring results will be incorporated into the report. A separate air monitoring report is not contemplated.

13 SCHEDULE

A schedule of on-site activities is shown on the following page. We anticipate the excavation of the purifier waste, tar wells and separator, and GH-1, and blending of the contents of GH-1, will take 42 working days.

Proposed Schedule
Interim Remedial Measures- Source Removal
Champaign MGP

ID	Task Name	Duration
1	Background Air Sampling	2d
2	Mobilization/Site Set-up	3d
3	Excavate Purifier Pad Area	4d
4	Exploratory Trench, Stockpile & Backfill	3d
5	GH-1 Dewatering System Set-up	2d
6	GH-1 Excavation & Blending (7-16.5')	18d
7	Waste Verification Sample	23d
14	Tar Well Material Blend & Stockpile	5d
15	Transportation of Blended Material	24d
16	GH-1 Backfill	4d
17	Site Take-Down/Demobilization	3d



Project: IP-Champaign
17246

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

Revised:Mon 9/15/97 15:07

List of Tables

Table 1. Analytical Parameters and Methods for Waste Samples

Parameter	**Method**
pH	SW846 9045b
Ash (550 °C)	EPA 160.4
BTU	ASTM E711-87
Paint Filter	SW846 9095
Total Solids (105 °C)	EPA 160.3
Reactive Sulfide	SW846 9030
Total and Reactive Cyanide	SW846 9010
Sulfur	SW846 6010 digested via Method 3051
Flash Point (open cup)	SW846 1010
EOX	SW846 9020
Total Phenolics	SW846 9066, mod.
BTEX	SW846 8260
TCLP Mercury	SW846 7470
TCLP Metals	SW846 6010
TCLP Volatiles	SW846 8260
TCLP Semi-Volatiles	SW846 8270

Table 2. Waste Characterization Analytical Results for Gas Holder GH-1
Champaign MGP

Field Sample ID		GH1-12
Date Sampled		3/12/97
Sample Depth (feet)		10 - 12
Sample Type		grab
Sample Description		coal-tar/water
Parameter	**Units**	**Value**
pH	S.U.	6.41
Ash (550 deg C)	%	1.1
BTU (Specific Heat)	btu/lb.	3,600
Moisture	%	22
Specific Gravity	g/cc	0.99
Sulphide	mg/kg	100
Cyanide (total)	mg/kg	2.3
Sulfur (as Sulphate)	%	0.29
Total Organic Halogens (TOX)	mg/kg	ND (5)
Ignitability	deg F	>200
Volatile Organic Compounds (VOCs) Detected		
Acetone	mg/kg	27
Benzene	mg/kg	380
2-Butanone	mg/kg	57
1,4-Dichlorobenzene	mg/kg	2.6
1,2-dichloroethane	mg/kg	8.1
Ethylbenzene	mg/kg	450
Toluene	mg/kg	550
Xylenes (Total)	mg/kg	570
Total BTEX	mg/kg	*1,950*
Total VOCs	mg/kg	*2,045*
Semi-Volatile Organic Compounds (SVOCs) Detected		
Naphthalene	mg/kg	49,000
Acenaphthylene	mg/kg	9,200
Acenaphthene	mg/kg	7,300
Fluorene	mg/kg	9,500
Phenanthrene	mg/kg	30,000
Anthracene	mg/kg	6,400
Fluoranthene	mg/kg	7,600
Pyrene	mg/kg	15,000
Benzo(a)anthracene	mg/kg	4,400
Chrysene	mg/kg	4,200
Bis(2-ethylhexyl)phthlate	mg/kg	270
Benzo(b)fluoranthene	mg/kg	1,900
Benzo(k)fluoranthene	mg/kg	1,700
Benzo(a)pyrene	mg/kg	3,400
Indeno(1,2,3-cd)pyrene	mg/kg	1,200
Dibenzo(a,h)anthracene	mg/kg	310
Benzo(ghi)perylene	mg/kg	1,300
2-Methylnaphthalene	mg/kg	37,000
Dibenzofuran	mg/kg	2,500
Total SVOCs	mg/kg	192,180

Parameter	**Units**	**Value**
Metals		
Arsenic	mg/kg	3.2
Barium	mg/kg	3.8
Cadmium	mg/kg	1.4
Copper	mg/kg	ND(10)
Iron	mg/kg	960
Lead	mg/kg	93
Manganese	mg/kg	ND(10)
Mercury	mg/kg	ND(0.4)
Nickel	mg/kg	ND(10)
Selenium	mg/kg	0.8
Silver	mg/kg	ND(1.0)
Sulphur	mg/kg	1,900
Zinc	mg/kg	160
TCLP Volatile Organic Compounds Detected		
Benzene	ug/L	3,000
Chloroform[1]	ug/L	16
1,2-Dichloroethane	ug/L	68
1,4-Dichlorobenzene[1]	ug/L	13
TCLP Semi-Volatile Organic Compounds Detected		
o-Cresol	ug/L	270
m&p Cresol	ug/L	310
TCLP Metals		
Cadmium	mg/L	ND(0.002)
Chromium	mg/L	ND(0.004)
Lead	mg/L	ND(0.022)

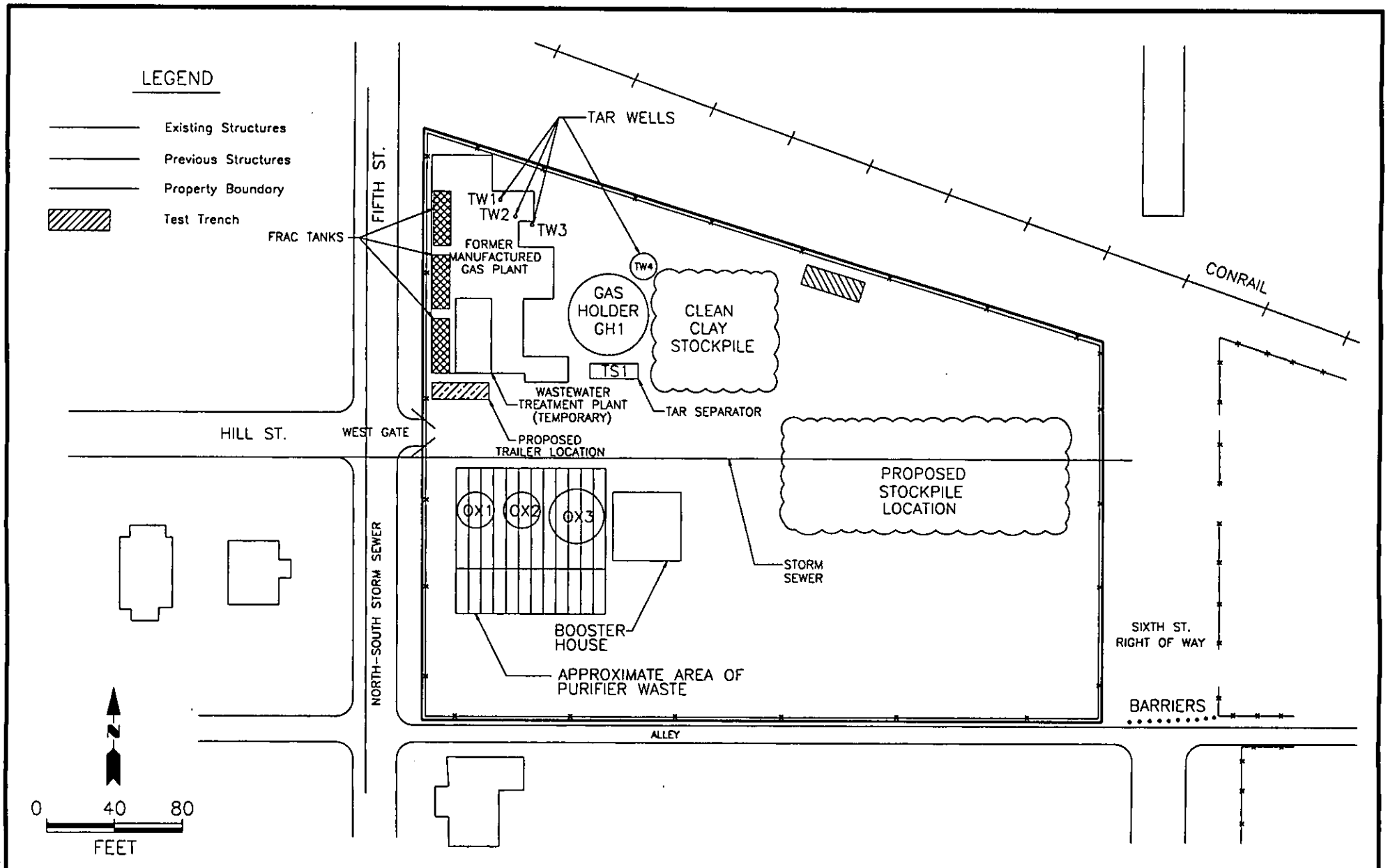
ND Not detected at detection limit in parentheses.
mg/kg milligrams per kilogram
BTEX Benzene, toluene, ethylbenzene, and total xylenes.
TCLP Toxic Characteristic Leachate Procedure
ug/L micrograms per liter
1 detected at higher concentrations in Method
mg/L milligrams per liter

Table 3. Waste Characterization Analytical Results for Purifier Waste
Champaign MGP

Field Sample ID		CHTP-101-102-103
Date Sampled		8/28/97
Sample Depth (feet)		1 - 3
Sample Type		composite
Sample Description		purifier waste
Parameter	Units	Value
pH	S.U.	5.5
Ash (550 deg C)	%	1.1
Total Solids	%	77.6
Reactive Sulphide	mg/kg	ND (31.9)
Reactive Cyanide	mg/kg	ND (0.32)
Total Organic Halogens (TOX)	mg/kg	ND (272)
Ignitability	deg F	>200
TCLP Metals		
Arsenic	mg/L	ND (0.025)
Barium	mg/L	0.041
Cadmium	mg/L	ND (0.0050)
Chromium	mg/L	ND (0.0050)
Lead	mg/L	ND (0.025)
Mercury	mg/L	ND (0.00020)
Selenium	mg/L	ND (0.040)
Silver	mg/L	ND (0.0050)

mg/kg milligrams per kilogram
mg/L milligrams per liter
ND Not detected at detection limit in parentheses
TCLP Toxic Characteristic Leachate Procedure

List of Figures



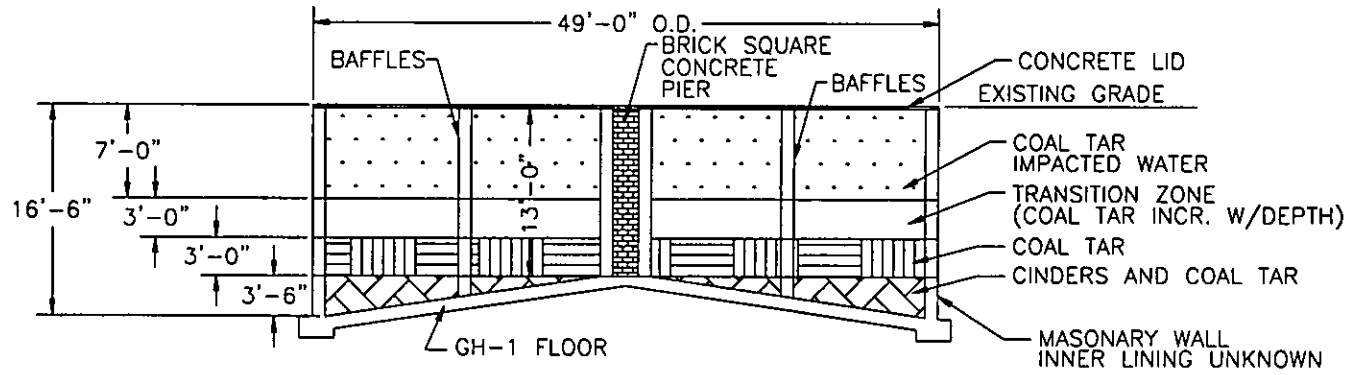
PHILIP ENVIRONMENTAL

TITLE:

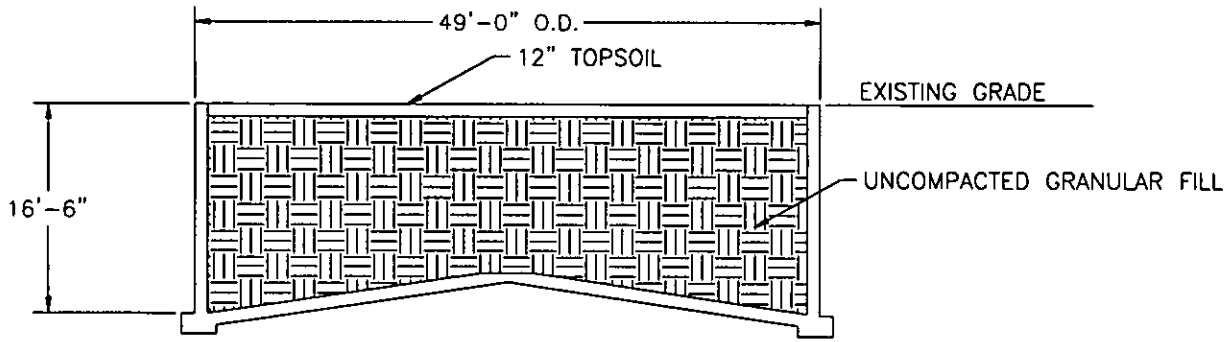
SITE PLAN
INTERIM REMEDIAL MEASURES
SOURCE REMOVAL

DWN:	DES.:	PROJECT NO.: 17246
MRC	SJC	MGP SOURCE REMOVAL CHAMPAIGN, ILLINOIS
CHKD:	APPD:	
DATE: 09/16/97	REV.: A	FIGURE 1

J:\17246\17246-A



EXCAVATION PROFILE THRU GH-1



BACKFILL PROFILE THRU GH-1

0 15
FEET

PHILIP ENVIRONMENTAL

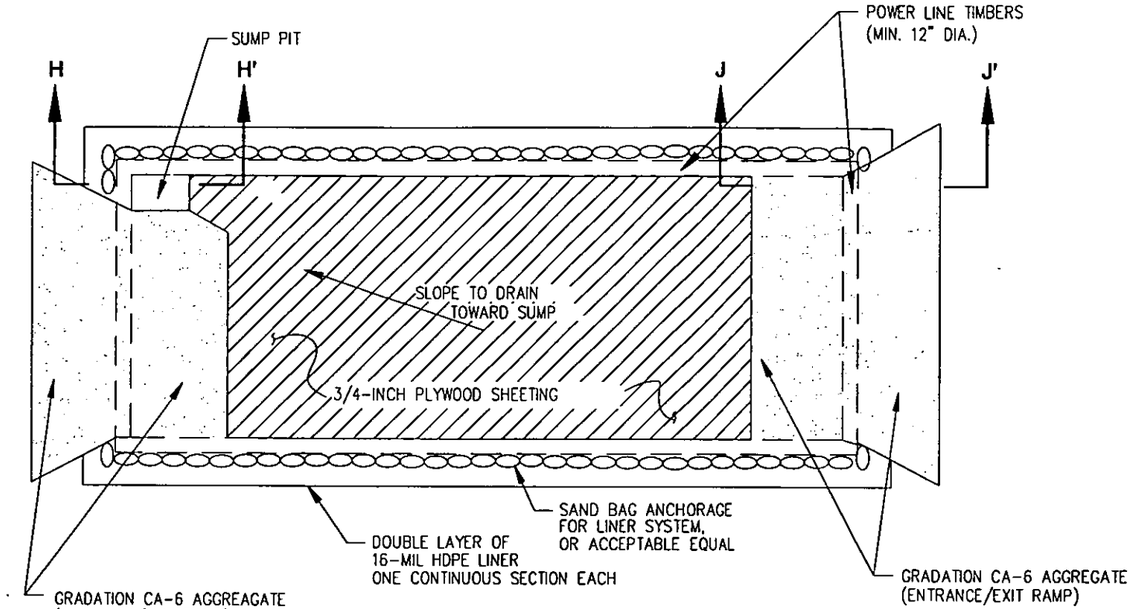
TITLE:
GH-1 PROFILES
EXCAVATION AND BACKFILL

DWN:	DES.:
MRC	SJC
CHKD:	APPD:
DATE:	REV.:
04/17/97	A

PROJECT NO.: 17246
IP - Champaign
Champaign, Illinois

Figure 2

COL1. J:\17246C-001

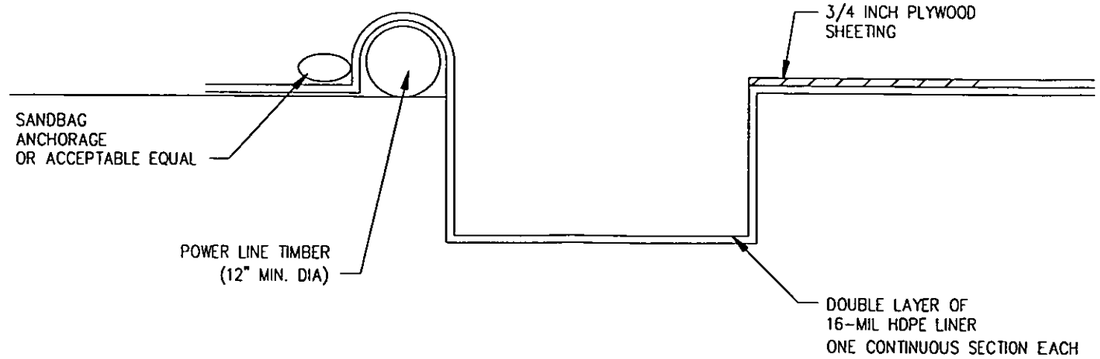


DECONTAMINATION PAD PLAN

0 30'

FEET

NOTE: PAD TO BE SIZED TO CONTAIN LARGEST PIECE OF EQUIPMENT PROPOSED BY CONTRACTOR, WITH NO OVERSPRAY

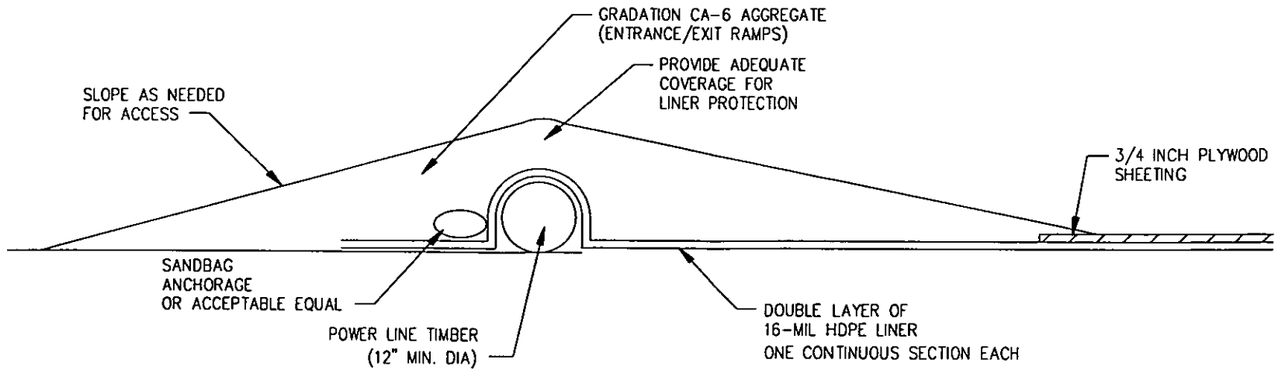


DECONTAMINATION PAD/SUMP DETAIL

SECTION H – H'

0 4'

FEET



DECONTAMINATION RAMP DETAIL

SECTION J – J'

0 4'

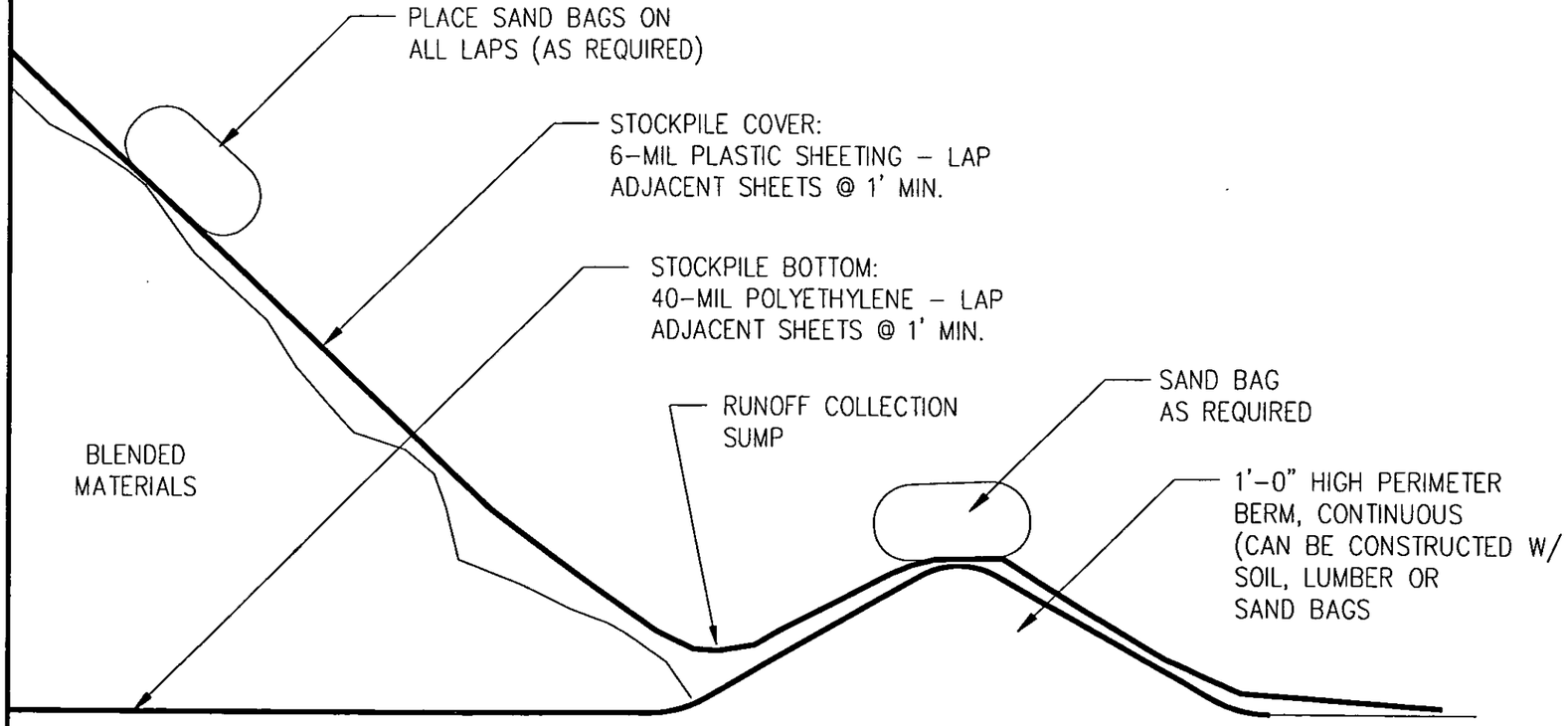
FEET

COL. J:\17248-002

PHILIP ENVIRONMENTAL

TITLE:
TEMPORARY FACILITIES
DECONTAMINATION PAD
PLAN & DETAILS

DWN: TMM	DES: JW	PROJECT NO: 17246	
CHKD: DEW	APPD: DEW	MPG SOURCE REMOVAL CHAMPAIGN, ILLINOIS	
DATE: 7/9/97	REV: 1	FIGURE 3	



STOCKPILE CONSTRUCTION DETAIL

COL J:\17246-002

PHILIP ENVIRONMENTAL

TITLE:
TEMPORARY FACILITIES
STOCKPILE & SILT FENCE
DETAILS

DWN:	DES:	PROJECT NO: 17246
TMM	JW	MPG SOURCE REMOVAL CHAMPAIGN, ILLINOIS
CHKD: DEW	APPD: DEW	
DATE: 7/22/97	REV: 1	FIGURE 4

Ambient Air Monitoring Plan
Former Champaign Manufactured Gas Plant
Interim Remedial Measures -
Source Removal

October 1, 1997

Prepared for:

ILLINOIS POWER COMPANY
Champaign, Illinois

PHILIP SERVICES CORPORATION
210 West Sand Bank Road
Post Office Box 230
Columbia, Illinois 62236-0230

Project 17246

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background/Overview

Illinois Power Company (IP) is conducting interim remedial measures at a former manufactured gas plant (MGP) site located in Champaign, Illinois. This remediation is to consist of dewatering GH-1, blending and disposal of coal tar within GH-1 and excavation of tar wells, a tar separator, and purifier wastes in the northwest section of the site. Figure 1 is a site map which shows the location of the proposed excavation.

To support the remediation, ambient air quality will be monitored around the site to evaluate the background quality of air at the site perimeter, and to prevent off-site areas from experiencing significant adverse impacts.

1.2 Air Monitoring Objectives

The overall objective of the proposed ambient air monitoring is to collect sufficient data to support a demonstration that the proposed remediation activities do not significantly impact human health or the environment in the area around the site. Specific objectives include:

- monitoring to document ambient air quality upwind and downwind of the site prior to remediation activities to provide a baseline for comparison;
- monitoring of ambient air quality upwind and downwind of the site during remediation activities to immediately identify emission occurrences and allow for prompt corrective measures of operations; and
- collection of sufficient ambient air quality and meteorological (MET) data that will be usable (following data validation) at a future time to perform an assessment of the air quality impact to the area surrounding the site from remediation activities. The intent is to demonstrate that the remediation activities on the site did not result in emissions that caused adverse human health or environmental impact.

2 AMBIENT AIR MONITORING

2.1 Ambient Air Sampling Parameters

Ambient air sampling will be conducted to monitor the concentrations of the following parameters:

- volatile organic compounds (VOCs);
- polycyclic aromatic hydrocarbons (PAHs);
- real-time particulates; and
- real-time VOCs.

These parameters were selected based on analytical data for soil from this site, as well as experience with other MGP sites.

2.2 Ambient Air Sampling Locations

Monitoring will be conducted by sampling predominantly at the site fenceline and at intermediate locations around the work area. Actual number of monitoring points and locations for stationary integrated sampling of VOCs and PAHs will be selected prior to each sampling event. Factors that influence the selection of monitoring points include:

- invasive or non-invasive remedial activities;
- location of activities occurring on the site;
- weather conditions, especially wind direction and speed;
- location of obstructions such as buildings in relation to wind direction;
- location of closest receptors, especially sensitive receptors; and
- any other pertinent conditions identified prior to the beginning of each sampling event.

Prevailing wind directions, based on historical MET data collected by the National Weather Service, along with the location of site activities and local conditions, will be used to conceptually locate the monitoring stations. For the months when this remediation is scheduled to occur (October through December), historical data indicate a predominant wind

direction from the southwest. A seasonal wind rose for the site is presented in Figure 2.

Several sensitive receptors are located near the site. A private child care center is located across the railroad tracks north of the site, a battered women's shelter (group home) is located across the alley from the southern boundary of the site, and a hospital is located southeast of the site. Figure 3 is a neighborhood map that identifies residential and other areas surrounding the site. Background sampling locations are also identified on Figure 3.

One building (approximately 20 feet tall) is located on the site (Figure 1). This building could significantly affect the dispersion of air-borne contaminants from the site; therefore, placement of the monitoring stations along the fenceline will take this into consideration.

It is recognized that actual locations may deviate from the "ideal" in that it may not be physically possible (or practical) to meet all of the desired sampling equipment siting criteria. Equipment siting criteria include:

- locate the monitor along the "fenceline" of the site (when possible);
- the monitor inlet should be placed approximately 2 meters above the ground surface level;
- the monitor inlet should be at least 20 meters away from the nearest street or trees;
- the monitor should be well-removed from obstacles (about two or more times the height of the obstruction);
- the immediate surroundings should have ground cover to prevent surface dust from affecting the measurements;
- the monitor should receive unrestricted airflow from at least three cardinal wind directions (270°), including the predominant wind direction;
- there should be no furnace or incinerator flues nearby;
- the station location must have suitable accessibility;
- the monitor must be placed on a flat surface;
- security, electrical power, and (if remotely operated or reporting) communication lines must be considered and provided; and

- if a roof-top location is considered, the monitor should be located at least 2 meters from walls, parapets, penthouses, etc.

Note: It is possible that meeting all of the above criteria may not be possible at any locations. Site-specific locations will be determined at the site by considering the above criteria.

Real-time VOC monitoring will be performed by use of portable hand-held equipment located and moved intermittently among fenceline locations and spots nearer to the work area as appropriate . Real-time dust (particulate) monitoring will be conducted by locating a real-time dust monitoring device in the downwind segment of the active work area. Real-time monitors will be relocated as needed based on wind conditions and site activities.

2.3 Ambient Air Sampling Methods and Equipment

Integrated sampling with stationary samplers will be conducted in accordance with Methods TO-13 (modified) and TO-14. These samples will be collected simultaneously over a 24-hour period. Sample media will be obtained from Zenon Laboratories, Inc. (Zenon) of Burlington, Ontario, Canada. Samples will be returned to Zenon for analysis to be performed in accordance with Methods TO-13 and TO-14 as described below. Table 1 lists the laboratory method detection limits for each method.

Real-time sampling of dust and VOCs will be conducted using portable instruments during the normal workday.

2.3.1 VOCs

USEPA Method TO-14 (USEPA, 1988) will be used for VOCs. For each VOC sample, air will be drawn into a SUMMA canister with subsequent analysis by gas chromatography/mass spectrometry (GC/MS) in accordance with this method.

For Method TO-14, a 1.7-liter sample will be collected. The laboratory will evacuate the SUMMA canisters to the prescribed negative pressure and the flow controller will be set for a 24-hour sampling period prior to shipping to the site. Standard temperature and pressure corrections for air density variations will be made from data collected at the site with an on-site MET station.

2.3.2 PAHs

USEPA Method TO-13 (USEPA, 1989) will be used for PAHs. Method TO-13 is for determination of benzo(a)pyrene and other PAHs in outdoor air. For each sample, air will be drawn through a combination quartz filter/adsorbent cartridge. Particulate-bound PAHs will be collected on the 4-inch-diameter acid-washed quartz-fiber filter and gaseous PAHs will be collected on the 2-inch-diameter by 3-inch-long PUF. Zenon will analyze the PUFs and fiber filters together (as one sample). Samples will be analyzed by GC/MS in accordance with this method.

Method TO-13 was modified to include the use of Gilian AirCon 2 programmable air sampling pumps, which have a lower flow rate. The lower flow rate results in higher detection limits; however, the detection limits have been judged acceptable for the purposes of this project. The AirCon 2 pumps operate on 110 volts AC and have an electronic monitor set to document the sampling duration and flow. The sampling flow rate will be 20 liters per minute for 24 hours. The samplers will be calibrated on-site using a Gilibrator primary standard calibration device immediately before and after the sampling period.

2.3.3 Real-Time Dust

Real-time monitoring of fugitive dust (particulates) will be conducted using a Laser Dust Monitor, which will be operated as necessary to monitor locations downwind from active remediation areas. Readings from the instrument will be observed and recorded either manually or by use of the datalogger.

Ambient air action levels for dust have been established based on the OSHA limit of 10 mg/m^3 over 8 hours. The real-time (instantaneous) action level for dust is 5 mg/m^3. The detection limit for the Laser Dust Monitor is 0.01 mg/m^3.

2.3.4 Real-Time VOCs

Real-time VOC monitoring will be conducted by use of a portable photoionization detector (PID) as a screening device to non-selectively monitor VOCs. More selective VOC monitoring will be performed via a portable GC.

The PID will be carried by field personnel along certain upwind and downwind locations from the active work areas to detect and

manually record VOCs. In the event of sustained VOC readings on the PID exceeding 2 parts per million (ppm), the portable GC will be used to determine the level of benzene present. Readings will be compared to the ambient air action levels presented in Section 2.5. The benzene detection limit for the portable GC is 0.001 ppm, which is less than the calculated action levels.

2.4 Ambient Air Sampling Duration and Frequency

Ambient air will be monitored in the three phases of activities described in the following subsections.

2.4.1 Background Ambient Air Sampling

Background ambient air will be characterized by collecting air samples for two consecutive 24-hour sampling events prior to site remediation activities. Each background sampling event will consist of a 24-hour sampling period, resulting in a 48-hour total sampling period. Five stationary locations along the fencelines will be sampled during the two events. One sampling station will have co-located samplers to collect duplicate samples. The location of the background monitoring points are shown on Figure 3, and marked with a "BL" prefix.

Real-time dust and VOC monitoring will be performed intermittently during each of the two background sampling events and the measurements recorded to identify and document potential VOC and dust sources prior to remediation activities.

Background monitoring will be performed on two consecutive workdays between Monday and Friday prior to start of remedial actions.

2.4.2 Ambient Air Sampling During Invasive Site Remediation

During "invasive" site remediation, stationary integrated ambient air sampling will be performed at least once every three days. Invasive remediation includes excavation, blending, or handling materials that are not yet acceptable to be transported off site. (Note: Sampling on a periodic basis during site remediation is consistent with USEPA requirements for ambient air sampling during remediation of Superfund sites.) Air sampling will occur on the first day of invasive remediation and an average of once every three days following that time for the entire period of invasive remediation.

Real-time monitoring for VOCs via the PID will be performed by taking instantaneous measurements of ambient air on at least one-hour intervals and during the start of a different activity. Real-time dust monitoring will be conducted at least once per day and more frequently if visible dust excursions are observed. Dust monitoring will be performed at the location specified by the qualified on-site air monitoring technician.

2.4.3 Ambient Air Sampling During Non-Invasive Site Remediation

After all materials are blended, removed from the gas holder and tar wells, and stockpiled (i.e., invasive site remediation is complete), these materials will be loaded and transported off site. Thus, loading, transporting, and possibly reblending (i.e. non-invasive activities) may extend several weeks beyond the invasive remediation. Sampling once every three days is proposed during the non-invasive activities. Real-time monitoring will continue during non-invasive activities, but will be performed less frequently.

2.5 Ambient Air Action Levels

The risk-based, site-specific ambient air action levels presented in the following list have been established so that unacceptable site-related airborne contaminant concentrations do not exit the site during the proposed IRMs.

The PID will be used as a screening device at the downwind fenceline location or other areas of potential VOCs. If sustained PID measurements exceed 2 ppm, the portable GC will be used to compare benzene measurements to the following action levels:

Monitoring Point along:	Acceptable Benzene Concentration at Monitoring Point			
	Stable Wind Speed (less than 10 mph)		*Average Wind Speed (10 mph or greater in all directions)*	
	mg/m^3	ppm_v	mg/m^3	ppm_v
North Fenceline	2.3	0.72	3.1	0.97
West Fenceline	0.7	0.22	0.8	0.25
South Fenceline	0.7	0.22	0.8	0.25
East Fenceline	1.4	0.44	1.6	0.50

If the portable GC indicates that these levels are exceeded as a result of remediation activities, ALL remediation activities shall cease until adequate control measures are implemented or site conditions change.

The process used to establish these ambient air action levels is described in Appendix A.

2.6 Analysis

Zenon will analyze the integrated ambient air samples collected for VOCs and PAHs (PUFs, fiber filters, and SUMMA canisters). Chain-of-custody forms will accompany all samples during shipment. The following is the laboratory contact for this project.

Mr. Rod Thompson
(905) 332-8788
Zenon Laboratories
5555 North Service Road
Burlington, Ontario L7L 5H7

3 METEOROLOGICAL MONITORING

MET monitoring will be accomplished by assembling a 3-meter tripod to support the MET sensors and a weather-tight enclosure to house the translators and the data acquisition system. The MET parameters measured will include: wind speed, wind direction, temperature, barometric pressure, date, and time. The general MET equipment that we propose to use for this project includes:

- tripod to support sensors;
- wind speed sensor;
- wind direction sensor;
- ambient dry bulb temperature sensor;
- barometric pressure sensor; and
- data acquisition/recording system.

The MET station will be placed in accordance with the following guidelines and field experience. The MET station will comply with the following criteria (when possible):

- sensors mounted at a height of approximately 3 meters above the ground;
- sensors placed such that the distance between the sensor and any obstruction (natural or man made) will be at least 10 times the height of the obstruction (when possible); and
- if mounted on a structure (stack or roof of a building), be mounted on a 10- to 15-foot mast placed on the side of the structure facing the prevailing wind direction.

The MET station will be set up as follows:

- locate MET station site;
- assemble and erect 3-meter MET sensor support tripod;
- locate 115 VAC, 20 amp electrical power source, if necessary, and have it connected to the station;
- install each sensor on the MET sensor support tripod and connect it to the respective indicator according to the manufacturer's instruction manual;
- verify wind speed, wind direction, ambient temperature, and barometric pressure sensors conforming to field experience and/or the supplier's instructions; and

- connect the indicators to the data recording device and compare the sensors with the output of the recorder.

The MET station will continuously record wind speed, wind direction, barometric pressure, and ambient temperature for each sampling period. The data collected will be used in the location of predominantly upwind and downwind air samples. Meteorological data will be tabulated for each sample period and included in the final report.

4 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

4.1 Ambient Air Sampling

The QC procedures that will be followed for collection of ambient air quality samples include preventive maintenance and the collection of blanks and duplicates. The maintenance procedures specified by the manufacturer will be performed to keep the instruments from failing and to return failed instruments to service.

Calibrations will be performed in accordance with USEPA and manufacturer instructions. Routine self audits will be performed by either Philip Services Corp. or subcontractor personnel that are not involved with other operating aspects during the monitoring program. Auditing will be performed at the beginning and end of the monitoring program.

The QC samples will be collected as follows:

- one duplicate during background air sampling event (Method TO-13 and TO-14);
- one duplicate on the 1st day of invasive remediation, and every fifth sampling event thereafter, or a minimum of 20 percent of the sampling events (Method TO-13 and TO-14);
- one field spike during the background air sampling event (Method TO-13 only);
- one field spike on the 1st day of invasive remediation, and every fifth sampling event thereafter, or a minimum of 20 percent of the sampling events (Method TO-13 only);
- two trip blanks (one per sample shipment) during the background sampling event (Method TO-13 only); and
- one trip blank for every sampling event (Method TO-13 only).

Laboratory QC will be in accordance with the method requirements for Methods TO-13 and TO-14.

4.2 Meteorological Monitoring

QA/QC procedures will be applied to the installation and operation of the MET monitoring system. QA/QC will follow manufacturer specifications. Meteorological sensors will be installed per manufacturing specifications

and have documentation indicating that the sensor has been calibrated within the past year by qualified technicians. MET data collected during the monitoring program will be routinely screened for potential operational problems.

5 DATA REPORTING

Samples will be shipped to the laboratory with 24 hours of sample collection. Preliminary results will be reported to the site manager to assess potential air quality concerns due to site activities and whether action levels have been exceeded.

Real-time sampling results will be reported immediately to the site manager to allow prompt evaluation and response to potential emission problems.

A field logbook and/or field forms will be maintained throughout the sampling effort. Information to be recorded in the logbook or field forms will include:

- description of remediation activities conducted during sample collection;
- sample media receipt dates, conditions, and numbers;
- sampling equipment installation, operation and removal dates;
- sampling equipment calibration dates and results;
- sampling equipment maintenance dates and results;
- MET conditions on sampling days;
- any unusual situations which may affect samples or sampling;
- project number and location;
- unique sample (filter) numbers;
- sample dates;
- start and stop times;
- SUMMA canister serial numbers; and
- AirCon 2 pump serial numbers.

Data will be summarized in a section of the project completion report. The summary will include site conditions, sampling and analytical procedures and analytical results.

List of Tables

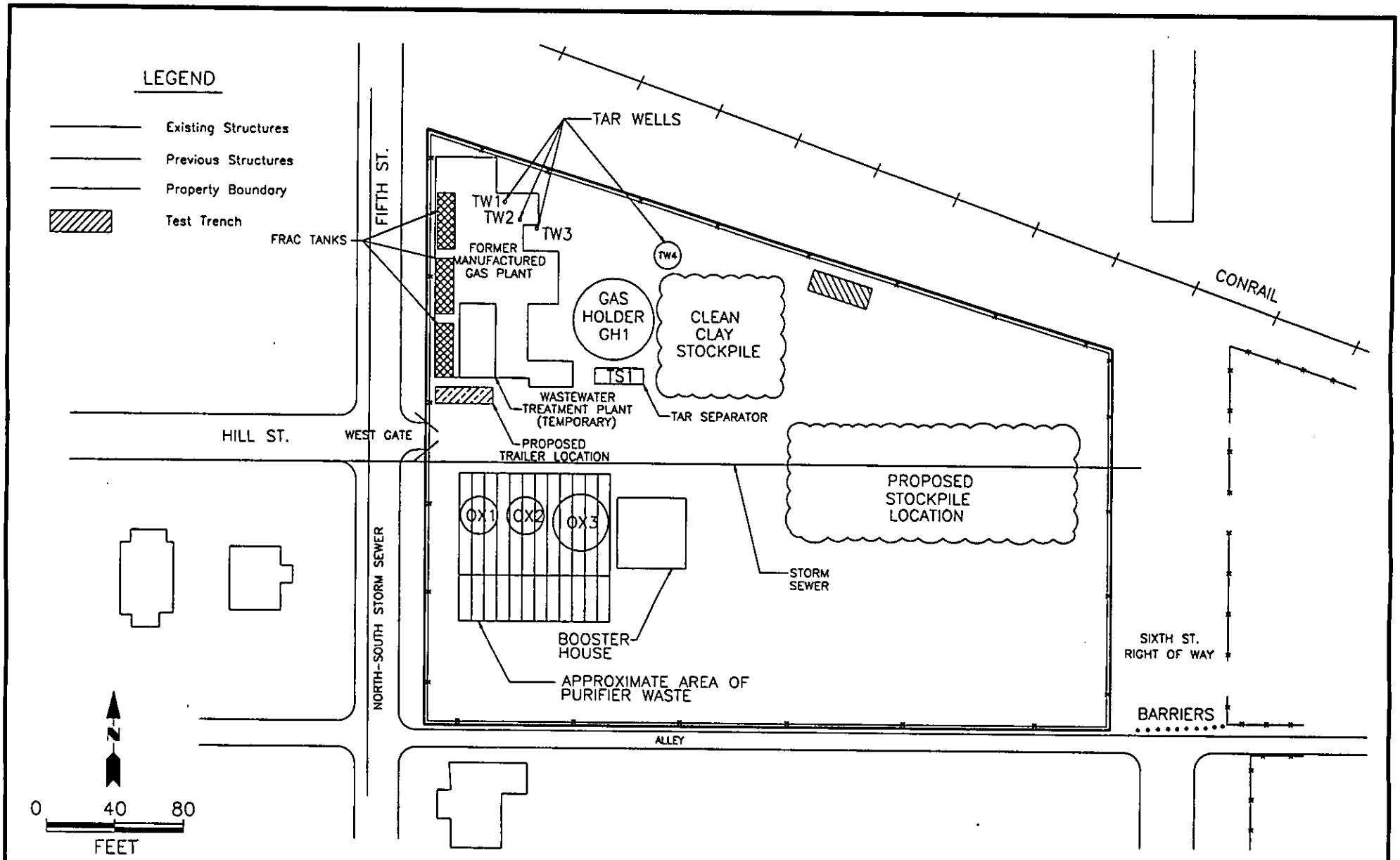
Table 1. Laboratory Method Detection Limits for Air Sampling Methods TO-13 and TO-14

Component	MDL	Units
TO-13 (PAHs)		
Naphthalene	1.9	ug
Acenaphthylene	1.6	ug
Acenaphthene	2.0	ug
Fluorene	1.3	ug
Phenanthrene	0.6	ug
Anthracene	1.1	ug
Fluoranthene	1.0	ug
Pyrene	0.5	ug
Benzo(a)anthracene	0.8	ug
Chrysene	0.5	ug
Benzo(b)fluoranthene	1.0	ug
Benzo(k)fluoranthene	1.1	ug
Benzo(a)pyrene	0.8	ug
Indeno(1,2,3-cd)pyrene	0.6	ug
Dibenzo(a,h)anthracene	1.0	ug
Benzo(ghi)perylene	0.7	ug

Component	MDL	Units
TO-14 (VOCs)		
Dichlorodifluoromethane	1.36	ppbv
Chloromethane	2.24	ppbv
Halocarbon 114	0.17	ppbv
Vinyl Chloride	1.22	ppbv
Chloroethane	0.11	ppbv
1,2-Dichloroethane	0.18	ppbv
Bromomethane	0.49	ppbv
Trichlorofluoromethane	0.17	ppbv
1,1-Dichloroethene	0.15	ppbv
cis-1,2-Dichloroethene	0.13	ppbv
1,1-Dichloroethane	0.20	ppbv
1,2-Dichloropropane	0.18	ppbv
Dichloromethane	0.30	ppbv
Chloroform	0.17	ppbv
1,1,2,2-Tetrachloroethane	0.56	ppbv
Halocarbon 113	0.15	ppbv
1,1,1-Trichloroethane	0.09	ppbv
1,1,2-Trichloroethane	0.22	ppbv
Toluene	0.21	ppbv
Benzene	0.12	ppbv
cis-1,3-Dichloropropene	0.15	ppbv
trans-1,3-Dichloropropene	0.20	ppbv
Trichloroethene	0.15	ppbv
Tetrachloroethene	0.24	ppbv
Carbon Tetrachloride	0.13	ppbv
Ethylene Dibromide	0.35	ppbv
Ethylbenzene	0.42	ppbv
m&p-Xylene	0.75	ppbv
o-Xylene	0.45	ppbv
1,3,5-Trimethylbenzene	1.10	ppbv
1,2,4-Trimethylbenzene	1.41	ppbv
1,3-Dichlorobenzene	1.34	ppbv
1,4-Dichlorobenzene	1.40	ppbv
1,2-Dichlorobenzene	1.74	ppbv
1,2,4-Trichlorobenzene	6.46	ppbv
Hexachloro-1,3-butadiene	6.10	ppbv

MDL - Method Detection Limit
PAHs- Polycyclic Aromatic Hydrocarbons
VOCs- Volatile Organic Compounds

List of Figures



PHILIP ENVIRONMENTAL

TITLE:

SITE PLAN
INTERIM REMEDIAL MEASURES
SOURCE REMOVAL

DWN:	DES.:
MRC	SJC
CHKD:	APPD:
DATE:	REV.:
09/16/97	A

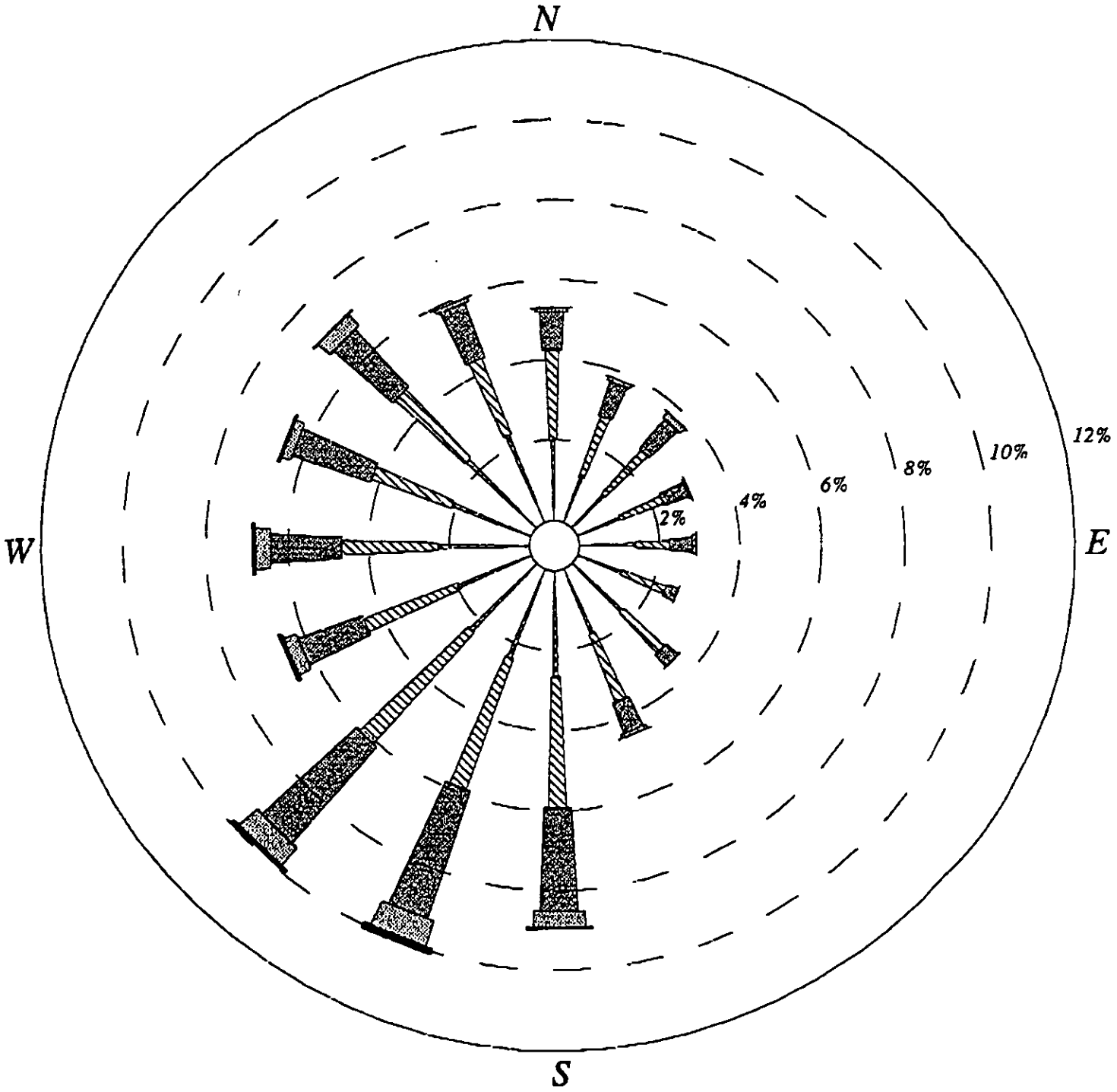
PROJECT NO.: 17246
MGP SOURCE REMOVAL
CHAMPAIGN, ILLINOIS

FIGURE 1

J:\17246\17246-A

Champaign

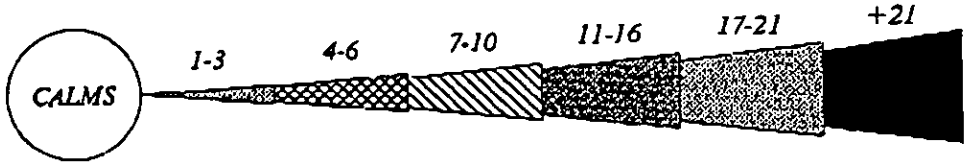
October 1-December 31; Midnight-11 PM

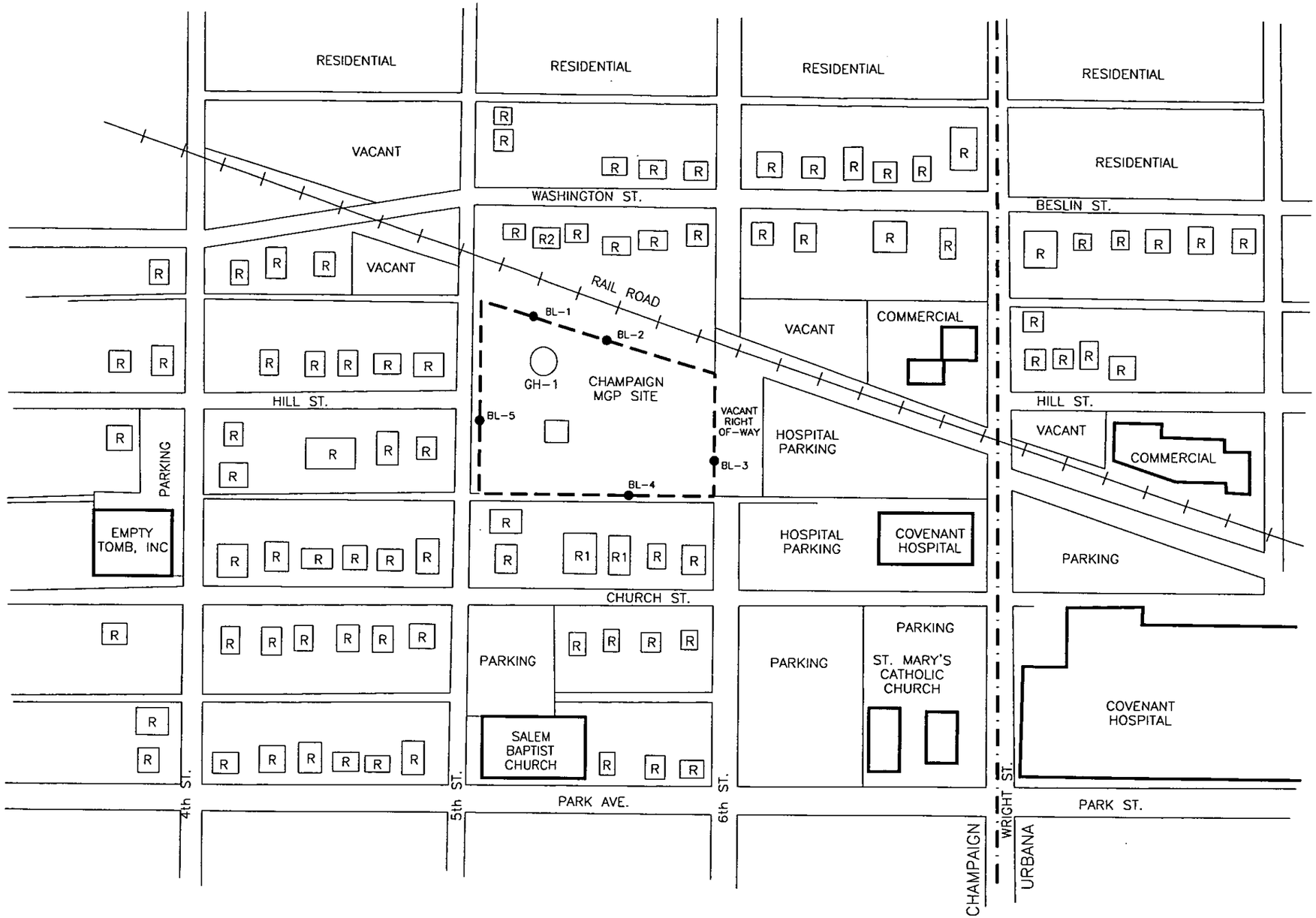


CALM WINDS 8.27%

NOTE: Frequencies indicate direction from which the wind is blowing.

WIND SPEED (KNOTS)





LEGEND

- R — RESIDENTIAL
- R1 — SOCIAL SERVICES (GROUP HOME)
- R2 — PRIVATE CHILD DAYCARE
- ● — BL— BASELINE AIR SAMPLE

0 200 FEET

N

COL. 17248A-001

PHILIP SERVICES CORP.

TITLE:

NEIGHBORHOOD MAP AND BASELINE AIR MONITORING LOCATIONS

DWN: TMM	DES: JW	PROJECT NO: 17246	
CHKD: JW	APPD: DEW	IP-CHAMPAIGN CHAMPAIGN, IL	
DATE: 9/4/97	REV: 0	FIGURE 3	

References

U.S. Environmental Protection Agency (USEPA). 1989. EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. June (with applicable updates).

APPENDIX A

Calculation of Ambient Air Action Levels

Selection of Benzene as Indicator Chemical

For this remediation project, action levels are needed for only the carcinogenic risk of benzene exposure because of benzene's high toxicity relative to other site-related contaminants. Based upon the experience of Philip and other firms at other MGP sites, concentrations of benzene will be high relative to those of other carcinogenic site-related contaminants.

Reference Exposure Level for Lifetime Benzene Exposure Limits

A 0.22 microgram per cubic meter ($\mu g/m^3$) average benzene concentration for residential exposure for 30 years represents a 10^{-6} cancer risk. (Reference: USEPA Region III Risk-Based Concentration Tables, January–June 1996.)

Modeled Equivalent Exposure Level for 2½-Month Project Duration

Since remediation activities are anticipated to require no more than 2½ months, a resident child would have to be exposed to an average benzene concentration of approximately 22 $\mu g/m^3$ to equal 10^{-6} cancer risk (Table 2: Cancer Risk Estimates for Benzene).

Adjustment for 10-Hour per Day Emission/Exposure Duration

The duration of potential exposure each day will be only 10 hours because remediation work at the site will last only 10 hours each day. The 22 $\mu g/m^3$ acceptable exposure concentration represents a 24-hour average concentration. Emissions will be unlikely during the non-work period because significant emissions occur only when the material is being disturbed. During non-work periods, the excavation and stockpiles will be covered. Therefore, the 24-hour acceptable exposure concentration should be adjusted to a 10-hour exposure concentration as follows:

$$\text{Real-Time Action Level (10-hour average)} = 22\ \mu g/m^3 \times \frac{24\ \text{hr / day}}{10\ \text{hr / day}} \cong 53\ \mu g/m^3$$

Adjustment for Variability in Wind Direction

The highest exposed receptor is likely to be downwind of the site no more than 25 percent of the 2½-month project duration (a reasonable assumption based upon local historical wind direction data which indicates wind blows from any one 22.5-degree direction sector for less than 10 percent of the time during October through December in Champaign).

$$\text{Adjusted Real-Time Action Level (10-hour average)} = 53\ \mu g/m^3 \times \frac{1\ \text{day}}{0.25\ \text{day}} \cong 211\ \mu g/m^3$$

Therefore, 211 $\mu g/m^3$ represents the acceptable benzene concentration at the receptor for a 10-hour daily period of remediation.

Calculation of Measuring Point Action Level Equivalent to Receptor Action Level

Ambient air will be monitored at the fenceline; however, the nearest off-site receptors reasonably expected to have more than an instantaneous exposure are located further away from the source of benzene. Benzene originating from the site will disperse naturally as it moves away from the

site. Modeling was performed to estimate the dispersion between the fenceline and the receptors.

The Champaign site has a roughly rectangular shape as shown on the neighborhood map. The gasholder, where the remedial activities will be conducted, is located in the northwest section of the site. A child day care center is located directly north of the gas holder, 130 feet from the fenceline. A group home is located south of the site, and Covenant Hospital is located southeast of the site, more than 650 feet from the fenceline. Residences are located west of the site.

Each fenceline will have unique action levels dependent upon the modeled dispersion between the fenceline and the nearest receptor in that direction. The action levels will be protective of the most sensitive receptors closest to the site. Several monitoring points were modeled, as indicated on Tables 3 and 4. The table below identifies the modeling points (and corresponding fencelines) that were chosen for the air monitoring program based on worst-case conditions as determined by the modeling. The action levels calculated from each modeling point will be applicable to the entire corresponding fenceline since they are based on the modeled worst-case conditions.

Fenceline Monitored	Receptor	Modeling Point (Tables 3&4)
North	child care	M-7
West	residence	M-6
South	group home	M-3
East	hospital	M-2

The following subsections calculate the real-time action level for each of the fencelines.

North Fenceline (Modeling Point M-7)

Based upon the modeling results for stable and average wind speeds to the north, the concentrations at the north fenceline are, respectively, 4.4 and 5.9 times higher than at the nearest receptors during these conditions. Average wind speed is 10 miles per hour (mph). Stable wind speed action levels will apply to wind speeds less than 10 mph. Application of these dispersion factors to calculate the fenceline concentrations corresponding to the acceptable off-site receptor level yields the following:

Adjusted Real-Time Action Level (10-hour avg) for Stable Wind Speed = 211 $\mu g/m^3$ × 4.4 ≅ 928 $\mu g/m^3$ = 0.9 mg/m^3

Adjusted Real-Time Action Level (10-hour avg) for Avg Wind Speed = 211 $\mu g/m^3$ × 5.9 ≅ 1,245 $\mu g/m^3$ = 1.2 mg/m^3

West Fenceline (Modeling Point M-6)

Based upon the modeling results for stable and average wind speeds, the concentrations at the west fenceline are, respectively, 1.4 and 1.5 times higher than at the receptor during these conditions. Average wind speed is 10 mph. Stable wind speed action levels will apply to wind speeds less than 10 mph. Application of these dispersion factors to calculate the fenceline concentrations corresponding to the acceptable off-site receptor level yields the following:

Adjusted Real-Time Action Level (10-hour avg) for Stable Wind Speed = 211 $\mu g/m^3$ × 1.4 ≅ 295 $\mu g/m^3$ = 0.3 mg/m^3

Adjusted Real-Time Action Level (10-hour avg) for Avg Wind Speed = 211 $\mu g/m^3$ × 1.5 ≅ 317 $\mu g/m^3$ = 0.3 mg/m^3

South Fenceline (Modeling Point M-3)

Based upon the modeling results for stable and average wind speeds, the concentrations at the south fenceline are, respectively, 1.4 and 1.5 times higher than at the receptor during these conditions. Average wind speed is 10 mph. Stable wind speed action levels will apply to wind speeds less than 10 mph. Application of these dispersion factors to calculate the fenceline concentrations corresponding to the acceptable off-site receptor level yields the following:

Adjusted Real-Time Action Level (10-hour avg) for Stable Wind Speed = 211 $\mu g/m^3$ × 1.4 ≅ 295 $\mu g/m^3$ = 0.3 mg/m^3

Adjusted Real-Time Action Level (10-hour avg) for Avg Wind Speed = 211 $\mu g/m^3$ × 1.5 ≅ 317 $\mu g/m^3$ = 0.3 mg/m^3

East Fenceline (Modeling Point M-2)

Based upon the modeling results for stable and average wind speeds, the concentrations at the east fenceline are, respectively, 2.6 and 3.1 times higher than at the receptor during these conditions. Average wind speed is 10 mph. Stable wind speed action levels will apply to wind speeds less than 10 mph. Application of these dispersion factors to calculate the fenceline concentrations corresponding to the acceptable off-site receptor level yields the following:

Adjusted Real-Time Action Level (10-hour avg) for Stable Wind Speed = 211 $\mu g/m^3$ × 2.6 ≅ 549 $\mu g/m^3$ = 0.5 mg/m^3

Adjusted Real-Time Action Level (10-hour avg) for Avg Wind Speed = 211 $\mu g/m^3$ × 3.1 ≅ 654 $\mu g/m^3$ = 0.7 mg/m^3

Summary

Monitoring Point along:	Acceptable Benzene Concentration at Monitoring Point			
	Stable Wind Speed		*Average Wind Speed*	
	mg/m^3	ppm_v	mg/m^3	ppm_v
North Fenceline	0.9	0.28	1.2	0.38
West Fenceline	0.3	0.09	0.3	0.09
South Fenceline	0.3	0.09	0.3	0.09
East Fenceline	0.5	0.16	0.7	0.22

Conversion of mg/m^3 to ppm_v for benzene (molecular weight = 78):

$$ppm_v = (mg/m^3) \times 24.5 / 78$$

Table 1
Intakes from Air Exposures to Benzene

Illinois Power
Champaign, IL

CA	IR	FI	EF	ED	BW	AT	Intake
Test to evaluate 0.22 ug/m3 for residential							
0.00022	20	1	350	30	70	25550	2.58E-05
2.5-Month Residential - Adult							
0.00022	20	1	260	0.208	70	25550	1.33E-07
0.0022	20	1	260	0.208	70	25550	1.33E-06
0.022	20	1	260	0.208	70	25550	1.33E-05
0.05	20	1	260	0.208	70	25550	3.02E-05
1	20	1	260	0.208	70	25550	6.05E-04
5	20	1	260	0.208	70	25550	3.02E-03
2.5-Month Residential - Child							
0.00022	15	1	260	0.208	15	25550	4.66E-07
0.0022	15	1	260	0.208	15	25550	4.66E-06
0.022	15	1	260	0.208	15	25550	4.66E-05
0.05	15	1	260	0.208	15	25550	1.06E-04
1	15	1	260	0.208	15	25550	2.12E-03
5	15	1	260	0.208	15	25550	1.06E-02

CA = Chemical concentration in air (mg/m^3)
IR = Inhalation rate (m^3/day)
FI = Fraction inhaled from a potentially impacted source (unitless)
EF = Exposure frequency (days/year).
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

Equation (USEPA, 1989):

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times FI \times EF \times ED}{BW \times AT}$$

Table 2
Cancer Risk Estimates for Air Exposures to Benzene

Illinois Power Company
Champaign, IL

	CDI (mg/kg-day)	SF $(mg/kg\text{-}day)^{-1}$	Risk
Test Residential			
0.00022	2.58E-05	2.9E-2	7E-7
2.5-Month Residential - Adult			
0.00022	1.33E-07	2.9E-2	4E-9
0.00220	1.33E-06	2.9E-2	4E-8
0.02200	1.33E-05	2.9E-2	4E-7
0.05	3.02E-05	2.9E-2	9E-7
1	6.05E-04	2.9E-2	2E-5
5	3.02E-03	2.9E-2	9E-5
2.5-Month Residential - Child			
0.00022	4.66E-07	2.9E-2	1E-8
0.0022	4.66E-06	2.9E-2	1E-7
0.022	4.66E-05	2.9E-2	1E-6
0.05	1.06E-04	2.9E-2	3E-6
1	2.12E-03	2.9E-2	6E-5
5	1.06E-02	2.9E-2	3E-4

Note; a risk of 1×10^{-6} is acceptable.

Air concentrations in mg/m^3.

CDI = Chronic Daily Intake for carcinogenic effects.

SF = Slope Factor.

Equation (USEPA, 1989):

$$Risk = CDI \times SF$$

Table 3
Worst-Case Condition (Stable Winds)
IP Champaign Site

Concentration in microgram/m^3		
	Fenceline	
Monitor	**Concentration**	**Receptor 1**
M1	2.61E+07	3.99E+06
M2	5.47E+06	2.16E+06
M3	8.02E+06	5.91E+06
M4	8.02E+06	6.99E+06
M5	1.65E+07	6.69E+06
M6	1.65E+07	1.19E+07
M7	3.84E+07	8.67E+06

Concentration in PPM[1]		
	Fenceline	
Direction	**Concentration**	**Receptor 1**
M1	8031.83	1230.66
M2	1685.57	665.11
M3	2472.42	1821.80
M4	2472.42	2153.43
M5	5088.47	2061.58
M6	5088.47	3655.31
M7	11847.41	2672.14

[1] Benzene used as reference molecular weight.

Concentration in PPM Scale[1]		
	Fenceline	
Direction	**Concentration**	**Receptor 1**
M1	1.00	0.15
M2	1.00	0.39
M3	1.00	0.74
M4	1.00	0.87
M5	1.00	0.41
M6	1.00	0.72
M7	1.00	0.23

[1] Benzene used as reference molecular weight.

Note : Emission Rate 1 g/s-m^2

Table 4
Actual-Case Conditions (Average Winds)
IP Champaign Site

Concentration in microgram/m^3		
Monitor	**Fenceline Concentration**	**Receptor 1**
M1	5.30E+06	4.88E+05
M2	7.32E+05	2.32E+05
M3	1.22E+06	8.12E+05
M4	1.22E+06	1.02E+06
M5	3.09E+06	9.58E+05
M6	3.09E+06	2.04E+06
M7	8.26E+06	1.40E+06

Concentration in PPM[1]		
Direction	**Fenceline Concentration**	**Receptor 1**
M1	1633.49	150.37
M2	225.73	71.57
M3	376.63	250.20
M4	376.63	312.83
M5	951.74	295.11
M6	951.74	629.97
M7	2546.70	430.56

[1] Benzene used as reference molecular weight.

Concentration in PPM Scale[1]		
Direction	**Fenceline Concentration**	**Receptor 1**
M1	1.00	0.09
M2	1.00	0.32
M3	1.00	0.66
M4	1.00	0.83
M5	1.00	0.31
M6	1.00	0.66
M7	1.00	0.17

[1] Benzene used as reference molecular weight.

Note: Emission Rate 1 g/s-m^2
Average Wind Speed = 10 mph