16-63376

0190100008 – Champaign
Champaign/Ameren Illinois MGP
SR/Tech

FILE COPY

November 3, 2016

Mr. Todd Hall
Illinois Environmental Protection Agency
Bureau of Land
Site Remediation Program
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Dear Mr. Hall:

Subject: **Addendum Combined Remedial Objectives Report/Remedial Action Plan – Residual MGP Impact**
Ambient Air Monitoring Plan
Ameren Remediation Project – Former Manufactured Gas Plant Site
Champaign, Illinois
LPC# 019010008

On behalf of Ameren Illinois, PSC Industrial Outsourcing, LP (PSC) is submitting two reports for the Champaign Former Manufactured Gas Plant (MGP) site in Champaign, Illinois. PSC is submitting two copies of each report. The two reports are the:

- Addendum Combined Remedial Objectives Report/Remedial Action Plan; and
- Ambient Air Monitoring Plan

Previous remedial actions were performed at the project site between 2009 and 2011. In-Situ chemical oxidation treatment was conducted within limited areas of the site in 2013. Impact remains along the northwest boundary of the site that exceeds project remediation objectives. Ameren will address remaining impact within ten feet of ground surface through soil excavation and disposal. Material impacted at a depth greater than 10 feet within this area will be addressed using various institutional controls, engineered barriers, and Tier 2 evaluations.

The results of the additional remedial actions will be described along with the previous remedial activities in a Remedial Action Completion Report (RACR).

Baseline ambient air monitoring is scheduled to begin November 8, 2016. The remedial actions for the residual MGP-impact is scheduled to begin November 16, 2016.

PSC Industrial Outsourcing, LP
210 West Sand Bank Road, Columbia, Illinois 62236
Tel (618) 281-7173 Fax (618) 281-5120 www.PSCnow.com

If you have any questions please contact me at 618-281-1583 or at mike.crutcher@pscnow.com or the Ameren Project Manager, Mr. Brian Martin, at 314-554-2233 or bmartin2@ameren.com.

Sincerely,

PSC Industrial Outsourcing, LP

Michael Crutcher PG, PE
Senior Project Manager

Enclosures: Addendum Combined ROR/RAP (2 copies)
Ambient Air Monitoring Plan (2 copies)
CD with both reports (1 copy)

cc: Ameren (Brian Martin)

16-63376

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0190100008 – Champaign
Champaign/Ameren Illinois MGP
SR/Tech

Illinois Environmental Protection Agency

Bureau of Land • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Site Remediation Program Form (DRM-2)
(To be Submitted with all Plans and Reports)

You may complete this form online, save a copy, print, sign and mail it to the address above.

I. Site Identification:

Site Name: Champaign Former Manufactured Gas Plant Site
Street Address: 308 N. Fifth Street P.O. Box:
City: Champaign State: IL Zip Code: 61820 Phone:
Illinois Inventory ID Number: 0190100008 IEMA Incident Number:

II. Remediation Applicant:

Applicant's Name: Mr./Ms. Mr. Brian Martin
Company: Ameren Services
Street Address: 1901 Chouteau Avenue; MC 602 P.O. Box: 66149
City: St. Louis State: MO Zip Code: 63166 Phone: 314-554-2233
Email Address: bmartin2@ameren.com

I hereby request that the Illinois EPA review and evaluate the attached project documents in accordance with the terms and conditions of the Environmental Protection Act (415 ILCS 5), implementing regulations, and the review and evaluation services agreement.

Remediation Applicant's Signature: Brian H. Martin Date: 11/2/16

III. Contact Person for Remediation Applicant:

Contact's Name: Mr./Ms. Mr. Brian Martin
Company: Ameren Services
Street Address: 1901 Chouteau Avenue; MC 602 P.O. Box: 66149
City: St. Louis State: MO Zip Code: 63166 Phone: 314-554-2233
Email Address: bmartin2@ameren.com

Contact Person for Consultant:

Contact's Name: Mr./Ms. Mr. Michael Crutcher
Company: PSC Industrial Outsourcing, LP
Street Address: 210 West Sand Bank Road P.O. Box:
City: Columbia State: Illinois Zip Code: 62236 Phone: 618-281-1583
Email Address: mike.crutcher@pscnow.com

IV. Review & Evaluation Licensed Professional Engineer or Geologist ("RELPEG"), if applicable:

RELPEG's Name: Mr./Ms.
Company:
Street Address: P.O. Box:
City: State: Zip Code: Phone:
Email Address:

IL 532-2547
LPC 566 June 2012

V. Project Documents Being Submitted:

Document Title: Revised ROR-RAP
Prepared by: PSC Industrial Outsourcing, LP
Date of Preparation of Plan or Report: 11/1/2016
Prepared For: Ameren Services

Type of Document Submitted:

- [ ] Site Investigation Report - Comprehensive
- [ ] Site Investigation Report - Focused
- [x] Remediation Objectives Report - Tier 1 or 2
- [ ] Remediation Objectives Report - Tier 3
- [x] Remedial Action Plan
- [ ] Remedial Action Completion Report
- [ ] Sampling Plan
- [ ] Health and Safety Plan
- [ ] Community Relations Plan
- [ ] Risk Assessment
- [ ] Containment Fate & Transport Modeling
- [ ] Other: _____

Document Title: AAMP
Prepared by: PSC Industrial Outsourcing, LP
Date of Preparation of Plan or Report: 11/1/2016
Prepared For: Ameren Services

Type of Document Submitted:

- [ ] Site Investigation Report - Comprehensive
- [ ] Site Investigation Report - Focused
- [ ] Remediation Objectives Report - Tier 1 or 2
- [ ] Remediation Objectives Report - Tier 3
- [ ] Remedial Action Plan
- [ ] Remedial Action Completion Report
- [ ] Sampling Plan
- [ ] Health and Safety Plan
- [ ] Community Relations Plan
- [ ] Risk Assessment
- [ ] Containment Fate & Transport Modeling
- [x] Other: Ambient Air Monitoring Plan

Document Title: _____
Prepared by: _____
Date of Preparation of Plan or Report: _____
Prepared For: _____

Type of Document Submitted:

- [ ] Site Investigation Report - Comprehensive
- [ ] Site Investigation Report - Focused
- [ ] Remediation Objectives Report - Tier 1 or 2
- [ ] Remediation Objectives Report - Tier 3
- [ ] Remedial Action Plan
- [ ] Remedial Action Completion Report
- [ ] Sampling Plan
- [ ] Health and Safety Plan
- [ ] Community Relations Plan
- [ ] Risk Assessment
- [ ] Containment Fate & Transport Modeling
- [ ] Other: _____

VI. Professional Engineer's or Geologist's Seal or Stamp:

I attest that all site investigations or remedial activities that are subject of this plan(s) or report(s) were performed under my direction, and this document and all attachments were prepared under my direction or reviewed by me, and to the best of my knowledge and belief, the work described in the plan and report has been designed or completed in accordance with the Illinois Environmental Protection Act (415 ILCS 5), 35 Ill. Adm. Code 740, and generally accepted engineering practices or principles of professional geology, and the information presented is accurate and complete.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

Professional Engineer's or Geologist's Seal or Stamp:

MICHAEL R. CRUTCHER
062.057791
LICENSED
PROFESSIONAL
ENGINEER
OF
ILLINOIS
11/30/2017

Engineer's or Geologist's Name: Michael Crutcher

Company: PSC Industrial Outsourcing, LP

Registration Number: 062.057791 Phone: 618-281-1583

License Expiration Date: 11/30/2017

Signature: _____ Date: 11/2/2016

Note: The authority of a Licensed Professional Geologist to certify documents submitted to the Illinois Environmental Protection Agency for review and evaluation pursuant to Title XVII of the Environmental Protection Act is limited to Site Investigation Reports (415 ILCS 58.7(f), as amended by P. A. 92-0735, effective July 25, 2002. A Licensed Professional Geologist cannot certify Remediation Objectives Reports, Remedial Action Plans or Remedial Action Completion Reports.

All information submitted is available to the public except when specifically designated by the Remediation Applicant to be treated confidentially as a trade secret or secret process in accordance with the Illinois Compiled Statutes, Section 7(a) of the Environmental Protection Act, applicable Rules and Regulations of the Illinois Pollution Control Board and applicable Illinois EPA rules and guidelines. The Illinois EPA is authorized to require this information under Sections 415 ILCS 5/58 - 58.12 of the Environmental Protection Act and regulations promulgated thereunder. Disclosure of this information is required as a condition of participation in the Site Remediation Program. Failure to do so may prevent this form from being processed and could result in your plan(s) or report(s) being rejected. This form has been approved by the Forms Management Center.

Ambient Air Monitoring Plan

Revised Interim Remediation Area
Former Manufactured Gas Plant

308 North Fifth Street
Champaign, Illinois

November 2016

Prepared for:

AMEREN ILLINOIS
1901 CHOUTEAU AVENUE
ST LOUIS, MISSOURI

Prepared By:

PSC INDUSTRIAL OUTSOURCING, LP
210 West Sand Bank Road
Columbia, Illinois 62236

Ambient Air Monitoring Plan

Revised Interim Remediation Area
Former Manufactured Gas Plant

308 North Fifth Street
Champaign, Illinois

November 2016

Prepared for:

AMEREN ILLINOIS
1901 CHOUTEAU AVENUE
ST LOUIS, MISSOURI

PSC INDUSTRIAL OUTSOURCING, LP
210 West Sand Bank Road
Columbia, Illinois 62236

Project 624-1201-0008

TABLE OF CONTENTS

ABBREVIATIONS & ACRONYMS

AAMP	Ambient Air Monitoring Plan
Ameren	Ameren Illinois
AMS	Air Monitoring Station
ATc	Averaging Time for carcinogenics
ATnc	Averaging Time for non-carcinogenics
bgs	below ground surface
BW	Body Weight
Cexp(c)	Concentration for carcinogenic constituent
Cexp(nc)	Concentration for non-carcinogenic constituent
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
ED	Exposure Duration
EF	Exposure Frequency
ERM	Environmental Resources Management
GC	Gas Chromatograph
GC/MS	Gas Chromatograph/Mass Spectrometer
Hg	mercury
IEPA	Illinois Environmental Protection Agency
IPML	Intermediate Perimeter Monitoring Location
IRIS	Integrated Risk Information System
MGP	Manufactured Gas Plant
mg/m^3	milligrams per cubic meter
mL	milliliter
NAAQS	National Ambient Air Quality Standard
nd	not detected
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbon
PID	Photoionization Detector
PM10	Particulate Matter equal to or less than 10 microns
ppbv	part per billion volume
ppm	part per million
PSC	PSC Industrial Outsourcing
PUF	Polyurethane Foam
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RL	Reporting Limit
SFi	Inhalation Slope Factor
SIM	Selective Ion Monitoring
SRP	Site Remediation Program

ABBREVIATIONS & ACRONYMS (cont'd)

SUMMA	generalized trademark referring to electro-polished stainless steel vacuum sampling device
TACO	Tiered Approach Corrective Action Objectives
THi	Target Hazard Index
TR	Target Risk
TWA	Time Weighted Average
$\mu g/m^3$	micrograms per cubic meter
USEPA	United States Environmental Protection Agency

1 INTRODUCTION

The following sections provide an overview of the project and the objectives of the air-monitoring program for the Champaign former manufactured gas plant (MGP) site remediation project.

1.1 Project Overview

At the request of Ameren Illinois (Ameren), PSC Industrial Outsourcing, LP (PSC) has prepared this Ambient Air Monitoring Plan (AAMP) for use during the interim remediation planned at the former Champaign MGP site (Site) located in Champaign, Illinois. The Site activities are being conducted to remove MGP-related soil impact present from the former MGP operations and structures located on the property. Ameren is completing this work in cooperation with the Illinois Environmental Protection Agency (IEPA) in accordance with the Site Remediation Program (SRP).

The Site is located within the city limits of Champaign, Illinois in Champaign County (Figure 1). The Site address is 308 North Fifth Street (formerly 502 East Hill Street), Champaign, Illinois. The former MGP began operations by approximately 1869 and continued through the early 1930s, at which time operations were converted to storage and distribution of natural gas. During this period two below ground gas holders, one aboveground gas holder, five tar wells, a tar separator, seven oil tanks, and two diesel fuel tanks were present. All aboveground structures, except for the booster house, were demolished in the late 1950s. The general area around the site consists of both residential and commercial properties. The property is currently vacant, is secured by a chain-link fence, and is owned by Ameren. The site has been enrolled in the IEPA SRP and been assigned site identification number 0190100008 – Champaign County.

This AAMP has been prepared to monitor air quality at the perimeter of the Site during the remediation, for the protection of the surrounding community. The air-monitoring program will consist of real-time perimeter air monitoring adjacent to the fence line and time-integrated air sampling at stationary locations also located at perimeter fence locations. The ambient air-monitoring program is separate from the industrial hygiene program designed for the protection of on-site remediation workers.

1.2 Air Monitoring Objectives

The ambient air-monitoring program will include the real-time measurement and the time-integrated sampling of the concentrations of airborne volatile contaminant constituents and particulates at the perimeter during the remediation. The real-time data will be compared to site-specific action levels established to determine if additional emission control measures are necessary. The time-integrated air sampling data collected during the remediation will be compared to

baseline pre-remediation local air quality data and to project specific risk-based air quality objectives established for the project.

The specific tasks to be completed to achieve the objectives of the air-monitoring program include:

- *Baseline Pre- and Post-Remediation Time-Integrated Air Sampling* – The objective of pre-remediation baseline air sampling is to document typical air quality at the Site prior to the start of remedial activities. The pre-remediation baseline sampling data will be used to compare pre-remediation air quality data with air quality conditions measured during remediation activities. Baseline air monitoring will be performed prior to the beginning of remedial actions. Post-remediation baseline sampling will be performed to verify that the air quality at the Site is consistent with the pre-remediation baseline air quality at the conclusion of the remediation.
- *Real-time Ambient Air Monitoring* – Real-time ambient air quality monitoring for particulates, volatile organic compounds (VOCs), and benzene as needed will be performed at the perimeter of the Site when remedial action activities are occurring to document perimeter air quality conditions. Real-time air monitoring will be compared to site-specific action levels to determine if the implementation of additional emission control measures is necessary.
- *Time-Integrated Ambient Air Sampling* – Time-integrated air sampling will be conducted throughout the remediation at the perimeter air sampling stations for approximately 72-hour periods for the collection of air samples. Samples will be analyzed for polynuclear aromatic hydrocarbons (PAHs), VOCs, and particulates equal to or less than 10 micrometers in diameter (PM_{10}) concentrations.
- *Meteorological Monitoring* – A meteorological monitoring station will be established to monitor weather conditions throughout the duration of the project, including the baseline monitoring, monitoring during the remediation activities, and the post-remediation monitoring.

2 AIR MONITORING PROGRAM

Perimeter air monitoring will be conducted during the pre-remediation baseline, the active remediation, and the post-remediation phases of the project with real-time and time-integrated sample collection instruments.

Real-time air monitoring will be conducted at regular intervals throughout the workday to monitor measured concentrations of photo-ionizable (volatile) vapors, benzene as needed, and particulates. The real-time air quality data will be collected to assess air quality conditions at the Site perimeter during the work day to identify if site activities are adversely affecting local air quality and identify when the implementation of additional emission control measures may be necessary. The real-time perimeter monitoring will begin in coordination with the onset of the remedial activities. The real-time perimeter monitoring will not be conducted during the baseline monitoring periods.

Time-integrated sampling will be conducted to document concentrations of VOCs, PAHs, and PM_{10} particulate matter at the perimeter of the Site. Time-integrated sampling will be conducted during the baseline and active remediation periods. Table 2-1 summarizes the constituents to be analyzed for the time-integrated samples.

2.1 Air Monitoring Station Placement

Four perimeter air monitoring stations (AMS) identified as AMS-1 through AMS-4 will be placed at intervals along the perimeter fenceline and at a location due east of the interim remediation area at the locations as shown on Figure 2. The AMS will be at locations in which sampling equipment for the collection of time-integrated air samples using USEPA Methods TO-13A for PAHs, TO-15 for VOCs, and EPA Method 40 CFR, Part 50, Appendix M – "Reference Method for Determination of Particulate Matter as PM_{10} in the Atmosphere" for PM_{10} will be established for the project. To satisfy project-specific quality assurance and quality control (QA/QC) sampling requirements, a duplicate station (AMS-1D) will be co-located at the AMS-1 location to the south of the interim remediation area for duplicate sample collection purposes. In addition to the perimeter fence line monitoring locations, Real-time air monitoring will also be conducted at the four AMS locations.

In addition to the four AMS and one duplicate AMS, four additional intermediate perimeter monitoring locations (IPML) will be established at locations approximately mid-way between the AMS as indicated on Figure 2. The IPML will serve as additional monitoring points for the perimeter real-time monitoring program.

Placement of the AMS will be based on locating them along each primary site boundary corresponding to the site orientation while also incorporating the configuration of the property and the predominant wind direction for the months of January to December. The AMS locations selected should provide

representative data of ambient air quality at the perimeter of the site along each boundary of the site. The potential receptors are identified on Figure 2.

The Site is located immediately east of the intersection of North Fifth Street and Hill Street. The interim remediation site encompasses an area that is approximately 22-feet wide by 170-feet long. The property is currently a vacant lot that is secured by a chain-link fence around its perimeter with three locked gates. The site is generally level and covered with grass.

This area of Champaign is primarily residential, with light commercial activity to the southeast (Figure 2). The residential properties proximate to the site are located directly north of the property line, across the railroad tracks. Residential properties to the south are separated from the site by an alley. These include a single residence and the Center for Women and Children in Transition. Immediately east of the site is the Sixth Street right-of-way, which is now abandoned between the railroad right-of-way and the alley south of the site. That area is now grass-covered. Other property east of the vacated Sixth Street right-of-way is zoned commercial and consists of vacant land and parking lots, which includes the Medical Center and its associated parking lots. North Fifth Street borders the site to the West and separates the site from residential properties. Formerly, Hill Street bisected the site in the east-west direction but is now part of the site. The nearest residences in this direction are 410 and 412 E. Hill Street. There are several lots that line Fifth Street that are vacant or in the case of 308 N. Fifth Street, 412 E. Hill Street, and 507 E. Washington Street, were purchased by Ameren, demolished, and will be converted to a gravel parking lot for this project.

Prevailing wind directions based on historical meteorological data were collected from the Midwest Regional Climate Center. The weather service station at University of Illinois, Willard Airport was selected because of its location in Champaign, Illinois. The historical weather data was reviewed to assist with conceptually locating the monitoring stations. Historical weather data for the months of January through December indicate predominant wind directions are from the south and the southwest. A wind rose diagram of historic prevailing wind directions for the months of January through December, along with annual averages are provided in Appendix A.

Time-integrated sampling equipment will be placed on secure platforms at each AMS. The position of the sampler inlet will be situated approximately two meters above the ground in accordance with USEPA guidance (Air/Superfund National Technical Guidance Study Series, Volume IV, EPA-45 1 /R-93-007, May, 1993). The stationary samplers will be positioned at each selected location using the following criteria:

- Located along the fence line or boundary of the Site where possible;
- The instrument sample inlet will be placed approximately two meters above the ground;

- The monitor will be located at a minimum of two meters from the nearest solid obstruction to allow airflow, and two times the height of the obstruction where possible;
- When possible, the immediate surroundings will have ground cover to prevent surface dust from affecting the measurements;
- The monitor will be installed on a flat surface with suitable accessibility, and will receive unrestricted airflow from at least three cardinal wind directions (270°), including the predominant wind direction;
- The monitor will be located away from combustion or fuel sources, when possible; and,
- 24 hour security, electrical power, and (if remotely operated or reporting) communication lines will be provided.

Site-specific locations will be determined during setup at the site using the above criteria. Based on the limited space available, meeting all of the above criteria may not be possible at all monitoring stations. The locations will be selected to minimize interference of obstructions. Air sampling stations may be temporarily relocated, if stations interfere with excavation or other activities. If the air monitoring stations are relocated, revised AMS location will be noted in the field notebook with an explanation for the AMS relocation.

2.2 Real–Time Air Monitoring

Real-time monitoring for particulates, VOCs, and benzene will be conducted at the perimeter fence line, particularly at each AMS and the IPML on all days when remediation activities are in progress and during the hours of operation. Real-time air monitoring will generally be conducted on an hourly basis (on average) at each AMS and IPML at the start and through the end of each active work day. The type of real-time monitoring performed will be in accordance with the following criteria:

- Each AMS and IPML – Real-time monitoring for particulates, VOCs, and benzene as needed in accordance with the response procedures in the event of VOC action level exceedances.

Real-time air monitoring at the AMS and IPML will be completed along the Site perimeter at the start and end of each workday on an hourly basis to verify that particulate and VOC concentrations do not exceed the action level concentration. The locations are shown on Figure 2.

During hourly real-time perimeter air monitoring, the current meteorological conditions from the on-site meteorological monitoring station will be documented. Air quality measurements will be collected from the "breathing zone" (3' to 6' above ground surface) at each AMS and IPML. The real-time monitoring instrument will be directed toward the open excavation or any

stockpile area. The instrument will be allowed to equilibrate and a reading from each instrument will be recorded on the data sheet. The average concentration measured over a 1-minute sample interval will be recorded at each AMS and IPML.

The Hourly Air Monitoring Data Form (Appendix B) will be used to record measured concentrations from the dust monitor, photoionization detector (PID) and when necessary, the gas chromatograph (GC). The Daily Air Monitoring Data form will be posted daily in a display case on the fence near the site field offices. A description of real-time monitoring methods and equipment are provided in the following subsections.

2.2.1 Particulates

Real-time monitoring of fugitive particulates will be conducted during hourly perimeter monitoring using a TSI Dust Trak II Aerosol Monitor, Thermo DataRAM pDR-Dust Monitor, (or equivalent instrument) at each AMS and IPML. The detection limit for these instruments is 0.001 milligrams per cubic meter (mg/m^3). Instrument readings will be observed and recorded manually on data sheets, transferred to Excel spreadsheets. If/when data is logged by the instrument, the logs will be transferred from the data-logger to electronic files.

Concentrations will be measured for a 1-minute sample interval at each perimeter monitoring location and the average measurements will be recorded. The result will be compared to the action level for particulates to assess air quality. Visible emissions of dust leaving the Site will be evaluated and addressed regardless of instrument readings.

2.2.2 Volatile Organic Compounds

Real-time monitoring for VOCs will be conducted using a ppbRAE or MiniRAE portable PID with a 10.6ev lamp (or equivalent instrument). The PID will be used to non-selectively monitor VOC concentrations at the site perimeter. The PID will have a detection limit of 0.1 parts per million (ppm).

The PID will be used to monitor air quality at each AMS and IPML along the fence line. Instrument readings will be measured over a 1-minute sample interval at each location. Instrument readings will be observed and recorded manually on data sheets, transferred to Excel spreadsheets. If/when data is logged by the instrument, the logs will be transferred from the data-logger to electronic files.

2.2.3 Benzene

Real-time monitoring of benzene will be conducted using a PetroPro portable gas chromatograph (GC) (or equivalent instrument) when

necessary in accordance with the response actions specified in Section 3.0 of the AAMP for Real-Time Air Monitoring Action Level exceedances. The portable GC will be used to selectively monitor benzene concentrations in air. Of all expected volatile constituents in MGP residuals, benzene is the analyte of most concern; therefore, benzene was chosen for selective GC monitoring. The portable GC has a detection limit for benzene that ranges between 0.002 to 0.005 ppm. All GC files will be downloaded daily.

The portable GC will be used to monitor benzene concentrations at perimeter locations when PID VOC Action Level exceedances occur. When an exceedance occurs, an air sample will be collected at that perimeter monitoring location for analysis with the GC. The GC will generally be maintained in the Site air monitoring field office in a temperature controlled environment. The air samples may be collected in Tedlar bags and the samples analyzed in the controlled environment of the on-site air field office. Alternatively, the GC may collect and analyze the sample directly from the perimeter monitoring location where the action level exceedance occurred. If the first GC reading exceeds the action level, a second and third sample (if necessary) will be collected and analyzed for confirmation.

2.3 Time-Integrated Sampling

Time-Integrated ambient air sampling will be conducted using stationary samplers at each AMS located along the perimeter fence for the collection of samples for laboratory analysis, as described in Section 2.1. A description of the time-integrated air sampling methods and equipment are provided in the following subsections.

2.3.1 Sample Frequency and Duration

Time-integrated ambient air sampling will be conducted over approximate 72-hour intervals, seven days per week throughout the remediation. The sampling schedule may be interrupted during holiday periods if no remediation activities are occurring. Air sampling will be concluded once all excavation and impacted soil handling activities have been completed and the excavated area has been backfilled. Air monitoring activities will not be conducted during site restoration. Baseline sampling events, as described in Section 2.3.2 will be completed prior to the start of site remediation activities and at the conclusion of site remediation activities to document local air quality conditions.

2.3.2 Baseline Time-Integrated Sampling

Baseline time-integrated air sampling will be conducted to characterize local area air quality prior to the start of remediation activities. The

baseline ambient air sampling will consist of two 72-hour time-integrated sampling events, and meteorological monitoring during an approximate six day period before intrusive remediation activities begin. Time-integrated samples for off-site laboratory analysis will be collected from each AMS at the end of each 72-hour baseline monitoring period. Samples will be collected from the duplicate AMS location during one of the baseline events.

The baseline time-integrated air sampling will be repeated at the conclusion of the remediation. The post-remediation baseline ambient air sampling will also consist of two 72-hour time-integrated sampling events. Meteorological monitoring will also be conducted during a six day period after intrusive site remediation activities are completed and final excavation backfilling. Time-integrated samples for off-site laboratory analysis will be collected from each AMS at the end of each 72-hour baseline monitoring period. Samples will be collected from the duplicate AMS location during one of the post-remediation baseline events.

2.3.3 Sample Collection and Analysis

At each AMS location, dedicated air monitoring samplers will be installed for the collection of air samples for analysis of PAHs and PM_{10} concentrations. Co-located SUMMA canisters will be stationed for the collection of air samples for VOC analysis. Following the completion of each time-integrated sampling event, the samples will be packaged and prepared for overnight delivery to Teklab, Inc., the analytical laboratory selected for the project. Chain-of-custody forms and the Ambient Air Monitoring Sheet will accompany all samples during shipment. Air monitoring forms are included in Appendix B.

Sampling and laboratory analysis for PAHs and VOCs analysis will be completed in accordance with USEPA Methods TO-13A and TO-15. The PAH and VOC compounds to be analyzed and the laboratory detection limits for each method are listed in Table 2-1. PM_{10} sampling and analysis will be in accordance with EPA Method 40 CFR, Part 50, Appendix M – "Reference Method for Determination of Particulate Matter as PM_{10} in the Atmosphere".

Unless a sampling event is pulled on a weekend or holiday, samples will be shipped to the laboratory within 24 hours of collection and analyzed within recommended holding times. If a sampling event is pulled on a weekend or holiday, sample media required to be iced, will be placed in an on-site freezer and shipped to the lab the next business day.

2.3.3.1 Polynuclear Aromatic Hydrocarbons Compounds

Samples for PAH analysis will be collected using Tisch Environmental Model GPS-1 samplers and PUF sampling system. Sampling and laboratory analysis will be completed in accordance with USEPA Method TO-13A.

The GPS-1/PUF sampling system collects suspended airborne particulates and organic vapors to measure total PAH concentrations. During sampling, air is drawn through a two-stage sample media containing a quartz particulate filter and an adsorbent cartridge for vapor entrapment. Particulate-bound PAHs will be collected on a 4-inch-diameter acid-washed quartz-fiber filter and the gaseous fraction of PAHs will be collected in the secondary 2-inch-diameter by 3-inch-long glass PUF cartridge, packed with polyurethane foam (PUF) and XAD-2 resin, as described in the USEPA Method TO-13A.

The PUF sampling system operates on 110 VAC, 10 Amp per pump/unit and has an electronic data recorder to document continuous operation during sampling events. The variable flow pumps will be set to sample at approximately 250 liters per minute (LPM) flow rate over the duration of the 72-hour sampling period. The flow rate will be monitored during real-time perimeter monitoring.

At the conclusion of each 72-hour sampling event, the PUF cartridge and filter will be prepped for shipment to the laboratory. The samples will be stored onsite at the air monitoring field office in a refrigerated system at a temperature not to exceed $4^{o}C$ (62^{o}), and protected from ambient or artificial light exposure to prevent decomposition of photo-sensitive PAHs. The laboratory will analyze each sample (PUF and filter) as one sample. Samples recovered from the sampling equipment on the weekends will be preserved onsite until the following Monday for shipment.

2.3.3.2 Volatile Organic Compounds

Samples for VOCs will be collected using laboratory certified, 6.0-liter SUMMA canisters and flow controllers. Sampling and laboratory analysis will be completed in accordance with USEPA Method TO-15. Teklab will provide pre-cleaned and batch-certified 6-liter SUMMA canisters for sample collection. The SUMMA canisters will be evacuated by the laboratory to approximately 29-inches of mercury (Hg) column vacuum. The vacuum level in each SUMMA canister will be checked onsite

prior to use. If the vacuum level is less than 27-inches of Hg vacuum, the SUMMA canister will not be used.

The flow controller will be used to regulate the flow rate into the canister. The flow controller will be laboratory calibrated to provide a constant flow rate of 1.2 to 1.33 ml/min over the 72-hour sampling period. Vacuum gauges will be attached between the flow controller and SUMMA canisters to monitor vacuum levels in the canisters during the 72-hour sample period. Vacuum level measurements will be recorded at each station during real-time perimeter monitoring. Flow control will be checked or recalibrated if vacuum readings deviate from the anticipated 0.4-inches of Hg vacuum reduction per hour rate of change. At the intended flow rate, the canister vacuum will drop from initial readings of approximately 29-inches of Hg vacuum to between 12 and 5-inches of Hg vacuum at the end of the 72-hour sampling event.

2.3.3.3 PM10 Particulate Matter

Particulate matter measuring less than 10 microns in diameter will be collected using high volume motors and PM_{10} monitoring stations at each of the AMS locations. Filter media used for the collection of PM_{10} samples will be pre-weighed quartz filters as in accordance with USEPA Method PM_{10} specified in 40CFR 50, Appendix J.

2.4 Meteorological Monitoring

A Davis Instruments self-contained digital meteorological system (or equivalent) will be used to measure and record wind speed, wind direction, ambient temperature, relative humidity, and barometric pressure at 10-second intervals. The recorded measurements will be averaged over 60-minute increments by the system's internal software. The 60-minute average measurements for each meteorological parameter will be stored in the Weatherlink data logger and downloaded periodically.

The meteorological system will be mounted on either 10-feet above the ground. The monitoring location will be selected to minimize interferences from surrounding natural or man-made obstructions. The system will be powered by 115 Volt AC, 20 amp electrical service.

Installation and operation of the meteorological monitoring system will be conducted in accordance with manufacturer specifications. Data collected during the monitoring program will be routinely screened for potential operational problems. General weather conditions will also be recorded daily on air monitoring field forms.

2.5 Quality Assurance/Quality Control

The following sections provide a brief description of the QA/QC procedures to be implemented for the ambient air monitoring program.

2.5.1 QA/QC Samples

Laboratory QC will be in accordance with the requirements for the specified analytical methods. Laboratory analytical data packages including QC batch summaries with control limits will be provided for all analyses completed by the laboratory.

Field QC samples will be collected as part of the QA procedures to ensure that quality objectives are met. Field QA/QC sample frequency is provided below.

Field Duplicates

One set of duplicate samples will be collected during the pre- and post-remedial baseline sampling events. Duplicate sample sets will be collected at the co-located station AMS-1D at a 10 per-cent frequency rate of sampling at all AMS during the time-integrated air sampling program throughout the project. With a total of four AMS locations, a duplicate sample set will be collected during every third sampling event.

Trip Blanks

Trip blanks will be submitted to the laboratory for PAH and PM_{10} analyses for each sampling event. PUF cartridges and filters for TO-13 and PM_{10} sampling will be selected from the sample batches at random and submitted with the collected samples for analysis as trip blanks. Trip blanks will not be submitted for VOC analysis since VOC cross-contamination does not occur with SUMMA canisters

2.5.2 Instrument Calibration and Checks

Periodic calibrations and checks are required on the field instruments and equipment to be used for the ambient air monitoring program. Daily instrument calibrations, or calibration checks, will be conducted at the beginning of each shift. The calibration results will be recorded in the calibration log form provided in Appendix B. The following sections provide a brief description of the calibrations and checks required for each piece of equipment.

Dust Monitor

The dust monitor will be calibrated daily in accordance with the manufacturer's specifications and results recorded on the calibration log form.

Photoionization Detector

The PID will be calibrated daily using 100 ppm (or less) isobutylene calibration gas and in accordance with the manufacturer's guidelines. Span checks will be completed as necessary throughout the day to verify calibration of the instrument. Instrument calibration will be recorded on the calibration log form.

Portable Gas Chromatograph

The GC will be calibrated daily by the field-sampling technician using 5 ppm benzene calibration gas. Span checks will be completed as necessary throughout the day to verify calibration of the instrument. Instrument calibration will be recorded on the calibration log form.

Sampling Using USEPA Method TO-13A

The TO-13 sampling systems will be calibrated in accordance with USEPA Method TO-13A procedures and manufacturer's instructions. A multiple point calibration will be completed in the field for comparison to the instrument calibration curve. The multiple point calibration will be performed at a minimum upon installation and once during the project or on a frequency of once-per-month, whichever is greater. The samplers will be recalibrated if the AMS is relocated and following sampler motor maintenance. Calibration data will be recorded on air monitoring forms provided in Appendix B.

Sampling Using USEPA Method TO-15

The flow controllers used for TO-15 sampling will be purged and calibrated prior to each use. Prior to each use, the flow controllers will be flushed with ultra-high-pure nitrogen gas. The flow controllers will then be calibrated using a digital flow meter. The flow rate is checked to determine if it is within the acceptable range. The flow controllers can be adjusted as necessary to meet the target final vacuum pressure of 5 inches of Hg vacuum upon the completion of a 72-hour sampling event. The flow controllers will also be checked upon the completion of each sampling event to verify that the calibrated flow rate was maintained throughout the sampling event. Purge and calibration data will be recorded on calibration data sheets provided in Appendix B.

The chain of custody for the SUMMA canisters documents vacuum level from the time the canisters are delivered to the site until the canisters are returned to the laboratory for analysis. The vacuum level record for each canister provides the assurance that the samples were not compromised prior to analysis.

Sampling Using EPA Method 40 CFR, Part 50, Appendix M – PM10

A multiple point calibration will be completed in the field for comparison to the instrument calibration curve. The multiple point calibration will be performed at a minimum upon installation or on a frequency of once-per-month, whichever is greater. The samplers will be recalibrated if the AMS is relocated and following sampler motor maintenance. Calibration data will be recorded on air monitoring forms provided in Appendix B. PM_{10} sampling and analysis will be in accordance with EPA Method 40 CFR, Part 50, Appendix M – Reference Method for Determination of Particulate Matter as PM10 in the Atmosphere.

Meteorological Weather Station

Meteorological sensors will be NIST calibrated by the manufacturer prior to shipment and properly oriented in accordance with manufacturer instructions. Weather conditions will be recorded hourly on the air monitoring field forms and the meteorological data will also be stored in the system's data logger.

3 AMBIENT AIR ACTION LEVELS

Site-specific action levels for real-time air monitoring and air quality objectives for time-integrated air sampling have been established for the remediation project. Real-time monitoring action levels were selected to maintain perimeter air quality at an acceptable level during remedial activities. The action levels have been established to identify occasions when additional emissions abatement measures will be required to control site emissions sufficiently such that the air quality is not adversely affected relative to the project air quality objectives. The real-time monitoring action levels will be used in association with tiered response measures in order to implement increasingly more rigorous emissions abatement measures to help prevent exceedances of the project air quality objectives.

Project specific air quality objectives have been calculated using risk-based exposure equations for inhalation. Air quality objectives have been calculated for specific VOCs and PAHs potentially present in Site emissions as typical MGP site contaminants. The National Ambient Air Quality Standard (NAAQS) for PM_{10} will be used for the remedial action levels. Benzene, naphthalene, and PM_{10} concentrations will be tracked throughout the project and compared to the project-specific air quality objectives. These potential "target contaminants" were selected to regularly monitor the performance of the project emissions abatement measures in meeting the air quality objectives. The project specific air quality objectives will be used to verify that local air quality is not being impacted by the remediation project.

3.1 Real-Time Action Levels

The real-time air monitoring action levels have been developed to serve as indicators to identify when emission control responses will be necessary. Real-time action levels have been developed for particulates, total VOCs (as measured by field instruments), and for the single constituent benzene because of its low exposure level, as established by the Integrated Risk Information System (IRIS), its potential ease of volatility and mobility, and the capability of field instruments to identify and quantify the constituent. The real-time action levels have been developed using air quality workplace and ambient air standards, the capability of the field screening and analytical instruments, and knowledge of MGP waste characteristics.

Action levels established for each of the three real-time monitoring parameters for the project (particulates, total VOCs, and benzene) are discussed in the following sections. The action levels were selected to maintain acceptable daily air quality at the Site, and reduce the potential for subsequent emissions at higher concentrations. A summary of the action levels and response guidelines for action level exceedances are provided in Table 3-1.

3.1.1 Particulates

A real-time air monitoring action level for particulates has been established for the Site based on the NAAQS. The NAAQS 24-hour average concentration for particulates with aerodynamic diameters of 10 microns or less than 150 $\mu g/m^3$. The sustained concentration measured over a one-minute monitoring interval will be recorded at each monitoring location. The real-time sustained action level of 200 $\mu g/m^3$ has been selected for particulate concentrations at the Site perimeter based on a work day time duration exposure.

If the particulate action level is exceeded as measured by the dust monitoring instrument, real-time monitoring of the background level will measured upwind immediately using the same portable monitor. If the sustained downwind particulate readings are more than 100 $\mu g/m^3$ greater than the upwind background level, or if visible dust is observed leaving the Site, the air monitoring technician will notify the site managers. If the particulate action level is exceeded, tiered dust suppression techniques will be implemented by the remediation contractor to address particulate emissions at the Site. Monitoring and abatement measures will be continued until sufficient control of particulate emissions is achieved to maintain perimeter air quality below the air level and the visible dust emission criteria. Response actions to address conditions causing exceedances of the particulates action level are described in Section 3.3.

3.1.2 Volatile Organic Compounds

Real-time air action levels for VOCs have been established for the Site based on the NIOSH REL and the OSHA PEL values for benzene. A real-time (sustained as a one minute average concentration) action level of 1.0 ppm has been selected as the level action level for total VOCs at the Site perimeter. The PID will be used to monitor non-specific concentrations of total photo-ionizable volatiles present. The detection of photo-ionizable volatiles provides an indication of the potential presence of benzene. PID readings at the Site perimeter compared to the VOC action levels will be utilized to determine when additional measurements and emission abatement measures are necessary.

When sustained readings remain below 1.0 ppm, the air monitoring technician will continue the perimeter monitoring route. If a sustained reading greater than or equal to 1.0 ppm during an initial measurement is obtained with the PID, a second measurement will be taken. If the PID sustained reading is not greater than or equal to 1.0 ppm during the second one minute monitoring period, the monitoring technician will proceed to the next monitoring station on the site perimeter route. If the PID reading is greater than or equal to 1.0 ppm during the second measurement at a monitoring location, the air monitoring technician will pause for 5 minutes

and then record a third measurement to assess if VOC levels may be attributable to a short-term transient condition or are more sustained.

If a PID reading greater than or equal to 1.0 ppm is obtained during the third measurement period, the technician will notify the site managers so that first level abatement measures for VOCs will be implemented by the remediation contractor, and the technician will proceed to collect a grab sample for GC analysis. A detailed description of the Site and surrounding area activities to evaluate possible VOC sources will be completed if the VOC action level is exceeded. Response actions to address conditions causing exceedances of the VOC action level are described in Section 3.3.

In addition to notifying the site managers regarding a VOC action level exceedance, the air monitoring technician will complete a measurement using the Photovac Voyager portable GC to obtain a "total benzene" measurement. The GC sample will be collected as a grab sample at the monitoring location where the VOC action level was exceeded using the PID as a sample pump for the grab sample collection. The grab sample will be analyzed on the Voyager in the Site air monitoring field office.

As a second tier action level for the VOC monitoring, if a benzene concentration equal to or greater than 0.1 ppm is measured with the GC following a VOC action level exceedance, the air monitoring technician will notify the site managers to implement more rigorous abatement measures for VOC emissions. If the benzene concentration measured is equal to or greater than 1.0 ppm the technician will notify the site managers that a third tier action level for VOCs has been exceeded so that progressively more rigorous abatement measures for VOC emissions are implemented. If the benzene concentration measured during this process is equal to or greater than 5 ppm, the technician will notify the site managers of a fourth tier action level exceedance and remediation activities will be suspended. Response actions to address conditions causing exceedances of the VOC action levels are described in Section 3.3 and summarized in Table 3-1.

3.2 Time-Integrated Air Quality Objectives

The time-integrated sampling will be used to document air quality at the site perimeter during the remedial action to identify potential project related air emissions. The analytical results for each 72-hour sampling period will be tabulated to calculate running average air concentrations for selected compounds (target compounds) detected during the site remedial activities. The running average air concentrations for the target compounds will serve as an ongoing measure of air quality at the site perimeter over the project duration. The running averages for the target compounds will be compared to the baseline concentrations measured

prior to the start of remedial actions and the air quality objectives established for the target compounds. The comparison of the target compound running averages to the project air quality objectives will be used to identify when emission abatement measures need to be implemented on semi-permanent basis rather than the short-term implementation of abatement measures after real-time monitoring action level exceedances.

The air concentrations at each AMS will be compared to the baseline concentrations collected at the start of the project before remediation activities begin and to the air quality objectives developed for the project duration of 45 days (0.123 years). Project-specific air quality objectives presented in Table 3-2 have been developed for benzene and naphthalene for this project. The time-integrated sampling results will be compared to the air quality objectives as they are received from Teklab to assess the effectiveness of emission control efforts during site remediation activities. Project running averages will be updated as the time-integrated sampling laboratory results are accumulated.

3.2.1 Particulates

The project air quality objective for particulates will be based on the NAAQS. The NAAQS 24-hour average concentration of 150 µg/m^3 for particulates with diameters of 10 microns will be used as the project air quality objective for particulates.

3.2.2 Benzene

The project-specific air quality objective for benzene has been developed using inhalation exposure equations as outlined in USEPA's Risk Assessment Guidance for Superfund document and the IEPA's Tiered Approach for Corrective Action (TACO) document. The risk-based exposure equation:

$$Cexp(c) = [TR \times BW \times ATc] / [SFi \times IR \times EF \times ED]$$

for potential exposure for carcinogenic effects. Where the following variables are defined:

Cexp(c) = Acceptable risk-based air concentration for carcinogenic constituent.

TR = Target cancer risk level (1 per 1,000,000 occurrences).

BW = Body weight. Kg

ATc = Averaging time for carcinogens.

SFi = Inhalation Slope Factor for carcinogens

IR = Inhalation Rate.

EF = Exposure Frequency.

ED = Exposure Duration.

The risk-based exposure equation:

Cexp(nc) = [THI x RfDi x BW x ATnc] / [IR x EF x ED]

was used for calculating non-carcinogenic effects. Where the following variables were defined:

Cexp(nc) = Acceptable risk-based air concentration for non-carcinogenic constituent.

THI = Target Hazard Index.

BW = Body weight.

ATnc = Averaging time for non-carcinogens.

RfDi = Inhalation reference dose for non-carcinogens.

IR = Inhalation Rate.

EF = Exposure Frequency.

ED = Exposure Duration.

Most of the potential receptors in the vicinity of the remediation site are residential properties to the north, west and south, with commercial/industrial property users to the west of the remediation site. As a conservative approach to deriving an acceptable maximum exposure level for benzene, the “theoretical sensitive receptor” model used is a potential child receptor in a residential setting with 24-hour per day exposure over a 30 day duration of the project. The standard USEPA default values for target cancer risk, body weight, inhalation rate, averaging time, and exposure frequency values were used as input parameters. The inhalation slope factor and inhalation reference dose values were obtained from the USEPA Integrated Risk Information System (IRIS). The exposure duration was based upon the estimated project duration of 45 days. An acceptable target risk exposure level concentration of 0.0728 mg/m3 (0.0228 ppm) was calculated for benzene based on the theoretical sensitive receptor model.

The air quality objective calculation parameters for the project-specific benzene objective are presented on Table 3-2.

3.2.3 Naphthalene

The project-specific air quality objective for naphthalene was developed using the same inhalation exposure equations as outlined in USEPA's Risk Assessment Guidance for Superfund document described above for calculating the benzene air quality objective.

The project-specific risk-based acceptable air quality objective concentration of 0.03 $\mu g/m^3$ was calculated for naphthalene based on the theoretical construction worker receptor model. The air quality objective calculation parameters for the project-specific naphthalene objective are presented on Table 3-3.

3.3 Response to Action Level Exceedances

Emission controls will be implemented as necessary to maintain acceptable air quality at the perimeter of the Site. Action levels developed for VOCs as measured with a PID, benzene as measured with the Voyager GC, and particulates measured with a dust monitor will be used to gauge relative air quality at the perimeter fence. Emission control measures will be implemented in the event action levels are exceeded. The response actions taken to control off-site emissions will be proportional to the severity of the recorded real-time exceedance at the perimeter fence line. The frequency of real-time measurements collected will be increased until perimeter air quality no longer exceeds action levels. The site managers will be notified of each action level exceedance and applicable emission abatement measures will be implemented to reduce Site emissions. Response guidelines to an action level exceedance are provided in Table 3-3.

3.3.1 Emission Control Measures

If an action level is exceeded, the initial step will be to assess potential sources or material handling procedures that may be contributing to the unfavorable conditions.

Actions taken to reduce volatile emissions will include as necessary:

- using cellulose/foam spray applications;
- covering exposed soil surfaces with tarps, plastic sheeting, or clean fill;
- reducing the area of exposed soils;

- altering material handling procedures;
- reducing the rate of production;
- moving the work to other areas of the Site until more favorable weather conditions or work practices can be implemented; and,
- stopping the work until more favorable weather conditions or work practices can be implemented.

Particulate emissions exceeding the action level or generating visible dust plumes at the site perimeter may be controlled by:

- wetting working surfaces and haul roads;
- covering exposed soils in inactive work areas; and/or by,
- covering backfill, and soil amendment material stockpiles as appropriate to the emission source(s) identified for particulate emissions.

If particulate action levels are sustained over a 30-minute monitoring interval, work activities will be ceased until an effective response can be implemented. The increased frequency of real-time air monitoring will be continued until air quality at the site perimeter no longer exceeds action levels.

At the end of each work day, stockpiles and exposed soil surfaces will be covered to minimize emissions. Tarps, plastic sheeting or cellulose/foam suppressant applications may be used, as applicable. The air monitoring technician will monitor air quality at each perimeter location to verify that action levels are not being exceeded before leaving the Site. The stockpile and excavation areas will be screened with the PID and inspected to assure that areas are properly covered.

4 DATA REPORTING

The following sections provide a description of the procedures that will be used for recording field data.

4.1 Field Logs

Field logs will be maintained throughout the project to accumulate site conditions on a daily basis that have or may have an effect on Site air quality conditions. Information to be recorded in the field logbook will include:

- description of site activities;
- weather conditions;
- general real-time perimeter monitoring observations;
- action levels exceedances; and
- emission abatement measures implemented in response to action level exceedances.

The data recorded in the field logs will be supplemented by data recorded on specific real-time and time-integrated field data sheets. Air monitoring field data sheets and field forms are provided in Appendix B.

4.2 Real-Time Monitoring Data

The real-time air monitoring data will be recorded on the field data sheets and stored in an electronic database. Field data including measured concentrations recorded during perimeter air monitoring rounds, calibration records, maintenance, sampling irregularities, and repairs will be recorded on data sheets and compiled in the field logbook for the real-time air monitoring.

The real-time sampling results will be routinely reported to the site manager to allow prompt evaluation and response to potential emission problems when action levels have been approached or exceeded.

4.3 Time-Integrated Sampling Data

Field data, including equipment calibration, sample identification; equipment maintenance, sampling irregularities, and shipments will be recorded on the time-integrated sampling field data sheets and compiled in the spreadsheet where field log data will be summarized. A set of field logbooks will be maintained for the time-integrated sampling network to log daily information of the nature described above, pertinent to documenting the time-integrated sampling program.

Preliminary results will be reported to the site manager to assess potential air quality concerns due to site activities. The accumulated time-integrated results,

field data, and comparison to the project air quality standards will be presented in the Ambient Air Monitoring Report upon the conclusion of the remediation project.

REFERENCES

National Archives and Records Administration, Code of Federal Regulations – Protection of Environment 40, Part 50, 1997. *National Primary and Secondary Ambient Air Quality Standards, Appendix M – Reference Method for the Determination of Particulate Matter as PM_{10}. in the Atmosphere.*

U.S. Environmental Protection Agency (USEPA). Office of Research and Development, National Center for Environmental Assessment. August, 1997. *Exposure Factor Handbook*. (EPA/600/P-95/002Fa)

Office of Air Quality Planning and Standards, 1998. *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II: Part 1, Ambient Air Quality Monitoring Program Quality System Development.* (EPA-415/R-98-004)

Office of Research and Development, National Risk Management Research Laboratory. January 1999. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, Compendium Method T0-13A, Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Ambient Air Using Gas Chromatography/Mass Spectrometry (GC/MS).*

Office of Superfund Remediation and Technology Innovation, January 2009. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment).* (EPA-540-R-070-002)

TABLES

Table 3-1
Real-Time Air Monitoring Action Levels - Response Actions and Abatement Actions
Champaign Former MGP Site Interim Remedial Action

Action Level	PSC Response	Recommended Abatement Actions
Particulates		
200 ug/m^3 dust one-min. average	Measure concentration at the upwind (background) side of the Site to determine background particulate concentrations entering the Site	> Attempt to identify the specific particulate emission source. > Wetting work surfaces and haul roads. > Covering exposed soil in excavation areas that are inactive. > Covering stockpiles. > Slow vehicle speeds onsite and on haul roads.
100 ug/m^3 dust above background	Notify the site managers of particulate action level exceedance. Note site activities, continue monitoring to evaluate abatement action effectiveness	
Visible dust at Site Perimeter	Notify the site managers of particulate action level exceedance. Note site activities, continue monitoring to evaluate abatement action effectiveness	
VOCs		
1.00 ppm total VOCs one-min. average	If a sustained reading greater than or equal to 1.0 ppm during an initial measurement is obtained with the PID, a second measurement will be taken.	No action required
1.00 ppm total VOCs one-min. average	If the PID reading is greater than or equal to 1.0 ppm during the second measurement at a monitoring location, the air monitoring technician will pause for 5 minutes and then record a third measurement	No action required
1.00 ppm total VOCs one-min. average **First Level**	PID reading greater than or equal to 1.0 ppm is obtained during the third measurement period, the technician will notify the site managers of VOC action level exceedance, and measure benzene concentration using UltraRae 3000	> Spray cellulose or foam vapor suppression materials. > Cover exposed impacted soil with tarps or plastic. > Reduce impacted soil exopsed areas. > Alter material handling procedures. > Reduce excavation & Loading rates. > Move the work to less impacted areas. > Stop the work until more favorable weather conditions are available.
Benzene		
0.1 ppm benzene **Second Level**	Notify the site managers of benzene action level exceedance. Note site activities, continue monitoring to evaluate abatement action effectiveness.	> Implement abatement actions as appropriate described above for VOC abatement actions.
1.0 ppm benzene **Third Level**	Notify the site managers of benzene action level exceedance. Note site activities, continue monitoring to evaluate abatement action effectiveness.	> Implement abatement actions as appropriate described above for VOC abatement actions.
5.0 ppm benzene **Fourth Level**	Notify the site managers of benzene action level exceedance, for site activity suspension. Note Site activities at action level, continue monitoring.	> Stop work and continue monitoring until air quality remains below action levels.

Table 3-2
Time Integrated Air Quality Objectives
Champaign Former MGP Site Interim Remedial Action
Benzene and Naphthalene -- Carcinogenic Effect -- 24-hour Per Day Exposure

Relevant Equations

$$CA = \frac{TR \times AT}{EF \times ED \times UR}$$

Where: CA is the air concentration (mg/m^3)
TR is the target incremental cancer risk (dimensionless)
AT is the averaging time for carcinogenic effects (days)
EF is the exposure frequency (days/yr)
ED is the exposure duration (yrs)
AF is the adjustment factor to address less than 24-hour exposure (unitless)
UR is the inhalation unit risk value $(mg/m^3)^{-1}$

Source: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)

Input Parameters

Parameter	Description	Value (Child)	Source
TR	Target Cancer Risk	1.00E-06	USEPA
AT	Averaging Time	25,550	USEPA
EF [(1)]	Exposure Frequency	45	site-specific
ED	Exposure Duration	1	site-specific
UR	Unit Risk	CS[(2)]	see below

Action Levels

Chemical	Unit Risk $(\mu g/m^3)^{-1}$	Unit Risk $(mg/m^3)^{-1}$	Source	Action Level (mg/m3)	Action Level (ppm)[(3)]
benzene	7.80E-06	7.80E-03	USEPA	7.28E-02	0.0228
naphthalene	3.40E-05	3.40E-02	USEPA	1.67E-02	0.0032

Notes:
[(1)] Exposure based on child receptor in residential setting, 24-hours per day, for 30 days.
[(2)] Chemical-specific.
[(3)] Based upon a molecular weight of benzene is 78.11 g/mol and naphthalene is 128.17 g/mol.

Table 3-3
Time Integrated Air Quality Objectives
Champaign Former MGP Site Interim Remedial Action
Benzene and Naphthalene -- Non-Carcinogenic Effect -- 24-hour Per Day Exposure

Relevant Equations

$$CA = \frac{THQ \times At_{nc} \times RfC}{EF \times ED}$$

Where: THQ is the Target Hazard Quotient
AT is the averaging time (days)
RfC is the Reference Concentration (mg/m^3)
EF is the exposure frequency (days/yr)
ED is the exposure duration (yrs)

Source: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)

Input Parameters

Parameter	Description	Value (Child)	Source
THQ	Target Hazard Quotient	1.00E+00	USEPA
AT_{nc}	Averaging Time [1]	45	USEPA
EF	Exposure Frequency	45	site-specific
ED	Exposure Duration	1	site-specific
RfC	Reference Concentration	CS[2]	see below

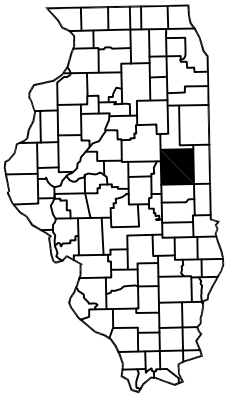
Action Levels

Chemical	RfC (mg/m^3)	Source	Action Level (mg/m3)	Action Level (ppm)[3]
naphthalene	3.00E-03	USEPA	3.00E-03	0.0009

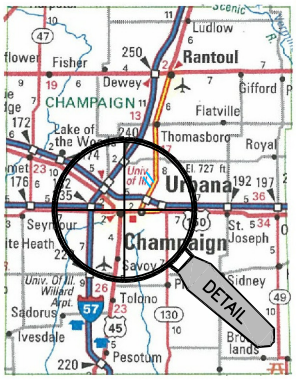
Notes:
[1] For non-carcinogenic effects AT = EF plus weekends and holidays
[2] Chemical-specific.
[3] Based upon a molecular weight of benzene is 78.11 g/mol and naphthalene is 128.17 g/mol.

FIGURES

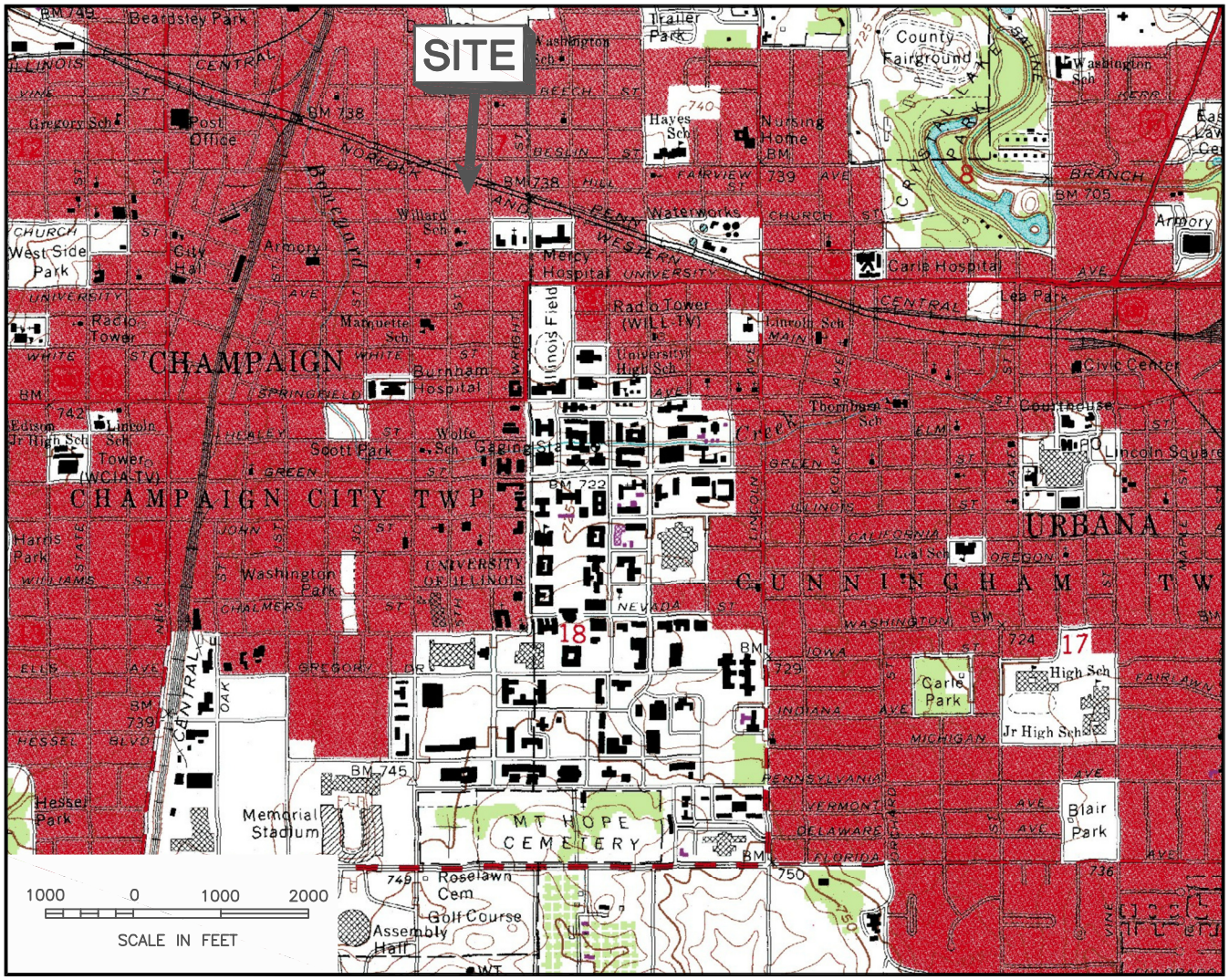
ILLINOIS



CHAMPAIGN COUNTY



AREA IN DETAIL



Modified from U.S. Geological Survey, Urbana, Illinois, quadrangle, Photorevised 1975.

SCALE IS VARIABLE

COL. 624\00345E-001

PSC	TITLE: SITE LOCATION MAP AMBIENT AIR MONITORING PLAN CHAMPAIGN FORMER MGP SITE	DWN: TMM / DES.: SPB CHKD: LH / APPD: MK DATE: 1/30/13 / REV.: 2	PROJECT NO.: 62412010008 AMEREN ILLINOIS CHAMPAIGN, ILLINOIS FIGURE 1

LEGEND

- EXISTING STRUCTURES (APPROXIMATE)
- NORFOLK SOUTHERN RAILWAY CORPORATION PROPERTY BOUNDARY
- REMEDIATION SITE BOUNDARY
- FENCE
- TEMPORARY FENCE
- AIR MONITORING STATION LOCATION
- APPROXIMATE EXCAVATION LIMITS

SOURCE:

THE SOURCE FOR THE PROPERTY BOUNDARY SURVEY IS VEGRZYN, SARVER AND ASSOCIATES.

0 80
FEET

COL J:\624\02647B-193

PSC

TITLE:
AIR MONITORING STATIONS
AMBIENT AIR MONITORING PLAN

DWN: TMM	DES: BT
CHKD:	APPD:
DATE: 10/26/16	REV:

PROJECT NO: 62412010008
AMERENIP
CHAMPAIGN, ILLINOIS

FIGURE 2

APPENDIX A

HISTORICAL WEATHER DATA AND WIND ROSE

LAST 5 YEARS

CHAMPAIGN WILLARD AP (IL) - Wind Frequency Table (percentage)						
Latitude : 40.0397	Start Date : Sep. 1, 2012	Sub Interval Windows				
Longitude : -88.2778	End Date : Sep. 30, 2016		Start	End		
Elevation : 754 ft.	# of Days : 1491 of 1491	Date	Jan. 1	Dec. 31		
Element : Mean Wind Speed	# obs : poss : 31486 of 35784	Hour	0	23		

(Greater than or equal to initial interval value and Less than ending interval value.)

Range (mph)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
1.3 - 4	0.4	0.2	0.2	0.4	0.7	0.4	0.3	0.3	0.5	0.4	0.3	0.3	0.5	0.3	0.3	0.3	5.6
8-Apr	1.4	0.9	1.4	2	2.7	1.8	1.8	1.5	2.7	1.9	1.7	1.5	2.4	1.4	1.2	0.9	27.1
13-Aug	2	1.4	1.8	1.7	1.9	1.3	1.5	1.6	4.2	2.4	1.8	1.4	2.3	1.6	1.6	1.3	29.8
13 - 19	1.6	0.9	0.9	0.8	0.8	0.5	0.7	1.4	4.2	2.1	1.4	1	2.2	1.8	1.5	1.3	23.1
19 - 25	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.3	1.5	0.6	0.3	0.3	1	0.7	0.5	0.3	6.6
25 - 32	0.1	0	0	0	0	0	0	0.1	0.5	0.1	0.1	0.1	0.4	0.2	0.1	0.1	1.9
32 - 39	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.3
39 - 47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total(%)	5.7	3.5	4.4	4.9	6.1	4	4.6	5.3	13.6	7.6	5.6	4.8	8.9	6.1	5.3	4.2	94.6
Calm (<1.3)																	5.4
Ave Speed	10.6	10.3	9.6	8.5	8.1	8.2	9.1	10.6	12.3	11.2	10.4	10.5	11.9	12.1	11.8	11.7	10.1

FULL
POR

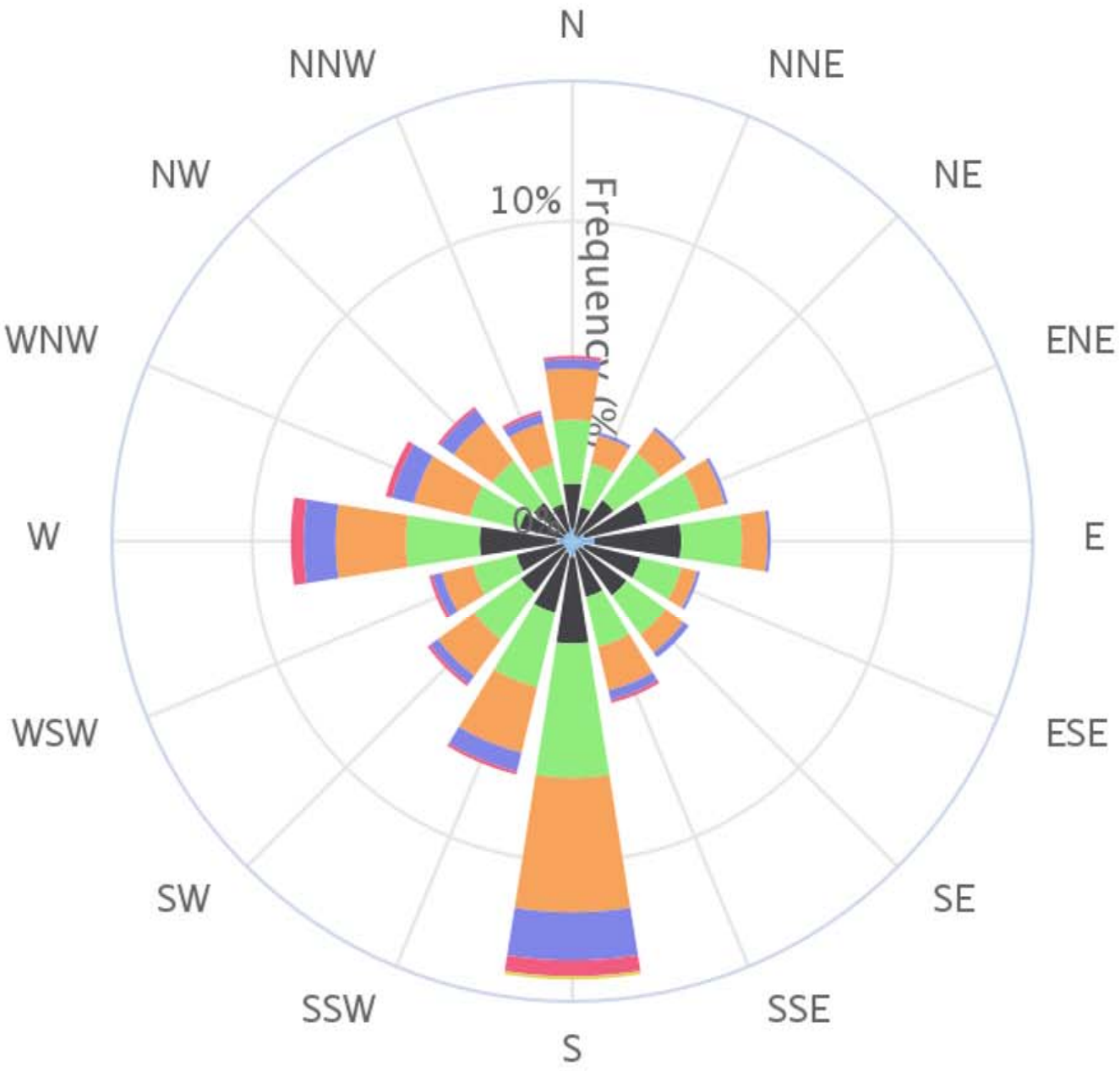
CHAMPAIGN WILLARD AP (IL) - Wind Frequency Table (percentage)						
Latitude : 40.0397	Start Date : Jan. 1, 1997	Sub Interval Windows				
Longitude : -88.2778	End Date : Sep. 30, 2016		Start	End		
Elevation : 754 ft.	# of Days : 7213 of 7213	Date	Jan. 1	Dec. 31		
Element : Mean Wind Speed	# obs : poss : 158889 of 173112	Hour	0	23		

(Greater than or equal to initial interval value and Less than ending interval value.)

Range (mph)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
1.3 - 4	0.3	0.1	0.2	0.3	0.5	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.5	0.3	0.3	0.2	4.9
8-Apr	1.4	0.9	1.5	1.9	2.6	1.6	1.7	1.6	2.6	1.8	1.7	1.5	2.2	1.4	1.3	1	26.8
13-Aug	2.1	1.5	2.4	2.1	2.1	1.2	1.7	1.9	4.7	2.8	2	1.7	2.7	1.9	1.7	1.4	34
13 - 19	1.2	0.9	1	0.9	0.9	0.5	0.7	1.1	3.5	1.8	1.2	0.9	2	1.6	1.3	1	20.5
19 - 25	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.3	1.3	0.6	0.4	0.3	1	0.7	0.5	0.3	6.6
25 - 32	0.1	0.1	0	0	0	0	0	0.1	0.4	0.2	0.1	0.1	0.4	0.2	0.1	0.1	1.8
32 - 39	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.3
39 - 47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47 -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total(%)	5.4	3.7	5.4	5.4	6.3	3.8	4.5	5.2	12.9	7.5	5.7	4.8	8.7	6.2	5.2	4	94.8
Calm (<1.3)																	5.1
Ave Speed	10.4	10.9	10.1	9.6	8.8	8.6	9	10.4	12.1	11.5	10.6	10.5	12.1	12.1	11.4	11	10.2

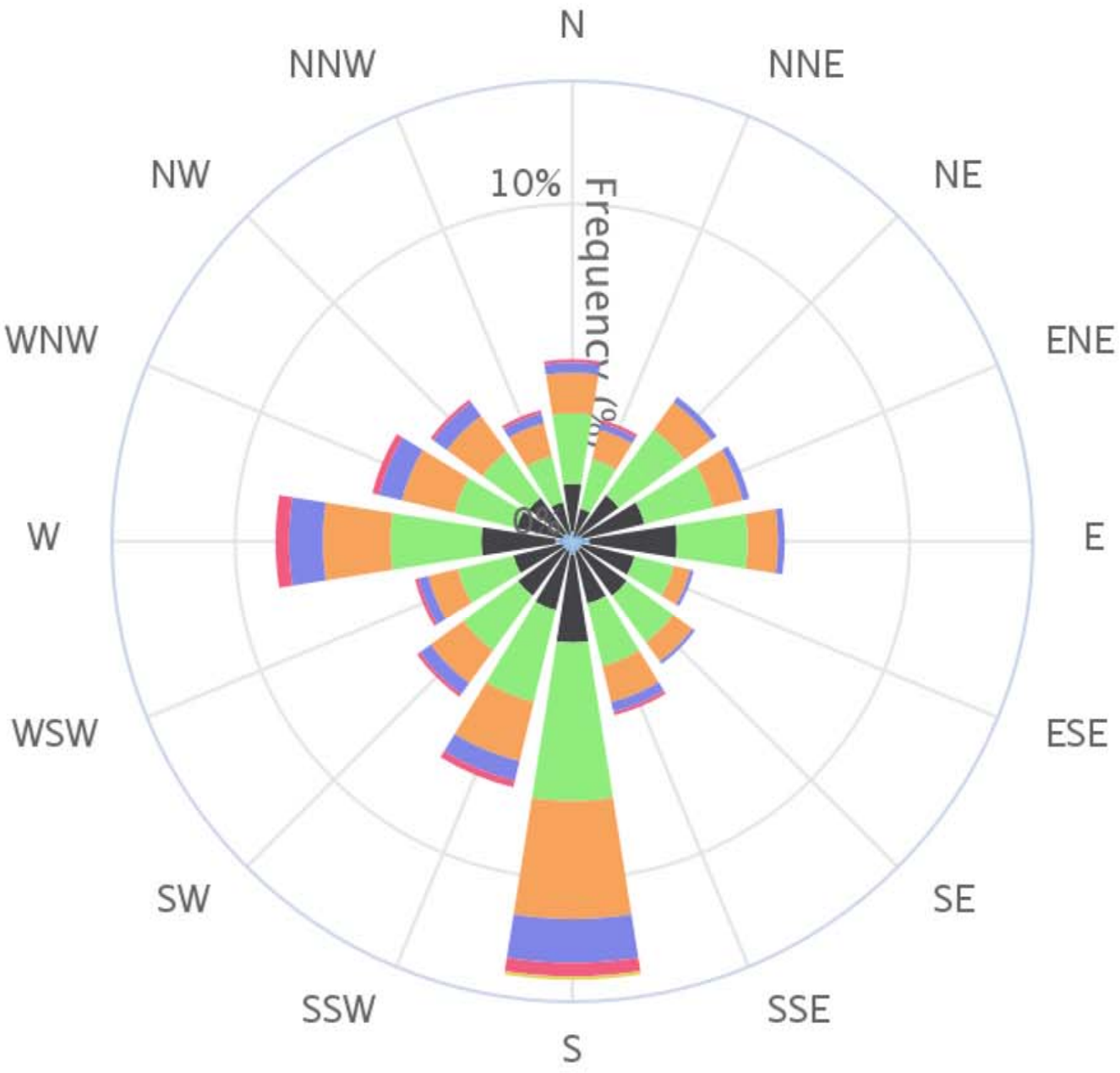
CHAMPAIGN WILLARD AP (IL) Wind Rose

Sep. 1, 2012 – Sep. 30, 2016



CHAMPAIGN WILLARD AP (IL) Wind Rose

Jan. 1, 1997 – Sep. 30, 2016



APPENDIX B

PSC FIELD FORMS

Daily Air Monitoring Activity Log

Project Name: Ameren - Champaign MGP (Residual IRM)

Page: 1 of 1

Site Location: 308 North Fifth Street, Champaign, Illinois

Date: 11 / / 2016

Project #: 624-1610-0001 - J0130

Field Air Crew:

Site Activity Log

Time	Activity

Note: This form is to document field activities on an hourly basis or as activities change.

Completed By: Field Air Crew Dude **Date:** 11/xx/2016

DAILY PERIMETER AIR MONITORING DATA FORM

Project Name: *Ameren - Champaign MGP (Residual IRM)* ***Page:*** ***1 of 1***

Site Location: *308 North Fifth Street, Champaign, Illinois* ***Date:*** ***11 / / 2016***

Project Number: *624-1610-0001 - J0130* ***Air Field Techs.:*** Lead Tech / 2nd Tech

Site Activities:

☐ Excavating / Loading	☐ Decon	☐ Compacting
☐ Backfilling	☐ Installing/pulling slide rail	☐ Rock
☐ Water Treatment	☐ Hauling Clean Fill	☐ No Work
☐	☐	☐

	Time - Clock Hour	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
PARTICULATES (mg/m^3)	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
VOCs (ppm)	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Benzene (ppm)	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
	0:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

Particulates Action Level: >0.200 mg/m^3

>0.100 mg/m^3 greater than upwind concentration

VOCs Action Level: Level One VOC Action Level: >1.0 ppm

Benzene Action Levels: Level Two Action Level: >0.1 ppm benzene

Level Three Action Level: >1.0 ppm benzene

Level Four Action Level: >5.0 ppm benzene

Notes / Comments:

HOURLY PERIMETER AIR MONITORING DATA FORM

Project Name: Ameren - Champaign MGP (Residual IRM) **Page:** 1 of 1

Site Location: 308 North Fifth Street, Champaign, Illinois **Air Technician:** **Date:** 11 / / 2016

Project Number: 624-1610-0001 - J0130 **Air Technician:** **Time:**

Site Activities: 1)

Fenceline Sample Location	Dust (mg/m^3)	1stPID (ppm)	2nd PID (ppm)	3rd PID (ppm)	GC (ppm)

AMS #	Time	Summa (in.Hg.)	TO-13 Flow	PM-10 Flow
1				
1D				
2				
3				
4				

Notes:

(1) The duplicate station AMS-1D is only used during every third sampling event.
(2) Samples for GC analysis are only collected when VOC concentrations exceed action levels.
N/A - Not applicable. The unit was not used at this time.

Atmospheric Conditions

WS _____ *Temp* _____ *RH* _____ *BP* _____ *Cloud Cover (S,PC,H,D):* _____

Predominant Wind Direction (from): _____

Upwind Location: _____

Downwind Location: _____

Cloud Cover: S = Sunny (Clear); PC = Partly Cloudy; H = Hazy; D = Dusty

Precipitation (Check Box)

None	Rain	Drizzle	Fog	Sleet	Snow

Notes/Comments:

Action Level(s): *(Document Exceedances Accordingly Below & Identify Location)*

Level One: PID VOC Reading >1.0 ppm -

Level Two: GC Benzene Reading >0.1 ppm -

Level Three: GC Benzene Reading >1.0 ppm -

Level Four: GC Benzene Reading >5.0 ppm -

Particulates: Dust Meter Reading >0.200 mg/m^3 -

Particulates: Dust Meter Reading >0.100 mg/m^3 greater than upwind concentration -

Daily Air Monitoring Weather Conditions Log

Project Name: *Ameren - Champaign MGP (Residual IRM)*

Page: ***1 of 1***

Site Location: *308 North Fifth Street, Champaign, Illinois*

Date: ***11 / / 2016***

Project #: *624-1610-0001 - J0130*

Field Air Crew:

Weather Conditions

Cloud Cover: S = Sunny (Clear); PC = Partly Cloudy; H = Hazy

Time	Temp. (°F)	Barometric Pressure (in. Hg)	Precipitation (check one)						Humidity (%)	Wind		Cloud Cover
			None	Rain	Drizzle	Fog	Sleet	Snow		Speed	Dir.*	
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0
0:00	0	0	0	0	0	0	0	0	0	0	0	0

Note: * Wind Direction is the direction from which the wind is coming **from**.

Completed By: Field Air Crew Dude **Date:** 11/xx/2016