



Environment

Prepared for:
National Grid
Hicksville, NY

Prepared by:
AECOM
Chelmsford, MA
60214741
September 1, 2011

Community Air Monitoring Plan Hempstead Intersection Street Former MGP Site Villages of Hempstead and Garden City, NY





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A handwritten signature in cursive script that reads "Melissa Wellman".

Prepared By: Melissa Wellman

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List of Acronyms

AM – Air Monitoring

ASTM – American Society for Testing and Materials

BTEX – Benzene, Toluene, Ethylbenzene, and Xylenes

CAMP – Community Air Monitoring Plan

COI – Constituents of Interest

DER-10 – DER-10 Technical Guidance for Site Investigation and Remediation

EPA – Environmental Protection Agency

FAM – Fixed Air Monitoring

GC – Gas Chromatograph

HASP – Health and Safety Plan

HCN – Hydrogen Cyanide

Hg - Mercury

H₂S – Hydrogen Sulfide

MGP – Manufactured Gas Plant

PAM – Portable Air Monitoring

PID – Photoionization Detector

PM₁₀ – Particulate Matter with a diameter 10 micrometers or less

NYSDEC – New York State Department of Environmental Conservation

NYSDOH - New York State Department of Health

SO₂ – Sulfur Dioxide

TVOC – Total Volatile Organic Compound

VOC – Volatile Organic Compound

Executive Summary

This Site-specific Community Air Monitoring Plan (CAMP) has been developed to provide specific procedures for measuring, documenting, and responding to potential airborne contaminants during the remedial action at the Former Hempstead Intersection Street Manufactured Gas Plant site, referred to herein as the Site. The procedures in this CAMP are focused on the monitoring of airborne contaminants at the Site perimeter and complement the work zone monitoring conducted to protect Site workers as described in the Site Health and Safety Plan (HASP). This CAMP is based on and builds on the air monitoring guidelines established by the New York State Department of Health (NYSDOH) in the New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation (DER-10) (May 2010). DER-10 is designed to provide monitoring procedures, Response Limits, Action Limits, and contingency measures if any concentration of the constituents of interest (COI) is approached. DER-10 defines a Response Limit as a contaminant concentration or odor intensity that triggers contingent measures. A contaminant or odor intensity greater than the Response Limit does not suggest the existence of a health hazard, but serves instead as a screening tool to trigger contingent measures if necessary, to assist in minimizing offsite transport of contaminants and odors during remedial activities. Additionally, DER-10 defines an Action Limit as a contaminant concentration or odor intensity that triggers a series of contingent measures and/or work stoppage. National Grid has created an Alert Limit for total volatile organic compound (TVOC) concentrations to provide notification of increasing TVOC concentrations. Contingent measures triggered by a Response and/or Action Limit concentration are defined in the Site-specific Emissions Control Plan as well as the National Grid Alert Limit.

During times of active remedial activities, perimeter air monitoring (AM) will be conducted using a combination of real-time (continuous and nearly instantaneous) AM at fixed locations (24 hours a day/7 days a week) and portable locations (Monday – Friday, 7:00 AM – 5:00 PM), walk-around supplemental monitoring using hand-held instruments on an as-needed basis, and continuous meteorological monitoring during active periods of the remedial program.

Contaminants commonly found at former MGP sites will be monitored, including volatile organic compounds (VOCs) and respirable particulate matter (PM₁₀) 10 micrometers or less in diameter. Relative odor intensity will also be monitored using an American Society for Testing Materials (ASTM) method. The Contingency Plan included in this document defines the Site-specific Alert, Response, and Action Limits, and response activities to be implemented during working hours if concentrations above an Alert, Response, and/or Action Limit concentration for a measured contaminant occurs. Although hydrogen cyanide (HCN) has not been detected in the soil or groundwater, there will be a separate contingency plan for monitoring for its presence if cyanide-containing material is encountered during excavation.

The CAMP describes the AM to be conducted during activities on the main site where there is reasonable expectation of encountering MGP-impacted materials. Where appropriate, an alternative level of monitoring which is in compliance with DER-10 and equally protective of the community may be employed. Based on specific field activities, a decision will be made as to the appropriate level of monitoring.

1.0 Introduction

The purpose of the air monitoring program is to provide early detection in the field of potential short-term emissions. The early detection of potential emissions and associated contingency measures is intended to expedite any necessary mitigation measures, and to reduce the potential for the community and public to be exposed to hazardous constituents at levels above accepted regulatory limits and guidelines provided in DER-10.

During remedial activities at the Site, the CAMP will be implemented using a combination of real-time AM at fixed and temporary locations, as well as supplemental walk-around perimeter monitoring using hand-held instruments as appropriate. An aerial overview and a site map showing the preliminary locations of the AM stations are shown in **Figure 1-1** and **Figure 1-2**, respectively.

The objectives of the CAMP are as follows:

- Provide an early warning system to alert National Grid that concentrations of total organic compounds (TVOC), PM₁₀, odor, and hydrogen cyanide (HCN) in ambient air are approaching Action Limits due to Site activities;
- Provide details for a Site Contingency Plan that is designed to reduce the offsite migration of contaminants/odors if established Action Limits are approached or exceeded;
- Determine whether engineering controls are effective in reducing ambient air concentrations to below Action Limits and make appropriate and necessary corrective actions; and
- Develop a permanent record that includes a database of perimeter air monitoring results and meteorological conditions, equipment maintenance, calibration records, and other pertinent information.

1.1 General Approach

The general approach to meet the objectives of the CAMP is two-fold:

1. Utilize a real-time air monitoring system to measure the constituents of interest (COI). Real-time monitoring data will be used as an early warning system so that the air monitoring contractor can alert National Grid and the Site Construction Manager (CM) if concentrations of COI are approaching the Action Limits. Under this scenario, National Grid, the Site CM, and the air monitoring contractor can then begin to evaluate and implement appropriate Site controls to maintain acceptable ambient air concentrations.
2. Develop comprehensive data management and analysis procedures. Data will be generated from a variety of sources, including real-time fixed and portable air monitoring, integrated VOC sampling, pre-construction baseline sampling, supplemental hand-held equipment, and meteorological monitoring. These data will be reduced, evaluated, verified, and presented to National Grid and the Site CM in a timely manner to facilitate timely decision-making.

Prior to the start of remedial activities, several preliminary periods of excavation will be conducted within the scope of this CAMP. These preliminary phase excavations will include: an approximately

one to three day soil remediation for Mercury impacted soils and a 30 to 45 day excavation near the temporary parking lot area. Monitoring during these preliminary periods of excavation is outlined in more detail in **Sections 3.4** and **3.5**. The locations of these areas of excavation and the air monitoring locations are shown in **Figure 1-3** and **Figure 1-4**, respectively.

Figure 1-1: Aerial View

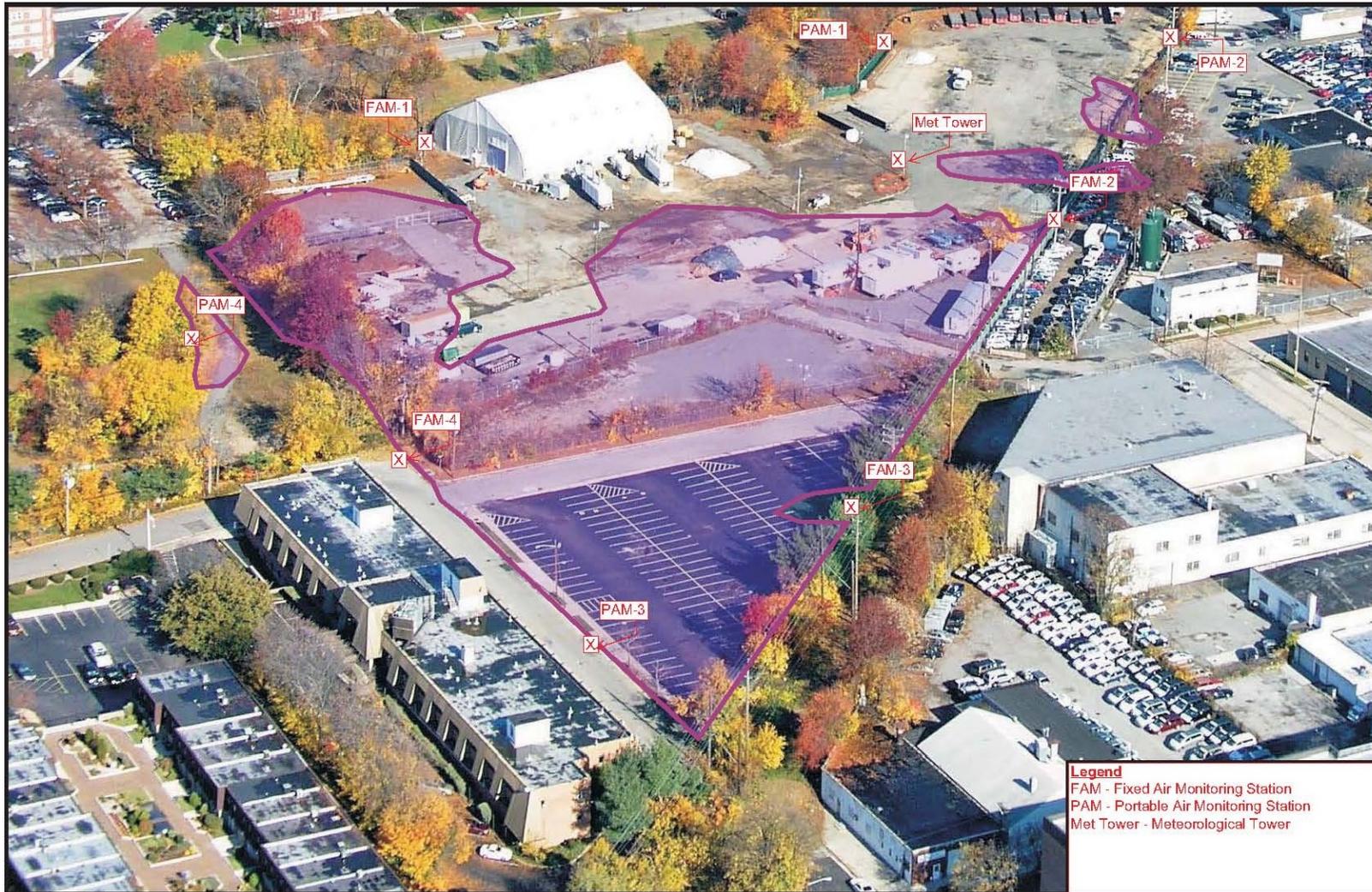


Figure 1-2: Site Map

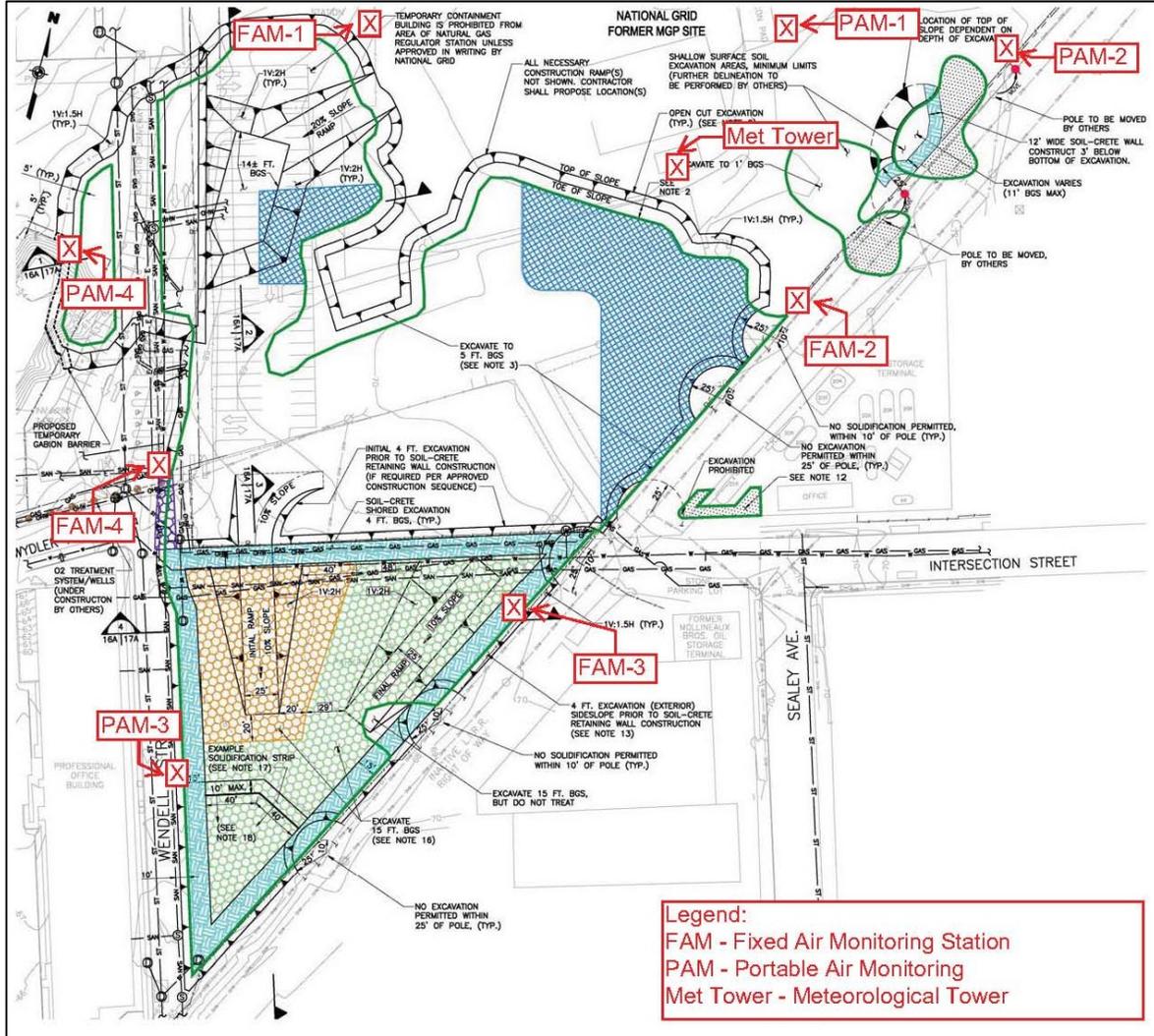


Figure 1-3: Site Map for Preliminary Excavation of Mercury Impacted Materials

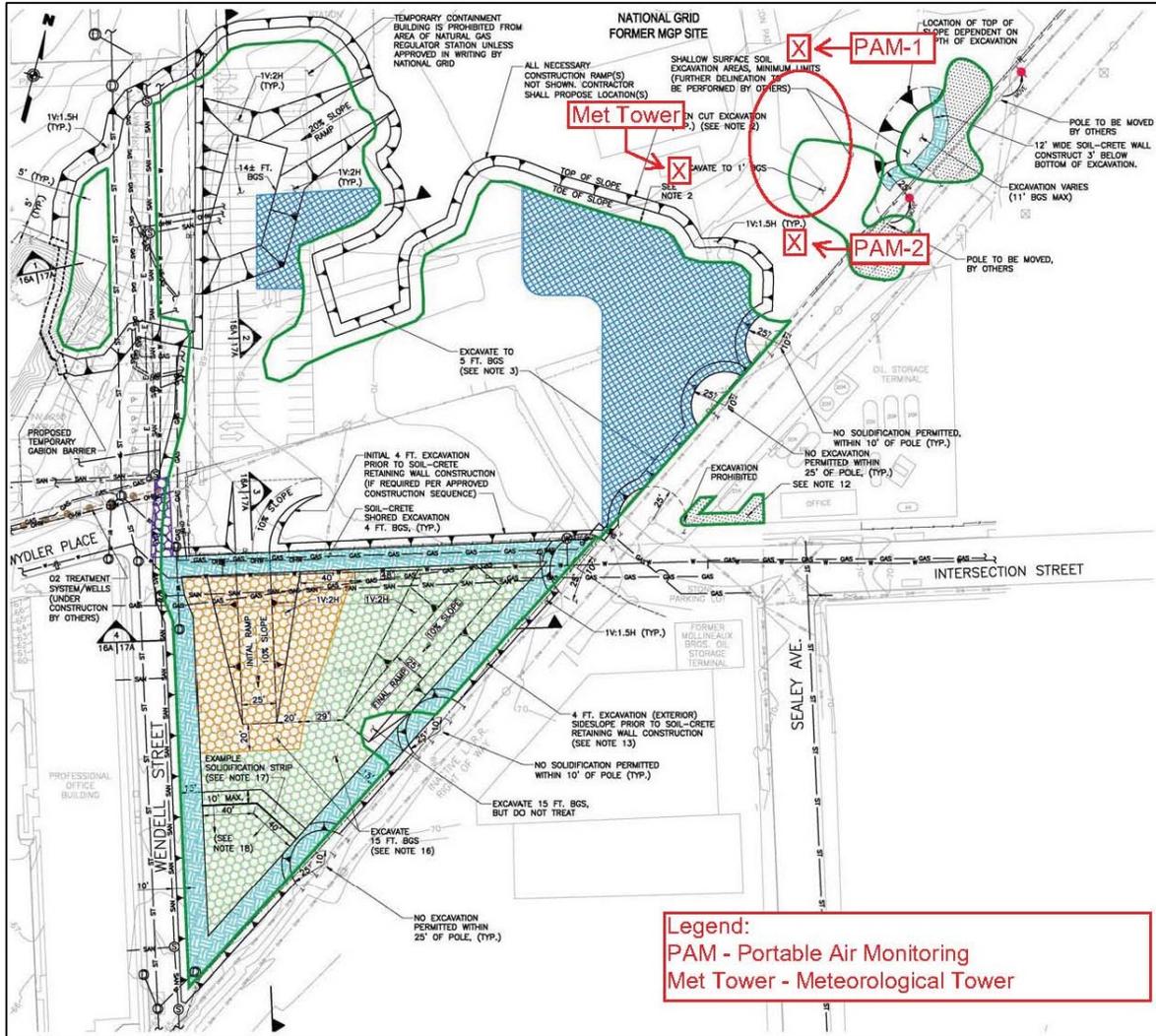
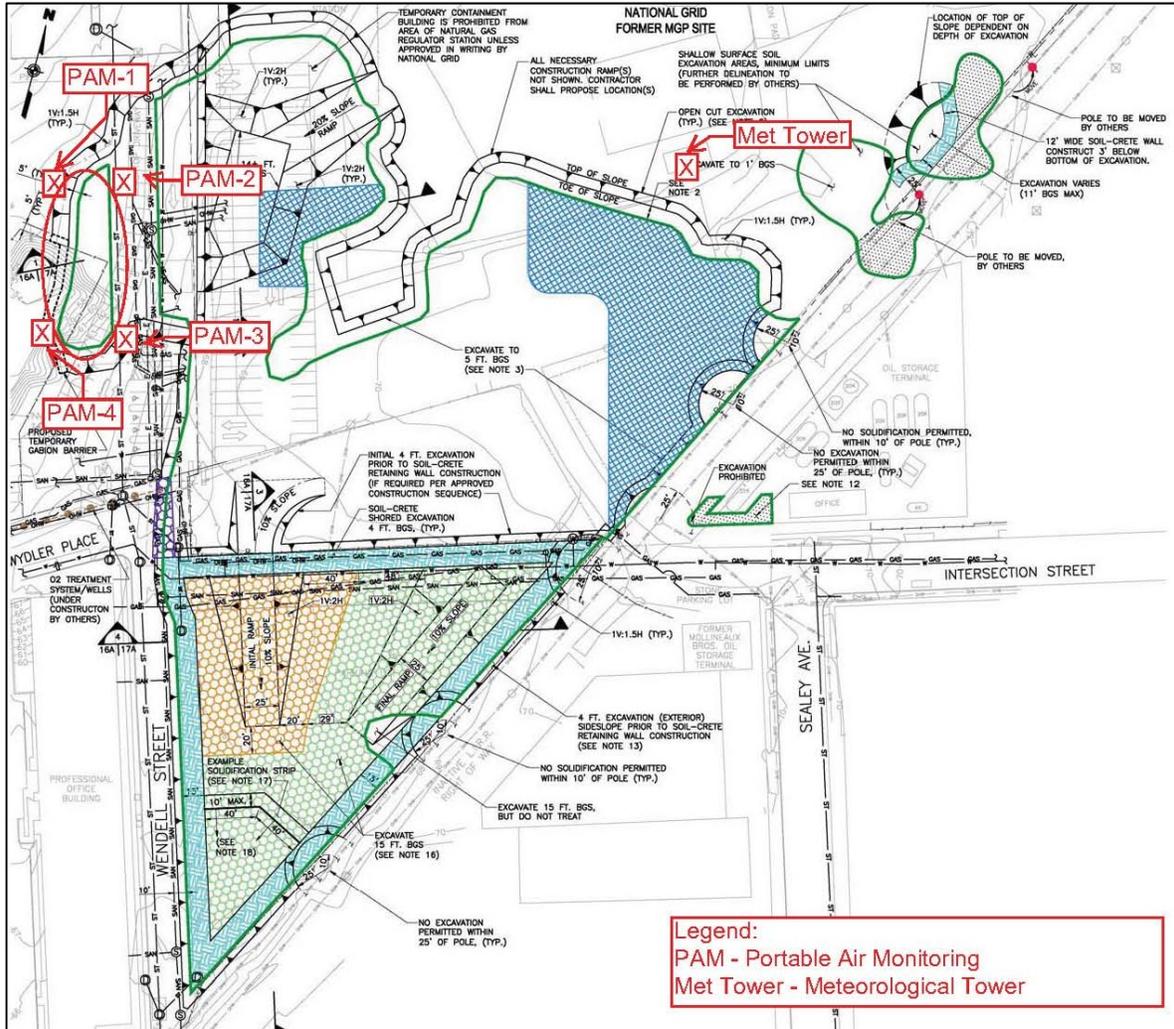


Figure 1-4: Site Map for Preliminary Excavation of Parking Area



2.0 Alert, Response, and Action Limits

Alert, Response, and Action Limits will be used as a real-time screening tool to manage remediation activities to minimize the potential for offsite emissions and/or potential long term health risk. If concentrations are above the Action Limits during the excavation, prompt implementation of operational modifications should be effective in preventing adverse impacts to offsite air quality in the vicinity of the Site.

2.1 Alert, Response, and Action Limits

The Alert, Response and Action Limits shown in **Table 2-1** are consistent with the 15-minute recommended concentrations listed in DER-10. These Action Limits were developed by the DER-10 as a Site management tool used to maintain existing air quality standards and guidelines at the Site perimeter.

The following COI and corresponding Response and Action Limits were developed in accordance with DER-10 and the Alert Limit (TVOC) was developed by National Grid to help manage the Site.

Table 2-1: Target Concentrations (above Background) and Site Conditions

Target – units	Alert Limit	Response Limit	Action Limit	Site Condition			
				Operational Condition	Alert Condition (Above Background ¹)	Response Condition (Above Background ¹)	Action Condition (Above Background ¹)
TVOC (PID) – ppm	3.7	5.0	25.0	$[C_{avg}] \leq 3.7$	$3.7 < [C_{avg}] \leq 5.0$	$5.0 < [C_{avg}] \leq 255.0$	$[C_{avg}] > 25.0$
Benzene (GC) – ppm	N/A		1.0	$[C_{avg}] \leq 1.0$	NA	NA	$[C_{avg}] > 1.0$
PM ₁₀ – $\mu\text{g}/\text{m}^3$	NA	100	150	$[C_{avg}] \leq 100$	NA	$100 < [C_{avg}] \leq 150$	$[C_{avg}] > 150$
Odor ² - n-butanol scale	NA	NA	3	OI ≤ 3 and No Odor Complaints	NA	NA	OI > 3 or Odor Complaints
Odor (naphthalene) – $\mu\text{g}/\text{m}^3$	NA	NA	440	$[C_{avg}] \leq 440$	NA	NA	$[C_{avg}] > 440$
Hydrogen Cyanide – ppm	Odor threshold ³ [0.6]	1.0	2.5	$[C_{avg}] \leq 0.6$	$0.6 < [C_{avg}] \leq 1.0$ (meter) and $[C] < 1.0$ (DT)	$1.0 < [C_{avg}] \leq 2.5$ (meter) and $[C] < 2.5$ (DT)	$[C_{avg}] > 2.5$ (meter) and and $[C] \geq 2.5$ (DT)

Definitions:
 TVOC = Total Volatile Organic Compounds
 PID = Photoionization Detector
 PM₁₀ = Particulate Matter
 ppm = parts per million volume
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter
 [C] = Concentration of target collected from a discrete sample
 [C_{avg}] = 15-minute average concentration of target
 DT = Dräger Tubes
 OI = Odor Intensity based on the n-butanol scale adapted from ASTM E544-99. Odor measurements made over a 15-minute interval.
 NA = Not applicable, odor intensity will be either an Operational Level or Action Level; there is no Alert and/or Response Limit and there is no Alert Limit for PM₁₀.

Notes:
¹ Background is defined as the current upwind concentration. Background concentrations will be used to calculate the actual Property contributions to TVOC's and PM₁₀ during the final evaluation of the Site conditions as part of the weekly data summaries.
² Odor intensity observations are based on the n-butanol scale.
³ HCN odor threshold is understood to mean that if the characteristic HCN bitter almond odor is detected (olfactory sensitivity ~ 0.6) that this could provide an indication for HCN. Accordingly, HCN monitoring will be performed if the almond odor is detected.

3.0 Monitoring and Sampling Procedures

This section of the CAMP presents a detailed description of the air monitoring and sampling procedures that will be used during the Site ground intrusive activities.

Air monitoring activities will be conducted throughout the program to evaluate conditions at the property line (fenceline) and other locations as specified below to ensure that the measures used to control potential fugitive emissions are effective, and document ambient air quality/conditions at the Property. The monitoring program will consist of the following real-time monitoring and integrated constituent-specific sampling during active periods of remediation:

- Continuous real-time monitoring for TVOCs and PM₁₀ will be conducted at four (4) fixed air monitoring (FAM) stations (24-hours per day, 7-days per week);
- Continuous real-time monitoring for TVOCs and PM₁₀ will be conducted at four (4) portable air monitoring (PAM) stations (8- to 10-hours per day, 5-days per week (Monday through Friday, 7:00AM through 5:00PM));
- Continuous real-time monitoring for TVOCs will be supplemented with an automatic benzene, toluene, ethylbenzene, and xylenes (BTEX) monitoring in the event the Action Level for TVOCs is exceeded at any of the FAM stations;
- Hand-held and observational monitoring for TVOCs, naphthalene, PM₁₀, odor, HCN, Hydrogen Sulfide (H₂S) and visible dust will be conducted, as warranted, during periods of remediation;
- Integrated sampling for VOCs will be conducted using SUMMA canisters; and
- Continuous meteorological monitoring.

3.1 Real-Time Air Monitoring

Continuous real-time AM for TVOCs and PM₁₀ will be conducted upwind and downwind of the work area along the Site perimeter at four (4) FAM stations and four (4) PAM stations. The intent of the real-time AM program is to provide an early detection of short-term emissions and potential offsite migration of remediation related TVOCs and PM₁₀. Real-time FAM stations will operate 24-hours, 7-days per week, during periods of remediation activity, and the PAM stations will operate 8 to 10-hours, 5-days per week, estimated to be Monday through Friday 7:00 AM – 5:00 PM, during periods of ground intrusive activities. The real-time perimeter AM system consists of FAM stations and PAM stations, supplemented by routine hand-held and observational air monitoring; one (1) meteorological tower, one (1) central computer system, and one (1) alarm notification system.

3.1.1 Fixed Air Monitoring Stations

AECOM will conduct continuous real-time TVOC and PM₁₀ monitoring at four (4) FAM stations around the perimeter of the Site. Locations of the FAM stations are shown in **Figure 1-2**. The FAM stations will be programmed to measure 15-minute average TVOC and PM₁₀ concentrations that will be updated continuously every 1-minute. Each FAM station will include an in-station Gas

Chromatograph (GC) programmed to speciate for individual BTEX compounds when the average 15-minute TVOC concentration exceeds the Response Limit. Note that the AECOM system is capable of speciating for the individual BTEX compounds and measure TVOC concentrations concurrently.

Each FAM station contains the following:

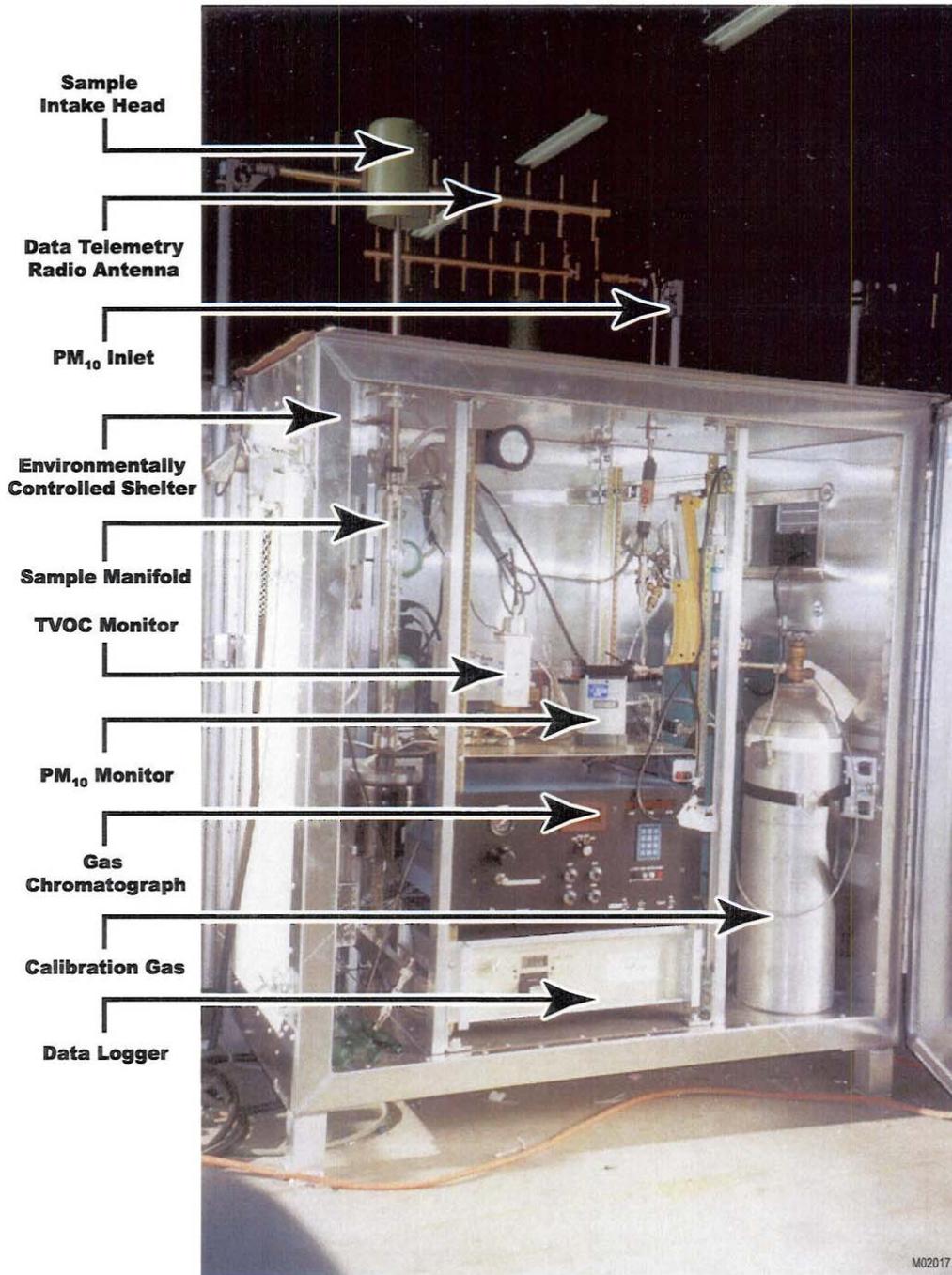
- Insulated station enclosure;
- Sample manifold system with humidity reduction;
- Photoionization detector (PID) (RAE PID or equivalent) plus a separate GC;
- Particulate monitor equipped with a PM₁₀ particle size separator (DustTrak or equivalent);
- Data logger;
- Wireless radio communications device; and
- Environmental control system (insulated panels, heater, and air conditioning system).

Each monitoring station is housed in a weather-tight NEMA-4 type enclosure. The internal capacity of each air shelter is illustrated in **Figure 3-1**.

The PIDs will operate in the TVOC mode to determine the TVOC concentration in ambient air. In TVOC mode, the PIDs will collect and analyze samples at a rate of one sample every 10-seconds, producing 1-minute averages which are then used to make 15-minute data averages. If the subsequent 15-minute average TVOC concentration measured at a station reaches the Response Limit then the PID will continue to measure TVOCs and the GC at that station will begin to continuously sample and measure in the compound-specific mode. In the compound-specific mode, quantitative concentrations of BTEX compounds in ambient air will be determined.

Each particulate meter will also be equipped with a PM₁₀ sampler to monitor particulate matter 10 micrometers or less in diameter. Particulate meters analyze samples once every 10-seconds and produce 1-minute averages. These 1-minute averages will be used to make 15-minute data averages.

Figure 3-1: Fixed Air Monitoring Station



3.1.2 Portable Air Monitoring Stations

AECOM will conduct continuous real-time TVOC and PM₁₀ monitoring at four (4) PAM stations around the perimeter of the Site. Locations of the PAM stations are shown in **Figure 1-2** and can change with proximity of work relative to wind conditions. The PAM stations will be programmed to measure 15-minute average TVOC and PM₁₀ concentrations updated continuously every 1-minute, 8 to 10-hours a day 5-days a week (estimated to be Monday through Friday 7:00AM to 5:00PM). Each PAM station will be positioned to monitor from the breathing zone and can be repositioned each work day to better target the fence-line concentrations in the vicinity of active work areas. The location of each station, the work zone, and the wind direction will be noted daily.

Each PAM station will include the following:

- Station tripod;
- PID (RAE PID or equivalent);
- Particulate monitor equipped with a PM₁₀ particle size separator (DustTrak or equivalent);
- Data logger; and
- Wireless communication device.

Each PAM station will continuously measure and record TVOCs and PM₁₀. TVOC and PM₁₀ data will be stored in data-loggers located within each PAM station. Similar to the FAM stations, data from each piece of equipment will be telemetered to the central location and stored on a central computer system. At each PAM station, the 15-minute data averages (60 concentrations per hour) of TVOC and PM₁₀ will be recorded and updated every 1-minute. In the event of elevated concentrations of TVOC and/or PM₁₀, the 15-minute average value of TVOC or PM₁₀ data from the upwind and downwind stations will be compared and the resultant concentration will be calculated and recorded.

Figure 3-2: Portable Air Monitoring Station



3.1.3 Supplemental Walk-Around Monitoring

Supplemental perimeter monitoring for TVOC, PM₁₀, odor, HCN, and H₂S will occur along the perimeter of the project Site on an as-needed basis. Additional hand-held monitoring for Mercury (Hg) will be conducted during the preliminary excavation of Hg impacted soils referenced in **Section 3.4**.

Specific Site conditions that may trigger walk-around perimeter monitoring include:

- Visible dust;
- Odor complaints;
- Detection of TVOCs and/or PM₁₀ at a FAM or PAM where concentrations exceed an Alert, Response and/or Action Limit;
- Elevated HCN levels within the exclusion zone from purifier waste or other materials, or if HCN (bitter almond) odors are detected onsite or in the vicinity of the Site; and
- Direction by National Grid, the Site CM, or NYSDEC.

When a triggering condition is observed during ground intrusive activity, the supplemental downwind perimeter monitoring will occur continuously until the conditions that triggered the monitoring have subsided.

3.1.3.1 Total Volatile Organic Compounds

TVOC concentrations will be measured and recorded using a portable real-time PID (RAE PID or equivalent).

3.1.3.2 Particulate Matter

PM₁₀ will be measured and recorded using a portable real-time particulate monitor (DustTrak or equivalent) equipped with a PM₁₀ impactor.

3.1.3.3 Odor Intensity

Odors will be observed based on the n-butanol scale, as adapted from ASTM E544-99. At each monitoring location, the data value, sample time, and sample location will be collected and recorded. Additional temporary monitoring points may be established due to changing Site and/or meteorological conditions.

Naphthalene concentrations will be measured if odor intensity is observed above the Action Limit. A separate GC specific for naphthalene will be installed at a central onsite location for this purpose. Samples will be obtained by collecting an air sample in a tedlar bag and subsequently analyzing the contents for naphthalene. 15-minute average naphthalene concentrations will be compared to the naphthalene Action Limit. The monitoring location, 15-minute average concentration, and the sample time will be recorded as part of the supplemental hand-held monitoring database.

3.1.3.4 Hydrogen Cyanide

If cyanide materials are encountered during excavation, work area monitoring detects a confirmed measurement of cyanide, or if HCN odors are detected in the vicinity of the site, cyanide will be monitored at the perimeter downwind. To monitor cyanide (as HCN gas), a real-time hand-held meter in conjunction with the Dräger standard tube measuring system will be used. The continuous monitoring equipment that will be used to measure HCN gas will be the Mini-Warn by Dräger Safety Systems. Due to potential interference from sulfur compounds, hydrogen sulfide gas (H₂S), Sulfur Dioxide (SO₂) and phosphine will also be monitored for comparison to any HCN gas levels detected. HCN gas detections will also be confirmed with standard Dräger tubes due to this interference. The Dräger tubes can quantify other gases that could potentially provide false positives for HCN gas (including sulfur dioxide, H₂S, phosphine gas, hydrogen chloride, and nitrogen dioxide) detected by the real-time meter.

3.1.4 Meteorological Monitoring

A Climatronics meteorological monitoring system, or equivalent, will be established onsite. The meteorological system will be set at a height of 10 meters (approximately 30 feet) above ground and located at the central air monitoring shelter that is clear of buildings, trees, or other obstructions. The meteorological system will continuously monitor temperature, dew point temperature (or relative humidity), wind speed, and wind direction. Fifteen-minute average values for each meteorological parameter will be stored in the meteorological system and downloaded continuously into the onsite central database.

A Campbell Scientific data logger (or equivalent) provided with the meteorological system also includes a digital standard deviation (sigma) processor which calculates the wind fluctuation (sigma theta). Sigma theta is an important parameter to observe during remediation activity, so that the

potential for fugitive emissions to change direction during slow wind periods can be assessed and documented.

3.1.5 Central Computer System and Interactive Display

TVOC, individual VOC constituents (BTEX), PM₁₀, and meteorological data will be stored in data-loggers located within each monitoring station. Stored data along with system performance data from each station will be sent in real-time, via wireless communication device, to the central computer system located in the central air monitoring trailer. Results are then sent electronically to the data processing office for validation.

3.1.6 Real-Time Alarm Notification System

In the event that concentrations above the Response or Action Limit for TVOC or PM₁₀ are observed the air monitoring consultant will be notified via a 24/7 phone paging system. The central computer will be equipped with a modem or wireless card that is capable of sending text pages to cell phones. If a PM₁₀ and/or TVOC Response or Action Limit is reached during non-working hours, the system will be checked remotely and an appropriate response action will be determined.

Equipment calibration will be performed according to the manufacturer's instructions. Each PID will be calibrated once daily using a certified standard isobutylene gas for TVOC mode. A certified standard gas mixture for BTEX specific compounds will be used to calibrate the onsite GC daily at each location. Particulate monitors for PM₁₀ will be zeroed daily and a once-per-week upscale check will be performed on each instrument. Hand-held portable equipment will be calibrated before each use, and at a minimum of once per week when not in use.

3.2 Integrated Volatile Organic Compound Measurements

Integrated VOC samples (24 hours) will be collected once per week at two (2) air monitoring stations (plus one (1) collocated sample per month). The samples are collected to demonstrate that the real-time monitoring stations are effective in measuring the concentration of the VOC COI.

Integrated VOC samples will be collected using 6-liter Summa® canisters (or equivalent vacuum canisters) and analyzed using United States Environmental Protection Agency (EPA) Method TO-15 (modified to include naphthalene). An accredited laboratory will perform the analytical testing on the canisters and will provide Category B deliverables as required by the New York Analytical Services Protocol. The data will be validated according to EPA and New York State requirements.

3.3 Pre-Construction Baseline Monitoring and Sampling

Pre-construction monitoring and sampling will be performed to establish baseline ambient air concentrations prior to the start of the principle excavation and solidification of MGP impacted media. Baseline conditions will be developed for TVOCs and PM₁₀ in ambient air using the real-time FAM and PAM system. In addition, a baseline odor survey plus integrated TO-15 VOC sampling at two (2) locations per day will be completed during the baseline monitoring and sampling period. Monitoring and sample collection and analysis methods will follow those described in **Section 3.0** (Real-Time Air Monitoring).

Pre-construction real-time monitoring will take place at the four (4) FAM stations and four (4) PAM stations to determine TVOC and PM₁₀ baseline conditions. TVOC plus PM₁₀ data will be recorded 24-hours per day for a minimum of three days.

Pre-construction odors will also be established for 3 days prior to construction activities. Onsite and offsite odor surveys will be conducted using the 8-point n-butanol scale. The onsite odor surveys will be conducted along the perimeter of the Site. The offsite odor surveys will be conducted throughout adjacent neighborhoods.

3.4 Preliminary Mercury Soil Excavation Air Monitoring

AECOM will conduct AM during the preliminary excavation and removal of Hg impacted soil in the area shown in **Figure 1-3**. This preliminary excavation will be conducted prior to the baseline monitoring and sampling program.

The following AM will be conducted in accordance with the procedures outlined herein:

- Continuous real-time monitoring for TVOCs and PM₁₀ will be conducted at two (2) PAM stations during periods of excavation;
- Hand-held and observational monitoring for Hg (with a Jerome Hg type analyzer), TVOCs, PM₁₀, odor, and visible dust may be conducted, as warranted, during periods of remediation; and
- Continuous meteorological monitoring.

Differences in monitoring procedures or types are outlined in the following sections.

3.4.1 Portable Air Monitoring

AECOM will conduct real-time PM₁₀ and TVOC monitoring at two (2) PAM stations during periods of work activities. Each PAM station will be programmed to measure 15-minute average PM₁₀ and TVOC concentrations updated every 1-minute and compare them to the Site-specific Alert (TVOC only), Response, and Action Limits. Lights on the PAM stations will be turned on in the event of a period of elevated concentrations greater than the respective Alert, Response or Action Limit. Data will be downloaded at the conclusion of each work day.

3.4.2 Supplemental Walk-Around Monitoring

Supplemental walk-around monitoring will be conducted along the Site perimeter and will include measurements and/or observations of the following: Hg, TVOC, PM₁₀, odor, and visible dust.

Mercury monitoring will be conducted using a Jerome Model 432-X analyzer (or equivalent) as part of the supplemental walk-around monitoring. Hand-held measurements for vapor phase Hg will be obtained at upwind and downwind locations along the Site perimeter. Concentrations of Hg will be compared to the Response and Action Limits listed in **Table 3-1**.

Table 3-1: Mercury Alert, Response and Action Limits

COI	Alert Limit	Response Limit ¹	Action Limit ¹
Mercury	NA	0.025 mg/m ³	0.05 mg/m ³
mg/m ³ – milligrams per cubic meter NA – not applicable ¹ Response and Action Limits for Mercury are based on the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limits (REL) Time Weighted Average (TWA).			

3.4.3 Meteorological Monitoring

Meteorological monitoring will be conducted using a temporary 3-meter tower. Meteorological measurements for wind direction, wind speed, sigma theta, and temperature will be collected and calculated into 15-minute averages.

3.5 Preliminary Parking Area Excavation Air Monitoring

AECOM will conduct air monitoring during the preliminary excavation and removal of impacted soil in the temporary parking area shown in **Figure 1-4**. This preliminary remediation is expected to take 30 to 45 days to complete and will be completed prior to the start of the baseline monitoring and sampling program.

During this period AM will be conducted in accordance with the procedures outlined herein and will include:

- Continuous real-time monitoring for TVOCs and PM₁₀ conducted at four (4) PAM stations during periods of excavation;
- Hand-held and observational monitoring for TVOCs, naphthalene, PM₁₀, odor, HCN, H₂S and visible dust conducted, as warranted, during periods of remediation; and
- Continuous meteorological monitoring.

Monitoring conducted during this period will be conducted in accordance with the specifications and procedures outlined in the CAMP. The complete AM system will be delivered and mobilized to the Site during this period.

4.0 Quality Assurance

The CAMP includes several activities related to Quality Assurance and Quality Control (QA/QC) designed to ensure that the field program is being and has been properly conducted and that the analytical results have been reviewed for accuracy and overall quality. Goals of the QA/QC aspect of the program are, among other things: to assure that the field activities; laboratory results; the associated responses to periods of elevated concentrations; and the data reporting are appropriate and protective of the environment and public health.

4.1 Field Documentation

A field log book and measurement device calibration field forms along with monthly data listings, will be maintained by AECOM throughout the air monitoring program. Information to be recorded by the air monitoring contractor (AECOM) will include:

- Description of remediation activities conducted during elevated data values;
- Daily Site maps showing the locations of each FAM and PAM station and hand-held monitoring locations for the day;
- Any corrective actions conducted due to elevated real-time air monitoring concentrations such as foaming/watering, covering stockpiles, reduced work pace, etc.;
- Integrated VOC sample media receipt dates, conditions, and numbers;
- Copies of the COC forms;
- Sampling equipment installation, operation, and removal dates;
- Sampling equipment calibration dates and results;
- General field weather conditions on sampling days;
- Any unusual situations which may affect samples or sampling;
- Sample dates; and
- Start and stop times.

General QA/QC procedures related to the collection and analysis of representative field monitoring data and samples are discussed in the following sections.

4.2 Instrument Calibration

Instrument calibrations will be performed according to the AECOM SOPs and manufactures recommendations. Hard copies of the AECOM SOPs and the manufacture's instrument manuals will be kept onsite as part of the project notebook. SOPs to be kept onsite include:

- Operation of the RAE PID (or equivalent);
- Operation of the DustTrak (or equivalent); and
- Operation of the GC (or equivalent).

The following sections detail the specific calibration frequencies for each type of monitoring. Daily instrument calibration results will be maintained onsite for the duration of the project.

4.2.1 Real-Time Air Monitoring

Instrumentation associated with FAM, PAM, and hand-held activities will be calibrated on a daily basis in accordance with AECOM's direction and the manufacturers' instructions using either commercially available standards, or internal calibration points. Specific calibration checks may be conducted at the start of daily remediation activities. In certain circumstances similar calibration checks will be conducted at the conclusion of the measurement day. For example: a calibration check will be conducted if a device, such as an analyzer, is suspected to be functioning improperly or a calibration check may be conducted during the operational day if a device is suspected of malfunctioning. There may also be circumstances where a calibration check is conducted in conjunction with a period of elevated concentrations to verify or validate the instrument (device) measurements. This check could be conducted just after the period of elevated concentrations or in certain circumstances during the period of elevated concentrations.

Each PID will be calibrated (to zero and an upscale concentration) once daily using a certified standard isobutylene gas for TVOC mode. Particulate monitors for PM₁₀ will be zeroed daily plus a once-per-week upscale check will be performed on each instrument with a dust generator (i.e., smoke tube). Hand-held instrumentation will be calibrated before each use.

Each GC will go through a nightly zero and upscale check of target compounds. Full calibrations will be performed as indicated by the results of the nightly checks.

The meteorological instrumentation will be calibrated during the setup of the project, every six months during the project, and at the time of take down to document the condition of the equipment and assure the quality of the meteorological data recorded. Periodic observations and comparisons to other meteorological stations will be made by a technician to evaluate the overall air flow and weather conditions in the area.

4.3 Integrated VOC Air Monitoring

The 24-hour integrated VOC samples will be collected in a 6 Liter Summa Canister equipped with a flow control regulator during remediation activities. Spare flow control regulators will be supplied by the laboratory for use on the integrated VOC sample. The flow controllers will be calibrated by the laboratory to collect a sample at a flow rate that will allow the canister to fill over a 24-hour period.

The flow controllers will be returned to the laboratory for cleaning and recertification every 3-months, or when routine checks indicate a change in flow rate.

4.3.1 Field Quality Control Samples

Field duplicate (or collocated) samples will be collected and used to facilitate the evaluation of the precision and accuracy of the results from the laboratory samples. Collocated samples will be collected at a rate of one (1) collocated sample per month (approximately 1 collocated sample will be collected for every 8 samples). The results will be evaluated and it will be determined if the results are reasonable.

5.0 Data Management Procedures

This section of the CAMP discusses the data management procedures that will be used during the program. Data will be generated from a variety of sources, including real-time monitoring, hand-held and observational monitoring, and integrated VOC sampling. These data must be reduced, evaluated, verified, and presented to National Grid and the Site CM in a timely manner to facilitate decision-making. The data management process for each source of data is discussed below.

Analytical data generated at each FAM and PAM station are sent to the central computer system via wireless radio telemetry. The FAM and PAM baseline monitoring data will also be downloaded to the project database for data evaluation.

5.1 Exceedance Notifications

Monitoring results for TVOCs and PM₁₀ will be reported to the construction manager and NYSDEC when Response and/or Action Limits have been exceeded, to allow prompt evaluation and response to potential emissions. The AECOM air monitoring technician, together with National Grid and the Site CM, will decide when shut-down and start-up criteria are met.

In addition, if there is a period of confirmed concentrations above the Action Limit during off hours, an email notification will be provided within 24 hours of the incident to the NYSDEC and NYSDOH.

5.2 Weekly Data Summaries

The following weekly data summaries will be prepared and transmitted to National Grid and the Site CM:

- Maximum 15-minute average concentrations of TVOC, PM₁₀, and odor intensity;
- Upwind and downwind comparison and discussion of Response and Action Limits reached during the week;
- Average 15-minute wind speed, wind direction, relative humidity, and air temperature data;
- Summary of Site activities; and
- Air monitoring station location maps.

5.3 Monthly Summaries

In addition to the weekly data summaries, a monthly data CD will be provided to National Grid, the NYSDEC, and NYSDOH.

5.4 Final Air Monitoring Report

At the conclusion of the program, AECOM will prepare a summary of the real-time and integrated VOC air monitoring results. The report will include summaries of meteorological data, as well as real-time and integrated VOC data from each air monitoring location. AECOM will prepare up to two (2) hardcopies and one (1) electronic copy of the final report documenting the air monitoring results. Additionally, copies of the analytical data and QA/QC documentation will be provided on CD following

the completion of the program. The air monitoring report will be submitted to National Grid for review within 90-days of the project completion.

6.0 Contingency Plan

The Contingency Plan is designed to identify potential Site control measures that may be implemented in response to elevated levels of COI or odor measured during ground intrusive activities. In general, a tiered approach to Site conditions with corresponding response actions will be implemented during the air monitoring program.

The four (4) tiers of Site conditions are defined as follows:

- **Operational Condition:** Normal or ambient air-conditions where PM₁₀ concentrations are less than the Response Limit and TVOC concentrations are less than the Alert Limit;
- **Alert Condition:** Concentration of TVOC is greater than the Alert Limit, but less than the Response Limit;
- **Response Condition:** Concentration of PM₁₀ or TVOC is greater than the Response Limit, but less than the Action Limit; and
- **Action Condition:** Concentration of PM₁₀ or TVOC is greater than the Action Limit.

The Contingency Plan will rely on real-time data generated from the FAM, PAM, hand-held, odor intensity, and meteorological monitoring. These data sources will be evaluated together in order to make appropriate decisions concerning Site conditions and potential control measures. **Table 2-1** presents the Site Condition decision table that will be used to determine the appropriate Site Condition based on contaminant concentrations. Possible Alert, Response, and Action Condition corrective actions are listed in **Table 6-1** and are presented in detail in the Emissions Control Plan.

Explanations of the notification system, specific conditions, and response actions for TVOCs, PM₁₀, and odor are presented in the following sections.

Table 6-1: Site Conditions and Corrective Actions

Site Condition	Corrective Action
Operational Condition	<ul style="list-style-type: none"> • Normal Site operations – No Response Action Required.
Alert Condition	<ul style="list-style-type: none"> • Establish trend of data and determine if evaluation/wait period is warranted; • Apply VOC emission suppressant foam over open excavation areas; • Slow the pace of construction activities; • Cover all or part of the excavation area; • Slow the pace of construction activities; • Change construction process or equipment that minimizes air emissions; and/or • Evaluate Site activities as they relate to COI concentrations.
Response Condition	<ul style="list-style-type: none"> • Establish trend of data and determine if evaluation/wait period is warranted; • Temporarily stop work; • Temporarily relocate work to an area with potentially lower emission levels; • Apply water to area of activity or haul roads to minimize dust levels; • Reschedule work activities; • Cover all or part of the excavation area; • Apply VOC emission suppressant foam over open excavation areas; • Slow the pace of construction activities; and/or • Change construction process or equipment that minimizes air emissions.
Action Condition	<ul style="list-style-type: none"> • Assess work activity modifications; • Cease construction activities; and • Re-evaluate CAMP.
<p>Notes: The bulleted response actions specified under each Site condition can be implemented in any order that is most appropriate under the existing site conditions and are detailed in the Emissions Control Plan.</p>	

6.1 Total Volatile Organic Compounds

TVOC concentrations in air will be measured and recorded by the FAM and PAM stations. **Table 2-1** presents the TVOC decision table that will be used to determine the appropriate Site Condition based on contaminant concentrations.

6.1.1 Operational Condition

Operational Condition will be in effect when the 15-minute TVOC concentration from each FAM or PAM station is less than the Alert Limit of 3.7 ppm.

Under an **Operational Condition**, each PID located at FAM and PAM stations will operate in the TVOC mode and will collect and analyze a TVOC sample at a frequency of one 15-minute average each minute.

6.1.2 Alert Condition

An **Alert Condition** will occur if any 15-minute TVOC concentration measured at a FAM or PAM station is greater than the Alert Limit (3.7 ppm), but less or equal to the Response Limit (5.0 ppm).

At this time, the upwind and downwind TVOC concentrations will be compared to determine if the preliminary Alert Condition is due to Site activities. If downwind TVOC concentrations are greater than 3.7 ppm above the background concentration, then it will be assumed that the preliminary Site condition is due to Site activities.

6.1.3 Response Condition

A **Response Condition** will occur if any 15-minute TVOC concentration measured at a FAM or PAM station is greater than the Response Limit (5.0 ppm), but less than or equal to the Action Limit (20.0 ppm). Under a Response Condition, the GC at the elevated FAM will automatically begin to analyze for the individual BTEX compounds in the compound-specific mode and the 15-minute concentration for each BTEX compound will be determined.

If the above condition is true, then a Response Condition will be verified. Under a verified Response Condition, a contingency meeting attended by the air monitoring consultant, National Grid, NYSDEC and/or NYSDOH representatives (when possible), and the Site CM will be held to determine appropriate response actions. This meeting will be held within 60 minutes of the Response Condition verification.

6.1.4 Action Condition

If average TVOC concentrations exceed the Action Limit of 25.0ppm or the benzene concentrations exceed 1.0 ppm during the GC speciation mode at any site, then the Site will enter into an **Action Condition**. An Action Condition will remain in effect if either of the following conditions is true:

- The 15-minute average benzene concentration is greater than 1.0 ppm (Action Limit); and/or
- The 15-minute average TVOC concentration is greater than or equal to 25.0 ppm (Action Limit).

Under an Action Condition, construction activities will be halted. A meeting attended by the air monitoring consultant, NYSDEC and/or NYSDOH representatives (when possible), National Grid, and the Site CM will be held within 60 minutes of the Action Condition notification to determine appropriate corrective actions. Possible Action Condition corrective measures/actions are listed in **Table 6-1**. After appropriate corrective measures/actions are taken, work activities may resume provided that the TVOC concentration at the Site perimeter is no more than 25.0 ppm above background for the 15-minute average and the benzene concentrations are below 1.0 ppm.

6.1.5 Evaluating Corrective Actions and Site Conditions

If average TVOC and benzene concentrations fall below the Action Limits, then the Site will be returned to a Response and/or Alert Condition at which time work activities may resume. The appropriate Site Condition can be determined as follows:

- Response Condition - The 15-minute average concentration for TVOC is greater than 5.0 ppm (Response Limit), but less than or equal to 25.0 ppm (Action Limit) above background;
- Alert Condition – The 15-minute average concentration for TVOC is greater than 3.7 ppm (Alert Limit), but less than or equal to 5.0 ppm (Response Limit) above background; and/or
- Operational Condition - The 15-minute average concentration for TVOC is less than or equal to 3.7 ppm (Alert Limit) above background.

Under the Operational Condition, the GCs in each of the FAM stations that were in VOC compound-specific (BTEX) sampling mode will be automatically turned off.

Specific TVOC target concentrations for Operational, Alert, Response and Action Conditions are summarized in **Table 2-1**.

6.2 Particulate Matter (PM₁₀)

PM₁₀ concentrations in air will be measured and recorded by the FAM and PAM stations. **Table 2-1** presents the PM₁₀ decision table that will be used to determine the appropriate Site Condition based on the contaminant concentrations.

6.2.1 Operational Condition

Operational Condition will be in effect when the 15-minute PM₁₀ concentration from each FAM or PAM station is less than the Response Limit of 100.0 µg/m³ (following an evaluation of background concentrations).

6.2.2 Response Condition

A **Response Condition** will occur if any 15-minute PM₁₀ concentration measured at a FAM or PAM station is greater than the Response Limit (100 µg/m³), but less than or equal to the Action Limit (150 µg/m³). At this time, the Site CM and National Grid will be notified of elevated measurements PM₁₀ concentrations and a possible Response Condition. Under a Response Condition, upwind and downwind PM₁₀ concentrations will be compared to determine if the Response Condition is due to Site activities. If downwind PM₁₀ concentrations are 100 µg/m³ (Response Limit) greater than upwind (background) concentrations (Response Limit), then it will be assumed that the Response Condition is due to Site activities.

The Response Condition will remain in effect as long as the 15-minute average PM₁₀ concentration is greater than or equal to 100 µg/m³ (Response Limit) above background and less than or equal to 150 µg/m³ (Action Limit). Under a Response Condition, dust suppression techniques must be implemented. At this point, routine monitoring continues and 15-minute averages continue to be evaluated. Work may continue with dust suppression techniques provided that downwind PM₁₀ levels do not exceed 150 µg/m³ above background, and provided that no visible dust is migrating offsite from the work area

If the above condition is true, then a Response Condition will be verified. Under a verified Response Condition, a contingency meeting attended by the air monitoring consultant, National Grid, NYSDEC and/or NYSDOH representatives (when possible), and the Site CM will be held to determine appropriate corrective actions. This meeting will be held within 60 minutes of the Response Condition if the elevated concentrations are not mitigated by dust suppression techniques.

6.2.3 Action Condition

An **Action Condition** will go into effect if the average 15-minute PM₁₀ concentration exceeds 150 µg/m³ (Action Limit) above background. Under an Action Condition, work must be stopped and a meeting attended by the AECOM, National Grid, the NYSDEC or NYSDOH representatives, and the Site CM will be held within 60 minutes of the Action Condition notification to determine appropriate corrective actions.

6.2.4 Evaluating Corrective Actions and Site Conditions

Work may resume provided that dust suppression measures and other controls are successful in reducing the downwind PM₁₀ concentrations below 150 µg/m³ above background and in preventing visible dust migration.

Specific PM₁₀ target concentrations for Operational, Response, and Action Conditions are summarized in **Table 2-1**.

6.3 Visible Dust

In addition to measured PM₁₀ concentrations, the CAMP requires monitoring of visible dust conditions. If visible airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM₁₀ levels do not exceed 150 µg/m³ above background and no visible dust is migrating from the work area.

6.4 Odor

Odors from MGP sites are generally negligible due to surface soil cover of contaminated materials. However, excavation work may expose these materials and odors may become detectable. Odors may cause concern among the nearby community, visitors to the site, and onsite workers regarding potential health risks. Health risks or the potential for health risks do not rely strictly on detectable odors. A detectable odor does not indicate health risks. However, controlling odor emissions from a site can allay public fears about health risks and provide additional means of controlling nuisance emissions during remediation activities.

For MGP sites, the characteristic odor during remediation has been attributed primarily to naphthalene and indene, although additional compounds may contribute to the overall odor. (Pure naphthalene has the characteristic odor of mothballs). EPA provides a threshold for the initial presentation of naphthalene odors at 440 µg/m³ (ATSDR, 1995; Amoores and Hautala, 1983). There is no reported odor threshold for indene. Odors emanating from the site will be monitored for general odor intensity, as described below.

Odor intensity levels will be noted and recorded as needed during perimeter walk-around monitoring. Intensity levels will be based on the n-butanol scale as adapted from ASTM E544-99. **Table 2-1** summarizes the Site Conditions and Odor Intensity observations. Naphthalene concentrations will be measured and recorded if odor intensity is observed above the Action Limit.

An Operational Condition will remain in effect if the odor intensity, based on the 8-point n-butanol scale, is less than 3 (Action Limit). An Action Condition will go into effect when odor intensities are greater than 3, based on the 8-point n-butanol scale, or there are odor complaints from the public.

If an Action Condition, due to odor, is verified, then a meeting attended by AECOM, National Grid, NYSDEC or NYSDOH representatives, and the Site CM will be held within 60 minutes of the Action Condition to determine appropriate corrective actions.

6.5 Hydrogen Cyanide

HCN will be monitored on the perimeter of the Site if cyanide-containing material (e.g. purifier waste) is encountered during excavation, or if exclusion zone monitoring detects confirmed levels of cyanide or if HCN (bitter almond) odors are detected in the vicinity of the Site. Sampling will be performed every fifteen minutes if sulfur odor or suspected purifier material is encountered. Measurements will be made downwind, and will be recorded into the field notebook. In the event that HCN is detected, the plan in **Table 6-2** will be used.

Table 6-2: Hydrogen Cyanide Gas Contingency Plan

Site Condition	Target Concentrations ¹	Contingent Measurements
Operational Condition	< odor threshold (0.6 ppm)	<ul style="list-style-type: none"> No contingent measurements
Alert Condition	> odor threshold (0.6 ppm) and > 0.6 ppm for 15-minute average using real-time meter	<ul style="list-style-type: none"> Run Dräger Tube; Continue monitoring with real-time meter; and Continue work, if Dräger Tube for HCN < 0.6 ppm.
Response Condition	> 1.0 ppm on Dräger tube	<ul style="list-style-type: none"> Stop work and move (with continuous monitoring meter) at least 25 feet upwind from excavation or until continuous monitoring meter registers < 1.0 ppm; Run Dräger Tube for HCN and re-evaluate activities; Continue monitoring with real-time meter; and Work may resume if Dräger Tube for HCN reads < 1.0 ppm.
Action Condition	> 2.5 ppm for 15-minute average using real-time meter and < 2.5 ppm on Dräger Tube.	<ul style="list-style-type: none"> Run Dräger Tube for HCN and confirm < 2.5 ppm concentration; Continue monitoring with real-time meter; Run Dräger Tube using SO₂, H₂S and phosphine tubes to evaluate potential interference; and Recalibrate the real-time meter and continue to monitor the work zone.
<p>Note:</p> <p>¹The ACGIH Threshold Limit Value (TLV) for HCN is 4.7 ppm.</p>		

