

DRAFT
PERIMETER AIR MONITORING PLAN

NON-PUBLIC PROPERTIES
NEWHALL STREET NEIGHBORHOOD
HAMDEN, CONNECTICUT

Prepared for:

Olin Corporation
Cleveland, Tennessee

Prepared by:



MACTEC Engineering and Consulting, Inc.
511 Congress St.
Portland, ME 04101

February 2009

Revision 0

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MACTEC Project No.: 6107-09-0004



MACTEC Electronic Signature

**Nelson Walter, P.E.
Project Manager**



MACTEC Electronic Signature

**Rod Pendleton, P.G.
Principal Scientist**

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Table 3-1	Perimeter Air Monitoring Action Levels

LIST OF ACRONYMS AND ABBREVIATIONS

AIHA	American Industrial Hygiene Association
EPA	United States Environmental Protection Agency
HASP	Health and Safety Plan
MACTEC	MACTEC Engineering and Consulting, Inc
µm	micrometer
mg/m ³	milligram per cubic meter
NIOSH	National Institutes of Occupational Safety and Health
Olin	Olin Corporation
OSHA	Occupational Safety and Health Administration
PAMP	Perimeter Air Monitoring Plan
PEL	Permissible Exposure Limit
QA	Quality Assurance
QC	Quality Control
RCSA	Regulations of Connecticut State Agencies
Site	Non-Public Properties Study Area, Hamden, Connecticut
TWA	Time-weighted average concentration
Work Plan	Final Design – Generic Remedial Action Plan Non-Public Properties, Newhall Street Neighborhood, Hamden, Connecticut Work Plan

1.0 INTRODUCTION

This Perimeter Air Monitoring Plan (PAMP) has been prepared to outline the requirements and methods for monitoring the ambient air quality during the remediation of the Non-Public Properties, Newhall Street Neighborhood Site in Hamden, Connecticut (the Site).

As part of the remediation work, approximately 110,000 cubic yards of lead-impacted fill will be excavated from the Site and disposed off-Site. Although strict operational controls will be in place to reduce emissions during the remediation activities, air quality at and surrounding the Site will be monitored to ensure that safe conditions are maintained for on-Site workers and the surrounding community. An air-monitoring program has been designed for the Site that is composed of two parts:

- Part A: Exposure monitoring and air sampling for on-Site workers; and
- Part B: Ambient or perimeter air monitoring and sampling for the protection of the public.

Part A of the air-monitoring program is described in the Health and Safety Plan (HASP) developed for the Site. The HASP describes the exposure monitoring and air sampling that will be conducted within the active Work Zone to ensure that proper engineering controls, work practices, and personal protective equipment are implemented for on-Site workers involved with the remediation activities at the Site.

Part B of the air-monitoring program is described in this PAMP, which outlines the perimeter or ambient air-monitoring and sampling that will be implemented at the Site to ensure the protection of the public. Since any Work Zone activity has the potential to affect the air quality at the Work Zone Perimeter and surrounding area, this PAMP is designed to be used in conjunction with the HASP and is not intended to serve as a stand-alone document. .

1.1 PURPOSE AND SCOPE

This PAMP has been developed to support the Site remediation activities as described in the *Final Design – Generic Remedial Action Plan Non-Public Properties, Newhall Street Neighborhood, Hamden, Connecticut Work Plan* (Work Plan).

The PAMP will be implemented to evaluate and document the air quality at the perimeter of the remediation Work Zones in order to monitor the potential for migration of Site contaminants beyond the remediation work zone.

Action levels from on-site and/or perimeter air monitoring will follow at a minimum, the requirements of the Occupational Safety and Health Administration (OSHA) Standards for nuisance dust and lead exposure (29 CFR 1910.1025 and 29 CFR 1926.62).

1.2 OBJECTIVES AND GOALS

The main objective of the PAMP is to define the methods that will be used to monitor the level of airborne contaminants and particulates during remedial operations at the Site, and relate those measurements to the established air action levels for the Site.

The primary goals of air monitoring and sampling described in the PAMP are to:

- Determine if concentrations of Site-related contaminants and particulate emissions are in excess of the air action levels established for the Site;
- Develop a correlation between particulate (dust) levels and contaminant concentrations, whereas the particulate measurements will act as a surrogate for the Site contaminants of concern; and
- Document that the engineering controls implemented at the Site are effective in controlling dust emissions so that no measureable emissions of Site contaminants are released from the remediation work zone as a result of ongoing remediation activities.

To meet the goals of safe air quality conditions at the Site and surrounding areas, air quality will be measured and documented within two integrated Site zones during all remedial activities and those measurements related to the Site air action levels. Site zones include:

- Work Zone
- Work Zone Perimeter

Monitoring of these two integrated zones will allow for the implementation of controls within the Work Zone, and if necessary at the Work Zone Perimeter, before air action levels can be exceeded at the Site perimeter.

The remainder of this PAMP is organized into the following sections and describes the air monitoring equipment, techniques, and frequency that will be implemented during remediation operations. This PAMP also defines the air action levels for particulates and Site contaminants, and summarizes the emission controls that will be implemented in response to results of the air monitoring and sampling:

- Section 2.0 Air Monitoring and Sampling Strategies
- Section 3.0 Action Levels and Emission Controls
- Section 4.0 Air Monitoring Procedures
- Section 5.0 References

2.0 AIR MONITORING AND SAMPLING STRATEGIES

Air monitoring will be completed during all remedial activities at the Site that have the potential to disturb fill/soil. Monitoring will be conducted using direct reading instruments to provide real-time data at upwind, downwind, and crosswind locations, and between each active Work Zone and any occupied buildings or sensitive receptors.

2.1 PREVAILING WIND DIRECTION AND WEATHER CONDITIONS

Prior to the start of remediation activities, a meteorological station will be erected in a central location at the Site in an area relatively free of trees, houses, and other large obstructions. This station will be set to continuously track and record wind speed and direction, ambient air temperature and relative humidity, atmospheric pressure, rainfall, and solar insolation on a daily basis for at least 7 days. The data will be recorded on a computer.

Based on the collected meteorological data, the prevailing wind direction will be determined. This data will be used to select the locations for the Work Zone Perimeter monitoring stations. Given the duration of the project and the potential seasonal variation of wind direction, data will be reviewed periodically and the prevailing wind direction adjusted as necessary throughout the project. Perimeter monitoring stations will then be located accordingly.

Once remediation activities begin, additional visual wind speed/direction indicators will be erected in a central area within each active Work Zone. Data from the central meteorological station and the Work Zone visual indicators will be used to refine the placement of the Work Zone Perimeter air monitoring stations, and to evaluate whether remediation operations need to be shutdown in the event of high winds.

2.2 WORK ZONE AIR MONITORING AND SAMPLING EQUIPMENT

Air Monitoring

Real-time continuous air monitoring will be conducted within each active Work Zone for worker protection during remedial operations as described in the Site HASP using appropriate monitoring

instruments. The instruments designed for continuous monitoring use light scattering photometry sensing technology to measure particulate matter in the size range of 0.1 to 10 micrometers (μm) at concentrations between 0.001 and 400 milligrams per cubic meter (mg/m^3). The instruments will be set to automatically store data for subsequent retrieval.

During any excavation activity, the Contractor will conduct continuous real-time monitoring close to the excavation area and throughout the active Work Zone. Real-time dust monitoring will continue daily throughout remedial operations, unless a significant precipitation event occurs, at which time dust monitoring may be suspended. Dust readings will be logged in the Site logbook, making note of the time the readings were obtained, the concentrations observed, the weather conditions, the prevailing wind direction, and the general site conditions and activities.

Continuous visual monitoring of dust (particulate) levels will also be conducted and recorded by the Contractor. If visible dust conditions are sustained for more than one minute within the active Work Zone, the Contractor will implement dust suppression methods (i.e., water spray) as described in the HASP and Dust Monitoring Plan to reduce airborne dust levels.

In conjunction with visual dust monitoring, Work Zone dust measurements will be checked during the anticipated 8-hour workday by field personnel and compared to the Site action levels to determine if additional emission control measures are needed in the Work Zone. All Work Zone monitoring data will be archived in a central computerized database for reporting purposes.

Air Sampling

To document workers exposures, the Contractor will collect personal air samples during the course of remediation activities as described in the HASP on workers who have the greatest potential for exposure to Site contaminants within each active Work Zone. These samples will be submitted for arsenic and lead analysis by an American Industrial Hygiene Association (AIHA) accredited laboratory following appropriate National Institutes of Occupational Safety and Health (NIOSH) analytical methods.

Results of the Work Zone air monitoring, dust observations, and personal sampling will be correlated to demonstrate that managing particulate levels within the Work Zone, also maintains

the arsenic and lead emissions below acceptable levels. Workers will be notified of the laboratory results in writing within 5 days of verifying the results.

If arsenic or lead concentrations indicate an exposure at or above the OSHA Action Levels, the Contractor will continue to monitor dust and review and amend BMPs as needed. If arsenic or lead concentrations reach the OSHA permissible exposure limits (PELs), the Contractor will shut down operations and re-evaluate Site operations and controls. Additional provisions may be implemented for the workers including upgrade of Personal Protective Equipment.

2.3 PERIMETER AIR MONITORING EQUIPMENT AND LOCATIONS

Four temporary, real-time particulate air monitoring stations will be installed on moveable stands at the approximate north, south, east, and west perimeter of all active Work Zones to document that particulate emissions have not migrated outside of a Work Zone. The locations of these stations are subject to change based on the wind conditions and Work Zone activity. These monitors will run the length of time that activity is conducted in the active Work Zone, and will serve as the primary control point for ensuring safe conditions at the Site Perimeter and any abutting sensitive receptors. The data collected from the Work Zone Perimeter monitors will be used to assess the effectiveness of emission control procedures implemented within an active Work Zone.

Real-time monitoring will be completed at each Work Zone Perimeter air monitoring station using a detector that measures particulate matter. In addition, during the workday, the readings on the monitors will be visually checked and recorded in the field logbook.

At the end of each day, this data will be used to calculate an 8-hour time-weighted average (TWA) concentration for each air monitoring station. All data will be archived in a central computerized database for reporting purposes.

Any significant change in the wind direction during the day will be noted in the field logbook to ensure an understanding of the possible variations in wind direction over the course of the day.

During precipitation events, or during periods when Site work is suspended due to adverse weather conditions, the air monitors will be shut down and covered, or if the work shutdown period is extensive, the equipment will be removed and stored in a secure location.

2.4 BACKGROUND AIR QUALITY MONITORING

Prior to beginning remedial operations at the Site, air quality monitoring will be performed as outlined in Section 2.3 for seven consecutive days at one upwind and one downwind air monitoring station at the Work Zone Perimeter. The seven days of monitoring results will be used to establish relative baseline levels. On any particular day, the up wind monitor will record background levels and will be compared with data from the downwind monitor during Site remedial operations.

A Site map will be marked to identify actual monitoring locations selected in the field.

2.5 REAL-TIME AIR MONITORING DATA STORAGE

Data logged on the Work Zone Perimeter and Site Perimeter monitors, and the central meteorological station will be stored on a central computer. The particulate data will be compared with the Site actions levels.

3.0 ACTION LEVELS AND EMISSION CONTROLS

The contaminants of concern for the Site are lead and arsenic. Action levels corresponding to occupational exposure limits for these parameters are established for the Site in the HASP and will be maintained throughout the duration of the Site remediation activities. Control of particulate emissions (dust) within the Work Zone will be maintained in order to not exceed the arsenic and lead action levels within the Work Zone and at the Work Zone Perimeter. For the protection of public health, action levels have been established for both real-time particulate monitoring and personal sampling of arsenic and lead. The anticipated short distance between an active Work Zone Perimeter and abutting sensitive receptors was taken into account when developing the air action levels as described below.

Table 3-1 summarizes the parameters to be monitored as part of air monitoring, the monitoring frequency, action levels, and general control measures to be implemented if the action levels are exceeded.

**TABLE 3-1
 PERIMETER AIR MONITORING
 ACTION LEVELS**

Parameter	Monitoring Method	Monitoring Frequency	Active Work Zone Action Level	Work Zone Perimeter Action Level	Control Measure
Airborne particulates ¹	Visual	Continuous	Visible dust within the active Work Zone sustained over 1 minute	Visible dust within the active Work Zone sustained over 1 minute	Implement additional dust control measures.
	Particulate Meter - Continuous	Continuous	315 ug/m ³ within the active Work Zone	150 ug/m ³ at the Work Zone Perimeter	Suspend fill/soil disturbing activities and implement additional dust control measures; implement actions to prevent recurrence.
Arsenic	Personal Sample	8-hour TWA	30 ug/m ³ from Work Zone sample	30 ug/m ³ from Work Zone sample	Suspend fill/soil disturbing activities. Re-evaluate the fill/soil operations and control measures; determine if additional provisions are necessary in accordance with the OSHA Arsenic or Lead Standards. Implement actions to prevent recurrence.
Lead	Personal Sample	8-hour TWA	5 ug/m ³ from Work Zone sample	5 ug/m ³ from Work Zone sample	

¹ = For particulates, a conservative action level of 150 ug/m³ (0.150 mg/m³) will be used for the Work Zone Perimeter; this value is consistent with short-term (24-hr.) ambient concentrations that have been determined by the United States of Environmental Protection Agency to be protective of the health of sensitive residential receptors (RETEC, 2003).

As described in the HASP and as shown in Table 3-1, if particulates exceed the action level within the Work Zone as measured with the handheld particulate meter, fill/soil disturbing operations will be suspended and dust control measures implemented to prevent recurrence.

If the results of personal sampling indicate that action limits for arsenic or lead are exceeded in the Work Zone, fill/soil disturbing/handling operations and dust control measures will be evaluated to determine better practices, and a plan will be implemented to prevent recurrence when operations resume. The plan may involve changes in the technical approach for fill/soil handling activities, alternate emission control measures, and/or adjustment of the particulate action level.

The following engineering, work practice, and/or environmental controls may be implemented to control dust:

- Use of tarps to cover soil stockpiles.
- Use of long-duration, emission-control foam or equivalent material to stabilize and cover excavation areas not actively being excavated.
- Use of wet methods, such as water spray, to control dust emissions during excavation, stockpiling, material handling, and hauling operations.
- Reducing vehicle speeds.
- During truck loading the drop height will be controlled to minimize fugitive emissions.
- Limiting fill/soil handling during unfavorable weather conditions (i.e., high winds).
- A combination of these controls may be used to reduce airborne emissions to meet the action levels.

The monitors at the Work Zone Perimeter will provide a real-time indication of the potential for contaminants of concern to migrating off Site. The arsenic and lead analytical data obtained from personal samples (see Section 2.2) from workers within the active Work Zone will help to determine the risk associated with these contaminants of concern leaving the Site. Any adjustments in the frequency of personal sample collection will be based on the control of particulate emissions within the Work Zone and the results of the collected samples.

4.0 AIR MONITORING PROCEDURES

The air monitoring program designed for the Site is intended to produce sufficient information for controlling the potential risk from fugitive emissions on an on-going basis.

The following sections describe procedures that will be used to monitor air at the Work Zone Perimeter to provide real-time particulate data. In addition to the Work Zone monitoring described in the HASP, continuous air monitoring will be conducted as discussed in Sections 2.2 and 2.3, at the Work Zone Perimeter during all fill/soil disturbing activities. These monitoring locations will be selected based on the prevailing wind direction and Site activity.

4.1 PARTICULATE MONITORING

Real-time air monitoring for particulates will be performed with instruments designed for continuous monitoring using light scattering photometry sensing technology to measure particulate matter. The instruments will be calibrated on a daily basis, and operated and maintained in accordance with the manufacturer's specifications. Standard Operating Procedures for operating these instruments will be maintained on site during the project.

All real-time monitoring data will be logged on the Ambient Air Monitoring Field Screening Data Sheet provided in Appendix A. Data records will be referenced to site location, time and date of reading, and the initials of the field technician. Data will be reviewed on the centralized data collection system in the Site trailer to ensure that airborne levels at the Work Zone Perimeter are less than the established site action levels.

4.2 ARSENIC AND LEAD SAMPLING

Characterization of air quality at the Site during remediation activities requires sampling of the Site contaminants, arsenic and lead, to verify that the Site action levels and engineering controls are protective of human health. Therefore, the Contractor will collect air samples for arsenic and lead analysis on workers conducting remediation activities within the active Work Zones as described in the HASP, and submit these samples for analysis by an AIHA accredited laboratory.

4.3 SAMPLE IDENTIFICATION

The personal air samples collected will be provided with a unique sample designation. The number will serve to identify the Site, location, date, and specific sample identification number. The following is an example of the sample designation format:

R25WA022009SmithJ, where:

R = the designation for the Block in which the sample is collected (i.e., A, C, E, F, H, J, K, L, M, N, P, Q, R, or S)

025 = the three-digit address number of the property

WA = the two-digit street name identifier, as defined below:

022009 = date (sample collected on)

SmithJ = worker's last name and initial of first name

A two-digit street name identifier will be used as defined below:

AS – Augur Street
BS – Butler Street
BT – Bryden Terrace
ES – Edwards Street
GS – Goodrich Street
HS – Harris Street
MA – Marlboro Street
MR – Mill Rock Road
MS – Morse Street
NH – Newhall Street
NS – North Sheffield Street
PL – Prospect Lane
RS – Remington Street
SA – Shelton Avenue
SM – Saint Mary Street
SS – Shepard Street
WA – Winchester Avenue

If the sample is a quality control sample, such as a media or field blank, the following designations will be added as a suffix to the sample number:

FB = Field Blank

D = Field Duplicate

B = Media Blank

The Contractor will use a sampling data sheet as described in the HASP to record all data for each personal sample collected.

4.4 SAMPLE PACKAGING, HANDLING, AND SHIPMENT

Air samples will be packaged in the shipping containers provided by and preserved as recommended by the analytical laboratory. A chain-of-custody form will be completed and shipped with the samples to the analytical laboratory. The samples will be shipped in accordance with U.S. Department of Transportation regulations via an overnight courier to the contracted AIHA accredited laboratory.

4.5 QUALITY ASSURANCE AND CONTROL PROCEDURES

Air Monitoring

The direct reading instruments described in this PAMP will be calibrated prior to initial use, and then at the frequency recommended by the manufacturer.

Air Sampling

In accordance with the HASP, personnel exposure will be evaluated by sampling in accordance with NIOSH Method 7300 for metals (lead and arsenic can be quantified from the same sample media) using personnel sampling pumps. Calibration of the samplers for arsenic and lead will be conducted as described in the HASP.

4.6 DATA INTERPRETATION AND REPORTING

As discussed previously, results obtained from the Work Zone monitoring and sampling will be reviewed on an on-going basis. Any field measurements or analytical data results exceeding the Site action levels will be reported immediately to the Project Manager, Site Superintendent, and the on-Site Health and Safety Officer so that actions can be implemented to control dust emissions.

Evaluation of the air monitoring and sampling data collected at the Site will be conducted daily to verify that controls implemented at the Site are effective in preventing migration of Site contaminants off-site. This data will be checked to ensure it meets the Site data quality objectives by verifying the following:

- Air monitoring instruments are properly calibrated at the required frequency.
- Samples for arsenic and lead were collected and analyzed according to the approved NIOSH method (7300) and that the appropriate detection limits were achieved to allow comparison of sample results with Site action levels.
- Verifying that field and laboratory QC results are within acceptable criteria, including reviewing blank data for contamination.

Data that are not representative of environmental conditions because they were generated through poor field or laboratory practice will not be used in the evaluation process. After data have been determined to be valid, data interpretation may be performed.

Information recorded during each work day and sampling event will include weather data (wind speed and direction, temperature, relative humidity, and precipitation) from the central meteorological station, and the presence of potential sources of the Site contaminants (e.g., vehicle exhaust). Analysis of the effects of these conditions on the air monitoring and sampling results will be included in a report discussion, if applicable.

A weekly air monitoring report will be prepared and will include the following information:

- Summary of the air monitoring stations used each day and their location relative to the site (e.g., upwind, downwind, etc.).
- Summary of 15-minute data from each perimeter monitoring station.

- Summary of calculated TWA dust concentrations per station monitored.
- Summary of calculated arsenic and lead concentrations, including detection limits, per sample collected.
- Contractor's field sampling and calibration data sheets for each high-volume air sampler.
- Calibration calculations for each high-volume air sampler.

Following sample data validation and review, the results of the Site air monitoring will be summarized and made available to the public through the CTDEP Hamden Newhall Remediation website.

5.0 REFERENCES

MACTEC, 2008a. Letter report “Evaluation of Fill for Placement at the Tire Pond Landfill Non-Public Properties, Newhall Street Neighborhood, Hamden, Connecticut” to Mr. Raymond Frigon, Remediation Division, Bureau of Water Protection and Land Reuse, State of Connecticut Department of Environmental Protection. February 14, 2008.

MACTEC, 2008b. MACTEC Short-Form Health and Safety Plan (HASP) for the Hamden Non-Public Properties, Newhall Street Neighborhood. July 22, 2008.

MACTEC, 2008c. Final Additional Investigation Work Plan for 22 Properties, Non-Public Properties, Newhall Street Neighborhood, Hamden, Connecticut. May 2008.

MACTEC, 2009. Final Design/Generic Remedial Action Plan, Version 1, Non-Public Properties, Newhall Street Neighborhood, Hamden, Connecticut, January 2009.

APPENDIX A

AMBIENT AIR MONITORING FIELD SCREENING DATA SHEET

