Pre-construction Air Monitoring Plan Area 1, Phase 1 Development

Baltimore Works Site
Baltimore, Maryland

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By:
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Harbor Point Development LLC

For:
U.S. Environmental Protection Agency – Region III
Maryland Department of the Environment

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LIST OF ACRONYMS

COC – Contaminant of Concern

CSSA – Cover Soil Stockpile Area

CrVI – Hexavalent Chromium

° C – Degrees Celsius

° F – Degrees Fahrenheit

DDP – Detailed Development Plan

EPA – U.S. Environmental Protection Agency

ERS – Environmental Remediation System

HMS – Head Maintenance System

Lpm – Liters per Minute

LSC – Layered Soil Cap

M^3 – Cubic Meters

MDE – Maryland Department of the Environment

µg - Microgram

mg – Milligram

MMC – Multimedia Cap

NOAA – National Oceanic and Atmospheric Association

ŋg – Nanogram

NWS – National Weather Service

OAM – Offsite Air Monitor

PAM - Perimeter Air Monitoring

PVC – Polyvinyl Chloride

RAM – Real-time Aerosol Monitor

RH – Relative Humidity

SAP – Sampling and Analysis Plan

QAPP – Quality Assurance Project Plan

TSP – Total Suspended Particulate

µg – Microgram

µm - Micron

UPL – Upper Prediction Limit

WET - Rain

WZ – Work Zone

1.0 INTRODUCTION

This Pre-construction Air Monitoring Plan ('the Plan") has been prepared in support of the Detailed Development Plan (DDP) for the Harbor Point Area 1, Phase 1 Development (the "Site", Figure 1). The principal contaminant of concern (COC) is hexavalent chromium (CrVI). The approved Environmental Remediation System (ERS) is operated and maintained by Honeywell International Inc. (Honeywell) pursuant to the Consent Decree dated April 27, 1989, as amended, among Honeywell, U.S. Environmental Protection Agency (EPA) and Maryland Department of the Environment (MDE) to contain chromium contaminated groundwater and eliminate exposure to impacted soil. The ERS consists of the Multimedia Cap (MMC), Hydraulic Barrier, Head Maintenance System and Outboard Embankment.

1.1 PURPOSE

The purpose of this Plan is to determine a real-time Total Particulate Matter (Total PM) action level and baseline CrVI concentration for use during intrusive activities. To that end baseline Total PM and CrVI airborne concentrations will be established for comparison to air quality during intrusive activities to demonstrate the effectiveness of the dust control measures implemented for the protection of human health and the environment. For the purpose of this Plan, "intrusive activities" occur any time there is disturbance of the surface immediately below the synthetic layers of the existing Multimedia Cap (MMC) in Area 1. This Plan provides a description of the methods to be utilized for real-time Total PM and weather data collection, air sample collection, laboratory analytical methods, data evaluation and reporting.

A Pre-construction Air Monitoring Sampling and Analyses Plans (SAP) and an Air Monitoring Program Quality Assurance Project Plan (QAPP), have been prepared for this project and are referenced in this Plan. Further discussion of the SAP and QAPP are provided below in Sections 2 and 3, respectively.

This plan is applicable specifically to the redevelopment related activities as described in the Detailed Development Plan – Area 1, Phase 1 Development and will be performed by the Developer and the Developer's representatives. This Plan is not applicable to routine operations, monitoring and maintenance work undertaken by Honeywell pursuant to the approved Consent Decree work plans.

1.2 SITE DESCRIPTION

The Site is located on a peninsula on the northeast shore of the Patapsco River of the Inner Harbor, in the Fells Point section of Baltimore City, Maryland. The former chromium chemical manufacturing facility consisted of chromium processing production buildings and numerous support buildings on an area that covered approximately 14 acres. The Site is surrounded by water on the north, west and south, the Living Classrooms facility to the north and condominiums on South Caroline Street to the east. The Thames Street Wharf Office Building is located to the east, beyond which is the Douglas Maritime Museum at South Caroline and Thames Streets.

1.3 SITE USE HISTORY

The Site has been divided into Areas 1, 2, and 3. Area 1 is the principal site of Honeywell's (formerly AlliedSignal) Baltimore Works Facility (Figure 1). Chromium ore was processed in Area 1 from 1845 to 1985. The former manufacturing processes resulted in chromium impacts to soil and groundwater.

1.4 PLAN ORGANIZATION

The remainder of the Plan is organized as follows:

- Sections 2 provides the core elements of the SAP;
- Section 3 provides the core elements of the QAPP;
- Sections 4 provides discussions regarding action levels; and
- Section 5 provides reporting requirements.

2.0 PRE-CONSTRUCTION AIR MONITORING

This section summarizes the key elements of pre-construction air monitoring SAP. Detailed descriptions of the air monitoring program elements are provided in the QAPP. The Data Quality Objectives (DQOs) for sampling are also are included in the QAPP and summarized below in Section 3. Field and Laboratory Standard Operating Procedures (SOPs) have been prepared for implementation during pre-construction air monitoring and are provided in the QAPP.

2.1 SAMPLING AND ANALYSIS PLAN (SAP) ELEMENTS

2.1.1 Monitoring Locations

Three monitoring locations will be established for pre-construction air monitoring (Figure 2). One station, Perimeter Air Monitor (PAM), will be located on the Harbor Point construction site at the eastern property boundary (PAM-1). A second station will be located at the Baltimore National Aquarium, Off-site Air Monitor (OAM-1) located west of the site. The third station will be located off-site at MDE's Old Town air monitoring site, OAM-2, located north of the site. ERM understands that EPA and MDE approve of these monitoring locations.

Monitoring locations and equipment will be sited, to the extent possible, away from trees, buildings, roadways, or other obstacles that may cause undue influence on the measured concentrations according to 40 CFR Part 58, Appendix E. All sampler inlets should be placed not less than 2 meters above ground level and have unrestricted air flow for at least 270 degrees around each sampler. It is noted that all monitoring locations will require electric power, safe access, and security.

The construction site monitoring location on the site perimeter boundary (PAM-1) will serve as a co-located monitoring site with two DustTrak Model 8533 real-time monitors and two BGI Model PQ-100 CrVI samplers to provide duplicate monitoring data. One DustTrak 8533 and one BGI Model PQ-100 will be designated as the "primary" samplers and the other equipment pair will be designated as the "duplicate" samplers. The co-located DustTrak monitors will both be connected to a "T" connection so that the monitors are sampling from the same inlet to reduce variability. The co-located CrVI sampling equipment inlets will be installed between 2 and 4 meters apart.

The monitoring instruments and sampling equipment will be protected inside a waterproof case with an omni-directional air intake port and will be mounted on a tripod. The data loggers will be downloaded to a personal computer via telemetry provided at each air monitoring station.

2.1.2 Pre-construction Monitoring Duration

The field data objective is to collect real-time Total PM concentration data and four CrVI samples per day for 15 sampling days. Sampling will yield 60 CrVI samples, plus field and trip blanks, for laboratory analysis per Standard Operating Procedure for the Preparation and Analysis of Hexavalent Chromium by Ion Chromatography prepared by Eastern Research Group, Inc. (ERG), dated February 2014. To achieve the field data objective, pre-construction sampling will be performed for 15 consecutive calendar days as practicable, weather permitting, and excluding Holidays. The pre-construction air monitoring duration will be extended to complete the field data objective should a sampling day be voided due to conditions such as severe weather prohibiting sample collection due to safety concerns, sampling equipment failure or rejection due to sample data validation. EPA and MDE designated representatives will be contacted immediately should such a condition occur. No potential dust generating construction activities may occur on the site during pre-construction air monitoring.

2.1.3 Monitoring Equipment and Methods

Each monitoring station will consist of a DustTrak 8533 real-time dust monitor and a BGI Model PQ-100 CrVI sample pump, except a noted previously; one monitoring location (PAM-1) will have duplicate, co-located equipment. The DustTrak Model 8533 is reported to monitor Total PM concentrations for particles from 0.1 microns up to approximately 15 microns in diameter and uses the terminology of Total PM to describe the measurement. Although not an established Reference Method, the DustTrak Model 8533 has the advantage of providing real-time concentration readings during construction.

Real-time Total PM monitoring will be performed continuously, 24 hours per day, seven days per week, at each monitoring location. The DustTrak Model 8533 will monitor Total PM concentrations and store 1-minute averages on the internal data logger. Because the DustTrak Model 8533 will be operated in the Total PM mode rather than size-specific classifications, the factory-set photometric calibration factor (PCF) of 1.0 and size correction factor (SCF) of 1.0 will be used. As recommended by the manufacturer, the Ambient Air calibration factor will be selected to represent outdoor ambient dust.

A meteorological monitoring station will be sited following EPA siting guidance in EPA-454/B-08-002 *Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV: Meteorological Measurements Version 2.0 (Final),* March 2008. The wind speed and direction sensors for the meteorological monitoring system will be situated approximately 10 meters above ground, on the Transfer Station Mechanical Room rooftop during the preconstruction pre-construction and construction air monitoring. The meteorological sensors will be calibrated on-site during installation following the guidance of EPA-454/B-08-002.

Concurrently with real-time monitoring for Total PM using the DustTrak 8533 at each location, CrVI concentrations will be determined from 24-hour air samples collected using BGI Model PQ-100 samplers. CrVI concentrations will be determined in accordance with the Standard Operating Procedure for the Preparation and Analysis of Hexavalent Chromium by Ion Chromatography prepared by Eastern Research Group, Inc. (ERG), dated February 2014, as provided in the QAPP, Appendix C. ERG's document references ASTM Standard Test Method D7614-12 Determination of Total Suspended Particulate (TSP) Hexavalent Chromium in Ambient Air Analyzed by Ion Chromatography and Spectrophotometric Measurements.

Sampling for CrVI will be performed at approximately 15 Lpm for 24 hours. The samples are collected on 47 mm ashless cellulose filters (Whatman 541) that have been acid washed and impregnated with sodium bicarbonate solution by the laboratory prior to deployment in the field. At the conclusion of each day's sampling, the filters will be recovered, sealed, and packed in coolers with ice packs to maintain a nominal temperature of 0^{o} C or less. Samples will be analyzed by IC with a post-column derivatization (PCV) module and UV-Vis detection.

ERG will provide pre-treated and pre-conditioned filters loaded in filter cassettes. The filter cassettes will be shipped to the field frozen on ice packs and will be maintained at or below 0^{o} C at all times, including shipment back to the laboratory, other than during actual sampling. Although CrVI samples are stable for more than three weeks prior to extraction, providing they are kept frozen, it is planned that CrVI samples, field and trip blanks will be shipped daily via overnight, next day delivery to the laboratory, except weekends. Sample coolers will be refreshed with ice packs as necessary to ensure a temperature of less than 0^{o}C is maintained until receipt by the laboratory. Samples will be stored in the laboratory freezer until extraction and sample analysis immediately thereafter.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL.

The QAPP addresses all aspects of the pre-construction and construction monitoring program ranging from siting the sampling equipment to sampling and analytical procedures. It is imperative that the approved QAPP and related documents be followed during pre-construction and construction air monitoring. No modifications to the QAPP may be implemented without written approval from EPA/MDE.

3.1 DATA MANAGEMENT

This section describes the data management process and methods to ensure data integrity from data production in the field to final use and retention. All data will be reviewed and verified for accuracy by the ERM QA/QC Officer and Field Manager (FM). The ERM FM will ensure that the field and technical data obtained for the project will provide the end user with acceptable data. All field and technical data shall be reviewed by the ERM QA/QC Officer, to ensure that the final data is accurate prior to the inclusion in the project report. The field data sheets, log books, COC forms, and DustTrak data are reviewed and submitted (faxed, electronic, or hard copy) by the ERM FM to the ERM QA/QC Officer daily.

The analytical data processing procedure is summarized as follows:

1. Samples are sent to the laboratory under COC.

2. The laboratory enters the sample information into their tracking system and performs the analysis.

3. The laboratory electronically submits raw data, sample results, and their QA information to ERM and to an independent third party validator, who in turn performs Level II validation, as described in EPA's *Guidance on Environmental Data Verification and Data Validation* (2002).

4. The third party validator electronically submits their validation report to ERM.

5. ERM reviews the data validation report, and, if acceptable, stores all data into the project files. If unacceptable, ERM may request re-analysis of the data by the laboratory. Under this condition, the ERM PM will bring this result to the attention of EPA and MDE

and request their concurrence of ERM's recommendation of whether or not to perform the re-analysis.

6. Once the ERM QA/QC Officer completes the accuracy review, the ERM FM, or their designee, then stores the validated information electronically into ERM's project files and uploads the summary tables to the project website.

Real-time data processing is summarized as follows:

1. The field data sheets (real-time Total PM) and real-time instrument data logs are submitted (faxed, electronic, or hard copy) by field personnel to the ERM PM weekly. The ERM PM, or their designee checks all metadata for accuracy, then stores the information electronically into ERM's project files.

2. ERM submits the field data sheets and real-time instrument data logs to the third party validator.

3. The third party validator electronically submits their validation report to ERM.

Real-time Total PM concentration data will be provided as hourly averages based on one (1) minute frequency data collection. The daily average real-time Total PM concentration data will be used to calculate the dust action level, i.e., the background threshold value (BTV).

Data will be retained on file at ERM for a minimum of one year after the cessation of air monitoring, and will be readily available for audits and data verification activities. After one year, hardcopy records and computer backup electronic media will be discarded.

3.2 DATA REVIEW AND VALIDATION

All data will be verified by a review of the completeness and accuracy of each result's metadata. Field operations will be fully documented, reviewed, and audited. All CrVI data will undergo Level II third party data validation. The precision of the DustTrak particulate data will be determined by daily duplicate results.

The quality of laboratory data will also be evaluated based on precision, accuracy, representativeness, completeness, and comparability of the data generated by each type of analysis. The specific analytical criteria,

including reporting limits and control limits for QC results, are provided in the QAPP, Appendix C.

Data validation is confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. The laboratory will provide Level 2 validation data packages in both hard copy and electronic format, including all raw data and calculations, summary data sheets and supporting quality assurance/quality control (QA/QC) and analytical information. To ensure that data is of a known and acceptable quality, all analytical data generated from the CrVI air sampling will be validated by a third party, independent of ERM, including 40% raw data re-calculation.

Data qualifiers will be assigned using guidance for qualification outlined in EPA documents *EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (January 2010). If deficiencies are encountered or specific data appear to be problematic based on the initial data review, more extensive data review will be implemented, such as review of raw data.

4.0 DEVELOPMENT OF ACTION LEVELS

The CrVI and Total PM concentration background threshold values (BTVs) to be utilized for construction air monitoring will be established based upon the pre-construction monitoring data. Pre-construction air monitoring data will be evaluated using EPA's latest technical guidance document for their ProUCL software, *ProUCL Version 5.0.00, Technical Guide* (USEPA 2013) as follows:

- Each of the individual data sets (Total PM and CrVI) will be statistically tested for distribution and the presence of outliers. Distribution and outlier tests (including normal Q-Q plots) will be conducted to establish that the background data set represents a single environmental population without outliers;

- Statistical comparison between the two, co-located DRX 8533 real-time monitor Total PM datasets to assess instrument precision;

- Statistical comparison between the two, co-located CrVI sampler datasets to assess instrument precision and

- Statistical determination of the DRX 8533 real-time Total PM and analytical CrVI BTVs.

If the co-located data sets both meet the acceptance criteria of 20% for the CrVI data and 40% for the real-time Total PM data, then the "primary" sampler set of results will be incorporated into the overall data set.

Initially, BTVs will be estimated by calculating upper simultaneous limits (USL) from the pre-construction data set. ProUCL Version 5.0.00 recommends the use of a USL95 when a large number of onsite observations (current or future) need to be compared with BTVs. Data sets with non-detects (left-censored) will be evaluated following the ProUCL 5.0.00, Chapter 5 methods. .

5.0 REPORTING

The summary data report titled, "Harbor Point Development Pre-Construction Air Monitoring Report", will be produced by ERM and will include, electronically, the complete laboratory data packages, and all underlying metadata. Pro UCL 5.0 printouts from the statistical evaluations of the datasets, analytical reports, data validation tables and the ProUCL 5.0 print results from the evaluation of the proposed Total PM action level and CrVI background threshold value concentration will also be provided in this summary data report.

Figures

Figure 1
Site Location Map

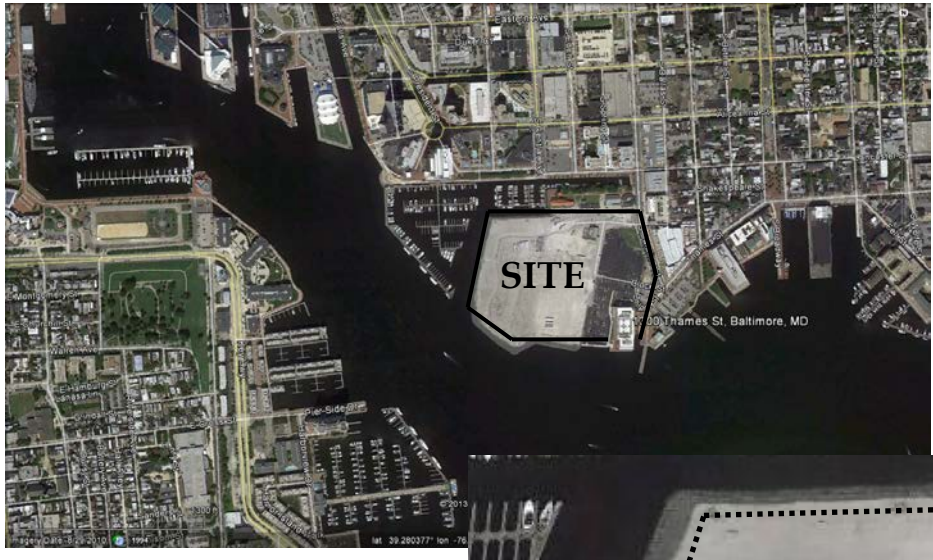
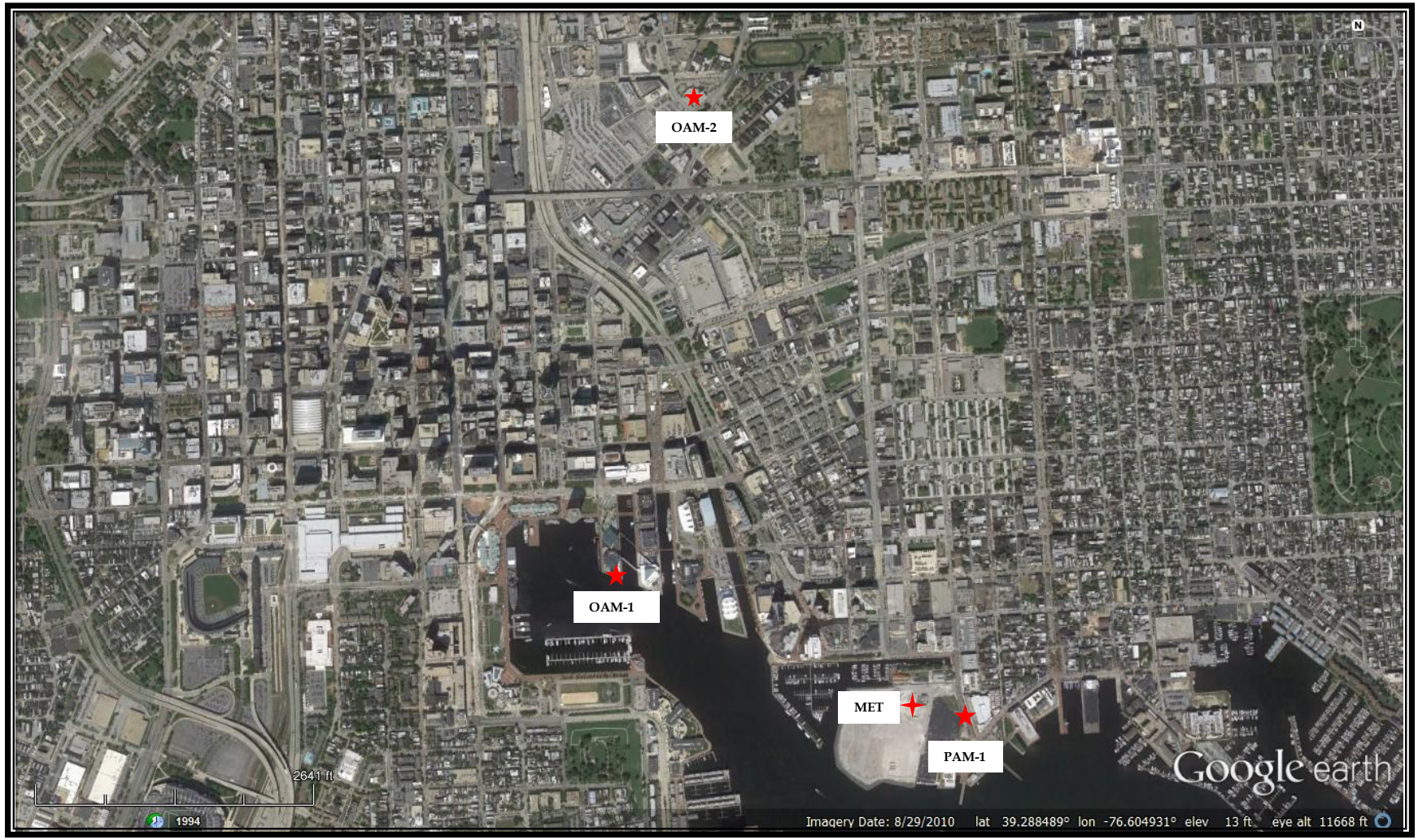


Figure 2
Pre-construction Air Monitoring Locations
Harbor Point
Baltimore, Maryland



MET – Meteorological Station
PAM – Perimeter Air Monitor
OAM – Off-site Air Monitor
1 – Baltimore National Aquarium
2 – MDE's Old Town Station