Area 1, Phase 2
Health and Safety Guidance
Parcel 3 Development

Honeywell Baltimore Works Site
Baltimore, Maryland

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Prepared for:
Honeywell International, Inc., U.S.
U.S. Environmental Protection Agency, Region III
Maryland Department of the Environment

Prepared by:
Harbor Point Parcel 3 Development, LLC
Environmental Resources Management, Inc.

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Acronyms and Abbreviations

Name	Description
AST	Aboveground Storage Tank
bgs	Below ground surface
BMPs	Best Management Practices
° C	Degrees Celsius
CAMP	Construction Air Monitoring Plan
CDP	Conceptual Development Plan
CFR	Code of Federal Regulations
CHASP	Contractor Health and Safety Plan
COC	Contaminant of Concern
COMAR	Code of Maryland Regulations
COPR	Chromium Ore Process Residue
CR	Crusher Run
CrVI	Hexavalent Chromium
CSSA	Cover Soil Stockpile Area
DDP	Detail Development Plan
DOT	U.S. Department of Transportation
DW	Deep Well
EC	Emergency Coordinator
EE	Engineering Evaluation
EMMP	Environmental Media Monitoring Plan
EPS	Expanded Polystyrene
ERM	Environmental Resources Management, Inc.
ERP	Emergency Response Plan
ERS	Environmental Remediation System
ESC	Erosion and Sediment Control
EWMI	Environmental Waste Minimization, Inc.
F	Fahrenheit
GCL	Geosynthetic Clay Line
GGMP	Groundwater Gradient Monitoring Plan
H&S	Health and Safety
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HB	Hydraulic Barrier
HDPE	High Density Polyethylene
HMS	Head Maintenance System
Honeywell	Honeywell International Inc.
HPD	Harbor Point Development LLC
HSC	Health and Safety Coordinator
HSG	Health and Safety Guidance

Name	Description
HW	Hazardous Waste
IC	Ion Chromatography
LLDPE	Linear Low Density Polyethylene
LOD	Limits of Disturbance
m	Meter
m^3	Cubic Meters
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MD SWM	Maryland Stormwater Design Manual
mg	Milligram
MHMP	Material Handling and Management Plan
MLW	Mean Low Water
MMC	Multimedia Cap
MPs	Monitoring Plates
MSDSs	Material Safety Data Sheets
msl	Mean Sea Level
MSS	Master Supervisory Station
MPs	Monitoring Plates
NAAQS	National Ambient Air Quality Standard
NELAP	National Environmental Laboratory Accreditation Program
ng	Nanogram
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OCP	Oil Control Program
OSHA	Occupational Safety and Health Administration
oz/sy	Ounce per square yard
PAHs	Polycyclic Aromatic Hydrocarbons
PAM	Perimeter Air Monitor
PE	Professional Engineer
PELs	Permissible Exposure Limits
PM	Project Manager
PM_{10}	Particulate Matter with aerodynamic diameter < 10 micrometer
PPE	Personal Protection Equipment
psf	Pounds per square foot
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAMs	Real-time Aerosol Monitors
RCRA	Resource Conservation and Recovery Act
RIC	Remote Intelligent Controllers
RQ	Reportable Quantity
S-B	Soil-bentonite
SWP	Solid Waste Program
SPCC	Spill Prevention, Control, and Countermeasure
SPRP	Spill Prevention and Response Plan
SSMP	Surface Soil Monitoring Plan

Name	Description
SSO	Site Safety Officer
SW	Shallow Well
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
TSP	Total Suspended Particulate
µg	Microgram
µg/m^3	Micrograms per cubic meter
USDOJ	U.S. Department of Justice
µm	Micrometer
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
VCP	Voluntary Clean-up Program

1. INTRODUCTION

Harbor Point Parcel 3 Development LLC and its consultant(s) have prepared this Health and Safety Guidance ("HSG") for the Parcel 3 development (Project). The Project is planned on a portion of the former AlliedSignal Baltimore Works Site (Site), located in Baltimore, Maryland. The Project will consist of constructing two, seven-story Office Buildings, an open space public area referred to as "Point Park", a promenade along the bulkheaded shoreline, and general site development, such as sidewalks, landscaping, a parking garage, a drop-off area, and other ancillary features.

This HSG has been prepared as part of the Detailed Development Plan (DDP) for the Project. For the Parcel 3 development, the primary chemicals of concern are hexavalent chromium (CrVI) and polycyclic aromatic hydrocarbons (PAHs).

1.1 Purpose

This HSG is intended to address worker safety related to potential exposure to environmental constituents of concern (e.g., hexavalent chromium, PAHs, etc.) during the Project. This document is solely intended to provide guidance to Contractors during the bidding and submittal processes by identifying environmental contaminant issues that Contractors at a minimum will address in their own Health and Safety Plan (HASP) for performance of work at the Site. The HSG is not intended to be inclusive of all health and safety issues that may be encountered at the Project, such as those associated with general construction activities.

It is the sole responsibility of Contractors to prepare and implement their own Site-specific health and safety plan (HASP) in accordance with all applicable federal, state, and local regulations and standards of care, inclusive of 29 CFR 1910.120(b), and Contractor employees for these tasks must be trained in accordance with 29 CFR 1910.120(e)(3)(i). This HSG is not intended to be, nor is it adequate to be used as a Site-specific HASP by any Contractor engaged at the Project, and does not supplant any requirement of any prevailing regulatory agency. The Developer or its consultants are not responsible for reviewing or approving the completeness, accuracy or requirements and mitigative measures specified in Contractor HASPs. In the event that a conflict in procedures or requirements exists between this HSG and any Contractor HASP (CHASP), the procedures or requirements that are most protective of human health will be applied. In addition, this HSG is not applicable to routine operations, monitoring, and maintenance work undertaken by Honeywell pursuant to the operation and maintenance of the ERS.

1.2 Location and Existing Environmental Controls

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 (Figure 1). The Site is surrounded by open water on the west and the south and the Living Classrooms facility to the north along a tidal inlet are referred to as the Back Basin. The Project area is adjacent to prior development projects at the Site, including Thames Street Wharf (completed in 2010) and Wills Wharf (completed in 2020) to the east, 1405 Point (completed in 2018) to the northeast, and the Exelon Tower and Central Plaza and Garage (completed in 2016) to the north. A portion of the Project area currently contains asphalt paved surfaces that are presently being used as active surface parking lots.

For prior environmental remediation purposes, the Site is divided into three Areas (Areas 1, 2, and 3); each Area is comprised of a different environmental remedy including different engineered caps. Area 1 has the most robust environmental remedy and is bounded by Will Street to the east, Dock Street to the north and the Patapsco River to the northwest, west and south. Area 1 has a multimedia cap (MMC) and is referred to as the "on cap" Area. Areas 2 and 3 have soil caps, and are located east of Wills Street.

Area 1 is approximately 14 acres, and is divided into five separate lots/parcels. The first phase of development on Area 1 (i.e., Area 1, Phase 1) was comprised of the Exelon Tower and Central Plaza Garage. Area 1, Phase 1 occupied Parcels 2 and 5, and the project was completed in 2016. This second phase of development on Area 1 (i.e., Area 1, Phase 2 development) is within Parcel 3 of Area 1. This Project is entirely located within Area 1.

An Environmental Remediation System (ERS) for the Site was completed in 1999 by Honeywell pursuant to the 1989 Consent Decree between the U.S. Environmental Protection Agency (USEPA), U.S. Department of Justice (USDOJ), Maryland Department of Environment (MDE), and Allied Signal (Honeywell). The ERS is currently maintained and operated by Honeywell to contain chromium contaminated groundwater and reduce human exposure to impacted soils within the limits of Areas 1, 2, and 3. Area 1 is the focus of this development project, and the principal contaminants of concern identified within Area 1 are hexavalent chromium and polycyclic aromatic hydrocarbons (PAHs). The Area 1 ERS components consist of a Multimedia cap (MMC), a Hydraulic Barrier, a Head Maintenance System (HMS) and an Outboard Embankment. It is anticipated that several Project features may conflict with components of the existing ERS. However, the Consent Decree requires that the overall Site development must not interfere with the efficacy of the corrective measures or with Honeywell's ability to comply with the performance standards defined in the Consent Decree, including the various media monitoring plans and performance requirements.

The Project will be the second major construction activity in Area 1, scheduled for commencement of construction in January 2022. The first construction (Phase 1) in Area 1 included the Exelon Tower and Central Plaza that was completed in 2016 in accordance with the USEPA and the MDE approved plans, including the CDP, DDP and subsequent minor modifications of the DDP. This Phase 2 development in Parcel 3 incorporates many similar components as implemented in Phase 1, including pile foundations with cap penetrations, MMC repairs, HMS modifications, material management, and air monitoring.

2. PROJECT PERSONNEL AND RESPONSIBILITIES

Contractors will designate and assign appropriately trained and qualified personnel to fulfill the following responsibilities for implementation of their HASP. The position titles and the names of the individuals assigned would be included in the written HASP:

- Contractor Project Manager (PM) – The Project Manager will serve as the Contractor's principal point of contact for Project-related decisions and communication.
- Contractor Project Health and Safety Coordinator (HSC) – The HSC will be responsible for preparing and overseeing implementation of the CHASP, as well as updating the HASP as conditions warrant. The HSC will be consulted by the Contractor PM or field personnel whenever Site conditions may require modification to the CHASP.
- Contractor Site Safety Officer (SSO) – The SSO will be responsible for ensuring that the CHASP is properly implemented by all Contractor employees and subcontractors. The SSO will serve as the primary point of contact for communications between field personnel and management. The SSO will be responsible for notifying the PM and the HSC of field conditions that may require modification to the HASP. It is the responsibility of the SSO or designee to ensure that Site personnel are in conformance with the level of personal protection equipment (PPE) specified by the CHASP. It is incumbent upon the SSO to establish and maintain direct lines of communication with the Developer and/or its consultants.

3. SITE CONTROL MEASURES

The CHASP must describe the establishment and maintenance of Site controls. The Contractor must ensure through the assigned SSO that Site control is maintained by establishing egress and ingress points for work activities and modifying them, as appropriate, as the Project and work areas progress. The CHASP must ensure that the Site is properly secured at all times to restrict unauthorized access by trespassers, visitors or other personnel.

The Contractor must ensure that visitors not engaged in Site work will be provided with the appropriate level of PPE and escorted at all times while on-Site by the SSO or designee. The Contractor must implement controls for all on-Site personnel such that smoking, eating, drinking, or other activities which promote hand-to-mouth contact are only permitted in designated clean area(s), the locations of which will be determined by the SSO.

4. PERSONNEL TRAINING

4.1 Overview

The CHASP must describe what training is necessary to safely conduct the specific job and what types of employees receive training. The Contractor will distribute its CHASP to appropriate employees and subcontractors involved in the Project. Prior to commencing with the fieldwork, the Contractor SSO will discuss the contents of the CHASP with the Contractor workers and subcontractor employees. The SSO will maintain documentation of specialty training provided for his/her role and the Contractor's employees based on their specific work task and responsibility. These documents will be made available to the Developer and its consultants.

It is the responsibility of the Contractor to ensure that its employees and subcontractors engaged in implementation of Project activities comply with the applicable OSHA regulations in 29 CFR 1910 and 29 CFR 1926. The general recommendations of this HSG regarding personnel training are presented in Section 1.3.

Pursuant to 29 CFR 1910.120, hazardous waste Site workers must, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste Site operations. Personnel who have not met the requirements for initial training or are not "current" in their training will not be allowed to work during any Site activities in which they may be exposed to environmental hazards. For a worker to be considered "current" for training purposes, their date of last training (initial, refresher, or manager/supervisory) must be within the last twelve months. Completion of an accredited Health and Safety Training Course for Hazardous Waste Operations or an approved equivalent will fulfill the requirements of this section. Where on-Site training is necessary, the Contractor SSO will conduct the training.

Prior to commencement of field activities, personnel assigned to the Project must be provided with training to specifically address the activities, procedures, monitoring, and equipment for the Project operations. It will include Project layout, hazards, and emergency services at the Project, and will highlight the provisions contained within the CHASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

The Site-specific training must also provide information regarding potential health hazards specific to the Site contaminants, the likelihood of exposure, and the precautionary measures (including PPE and air and medical monitoring procedures) to be implemented to protect against these hazards. Additional training, if required for completion of field tasks during the Project, will be identified and provided as the work progresses.

4.2 Site-Specific Training

Prior to commencement of field activities, personnel assigned to the Project will be provided with training to specifically address the activities, procedures, monitoring, and equipment for the Project operations. It will include Project layout, hazards, and emergency services at the Project, and will highlight the provisions contained within the CHASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

It is the responsibility of the Contractor to ensure that its employees and subcontractors engaged in implementation of Project activities comply with the applicable OSHA regulations in 29 CFR 1910 and 29 CFR 1926. It is required that employees who may come into contact with subsurface soils and groundwater during performance of the work comply with the training specified in 29 CFR 1910.120(e).

Particular attention to dust suppression activities will be required if Chromium Ore Process Residue (COPR) be encountered. Additionally, field staff will be provided training in advance of Site activities on the physical and characteristics of COPR and, if COPR be identified, the Contractor will use that opportunity to train field staff to visually recognize this material. It is the Contractor responsibility to determine which employees may potentially be in contact with contaminated subsurface soils and groundwater, and the level of training required. It is anticipated that the workers with the following job descriptions may potentially come into contact with contaminated media and must have the appropriate health and safety training:

- Backhoe Operators;
- Vacuum Truck or Pump Operators;
- Truck Drivers; and
- Laborers/Spotters.
- Drillers and driller's helpers (e.g., drilling foundation piles, monitoring well abandonment).

Workers on-Site only occasionally for a specific limited task (such as, but not limited to, groundwater monitoring, land surveying, or geophysical surveying) must also comply with the training specified in 29 CFR 1910.120(e).

4.3 Additional Training

Additional training, if required for completion of field tasks during the Project, will be identified and provided by the Contractor as the work progresses.

4.4 On-Site Safety Briefings

Periodic on-Site health and safety briefings will be performed by the Contractor SSO, as necessary, to assist Site personnel in safely conducting their work activities. In addition, job-specific briefings will be performed on a daily basis and documented. The briefings will include information on new operations to be conducted, or changes in work practices or the Site environmental conditions, and will provide a forum to facilitate conformance with health and safety.

5. COMMUNICATION AND REVIEW OF SITE-SPECIFIC HEALTH AND SAFETY GUIDANCE COMMUNICATION

An initial review of the CHASP will be held with its workers either prior to mobilization or after mobilization. This review will occur prior to commencing with the applicable work described in Section 1.3 at the Site to communicate CHASP details and answer questions to individuals working at the Site.

It is the Contractor's responsibility to keep the CHASP on-Site and assessable to all employees, as well as keeping it up to date and current with Site conditions.

5.1 Daily Safety Meetings

Daily tailgate safety meetings will be led by the SSO each morning to review work practices for the day and to discuss safety related issues. The meetings will include information on new operations to be conducted, or changes in work practices or Site conditions. Any new hazard or safety information will be disseminated at the daily tailgate safety meeting or as needed throughout the day and documented.

6. MEDICAL MONITORING

Personnel involved in Site operations with the potential for encountering contaminated media must have undergone medical surveillance with their employer, to include initial and periodic examinations, prior to performing field work at the Site. Each employer's occupational health physician will determine the frequency of examinations based on a variety of factors. The Contractor is responsible for the Contractor's employees involved in field activities associated with the Project would be required, as appropriate, to adhere to the medical monitoring requirements of 29 CFR 1910.120(f). Project personnel will utilize the services of a licensed occupational health physician with knowledge and/or experience in the hazards associated with the Project to provide the medical examinations and surveillance specified herein. Medical "fit-for-duty" certifications shall be maintained on Site for all HAZWOPER workers.

7. HAZARD IDENTIFICATION CONTROL

7.1 Hazard Identification Process

Prior to initiating any new Project activity or when there is a change in Site conditions, the SSO will assist Project team members in completing and documenting a Job Hazard Analysis (JHA). A copy of the JHA form that may be used by the Contractor is located in Attachment 1.

7.2 General Hazards

A variety of physical hazards may be present on-Site during work activities. These may include, slip/trips/falls associated with rubble, debris, uneven terrain or slippery conditions. In addition, hazards associated with heavy equipment operation, working near excavations, the use of hand and power tools, electrical hazards, and handling of hazardous materials. Although these hazards are identified, this HSG is not intended to address all general physical hazards of a construction Site. A list of typical general safe work practices are provided in Section 15.0.

7.3 Chemical Hazards

Hexavalent chromium (CrVI) and PAHs may be present at the Site. For Phase 1 construction in Area 1, the primary chemical of concern is hexavalent chromium in soil, chromium ore process residuals, and groundwater, or on debris below the MMC synthetic layers. PAHs may be present in Areas 2 and 3. Chemicals may be introduced into the body by ingestion, inhalation, or absorption through the skin. Since not all chemicals have the same level of toxicity, the length of time for the exposure and the concentration of the chemical are important in determining the potential risk to on-Site workers. Inhalation and skin contact are the most common routes of entry for the type of work that is contemplated for this Site. Chemicals can be introduced into the body by ingestion when chemicals present on the hands are transferred to food or cigarettes.

7.4 Soil Conditions

The uppermost material encountered in all of the soil borings collected on this Site is fill material, ranging in thickness from about 7 to 30 feet. The fill consists of medium compact to loose, gray and brown fine to coarse sand, with some silt, trace to some gravel, trace clay, and with variable amounts of brick, concrete fragments, cinders and wood and likely contain materials impacted by hexavalent or trivalent chromium. As a general practice COPR was not landfilled at the Site; however, the 1985 IT report and 1986 NUS report indicated the potential presence of COPR in dispersed soils across the Site. Soil containing elevated concentrations of chromium can be expected to be encountered below the layers of the MMC. PAHs may also be encountered in soil in Area 2.

7.5 Groundwater Conditions

Elevated concentrations of hexavalent chromium have been reported in shallow groundwater. Shallow groundwater levels have not been recorded above elevation +3 feet mean sea level (msl).

8. FIELD ACTIVITIES

The following activities are anticipated to be performed for the Project:

- Continuous operation of the Transfer Station and HMS including the storage and transfer of contaminated groundwater;
- Installation of erosion and sediment controls;
- Demolition of concrete structures and asphalt paving;
- Exposing portions of the MMC geosynthetic materials;
- Excavation, temporary storage and transportation of clean and contaminated soils and water;
- Sheet pile and pipe pile driving;
- Foundation pile driving;
- Concrete forming;
- Installation of clean fill, aggregates, and geosynthetic materials;
- Installation of utilities in clean fill;
- Backfill and surface grading;
- Vibration monitoring; and
- HMS modifications.

9. SITE PERSONNEL

Workers with the following job descriptions will be engaged in activities conducted at the Site:

- Heavy Equipment Operators;
- Vacuum Truck or Pump Operators;
- Truck Drivers;
- Laborers/Spotters;
- Drillers and Driller's Helpers; and
- Technical Personnel.

Other visitors to the Site, not directly involved in proposed work activities, will be considered in the CHASP as Technical Personnel listed above.

10. PERSONAL PROTECTIVE EQUIPMENT

Level D is the expected level of protection for this construction work. However, it is the responsibility of the Contractor to review the Project documents in order to make its own determination as to the appropriate level of PPE for its personnel and subcontractors, as well as applicable action levels for use of more protective PPE. At a minimum, Level D PPE consists of the following:

- Coveralls or long sleeve shirts and long pants, unless otherwise directed by the SSO;
- Outer protective work gloves at a minimum for all hazardous or potentially hazardous material handling activities that may occur during Site activities;
- As a conservative measure, workers that may routinely come into contact with groundwater (e.g., workers in the trench making the utility line connections) will be in poly-coated Tyvek, (Modified Level D) or similar chemical resistant suit, chemical resistant gloves and boots;
- Steel-toed work boots;
- Hard Hat, where appropriate;
- Safety Glasses;
- High visibility outer ware or safety vest; and
- Optionally, as required;
    - Disposable outer boots;
    - Hearing protection; and
    - Chemical Resistant gloves.

Contractors performing intrusive operations into known or potential chromium-impacted areas must address specific air/personal air monitoring requirements for hexavalent chromium in accordance with either 29 CFR 1910.1026 or 29 CFR 1926.1126. Prior to initiating any new Project activity or when there is a change in Site conditions, an additional JHA will be completed. A copy of the JHA form is located in Attachment 1. Personal Protective Equipment requirements are provided in Table 9-1, below.

Table 10-1: Personal Protection Equipment Requirements

PPE Level	Ensemble Components	Anticipated Use
Level D		
Will be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.	■ Long pants and shirt with sleeves. ■ Safety-toed footwear. ■ Safety glasses with molded side shields. ■ Hard hat. ■ Work gloves ■ Hearing protection if hazard is present	■ Demolition of concrete structures and asphalt paving. ■ Excavation, temporary stock pile and transportation of soils. ■ Installation of clean fill, aggregates, and synthetic materials. ■ Installation of utilities in clean fill area. ■ Air monitoring. ■ Backfill and surface grading. ■ Pile driving. ■ Concrete forming. ■ Dewatering.

PPE Level	Ensemble Components	Anticipated Use
Modified Level D		
	Level D and the following: ■ Disposable poly-coated Tyvek coveralls. ■ Safety-toed rubber boots or disposable boot covers over shoes. ■ Thin nitrile gloves. ■ Green nitrile gloves over thin nitrile gloves when primary gloves may tear or puncture.	Any of the above-referenced tasks in which there is moderate potential for skin contact with chromium impacted soil and/or water and for all activities involving direct contact with chromium impacted soils located beneath the multimedia cap.
Level C		
Will be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.	Level D or Modified Level D and the following: ■ Full-face air purifying respirator with combination dust organic vapor cartridges at least rated N-100 or better. If second action level surpassed ■ Half-face air purifying respirator with combination dust organic vapor cartridges at least rated N-100 or better. If first action level surpassed	Any of the above-referenced tasks in which there is moderate potential for skin contact with chromium soil and air monitoring data indicate a need for respiratory protection.
Level B		
Will be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed.	Not anticipated to be required	Tasks requiring Level B PPE are not anticipated during this Project. If Level B PPE is needed, as determined by the SSO and/or the Project Health and Safety Coordinator, the CHASP will be revised.
Level A		
Will be worn when the highest level of respiratory, skin, and eye protection is needed.	Not anticipated to be required	Tasks requiring Level A PPE are not anticipated during this Project. If Level A PPE is needed, as determined by the SSO and/or the Project Health and Safety Coordinator, the CHASP will be revised.

11. RESPIRATORY PROTECTION

The type of respiratory protection required will be based on the results of ambient air monitoring, the results of any models used to predict ambient air concentrations, and the professional judgment of either the SSO or the Project Health and Safety Coordinator (HSC). Respiratory protection requirements are outlined on Table 10-1.

As required by 29 CFR 1910.134, *Respiratory Protection*, a cartridge change-out schedule will be developed based on either the results of ambient air monitoring, the results of any models used to predict ambient air concentration or the professional judgment of the Project HSC. The Site-specific dust action levels utilized for this HSG were previously established for the Exelon Project and were approved by the USEPA and MDE.

The Site soil data indicates that the soil CrVI concentration presents conditions requiring exposure monitoring for the Project during intrusive activities. Construction air monitoring is described in the Construction Air Monitoring Plan (CAMP). The action levels in the CAMP, which reflect those established during the Exelon Project, are more conservative than the OSHA requirements and as such are protective of both perimeter receptors and those workers involved in intrusive work on the Project. Exceedance of an action level requires augmenting dust suppression activities at the Project. Section 13 presents additional discussion on air monitoring and action levels.

12. DECONTAMINATION PROCEDURES

Decontamination involves the orderly controlled removal of contaminants from both personnel and equipment. The purpose of decontamination procedures is to prevent the spreading of contaminated materials into uncontaminated areas. All Site personnel will limit contact with contaminated soil, groundwater or equipment in order to reduce the need for extensive decontamination. Decontamination only applies to Site personnel and equipment that contact contaminated media.

12.1 Equipment Decontamination

All contaminated tools and equipment will be decontaminated within the Project LOD using appropriate methods. The Project DDP established a sealed container area/decontamination pad.

Dry decontamination procedures will consist of thoroughly brushing or wiping down tools and equipment. Wet decontamination will consist of thoroughly scrubbing and cleaning tools with a designated cleaning solution. All wipes, pads or towels will be containerized. All decontamination fluids will be drummed and temporarily stored within the limits of the sealed container storage area shown in the drawings prepared for the DDP for proper off-Site disposal.

Equipment and materials used in the decontamination process may include the following:

- High pressure/hot water cleaning using only potable water/fire water;
- Phosphate-free detergent;
- Five-gallon bucket;
- Potable water;
- Distilled water;
- Paper towels; and
- Brushes.

12.2 Personnel Decontamination

Decontamination is required for all workers exiting a contaminated area. Personnel may re-enter the Support Zone only after undergoing the decontamination procedures. Personnel will remove all contaminated PPE and containerize it in drums. All work boots will be decontaminated using a secured boot brush mounted over disposable plastic sheeting. All personnel will remove any inner clothing that is contaminated and redress. All personnel must wash face and hands before taking breaks, eating and at the end of the work shift. All PPE and wash water drums will be disposed properly.

Emergency decontamination for a life threatening medical emergency will consist of removal of the victim's outer protective clothing or equipment to the extent where life-saving procedures/medical treatment can be performed. Final decontamination can be postponed until emergency medical attention is received. The emergency medical personnel must be advised of the potential contamination.

13. AIR MONITORING

The potential exposure pathways of concern are incidental inhalation, ingestion or dermal contact with chromium, CrVI and PAHs from soil, debris, or dust. Therefore, measures will be followed during soil and debris handling to eliminate the potential exposure pathway. Particular attention to dust suppression activities will be required if COPR be encountered.

13.1 Procedures

Based on the Site characteristics and nature of the Project, the potential exposure pathway of concern is incidental ingestion, inhalation, or dermal contact via airborne dust. Air monitoring for particulates will be performed during specific construction-related activities at the Project, pursuant to the CAMP. As discussed in the CAMP, real-time air monitors (RAMs) will be used for evaluating particulate concentrations around the Project perimeter (Figure 2) during specific intrusive construction activities and at the work zone in Area 1 under certain conditions.

Based on the RAMs, dust suppression measures will be followed when elevated dust levels occur, or Project activities may be shut down temporarily. The CAMP will be consulted for additional details regarding air monitoring procedures, sampling and analysis methods, response procedures, reporting, etc. The Project Material Handling and Management Plan (MHMP) describes best management practices (BMPs) to be implemented at the Project for dust control

13.2 Action Levels

Action levels have been established in the CAMP, and reflect the Project environmental characteristics as well as prior construction activities on the overall Harbor Point Site, specifically for the Exelon Project. For this Project, the fixed perimeter air monitors (when required) will be set to trigger an audible alarm at a PM_{10} concentration of 150 micrograms per cubic meter ($\mu g/m^3$). This value is equivalent to the National Ambient Air Quality Standard and is 1/100th of the OSHA nuisance dust standard of 15 milligrams per cubic meter (mg/m^3); therefore, this value is highly conservative. The approximate threshold for visible dust is 1 mg/m^3.

At the work zone in Area 1, the mobile work zone air monitor (when required) will be set to trigger an audible alarm at a PM_{10}concentration of 68 $\mu g/m^3$. The work zone action level maybe adjusted based on certain weather conditions. The CAMP provides additional details regarding air monitoring procedures, sampling and analysis methods, response procedures, reporting, etc.

If an alarm is triggered, dust control measures will be implemented in accordance with the CAMP. Follow-up steps may be necessary if dust control measures are not successful in reducing the dust levels, as discussed in the CAMP, potentially including an upgrade to Level C PPE with respirators.

Using the previously detected on-Site soil concentrations, the OSHA Permissible Exposure Limits (PELs) for CrVI or other detected compounds may only be exceeded if the nuisance dust PEL is exceeded by several to many orders-of-magnitude. Therefore, these action levels provide a highly conservative guideline for air monitoring. The real-time total particulate air monitoring is being performed as a surrogate for chromium monitoring.

14. THERMAL STRESS

14.1 Heat Stress

Heat stress is caused by a combination of factors such as temperature, humidity, type of work being performed, and use of personal protective equipment including protective clothing. Heat stress tends to increase body temperature, heart rate, and sweating. The key to preventing heat stress is education of personnel relative to the hazards associated with working in the heat and implementation of proper controls and work practices. Table 14-1 summarizes heat stress disorders and prevention/first aid issues.

When the temperature is above 80º Fahrenheit (F), the SSO will monitor both the temperature and the humidity throughout the day in order to determine the Heat Index. The National Weather Service has developed a Heat Index that combines the ambient temperature and humidity into a value that reflects how hot it really feels. This Heat Index can be used to determine the risk associated with working outdoors during the hot months of the year. To use the heat index chart (Table 14-2), read the temperature at the left and humidity across the top, the Heat Index is where the two intersect. For example, with a temperature of 96 and a humidity of 50%, the Heat Index is 108.

The SSO will also inform Site workers when the Heat Index Risk Level, as defined on Table 14-3, reaches Danger and/or Extreme Danger; the following additional precautions may be implemented at the discretion of the SSO based on factors such as use of Tyvek coveralls and the physical activity associated with each task. The following actions or work practices will be implemented, as practical, as part of the Heat Stress Management Program:

- Designated areas will be used for Site workers to take breaks and for eating;
- If possible, physically demanding and strenuous tasks may be scheduled for the cooler parts of the day;
- Site workers will be required to drink 6-8 ounces of cool water or electrolyte replacement drinks every 60 minutes. Diabetics must use caution when using electrolyte replacement drinks to replenish fluids as these drinks may have high sugar content;
- Site workers taking prescription medications must check with their doctor or other medical professional regarding the interaction between working in hot environments and their medications;
- SSO will more closely observe Site workers, especially those working in Tyvek coveralls or performing strenuous job tasks;
- Implement worker rotation during strenuous or physically demanding job tasks; and
- SSO will implement a work-rest cycle.

Table 14-1: Heat Stress Disorders

Disorder	Symptoms	Cause	Prevention/First Aid
Heat Rash or Prickly Heat	■ Rash ■ Itching	■ Hot, humid conditions ■ Sweat doesn't evaporate easily ■ Sweat ducts become clogged	■ Ointments ■ Keep skin clean and dry ■ Good daily personal hygiene
Heat Cramps	■ Sudden onset of muscle cramps usually in legs or arms ■ Hot, moist skin ■ Normal pulse ■ Normal or slightly elevated temperature	■ Loss of water (sweating) ■ Loss of electrolytes ■ Replacing water but not electrolytes	■ Move into shade ■ Loosen clothing ■ Drink tepid electrolyte drinks or water ■ Seek medical assistance if conditions persist
Heat Exhaustion	■ Pale, clammy skin ■ Profuse perspiration ■ Thirst from dehydration ■ Weakness ■ Headache ■ Nausea ■ Loss of coordination	■ Overexertion ■ Excessive loss of water and electrolytes	■ Move into shade ■ Remove PPE ■ Loosen street clothing ■ Cool by applying damp cool compresses or ice packs ■ Drink tepid electrolyte drinks or water ■ Summon medical assistance
Heat Stroke	■ Elevated temperature (>103F) ■ Flushed, hot, dry skin ■ Absence of sweating ■ Delirious ■ Rapid pulse ■ Nausea ■ Headache ■ Dizziness ■ Unconsciousness	■ Failure of body's cooling (sweating) mechanism	■ **Summon medical assistance immediately** ■ Move to shade ■ Remove PPE ■ Loosen street clothing ■ Cool by fanning or applying damp compress or ice packs

Table 14-2: Heat Index Chart

Temperature (F)	Relative Humidity (%)													
		40	45	50	55	60	65	70	75	80	85	90	95	100
	110	136												
	108	130	137											
	106	124	130	137										
	104	119	124	131	137									
	102	114	119	124	130	137								
	100	109	114	118	124	129	136							
	98	105	109	113	117	123	128	134						
	96	101	104	108	112	116	121	126	132					
	94	97	100	102	106	110	114	119	124	129	136			
	92	94	96	99	101	105	108	112	116	121	126	131		
	90	91	93	95	97	100	103	106	109	113	117	122	127	132
	88	88	89	91	93	95	98	100	103	106	110	113	117	121
	86	85	87	88	89	91	93	95	97	100	102	106	108	112
	84	83	84	85	86	88	89	90	92	94	96	98	100	103
	82	81	82	83	84	84	85	86	88	89	90	91	93	95
	80	80	80	81	81	82	82	83	84	84	85	86	86	87

Table 14-3: Heat Index Risk Level and Associated Health Effects

Heat Index	Associated Risk
>130	*Extreme Danger* Heat stroke highly likely with continued exposure
105-130	*Danger* Heat exhaustion and heat cramps likely and heat stroke possible with prolonged exposure and/or physical activity
90-105	*Extreme Caution* Heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
80-90	*Caution* Fatigue possible with prolonged exposure and/or physical activity

Notes:
1. Heat Index values were devised for shady, light wind conditions. Exposure to full sun may increase these values by up to 15º.
2. Heat Index values were devised for the general public wearing typical lightweight summer clothing. Acclimatized workers may be able to work under conditions with a slightly higher Heat Index.
3. The use of personal protective equipment, including clothing increases the heat stress load on the body.

The work-rest cycle outlined below may be implemented based on the professional judgment of the SSO and/or the Project Health and Safety Coordinator.

Table 14-4: Work-Rest Cycle

Heat Index	Risk Level	Work-Rest Cycle
> 130	Extreme Danger	15 minute break every 30 minutes
105-130	Danger	15 minute break every 60 minutes
90-105	Extreme Caution	15 minute break every 90 minutes
80-90	Caution	15 minute break every 120 minutes

14.2 Cold Stress

Cold stress situations may be encountered at the Site. If lower than normal temperatures (i.e., less than 35 degrees [º] Fahrenheit [F]) are forecasted, the following information will be utilized. Most cold related worker fatalities have resulted from failure to escape low environmental air temperatures, or from immersion in low temperature water. The two most prominent adverse effects from exposure to cold temperatures are frostbite and hypothermia. A person qualified in first aid or a professional medical provider would administer treatment for cold related injuries. The single most important aspect of life-threatening hypothermia is a drop in the deep-core body temperature. Response to cold stress will be based on Cold Stress section of the ACGIH TLV booklet.

14.2.1 Frostbite

Frostbite occurs when the extremities do not get sufficient heat from the central body stores. The fluids around the cells of the body tissues freeze from exposure to low temperatures. This condition can result in damage to, and loss of, tissue. The most vulnerable areas are the nose, cheeks, ears, fingers, and

toes. Damage from frostbite can occur in either the outer layers of skin or in the tissue beneath these layers and can be serious, resulting in scarring, tissue death, permanent loss of movement, or amputation.

14.2.2 Hypothermia

This is the most severe form of cold stress and results from a drop in the body's core temperature. Hypothermia can occur in relatively mild temperatures if there is a wind and the person's clothing becomes wet. The symptoms of hypothermia are:

- First, uncontrollable shivering and the sensation of the cold;
- Heartbeat slows and may become irregular;
- Pulse weakens and blood pressure changes;
- As the body's core temperature drops, other signs may include cool skin, slow irregular breathing, and apparent exhaustion;
- When core temperatures are in the mid-range, the victim may become listless, confused, exhibit severe shivering, or develop severe pain in the extremities; and
- Final signs are a significant drop in blood pressure, fatigue, and shallow respiration.

14.2.3 Control Measures for Cold Stress

Worker comfort will be monitored and increased layers of PPE or modesty clothing worn under the PPE may be required to minimize cold stress for those persons working inside a building. For those workers performing tasks outside a building when ambient temperature falls below 36ºF, the following guidelines will be used:

- If wind chill is a factor, shielding the work area or providing employees an outer windbreak layer garment will reduce the cooling effect of the wind;
- Extremities, ears, toes, and nose will be protected from extreme cold by protective clothing;
- Employees performing light work and whose clothing may become wet will wear an outer layer of clothing that is impermeable to water;
- Employees performing moderate to heavy work and whose clothing may become wet will wear an outer layer of clothing that is water repellent; and
- Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat.

Workers who become immersed in water or whose clothing becomes wet will immediately be provided a change of clothing and be treated for hypothermia if necessary. If the clothing becomes wet from sweating, the employees may finish the task that caused the sweating before changing into dry clothes. Metal handles of tools and control bars will be covered by thermal insulating materials when temperatures fall below 30ºF. Whenever a Site becomes covered with snow or ice, eye wear providing employees' protection against ultraviolet light, glare, and blowing ice crystals shall be worn.

When conducting work in air temperatures below 35º F, the following practices shall be followed:

- If the clothing of an employee is expected to become wet, the outer layers of clothing must be impermeable to water;
- If an employee's underclothing becomes wet it must be changed immediately. If the clothing becomes wet from sweating, the employee may finish the task that caused the sweating before changing into dry clothing;

- Employees will be provided a warm area (65º F or above) to change from work clothing into street clothing and for breaks;
- Hot liquids, such as soups, warm drinks, etc. shall be provided in the break area. The intake of caffeine containing products shall be discouraged due to their diuretic and circulatory effects;
- If appropriate, approved space heaters may be provided in the work area to warm the hands, feet, etc.;
- The buddy system shall be practiced. Any employee observed with signs of cold stress shall immediately proceed to the break area;
- Employees will be reminded to layer their clothing, i.e., wear thinner, lighter clothing next to the body with heavier clothing layered outside the inner clothing;
- Avoid overdressing when going into warm areas or when performing activities that are strenuous. This could potentially lead to heat stress situations;
- Auxiliary heated versions of hand wear, footwear, etc., can be used in lieu of mittens, insulated socks, etc. if extremely cold conditions exist;
- Employees handling liquids with high evaporation rates (gasoline, hexane, alcohol, etc.) shall take special precautions to avoid soaking of clothing with the liquids because of the added danger of cold injury caused by evaporative cooling;
- Work shall be arranged in such a way that sitting still or standing for long periods is minimized; and
- If the air temperature is 20º F or below the hands shall be protected by mittens or gloves prior to contact with cold surfaces such as metal, etc.

Air temperature is not the only factor to be considered while evaluating cold stress situations. Wind chill cooling rate and the cooling power of air are critical factors. The higher the wind speed the greater the risk of experiencing cold related injuries. For exposed skin, continuous exposure will not be permitted when the air speed and temperature result in an equivalent chill temperature of –25º F or less.

15. SAFE WORK PRACTICES AND STANDARD OPERATING PROCEDURES

15.1 General Safe Provisions

For Contractor convenience, key regulations (including construction-related regulations) that may apply to the Project activities are listed below. Contractors are responsible for ensuring that their CHASP address the issues and regulations applicable to their respective scopes of work for the Project:

- Hazardous Waste Site Operations (29 CFR 1910.120);
- Construction Activities (29 CFR 1926);
- Hazard Communication (29 CFR 1910.1200 & 29 CFR 1926.59);
- Personal Protective Equipment (29 CFR 1920.132 & 29 CFR 1926.95)
- Fire Protection (29 CFR 1910.39 & 29 CFR 1926.150);
- Excavations (29 CFR 1926 Subpart P);
- Powered Hand Tools (29 CFR 1910.242 & 29 CFR 1926.301);
- Electrical Safety (29 CFR Subpart S & 29 CFR 1926.400-449);
- Fall Protection (29 CFR 1926 Subpart M);
- Walking Working Surfaces (29 CFR 1910.22)'
- Welding (29 CFR 1910.251 & 29 CFR 1926.350-354);
- Earthmoving Equipment (29 CFR 1926.602);
- Hazardous Energy Control (29 CFR 1910.147);
- Sanitation (29 CFR 1926.51);
- Scaffolding (29 CFR 1910.28 &29 CFR 1926.450-454);
- Confined Space Entry (29 CFR 1910.146):
- Occupational Noise Exposure (29 CFR 1910.95);
- Eye and Face Protection (29 CFR 1910.133); and
- Respiratory Protection (29 CFR 1910.134).

15.1.1 Smoking and Eating Areas

Smoking will only be allowed in designated areas. Upon mobilization at the Site, the SSO will establish smoking areas per Site-specific or client-specific requirements. Individuals caught smoking outside the designated smoking areas will be subject to disciplinary action up to and including immediate termination.

Upon mobilization at the Site, the SSO will establish eating and break areas per Site-specific requirements. Eating will only be allowed in the designated areas and the areas will be maintained in a clean and sanitary condition.

15.1.2 Sanitation and Potable Water

Containers used for drinking water will be equipped with a tap and capable of being tightly closed. In addition, the container will be labeled as "Drinking Water" or "Potable Water." Disposal cups will be stored in a sanitary condition and a receptacle for disposing of the cups will be near-by.

Potable and non-potable water containers and portable toilets (if used) will comply with OSHA 29 CFR 1910.141 requirements.

15.1.3 Temporary Facilities

All temporary facilities will be maintained in a clean and sanitary condition to discourage the entrance of rodents or vermin. If rodents or vermin become an issue, the SSO will be responsible for implementing an extermination program per Site-specific or client-specific guidelines.

Trailers and other temporary structures used as field offices or for storage will be anchored with rods and cables or by steel straps to ground anchors. The anchor system will be designed to withstand winds and must meet applicable state or local regulations for the anchoring of mobile trailer homes. Use of standard anchoring systems to anchor structures is not permitted in Area 1 due to potential damage to the MMC. Methods designed to avoid impacting the MMC will be used to secure structures.

15.1.4 First Aid Station

A designated area must be readily accessible to employees. Signs will be posted indicating the location for the first aid station and name of designated first aid provider(s). The sign will be in the form of a symbol that does not require workers to have language skills to understand.

15.1.5 Eye Wash Stations

The location of each eyewash station must be identified with a highly visible sign. The sign will be in the form of a symbol that does not require workers to have language skills to understand it. Eye wash stations must be inspected monthly.

16. STANDARD OPERATING PROCEDURES

The following standard operating procedures will be adhered to at all times:

- All personnel entering the Site must check in with the SSO.
- All individuals entering the Site must demonstrate to the SSO that they have been adequately trained as defined in Section 4.
- All individuals must be familiar with emergency communication methods and how to summon emergency assistance.
- Use of alcoholic beverages before, during operations, or immediately after hours is absolutely forbidden. Alcohol can reduce the ability to detoxify compounds absorbed into the body as the result of minor exposures and may have negative effects with exposure to other chemicals. In addition, alcoholic beverages will dehydrate the body and intensify the effects of heat stress.
- Horseplay of any type is forbidden.
- All unsafe conditions will be immediately reported to the SSO, who will document such conditions in the field log. The SSO will be responsible for ensuring that the unsafe condition is corrected as quickly as possible.
- No smoking, eating, chewing gum or tobacco, taking medication, or applying cosmetics in the Contamination Reduction Zone or the Exclusion Zone. Wash hands and face thoroughly prior to conducting the activities in the Support Zone.
- Smoking, matches, and lighters are only allowed in the designated smoking area.
- Avoid contact with potentially contaminated substances. Avoid, whenever possible, kneeling on the ground, or leaning or sitting on trucks, equipment or the ground. Do not place equipment on potentially contaminated surfaces.
- If PPE becomes torn or saturated with contaminated material, immediately leave the Exclusion Zone, go through the decontamination steps, and replace the affected PPE. Additionally, wash any exposed skin thoroughly with soap and water.

17. SAFE WORK PRACTICES

17.1 Pre-Excavation

Prior to mobilizing to the field, the Project Manager will be responsible for ensuring a Subsurface Clearance Checklist is followed, including verifying that the following issues have been adequately addressed:

- Contacting the Maryland One-Call utility locator service to identify underground pipelines, utility lines, and fiber optic cable;
- Contacting appropriate municipality to identify underground water and sewer lines;
- Contacting posted pipeline companies;
- Contacting client to identify underground pipelines or other obstructions; and
- Notifying Honeywell, the MDE and the USEPA that excavation to the geosynthetic layers, or through the geosynthetic layers, is about to occur. The anticipated date of the beginning of excavation will also be provided.

17.2 Fall Protection

In the event that Project team members and/or subcontractors are working more than six feet above grade and are not protected by handrails, complete floor decking or working on approved access ways, fall protection equipment will be required.

The distance above grade is measured from the employee's feet to the grade or approved work surface. Fall protection equipment will consist of an ANSI-approved full-body harness and shock-absorbing (or retractable) lanyard with double-locking d-rings.

Acceptable anchor points to which the lanyard may be attached includes, but are not limited to, the following:

- Structural beams at least six-inches in depth for one or more persons in a completed structure;
- Pipes at least four-inches in diameter for one person;
- Pipes at least six-inches in diameter for two people;
- Nozzles at least three-inches for one person;
- Nozzles greater than three-inches for two people; and
- Permanent platform handrail post below mid-rail for one person.

17.3 Weather-Related Events

Weather-related events that may impact field work include, but are not limited to, rain, thunder, lightning, flash flooding, high winds and tornados. The SSO will be responsible for determining what Site work can be performed safely in the rain and at what point work will cease due to either quality or safety issues. In the event of thunder and/or lightning, all work will be suspended until 15 minutes have elapsed from the last clap of thunder or flash of lightning.

17.3.1 Lightning Safety for Outdoor Workers

Lightning is present in all outdoor work environments, and SAFETY FIRST must be exercised, anticipating a high-risk situation that demands relocation to a low-risk location. Lightning safety awareness is therefore a priority at every outdoor facility and operation. Education is the single most important means to achieving lightning safety. The following steps are suggested:

- Monitor weather conditions in the early morning hours. Local weather forecasts -- from The Weather Channel or NOAA Weather Radio or other notably reliable source -- will be noted 24 hours prior to scheduled activities. An inexpensive portable weather radio is recommended for obtaining timely storm data.
- Suspension and resumption of work activities will be planned in advance. Understanding of SAFE shelters is essential. SAFE evacuation sites include:
  - Fully enclosed metal vehicles with windows up;
  - Substantial buildings;
  - Low ground -- seek cover in clumps of bushes; and
  - Trees of uniform height, such as a forest.
- UNSAFE SHELTER AREAS include all outdoor metal objects, like power poles, fences and gates, high mast light poles, metal bleachers, electrical equipment, mowing and road machinery. AVOID solitary trees. AVOID water. AVOID open fields. AVOID high ground and caves.
- Lightning distance may be calculated: If thunder is heard, the associated lightning is within audible range ... about 6 to 8 miles away. The distance from Strike A to Strike B also can be 6 to 8 miles. This is a rule-of-thumb and may vary. In this case, suspend activities, allowing sufficient time to get to shelter. A good lightning safety motto is:

  If you can see it (lightning), flee it; if you can hear it (thunder), clear it.
- If an individual feels hair standing on end, and/or hears "crackling noises," a lightning electric field is present. If caught outside during close-in lightning, immediately remove metal objects (including baseball cap), place your feet together, duck your head, and crouch down low in baseball catcher's stance with hands on knees.
- Wait a minimum of 30 minutes from the last observed lightning or thunder before resuming activities. Be extra cautious during this phase as the storm may not be over.
- People who have been struck by lightning do not carry an electrical charge and are safe to handle. Apply first aid immediately if you are qualified to do so, and get emergency help promptly.

During rain, lightning and/or thunder events, Site workers will seek shelter in either a building or vehicle. In the event of a tornado, Site workers will seek shelter in a building, except trailers, or in a low-lying area.

17.3.2 Noise

Employees performing any noise-creating task, such as but not limited to operating heavy equipment, using power tools, or employees working nearby the person performing the task will wear hearing protection consisting of either earplugs or earmuffs. Personnel operating heavy equipment, such as pile driving equipment and excavators with hoe-ram attachments will also wear hearing protection. Hearing protection will be used as directed by the Contractor SSO, however a general rule-of-thumb is that hearing protection must be worn if normal speech cannot be understood within an arm’s length of the person talking.

18. CONFINED SPACE ENTRY PROCEDURES

Entry into existing confined spaces is strictly forbidden by untrained personnel and without a confined space permit issued by the SSO. If a Project task or activity involves entry into a permit-required confined space or if there is a question as to whether or not a job task or activity involves a permit-required confined space, the work will not proceed until the Contractor's PM or SSO contacts the Contractor HSC for assistance.

19. SPILL CONTAINMENT PROGRAM

The spill containment program for this Project will involve the use of preventative measures in order to reduce the potential for environmental releases. These preventative measures will include the following:

- Equipment inspection;
- Staging equipment on containment pads;
- Secondary containment for fuel storage tanks;
- General housekeeping practices; and
- Appropriately sized and stocked spill/release kits/containers.

If Project activities involve the use of drums or other containers, the drums or containers will meet the appropriate U.S. Department of Transportation (DOT) regulations and will be inspected and their integrity assured prior to being moved. Operations will be organized so as to minimize drum or container movement. Drums or containers that cannot be moved without failure will be over-packed into an appropriate container. Additionally, refer to the Project-specific Spill Prevention and Response Plan (SPRP) prepared as part of the DDP.

20. SITE COMMUNICATION

Telephones and two-way radios will be used for communication between the Project team and the Developer and its consultants. Cell phones may be used as part of the communication method; however, cell phones cannot be used while driving any type of vehicle.

21. EMERGENCY RESPONSE PLAN

This section describes possible contingencies and emergency procedures to be implemented at the Site. Pre-emergency planning consists of this emergency response plan, assigning emergency functions to on-Site personnel, training of personnel as necessary, and ensuring that emergency procedures and equipment are in place. Such emergency equipment will include, at a minimum, first aid supplies, fire extinguishers, a non‐phosphate soap and water solution and potable water rinse, and potable water for eye washing.

21.1 Personnel Roles and Lines of Authority

The Contractor SSO has primary responsibility for Site evacuation and notification in the event of an emergency situation. This includes taking appropriate measures to ensure the safety of Site personnel and the public. Possible actions may involve the evacuation of personnel from the Site area and ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. If the SSO is not available, the Project Health and Safety Coordinator will assume these responsibilities. Subcontractors are responsible for assisting the SSO in their mission within the parameters of their scope of work.

21.2 Evacuation Routes and Procedures

In the event of an emergency, it is important to be aware of the prevailing wind direction and evacuate upwind or crosswind.

21.3 Assembly Points

The Contractor shall identify primary and secondary Assembly Points for its staff in the event of an emergency. For example, the primary Assembly Point could be in front of the construction trailer. In the event of an emergency requiring evacuation to an Assembly Point, the Contractor SSO will be responsible to account for the presence of all Project team members and subcontractors on-Site at the time of the emergency.

22. EMERGENCY RESPONSE

If an employee working in a contaminated area is injured, first - aid procedures will be followed, and if necessary, the injured person will be transported to the nearest medical facility. Some common first-aid procedures are summarized below; however, these will be considered general recommendations, only.

- Eye Exposure – Wash the eyes immediately at the emergency eyewash station for at least 15 minutes, using large amounts of water and lifting the lower and upper lids occasionally to help flush the eye. Do not rub eyes or keep eyes tightly closed. Obtain medical attention immediately.
- Skin Exposure – Use copious amounts of soap and water to wash/rinse the affected area thoroughly, then provide appropriate medical attention. For reddened or blistered skin, consult a physician.
- Ingestion – Do not induce vomiting. Call poison control center or seek medical help.
- Inhalation – Move the person to fresh air. If breathing has stopped, perform artificial respiration. Obtain medical attention as soon as possible.

22.1 Notification of Site Emergencies

The Contractor must have systems in place for responding to all emergencies. The written CHASP will identify potential emergencies associated with the Project and describe methods anticipated to perform the following:

- Notify appropriate individuals, authorities, and/or health care facilities of the Site activities and anticipated duration prior to the mobilization of equipment;
- Ensure that, at a minimum, the following safety and monitoring equipment is available at the Site: first aid supplies, fire extinguishers, a non-phosphate soap and water solution and potable water rinse, and potable water for eye washing;
- Ensure that a sufficient number of cellular telephones are present during Site activities for emergency response and office communications. If deemed appropriate by the SSO or HSC, two-way radios may also be used on Site for communication among workers;
- Have working knowledge of all safety equipment available at the Site;
- Ensure that a map, which details the most direct route to the nearest hospital, is readily available with the emergency telephone numbers; and
- The CHASP shall contain a list of emergency response telephone numbers. This list will be maintained at the work Site by the SSO or his designee in a readily accessible location for use in case of an emergency.

22.2 Directions to the Nearest Hospital

The CHASP will include a map and written directions to the Johns Hopkins Hospital Emergency Entrance located at 1800 Orleans Street, Baltimore, Maryland. The SSO will identify Site egress routes during the daily briefing prior to commencement of that day's work. A map depicting the hospital and route is presented in Attachment 2.

23. EVACUATION PROCEDURES

Where Site evacuation could possibly be a health and safety consideration, the CHASP must define the primary evacuation route and also identify an alternate evacuation route based on the scheduled Site operations. The two routes will be established independent of each other in the event of an obstruction on a particular route. A system will be in place to ensure that employees can easily evacuate the work area. It is recommended that daily evacuation routes will be reviewed with Site workers at the start of each day.

24. INCIDENT REPORTING PROCEDURE

In the event that a health and safety incident occurs, it is imperative that specific reporting procedures be followed so that appropriate corrective action can be taken by the HSC and the PM for the duration of the Project. The CHASP must define methods by which accidents are reported, investigated, and prevented in the future. It is recommended that the Contractor Project Manager and the HSC investigate the Site conditions to determine: (1) the severity of the incident; (2) the cause of the incident; (3) the means to prevent the incident from recurring; and, (4) personnel responsible for implementing the corrective action.

The following additional personnel shall be identified in the CHASP and notified within a reasonable timeframe, but this will be no later than 1 hour after any incident.

- Jonathan Flesher, HPD, (cell: 443-463-3937;
- Bryn Hansen, Jacobs, (cell:410-404-9111);
- Bob Steele, Jacobs (cell: 609-625-1780);
- Mary Reif, Jacobs (cell: 703-628-6715); and
- George Pfeiffer, Honeywell (cell: 908-791-0897).

The CHASP will include an incident reporting form so that consistent and appropriate information is obtained regarding employee exposures or accidents. The form will be filed at the Contractor's office with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

25. INCIDENT INVESTIGATIONS

All safety events, including incidents, will be recorded and documented within 24 hours of an incident. All incidents will be reported to Matt Gillis and investigated in a timely manner. Incidents will require entry into the Honeywell Event Tracking System by Jacobs, consultant to Honeywell at the Site. The Safety Team will schedule the investigation and include the SSO, the Project Manager, Project supervision (subcontractors, and client), the injured/involved employee(s) and the Project Health and Safety Coordinator. Root cause analysis will be performed to assess the apparent cause and identify corrective measures to be implemented to prevent re-occurrence. The last page of the Incident Form is used to document the investigation.

26. MATERIAL SAFETY DATA SHEETS

Sample Material Safety Data Sheets (MSDSs) for the notable Project contaminants are presented in Attachment 3. The CHASPs will include the MSDSs and any other hazardous chemicals brought to, used, stored, or otherwise identified at the Site in conjunction with the Project.

27. ON-SITE HEALTH AND SAFETY LOG BOOK

The Contractors SSO or designee will maintain an on-Site health and safety log book in which daily Site conditions, activities, meetings, personnel, and significant events will be recorded by the Contractor. Calibration records and personnel monitoring results, if available, will also be recorded in field log book. The original log book will be maintained by the Contractor. Attachment 4 includes a daily meeting summary form.

28. CERTIFICATION OF FAMILIARITY WITH PLAN BY SITE PERSONNEL

By signing below, signee certifies that they have read, understand and will abide by the contents of this HASP.

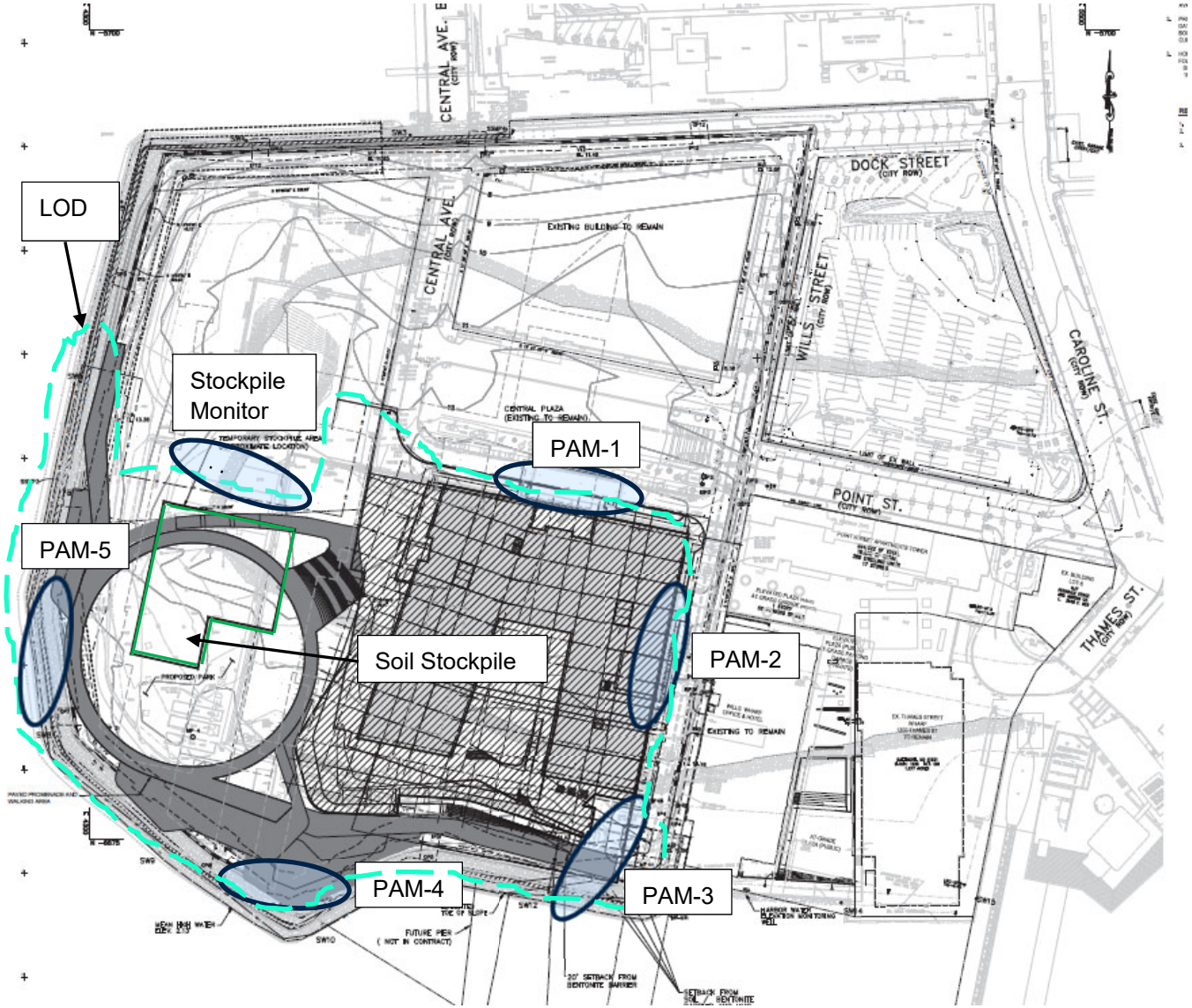
Name	Signature	Company	Date

FIGURES

Figure 1
Site Location Map
Harbor Point
Baltimore, Maryland

1 – Area 1: Exelon Headquarters
2 – Area 2: Thames Street Wharf and Wills Wharf Office Buildings
3 – Area 3: Point Street Apartments

Figure 2 – Construction Perimeter and Air Monitoring Stations



ATTACHMENT 1 JOB HAZARD ANALYSIS FORM

ERM

JHA
Job Hazard Analysis

Project Number:	add	Project / Client Name:	add
Project Manager:	add	Location:	add
Partner-in-Charge:	add	Date and Revision Number:	add

SPECIFIC TASK:	**add**

Minimum Required PPE for Entire Task:	☐ Hard Hat ☐ Safety-Toe Shoes ☐ Hearing Protection ☐ Goggles ☐ Face Shield ☐ Respirator <enter type and cartridge type> ☐ Other (specify): ☐ Safety Glasses ☐ Reflective Vest ☐ Gloves <enter type here> ☐ PPE clothing <enter type here (eg, Tyvek, FRC, long sleeves)> <enter additional PPE here>		
Additional Task-Step Specific PPE: (as indicated below under Controls)	add	Equipment / Tools Required:	Include monitoring equipment, hand tools, powered equipment, etc.
Training Required for this Task:	Include regulatory, client, ERM training requirements	Permits Required for this Task:	Include both safety permits (eg, LOTO, Hot Work) and environmental permits (eg, drilling permit, NPDES)
Forms Associated with This Task:	add		

JHA Developed / Reviewed By:			JHA Review In Field
Name / Job Title:	Name / Job Title:	Name / Job Title:	Field Safety Officer (FSO) to ensure all personnel performing this task have reviewed JHA and agree to follow it. Site-specific changes to this JHA have been made as warranted based on this review. **FSO Signature/Date:**

Task Steps[1]		**Potential Hazards & Consequences**[2]		select	**Likelihood**	**Severity**	**RISK**	**Controls to Eliminate or Reduce Risks**[3]	
1		1a						1a	
		1b						1b	

Task Steps[1]		Potential Hazards & Consequences[2]		select	Likelihood	Severity	RISK	Controls to Eliminate or Reduce Risks[3]	

ONE JHA PER TASK. SUBCONTRACTORS MUST PROVIDE THEIR OWN JHAS. JHAS SHOULD BE WRITTEN IN PLAIN LANGUAGE AND SHOULD BE NO MORE THAN 2-3 PAGES IN LENGTH.
INSERT ADDITIONAL ROWS AS NEEDED ABOVE (MUST MANUALLY COPY AND PASTE FORMULA IN COLUMN H). ROW HEIGHTS MAY NEED TO BE MANUALLY EXPANDED TO VIEW ALL TEXT.
LEAVE SEVERAL BLANK OVERSIZED ROWS TO ALLOW HANDWRITTEN FIELD ADDITIONS. CAN ALSO DELETE UNNEEDED ROWS TO FIT PAGE(S).

1. Each task consists of a set of steps. List and number all the steps in the sequence they are performed. Specify the equipment or other details.

2. List potential health & safety hazards and consequences - ONE PER ROW - and select "H&S" from the drop-down list. Then list any potential security, environmental, and/or property loss impacts - ONE PER ROW - and select the corresponding code(s) from the drop-down list. Use numbers and letters for each hazard/impact listed (1a, 1b, etc). Hazards should be described in terms of their specific origin and negative consequences (e.g., instead of “moving equipment”, write “injury from getting struck by forklift”).

3. Describe the specific actions or procedures that will be implemented to eliminate or reduce each hazard. Be clear, concise, and specific. Use objective, observable, and quantified terms (e.g., instead of “use good body positioning,” write “don’t bend at waist or reach above head”). Use numbers and letters corresponding to listed hazards.

4. Select the likelihood of occurrence and severity of each hazard, AFTER implementation of the planned control measures (use the Risk Matrix as a guide). The corresponding risk rating will then be automatically calculated [RISK = Likelihood x Severity].

A risk rating shaded red indicates that work cannot continue without additional control measures and approval of Partner-in-Charge.

WAYS TO ELIMINATE OR REDUCE RISKS (IN ORDER OF PREFERENCE):

ELIMINATE / AVOID --> SUBSTITUTE / MODIFY --> ISOLATE --> ENGINEER / SAFEGUARD --> TRAINING AND PROCEDURES --> WARNING AND ALERT MECHANISMS --> PPE

Risk Matrix

ERM

What could go wrong? What is the worst thing that could happen if something goes wrong?

			Hazard Severity				
			1	2	3	4	5
			INSIGNIFICANT negligible or no injury could result	**MINOR** minor injury requiring only first aid	**MODERATE** Injury resulting in lost time could occur	**HIGH** Serious injury or death could occur	**VERY HIGH** multiple deaths could occur
Likelihood	**1**	**VERY UNLIKELY**	1	2	3	4	5
	2	**UNLIKELY**	2	4	6	8	10
	3	**POSSIBLE**	3	6	9	12	15
	4	**LIKELY**	4	8	12	16	20
	5	**VERY LIKELY**	5	10	15	20	25

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Sharp Edges (designate in JHA the specific cut or puncture hazard associated with the task step)	Wear ____ gloves (designate type, e.g. heavy leather, cut-resistant, puncture-resistant). Wear ___ footwear (designate type, e.g. puncture-resistant insoles). Wear ___ clothing (designate type, e.g. long sleeves, heavy coveralls). Have gloves on your person at all times. Employees performing significant amounts of cutting tool use should wear high-visibility gloves to encourage awareness of where hands are being placed. Do not attempt to catch falling tools/equipment. Ensure guards are in place. Use ___ cutting tool (designate type, e.g. scissors, shears, snips). Do not use dull blades. Do not use open-bladed knives. Inspect tools/equipment in area prior to start of task to identify sharp edges and, if possible, remove/protect or position body to ensure no contact during task. Always cut away from hand, body and face. Ensure others are not in line-of-fire when cutting. Place object to be cut in a vise or on a flat surface or use another tool to hold object while cutting. Do not place fingers in ends of piping or other tubular material.
Pinch Points (designate in JHA the specific pinch hazard associated with the task step)	Wear ___ gloves (designate type, e.g. heavy leather, puncture-resistant). Have gloves on your person at all times. Inspect work area prior to start of task to identify pinch points and remove/protect to ensure do not contact during task. Consider body positioning prior to start of task to identify potential pinch points and change position to ensure do not contact during task. Identify pinch points by warning label and/or paint color. Do not position your hand or body so it can be caught between a lifted load and adjacent objects. Do not place fingers/hands between sections of multi-component/moveable items (e.g. fencing sections, sheet piling, hinged panels).
Slips / Trips / Falls from Surface Conditions (designate in JHA the specific slip, trip, fall hazard associated with the task step)	Wear ___ footwear (designate type, e.g. shoes with rubber soles or low heels, crampons). Identify and use only safe pathways and stairs when entering/exiting/working in area. Obtain additional lighting and use clear safety glasses in areas with low/unclear visibility. Inspect work area for potential slip/trip/fall obstructions prior to start of work and remove or, if not possible, mark with highly visible tape/flags, etc. Keep work area organized and free of surface obstructions during task. Immediately dry wet areas or restrict access (e.g. with warning tape, signs, cones). Remove snow/ice prior to start of work. Reassess surface conditions if weather changes and address any new hazards (e.g. slick surface developing as a result of wet/freezing conditions). Do not carry loads that restrict visibility. Do not stack objects higher than ___ (designate height). Ensure steps, walkways and shoes are not slippery or loose prior to use. Keep work area surfaces clear of debris (e.g. mud, leaves) and store tools/equipment to eliminate trip hazards when not in use. Keep eyes on path and nearby surroundings when walking. Take small steps and shuffle feet in potentially slippery areas. Walk slowly around corners and when entering/exiting doors. Use slip-resistant mats. Use handrails when going up/down stairs. Fill in/flatten uneven ground. Use steps/stepladders for access in and out of shallow trenches/excavation.
Fall from Elevated Position (designate in JHA the specific elevated hazard associated with the task step)	Use carts with high sides to contain load. Ensure load is secure and balanced prior to moving. Maintain 3-points of contact when mounting/dismounting vehicle/equipment. Maintain 3-points of contact when climbing/descending ladders. Use equipment/mechanical means (e.g. tool belt, rope) to transport tools/materials. Ensure steps, ladder rungs and shoes are not slippery or loose. Do not stand or work off top of ladder (e.g. top 2 steps of stepladder). Extend ladder at least 3-feet beyond top bearing point. Have another person hold bottom of ladder at all times while working or until top is secured; if ladder is not equipped with grip pads, hold bottom at all times. Position extension ladder at 1 foot distance for every 4 feet of working height. Do not overreach; keep body between ladder rails and both feet on same rung. Wear fall protection when working at a height of 6 feet (1.8 meters) or greater. Wear full body harness with double-locking snap hooks and shock absorbing lanyard. Inspect fall protection prior to use and do not use if: worn or frayed lanyard or webbing/stitching; locking devices, snap hooks, etc. are not working properly; metal components are worn, damaged, or have burrs, etc.; annual inspection tag is not in place and current. Connect to secure anchor point meeting fall protection specifications (capable of supporting 5,000# per person attached, above shoulder height, no sharp edges, etc.). Ensure scaffolding has secured boards, is adequately braced, has a handrail, is free of debris and holes and is in good working condition. Stand only on secured and inspected flooring and uprights. Work only within the scaffolding structure.

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Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Back Sprain/Strain (designate in JHA the specific back sprain/strain hazard associated with the task step)	Use ___ mechanical lifting/carrying device (designate type, e.g. cart, dolly, forklift). Obtain assistance when lifting ____ (designate what, e.g. awkwardly shaped objects) or objects weighing greater than ___ (designate limit). Bend and lift with legs/arms, not back. Keep objects close to body and do not twist while lifting (turn with feet). Position work equipment to avoid over-reaching while working. Do not overload waste containers, fill ___ full (designate volume). When objects are lifted/carried by two persons, take positions on opposite ends. Store heavy/bulky items with safe access in mind. Take regular breaks every ___ (designate frequency).
Suspended Loads/Low-Hanging Objects (designate in JHA the specific suspended load, low-hanging hazard associated with the task step)	Wear hard hat. Wear ___ gloves (designate type, e.g. rubber dot for grip). Wear ___ footwear (designate type, e.g. steel-toe boots; footwear with metatarsal-protection). Do not attempt to catch falling objects. Stay ___ (designate distance) away from raised objects. Restrict access with warning tape and/or posted signs. Secure loose objects prior to lifting or moving by ___ (designate how, e.g. with straps, sideboards, use of panel cart with high sides). Remove low-hanging objects or identify (e.g. mark with highly visible paint, tape, flags) and/or communicate location to site personnel. Visually inspect equipment before beginning task. Verify latest equipment inspection/tag is current before beginning task. Inspect lifting rigging (chains/slings/cables) to ensure in good condition and do not use if defects, signs of excessive wear are identified. Verify lifting equipment is certified and rated for handling the reach and load limits for required work. Use trained spotter(s) to alert others of hazards. Use tag lines held by trained personnel to guide load and do not wrap lines around body parts. Pre-inspect travel route to ensure clearance. Keep load low to ground to ensure clear visibility when transporting. Move load using low, slow, controlled movements.
Rotating / Automated / Energized Equipment (designate in JHA the specific rotating hazard associated with the task step)	Do not work on moving equipment. De-energize all energy sources (e.g. compressed, pressurized) equipment prior to working on. Lock out/tag out equipment per LOTO procedure and verify energy isolation prior to start of task. Employees who perform LOTO must receive authorized employee training. Identify and do not position your hand or body in the potential line-of-fire in the event of unexpected start-up of equipment or release of energy. Ensure protective guards/barricades are in place. Remove/secure loose clothing, hair and jewelry. Keep hands/body/tools ___ (designate distance) away from equipment. Identify automatic-start equipment with signs/labels. Locate emergency stop/shutdown switch prior to start of task. Ensure all associated personnel are notified of work activities. De-energize hand-held and mobile equipment when not in use. Plan work lay-out/processes to avoid and/or minimize line-of-fire risks. Define and barricade personnel exclusion zones based on machine swing areas, area below crane operation, etc.
Vapors, Airborne Debris (designate in JHA the specific vapor, debris or liquid hazard associated with the task step)	Keep area ventilated by ___ (designate how, e.g. with forced draft fans, outside use only). Perform ___ monitoring (designate method and frequency) and stop work if monitoring result ___ (designate limits). Position body upwind. Keep work area wet to limit dust. Set-up work zone to restrict non-essential access and minimize off-site impacts. Wear ___ eye/face protection (designate type, e.g. safety glasses, face shield, splash goggles or combinations). Wear ___ clothing (designate type, e.g. long sleeves, paper suit). Wear ___ breathing protection (designate type, e.g. dust mask, full/half-face respirator with ___ (designate type) cartridges). Establish cartridge change-out schedule. (designate in JHA the specific ignition risks associated with the task step)
Ignition (designate in JHA the specific ignition risks associated with the task step)	Undertake work under Hot Work Permit. Monitor VOCs and LEL by ___ (designate method and frequency) and stop work if monitoring result ___ (designate limits). Seal all pipe/openings (e.g. tank holes, storm drains) in work zone that may emit vapors. Ensure all equipment in work area is intrinsically safe. Define/barricade work areas to exclude unauthorized access/external ignition sources (e.g. vehicular traffic). Keep area ventilated by ___ (designate method, e.g. with fans). Ensure lines are clear prior to disconnect and/or use dry couplings. Assess and control static risks for all work equipment and processes. Have ___ (designate number, type and size) fire extinguisher(s) on site and immediately available for use. (designate in JHA the specific high noise hazard associated with the task step)
	Determine whether noise monitoring has been necessary on other projects of similar scope. Measure noise levels with a noise dosimeter if project will last over 30 days, or for shorter work use the rule or thumb that you should be able to hear a

JHA Development Checklist

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Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
High Noise Level (designate in JHA the specific high noise hazard associated with the task step)	Measure noise levels with a noise dosimeter if project will last over 30 days, or for shorter work use the rule of thumb that you should be able to hear a person talking to you in a normal voice at 1m/3 ft. If you cannot hear them without them raising their voice the hearing protection is necessary, and noise monitorting is advisable. For any employee working on the site who has not attended hearing conservation training within the past year, review this JHA with them and document their training. Wear ___ hearing protection (designate type, e.g. ear plugs, ear muffs, double hearing protection) based on known or potential noise levels. Post warning signs at ___ (designate distance) from work area stating entry restrictions and/or type of hearing protection required. Ensure mufflers are installed in equipment. Minimize potential external/third party/community impacts by ___ (designate how). Share noise dosimetry results with your Divisional Safety Advisor so we can build up a bank of knowledge about the types of equipment at projects where hearing protection should be considered.
Heat Stress and Burns (designate in JHA the specific heat hazard associated with the task step)	**Hot Equipment:** Allow equipment/material to cool prior to working with. Use designated handles to open/move equipment. Turn off equipment and allow to cool prior to refueling. Identify hot surfaces prior to start of task and avoid direct contact with.Drink cool fluids and take rest breaks every ___ (designate frequency). Wear ___ gloves (designate type, e.g. oven mitts, thermal, etc...). Use ___ (designate type, e.g. tongs, insulated handles) tool to move equipment or materials. **Hot Weather:** Check the weather forecast in advance & be prepared for those conditions Wear ___ clothing (designate type, e.g. light-weight fabrics with long sleeves & trousers, cool vest, etc...). Schedule regular breaks, watch your colleagues using the buddy system. Use sun block for skin protection, drink cool drinks regularly (i.e.: before you become thirsty), take breaks in the shade (advice on the regularity and duration of these can be found in the SWP linked to below) Stop work if fatigue or physical stress situations develop in your or those around you High humidity, working in direct sunlight, work in contact with hot surfaces influence the severity of hot working conditions. Seek specific guidance and training if work in these conditions is necessary. (Advice is available on the SWP for heat stress available on Minerva Americas H&S pages at the following link: http://minerva.erm.com/Support/HS/AmericasHS/Safe%20Work%20Practices%20SWP/04%20-%20Heat%20Stress%20-%20updated%208-11.doc)
Cold Stress (designate in JHA the specific cold hazard associated with the task step)	Drink hot/warm fluids and take rest breaks every ____ (designate frequency) Wear ___ clothing (designate type, e.g. insulating layers, down jacket, chef coat). Wear ___ gloves (designate type, e.g. thermal, freeze-protection). In temperatures below freezing do not touch bare metal surfaces with the naked skin without adequate PPE, such as gloves. At or below 4°C/40°F adequate dry insulating clothing must be available to keep worker's core temperature at or above 36°C/96.8°F Dampness/condensation, work in contact with cold water or surfaces, and wind speed all influence the severity of cold working conditions. Seek specific guidance and training if work in these conditions is necessary. (Training is available on ERM North American Minerva page at the following link: http://minerva/erm/globalsupport/healthandsafety/NA/HS%20Training%20Materials/Home.aspx)
High Voltage/Electrical Contact (designate in JHA the specific high voltage / electrical hazard associated with the task step)	Use wooden or fiberglass ladder. Stand on non-conductive surface. Remove metal jewelry. Footwear worn around electrical circuits should be non-conductive. Ensure power cords are free of defects and exposed wires. Do not work in ___ (designate condition, e.g. thunderstorm) weather. Use___ gloves (designate type in JHA, e.g. electrical-insulted). Use ground fault circuit interrupter (GFCI). Use low voltage lighting. Ground equipment by ___ (designate how or refer to separate procedure). Pre-inspect travel route to ensure clearance. Inspect above and below ground areas prior to start of work to identify electrical lines and communicate locations to site personnel. **SSC:** Ensure completion of subsurface clearance procedure requirements. Ensure line locator service identification of underground lines. Use non-destructive drilling techniques (e.g. air-knife). When excavating, assign spotter to stop work at sign of subsurface conduits/wires. Keep ___ distance from overhead power lines (designate distance in JHA based on voltage, regulations, etc.). Lock-Out/Tag-Out (LOTO): LOTO equipment must be available as per the LOTO procedure and verify isolation of energy source prior to start of task. Tags must read “DANGER – DO NOT OPERATE” and be resistant to wear and tear by the environment they are being used in. Employees who perform LOTO must receive authorized employee training, subcontractors must provide evidence that they have (e.g.: a certficate) Wear a cotton t-shirt, Class II Electrical Arc Protection suit, Class O (low voltage) gloves, and non-conductive footwear. Only the person who placed the LOTO device is authorized to remove it, so after-hours contact information for LOTO employees must be in the HASP. Ensure all associated/potentially impacted personnel are notified of work activities. Before working on live equipment, it should be brought to a “zero-energy state” by turning off the equipment’s power (at source, such as by switching off specific circuit breakers. (“Zero-energy” is not attained until the individual working on the machinery attempts to turn the machine on and is unsuccessful.) In certain situations, where machinery must stay live to do work, and Lock-Out is not possible, the Project Manager and Field Safety Officer must be directly involved when Tag-Out is taking place. For all sites where work extends beyond 1 year, a LOTO a documented process inspection must occur to check that LOTO procedures in-place are still valid.
	Wear ___ eye/face protection (designate type, e.g. safety glasses, face shield, chemical splash goggles or combination) Wear ___ clothing (designate type, e.g. long sleeves, paper suit, protective apron, polyethylene coated suit). Wear ___ gloves (designate type, e.g. butyl, nitrile, rubber, resistant to specific chemical/duration). Ensure that gloves and boots are taped to the suit to prevent liquid splash.

JHA Development Checklist

This checklist provides common hazards and some hazard control measures for consideration, and can be used to help develop site-specific JHAs

Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Chemical/Liquids Contact or Release (designate in JHA the specific chemical/liquid hazard associated with the task step)	Double-layering nitrile or latex protective gloves is a good idea for added protection. If acidic or caustic chemicals are present, wear outer neoprene or rubber gloves. Restrict access to work area by ___ (designate how). Use funnel when pouring liquid. Ensure bleed valves are open and lines are clear prior to disconnect and/or use dry couplings. Have ___ (designate type/amount, e.g. pads, boom) absorbent material on hand. Place container and/or absorbent/plastic sheeting under connection prior to disconnect. Store hazardous materials in dedicated container/area (e.. shed, box). Wash hands frequently. Inspect pressurized lines and all fittings/couplings to ensure integrity/closure. Assess rating and compatibility of materials used vs purpose. Ensure storage compatibility of multiple products. **Hazard Communication:** For each chemical product used by ERM employees or subcontractors, a MSDS sheet must be obtained and kept on-file. Chemical containers must be labeled in accordance with OSHA regulations. Review MSDS and container label prior to start of task/handling and follow associated requirements. Ensure all employees on the jobsite have been told about the chemical in-use and are protected. Confirm MSDS is relevant when working with legacy material (e.g. historic releases). A chemical inventory list must be prepared and updated as new or different chemicals are procured. If chemical exposure occurs, even if medical symptoms are not present, inform the Field Safety Office or Office H&S Contact.
Biological Contact (designate in JHA the specific biological hazard associated with the task step)	Wear ___ clothing (designate type, e.g. long sleeves, hood, paper suit). Wear ___ gloves (designate type, e.g. fabric, nitrile). Use insect repellant. Inspect area prior to start of task and remove/avoid animal (e.g. dogs), insect (e.g. bees, wasps), plant (e.g. poison ivy) hazards if possible; otherwise reschedule work and/or contact professional service for removal. Report allergies and ensure treatment is available on site. Avoid loud noises/brightly colored clothing if bees are known to be in area.
Repetitive Motion (designate in JHA the specific repetitive motion hazard associated with the task step)	Use ___ tool and/or ___ technique (designate, e.g. ratchet wrench) to minimize repetitive stress risk. Change position frequently during job (e.g. vary grip, hand motion). Keep wrists in a neutral (straight) position as you work. When possible, rotate tasks to give body parts a rest. Take breaks every ___ (designate frequency) and do simple stretches/exercises. Ensure gloves fit hands properly to decrease stress on hand/joints.

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Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Traffic (designate in JHA the specific pedestrian / motorized traffic hazard associated with the task step)	Wear ___ clothing (designate type, e.g. reflective vest, neon orange/green shirt). High-visibility safety vests: class I may be used when traffic is below 25 mph, Class II for 25-50 mph, and Class 3 for >50 mph. Set up work zone to restrict non-essential access by ___ (designate how, e.g. with cones/barricades/fencing, placed specified distance apart/from work area, etc.). Avoid risks posed by detour (e.g. pedestrians forced into other traffic). Use parked vehicle with hazard lights facing oncoming traffic to protect work zone. Use buddy system to establish traffic watch. Use trained spotters when backing and when visibility is restricted. Inspect surrounding area prior to backing. Adjust mirrors and check equipment back-up alarm to confirm operational prior to start of task. Use horn to alert others prior to backing. Use traffic management consultant. Stay ___ (designate distance) from operating equipment/extended arm, etc. Make eye contact with equipment operator and receive approval prior to approaching. Ensure spotters and equipment operators maintain eye contact. Establish parking/staging/loading/unloading areas (consider equipment turning circles, swing zones etc.). Ensure trailers / trucks are rated and balanced. Chock truck/trailer wheels when not moving. Ensure load is distributed during load/unload to avoid tip/roll-over. Ensure all personnel remain outside of tip-over radius when dumping.
Improper Waste Transport / Disposal (designate in JHA the specific waste disposal hazard associated with the task step)	Designate safe waste storage area/container prior to start of task. Ensure waste materials meet container specifications prior to use. Label waste containers. Separate hazardous and non-hazardous wastes. Place waste containers in designated storage area and secure prior to leaving site. Confirm waste transport truck/container integrity prior to loading. Confirm shipping document description/approved destination with waste container label prior to off-site shipment. For unsealed/partially exposed loads, perform ___ monitoring (designate method and frequency) and stop work if monitoring result ___ (designate limits).
H&S Risks and Increase in ERM Liability caused by Subcontractors Working on the Jobsite	Select only subcontractors that have been prequalified and approved for use. Ensure a signed, executed subcontract agreement is in-place prior to subcontractors performing work on the jobsite for ERM. Ensure the subcontractor has received a copy of the ERM HASP and supporting documentation prior to mobilization to the jobsite. Specify both the ERM and the subcontractor's scope of work in the ERM HASP document. Ensure that any subcontractor personnel on-site have reviewed and signed the site HASP. In all cases, require the ERM subcontractor to either develop their own site-specific HASP, or at minimum develop Job Hazard Analyses (JHA) for the specific tasks they will perform. Attach these documents to the ERM HASP as appendices. Ensure subcontractor work is overseen by ERM personnel at all times. Always include subcontractor personnel in daily jobsite tailgate safety meetings. Do not supply subcontractor personnel with personal protective equipment (PPE). If ERM is performing air monitoring for the subcontractor, ensure calibration of air monitoring equipment is done before and after each use. At a minimum, air monitoring equipment must be calibrated at least once per day. Document equipment calibration and file with the site HASP.
Exposure to Toxic and Hazardous Chemical Substances (designate in the JHA the specific chemicals of concern)	Determine whether there is a potential for exposure to any toxic or hazardous chemical substances in the work area prior to performing any work that may involve handling of one or more of the chemicals or may result in exposure through production, research, or process activities. This would include, but not be limited to, OSHA's 13 regulated carcinogens, and the following: • Acrylonitrile • Asbestos • Benzene • Cadmium • Chromium (VI) • Coke oven emissions • Cotton Dust • Ethylene oxide • Formaldehyde • Hydrogen sulfide • Inorganic arsenic • Lead • Methylene chloride • Methylenedianiline • Vinyl chloride • 1,2-dibromo-3-chloropropane • 1,3-butadiene
	If any of the substances are identified, conduct an exposure assessment to determine whether employees have the potential to be exposed above any action level identified in the substance-specific regulations.
	Where the initial assessment identifies the potential for employee exposures above an established action level or permissible exposure limit, develop a site-specific program to address all required regulatory concerns for that substance. Completed programs shall be included in the site-specific health and safety plan.
	Ensure the health and safety plan specifies the airborne contaminants that may be encountered and the need for respiratory protection. Ensure the plan provides a selection process for the respirator and cartridge type, develops actions levels for upgrades/downgrades of respiratory protection, describes cartridge change out schedules, and provides information on medical surveillance criteria and respirator fit testing requirements.
	Prior to donning any respirator, complete a thorough inspection to ensure it is in good operating condition. Inspected elements should include, but not be limited to, straps, sealing surfaces, inhalation/exhalation vales, and facepieces. Do not use respirators with any signs of damage.
	Where necessary, replace damaged parts. If repair is not possible, discard and replace entire respirator.
	Clean and disinfect respirators using a mild soap and water solution following use. Where respirator sharing is allowed, ensure respirators are cleaned and sanitized before being exchanged by employees.

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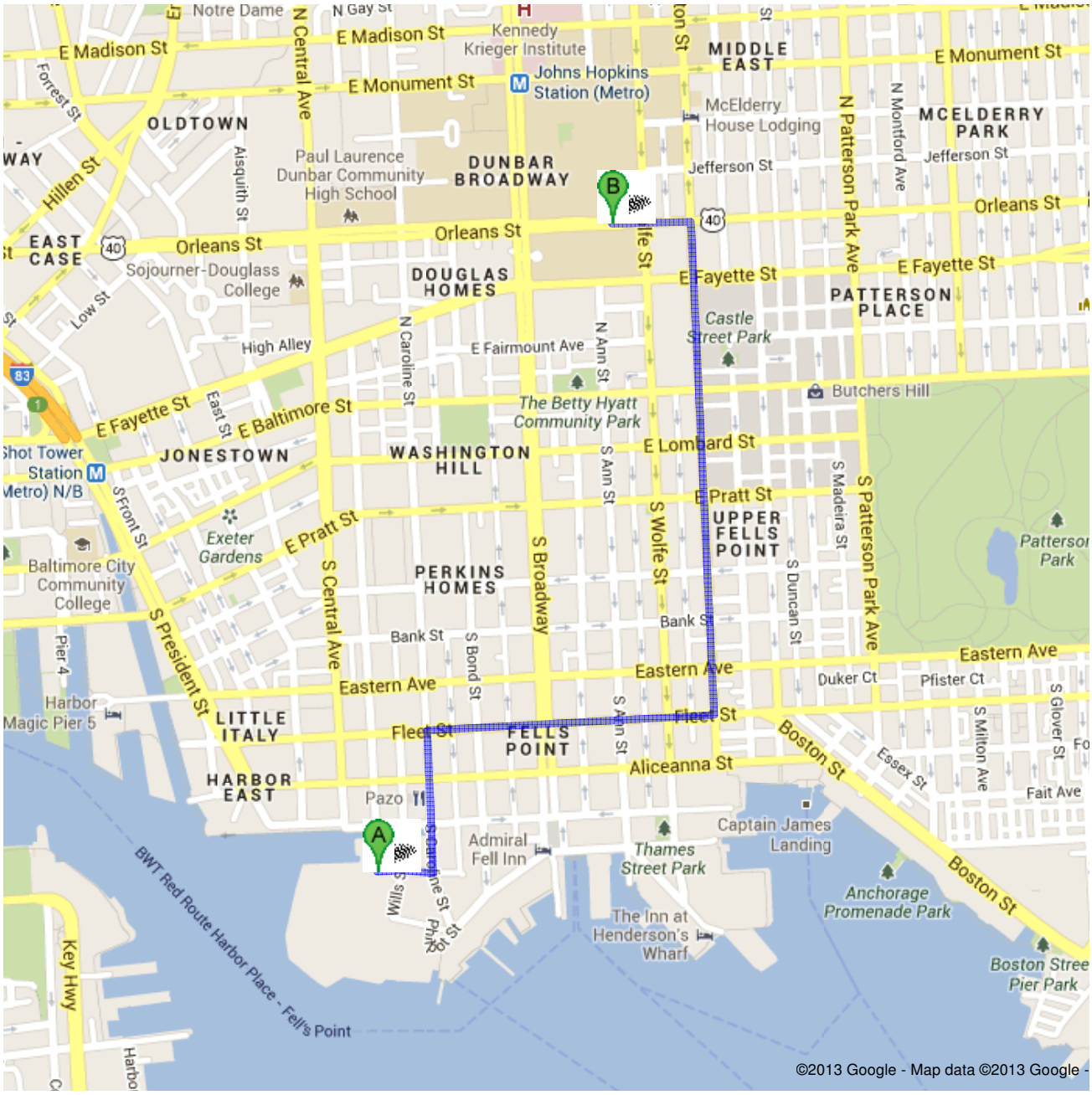
Hazards	Some Methods To Eliminate/Control Hazard for JHA Consideration:
Respiratory Protection	For cartridge-type respirators, affix the cartridges to the respirator as indicated in the manufacturer's guidelines. Cartridges should be hand tightened only.
	Employee must be clean shaven in those areas of the face where the respirator makes skin contact, including any inner nose cups.
	Don the respirator prior to other personal protective equipment in the head/neck area so that nothing comes between the respirator straps and the head surface. Safety glasses, hard hats, etc. must be donned after the respirator.
	For cartridge-type respirators, perform a positive and negative fit check to ensure a good respirator seal.
	Adjustments made while wearing tight-fitting respirators within the work area may result in a compromised respirator seal. If this occurs, stop work, move to an area with no chemical contamination (go through the decontamination process, if present), readjust the respirator, and perform positive and negative fit-checks to ensure a proper facepiece seal.
	If it becomes difficult to breathe due to particulate clogging of respirator cartridges, stop work, move to an area with no chemical contamination (go through the decontamination process, if present), replace the cartridges, readjust the respirator, and perform positive and negative fit-checks to ensure a proper facepiece seal.
	If using a chemical catridge and you either (1) reach or exceed the required wear time as described in the cartridge change schedule or (2) detect any evidence of chemical breakthrough (odors, tastes, burning sensations, etc.), stop work, move to an area with no chemical contamination (go through the decontamination process, if present), replace the cartridges, readjust the respirator, and perform positive and negative fit-checks to ensure a proper facepiece seal. If chemical breakthrough was detected, determine what level of exposure may have occurred through testing of the work atmosphere.
	If a decontamination line is present, proceed through the line as directed. If no decontamination line is present, remove all other PPE except clean gloves before removing the respirator. Once removed, clean as directed.
Natural Hazards (designate in JHA the specific natural hazards associated with the task step)	For sites where poison ivy, oak, and sumac are present, have a poison ivy wash available for employees on-site. If exposure occurs and no poison ivy wash is available, employees should wash in cool water and use soap. Keep work areas free from clutter so that ground surfaces can be easily seen by employees. **Working around poisonous insects:** Use insect repellant containing DEET at all times on the jobsite. Periodically throughout the day and at the end of the day, perform a thorough "tick-check" to ensure ticks or other insects are found and removed promptly. Avoid obvious conical mounds of dirt that may indicate ants, wasps, or other flying insects. Before reaching into dark or damp spaces such as monitoring well-heads, inspect the area thoroughly to ensure spiders are not present. Always take a shower as soon as possible after leaving a jobsite for the day to remove any insects, such as chiggers. **Working around snakes:** Visually inspect the work are prior to beginning any work to located areas with high grass and underbrush. Do not walk through these areas if at all possible to avoid snakes. Wear leather steel-toe boots and snake chaps in areas where snakes are suspected or confirmed to be present. Do not attempt to kill snakes, as people are commonly bitten attempting this. **Working around feral animals:** High rat populations within an enclosed space present a hazard of Hanta virus. Spray such areas with bleach solution prior to performing any work in the area (10 parts water to 1 part household bleach). If dogs or other animals are spotted that are acting strangely, do not approach them. Contact the local animal control center for assistance.

ATTACHMENT 2 MAP TO HOSPITAL

Google

Directions to 1800 Orleans St, Baltimore, MD 21287
1.6 mi – about **9 mins**



1000 Dock St, Baltimore, MD 21231

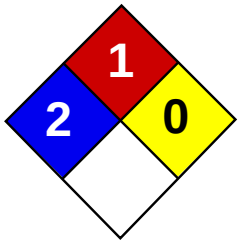
1.	Head **east** on **Dock St** toward **Wills St** Restricted usage road	go 443 ft total 443 ft
2.	Take the 1st left onto **S Caroline St** About 1 min	go 0.2 mi total 0.3 mi
3.	Take the 3rd right onto **Fleet St** About 2 mins	go 0.4 mi total 0.7 mi
4.	Turn left onto **S Washington St** About 4 mins	go 0.7 mi total 1.5 mi
5.	Turn left onto **Orleans St** Destination will be on the right About 1 min	go 0.1 mi total 1.6 mi

1800 Orleans St, Baltimore, MD 21287

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ATTACHMENT 3 MATERIAL SAFETY DATA SHEETS (EXAMPLE)



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:
Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.5 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 (mg/m3) from OSHA (PEL) [United States] TWA: 0.5 (mg/m3) from NIOSH [United States] TWA: 0.5 (mg/m3) [United Kingdom (UK)] TWA: 0.5 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- !0 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:
Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation , sneezing, reddness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconoisis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 05/21/2013 12:00 PM

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MATERIAL SAFETY DATA SHEET
ERA A Waters Company

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER: ERA
ADDRESS: 16341 Table Mountain Parkway
Golden, CO, 80403 U.S.A.

BUSINESS PHONE: 303-431-8454
FAX: 303-421-0159 **EMAIL:** info@eraqc.com
CHEMICAL EMERGENCY PHONE: 352-535-5053 (INFOTRAC)

Product Name(s): Hexavalent Chromium 1000 mg/L
Catalog / Part Number(s): 019, 973, 186004178
MSDS Creation Date: November 22, 2005
Revision Date: July 18, 2012 **MSDS Reference Number:** 019

SECTION 2: HAZARDS IDENTIFICATION

Toxic. Harmful by inhalation. May cause cancer. Risk of cancer depends on duration and level of exposure. The matrix of each standard is a K2Cr2O7/water mixture listed below which is classified as dangerous by Directive 199/45/EC. Use only as directed and in accordance with good laboratory practices.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

				EXPOSURE LIMITS		EU LABEL
CHEMICAL INGREDIENT NAME	CAS NUMBER	EC NUMBER	% BY WT.	OSHA	ACGIH	HAZARD LABEL
Potassium dichromate	7778-50-9	231-906-6	≤0.1	0.1 mg/m3 PEL	0.05 mg/m3	

Notes: This standard is 125 mL of a mixture containing potassium dichromate salt with the balance being ≥99.9% water. Hexavalent chromium is a known human carcinogen. Exposure Limits are 8-Hour TWA (Time Weighted Average) unless designated C (Ceiling) or STEL (Short Term Exposure Limit). Other components considered Non-Hazardous under OSHA 1910.1200 (HazCom) as they are not present in concentrations exceeding 1% (or 0.1% if considered a known or potential carcinogen). Material Use: Analytical reagent or certified reference material used in laboratories. Uses also include research and development.

SECTION 4: FIRST-AID MEASURES

Inhalation: Remove to fresh air.
Skin Contact: Flush with water.
Eye Contact: Immediately flush with water for a minimum of 15 minutes.
Ingestion: Get medical attention
After following first aid measures, seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Flammable Properties: Not flammable.
Extinguishing Media: Dry chemical, carbon dioxide or appropriate foam.
Unique Aspects Contributing To a Fire: None.
Special Fire Fighting Procedures: None.
Note: As in any fire, wear self-contained breathing apparatus, and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Absorb liquid with spill pillow or other absorbent. Ventilate and wash spill site after material pick up is complete. Place wastes into closed containers for proper disposal.

SECTION 7: HANDLING AND STORAGE

Handle in accordance with good laboratory practices. Store in a dry well-ventilated place. This product is intended for use only by people trained in the safety and handling of chemicals and laboratory preparations.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Handle in accordance with good laboratory practices. Wash thoroughly after handling.
Respiratory Protection: Not normally needed. If exposure limits are exceeded, use approved respirator.
Eye Protection: Safety glasses with side shields or safety goggles
Skin Protection: Neoprene or other chemical resistant gloves.
Engineering Controls: Not normally needed. If exposure limits are exceeded, work in a fume hood.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

DATA FOR MATRIX:

Appearance:	**Clear to yellow**	**Specific Gravity:**	**NA**	**Melting Point:**	**NA**
Physical State:	**Liquid**	**Flash Point:**	**NA**	**Vapor Pressure:**	**NA**
Odor:	**NA**	**Explosion Limits:**	**NA**	**Vapor Density (air=1):**	**NA**
pH:	**NA**	**Boiling Point:**	**NA**	**Solubility in Water:**	**Soluble**

SECTION 10: STABILITY AND REACTIVITY

Hazardous Polymerization Will Not Occur __X__ May Occur____ Stability: Stable __X__ Unstable ____
Hazardous Decomposition/Combustion Products: NA
Conditions and Materials to Avoid: Oxidizing agents.

SECTION 11: TOXICOLOGICAL INFORMATION

Primary Route(s) of Exposure Under Normal Use: Skin contact: may cause skin irritation or be harmful if absorbed through skin. Eye contact: may cause eye irritation. Inhalation: hamful if inhaled, may be irritation to mucous membranes and upper respiratory tract. Ingestion: harmful if swallowed.

Target Organ(s): Lungs, kidneys, blood.

Acute Effects: Harmful by inhalation. May cause sensitization by inhalation and skin contact. Ingestion can cause vomiting.
Potassium dichromate: Oral, child: LDLO=26 mg/kg; Oral, man: LDLO=143 mg/kg; Oral, rat:LD50=25 mg/kg; Skin, rabbit:LD50=14 mg/kg.

Chronic Effects: Carcinogen; Teratogen; May cause heritable gentic damage. Reproductive hazard; May impair fertility. May cause harm to the unborn child.

Other Information: Chemical Ingredient(s) potassium dichromate is classified as carcinogen(s) by OSHA, IARC (Group 1), NTP, ACGIH (A1), or California. California Prop-65: This product is or contains chemicals known to the state of California to cause cancer.

SECTION 12: ECOLOGICAL INFORMATION

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Avoid release into the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

To determine proper disposal, consult applicable federal, state and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION

Shipment Name/Type: Non-hazardous for transport.
UN Number: NA Shipping/Hazardous Class: NA Packing Group: NA
Shipping regulations are based on combinations of criteria such as quantity, class and packaging according to DOT, IATA and (49) CFR.

SECTION 15: REGULATORY INFORMATION

EU Symbol of Danger: Toxic (T) concentration ≤0.1 C <0.2%
EU Risk Phrases: May cause cancer [R45]; May cause heritable genetic damage [R46]; Harmful by inhalation [R20].

U.S. TSCA: Listed
Canada: This product has been classified according to the hazard criteria of the CPR and this MSDS contains all the information required by the CPR.

SECTION 16: OTHER INFORMATION

United States EPA Regulatory Information:		**NFPA Rating:**	**Health: 3**	**Flammability: 0**	**Reactivity: 0**
SARA 313:	**Yes (0.1% deminimis)**				
CERCLA RQ:	**10 lbs**	**HMIS Rating:**	**Health: 3**	**Flammability: 0**	**Physical Hazard: 0**

NOTE: NA = Data not available, not established, determined or not pertinent.

MATERIAL SAFETY DATA SHEET

EM SCIENCE

|1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer.....:
EM SCIENCE
A Division of EM Industries
P.O. Box 70
480 Democrat Road
Gibbstown, N.J. 08027

Preparation Date.: 10/25/96

Information Phone Number.: 856-423-6300
Hours: Mon. to Fri. 8:30-5
Chemtrec Emergency Number: 800-424-9300
Hours: 24 hrs a day

Catalog Number(s):

BX0207

Product Name:
1,2-Benzanthracene
Synonyms:
Benzo (A) Anthracene
Chemical Family:
Aromatic Hydrocarbon
Formula:
$C_{18}H_{12}$
Molecular Weight.:
228.29

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS #	Appr %
1,2-Benzanthracene	56-55-3	100%

|3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
SUSPECT CANCER HAZARD. MAY CAUSE CANCER.
HARMFUL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN.
IRRITATING TO SKIN, EYES AND MUCOUS MEMBRANES.
MAY CAUSE DAMAGE TO KIDNEY, URETER, BLADDER.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

Appearance:
Light yellow powder

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

Symptoms of Exposure:
Harmful if inhaled, swallowed, or absorbed through the skin. Irritating on contact with skin, eyes or mucous membranes. May cause damage to kidney, ureter, bladder. Chronic exposure may cause alteration of genetic material.

Medical Cond. Aggravated by Exposure:
Urinary conditions

Routes of Entry:
Inhalation, ingestion or skin contact.

Carcinogenicity:
Suspected human carcinogenic substance. Suspect Cancer Hazard.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

4. FIRST AID MEASURES

Emergency First Aid:
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.
Skin: Immediately flush thoroughly with large amounts of water.
Eyes: Immediately flush thoroughly with water for at least 15 minutes.
Inhalation: Remove to fresh air; give artificial respiration if breathing has stopped.
Ingestion: If conscious, drink water and induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
Remove contaminated clothing and wash before reuse.

5. FIRE FIGHTING MEASURES

Flash Point (F): Noncombustible
Flammable Limits LEL (%): N/A
Flammable Limits UEL (%): N/A
Extinguishing Media:
Foam, Carbon dioxide, Water spray

Fire Fighting Procedures:
Wear self-contained breathing apparatus and protective clothing.

Fire & Explosion Hazards:
Thermal decomposition produces highly toxic fumes.

6. ACCIDENTAL RELEASE MEASURES

Spill Response:
Evacuate the area of all unnecessary personnel. Wear suitable protective equipment listed under Exposure / Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Take up and containerize for proper disposal as described under Disposal. Comply with Federal, State, and local regulations on reporting releases. Refer to Regulatory Information for reportable quantity and other regulatory data.

7. HANDLING AND STORAGE

Handling & Storage:
Keep container tightly closed. Store in a cool, dry, well-ventilated area. Do not breathe vapor or dust. Do not get in eyes, on skin, or on clothing.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:
Ventilation, Respiratory Protection, Protective Clothing, Eye Protection:
Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure. Material must be handled or transferred in an approved fume hood or with equivalent ventilation. Protective gloves must be worn to prevent skin contact (Viton or equivalent) Safety glasses with side shields must be worn at all times. Impervious protective clothing should be worn to prevent skin contact.

Work/Hygenic Practices:
Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

EXPOSURE GUIDELINES

OSHA - PEL:

	TWA		STEL		CL		
Component	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	Skin
1,2-Benzanthracene							

ACGIH - TLV:

	TWA		STEL		CL		
Component	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	Skin
1,2-Benzanthracene							

If there are no exposure limit numbers listed in the Exposure Guidelines chart, this indicates that no OSHA or ACGIH exposure limts have been established.

9. PHYSICAL AND CHEMCIAL PROPERTIES

Boiling Point (C 760 mmHg) : 435C Sublimes
Melting Point (C) : 160C
Specific Gravity (H_20 = 1) : N/A
Vapor Pressure (mm Hg) : N/A
Percent Volatile by vol (%): N/A
Vapor Density (Air = 1) : N/A
Evaporation Rate (BuAc = 1): N/A
Solubility in Water (%) : Insoluble
Appearance :
Light yellow powder

10. STABILITY AND REACTIVITY

Stability: Yes

Hazardous Polymerization:
Does not occur

Hazardous Decomposition:
CO_x

Conditions to Avoid:
None indicated

Materials To Avoid:

( ) Water
(X) Acids
(X) Bases
( ) Corrosives
(X) Oxidizers
( ) Other:

11. TOXICOLOGICAL INFORMATION

Toxicity Data

ivn-mus LDLo: 10 mg/kg

Toxicological Findings:
Tests on laboratory animals indicate material may produce adverse mutagenic effects and cause tumors.
Cited in Registry of Toxic Effects of Chemical Substances (RTECS)

12. DISPOSAL CONSIDERATIONS

EPA Waste Numbers: U018

Treatment:
Specified Technology - Incineration to a level below TCA (Total Constituent Analyses) levels. Contact your local permitted waste disposal company (TSD) for permissible treatment site.
ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name:
Environmentally Hazardous Substance, Solid, n.o.s. (1,2-Benzanthracene)

DOT ID Number :
UN3077

14. REGULATORY INFORMATION

TSCA Statement:
The CAS number of this product is listed on the TSCA Inventory.

Component	SARA EHS (302)	SARA EHS TPQ (lbs)	CERCLA RQ (lbs)
1,2-Benzanthracene			10

Component	OSHA Floor List	SARA 313	DeMinimis for SARA 313 (%)
1,2-Benzanthracene	Y	Y	0.1

If there is no information listed on the regulatory information chart, this indicates that the chemical is not covered by the specific regulation listed.

15. OTHER INFORMATION

Comments:
None

NFPA Hazard Ratings:

```
Health          : 3
Flammability    : 0
Reactivity      : 0
Special Hazards :
```

Revision History: 1/1/84 7/18/87 1/24/91 3/1/91 11/19/93 3/10/95

| = Revised Section

N/A = Not Available

N/E = None Established

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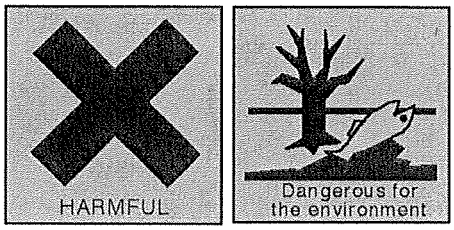
Safety data for dibenz(a,h)anthracene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2:5,6-benzanthracene, 1,2:5,6-dibenzanthracene, dibenzo(a,h) anthracene, DBA, 1,2,5,6-DBA
Use: a common pollutant in smoke and used oils
Molecular formula: $C_{22}H_{14}$
CAS No: 53-70-3
EINECS No: 200-181-8
Annex I Index. No: 601-041-00-2

Physical data

Appearance: white to light yellow crystalline solid
Melting point: 266 - 267 C
Boiling point: 524 C
Vapour density:
Vapour pressure:
Density (g cm^{-3}): 1.28
Flash point:
Explosion limits:
Autoignition temperature:
Water solubility:

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Harmful if swallowed or inhaled. Experimental carcinogen, tumorigen and neoplastigen. IARC probable human carcinogen.

Toxicity data
(The meaning of any toxicological abbreviations which appear in this section is given here.)
IVN-MUS LDLO 10 mg kg^{-1}

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)
R45 R50 R53.

Environmental information

Harmful in the environment - may cause long-term damage.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
Non-hazardous for air, sea and road freight.

Personal protection

Safety glasses, gloves, good ventilation. Handle as a possible carcinogen.

Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)
S45 S53 S60 S61.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

Material Safety Data Sheet
Benzo[k]fluoranthene, 99+% (tlc)

MSDS# 54641

Section 1 - Chemical Product and Company Identification

MSDS Name:	Benzo[k]fluoranthene, 99+% (tlc)
Catalog Numbers:	AC279730000, AC279732500
Synonyms:	8,9-Benzofluoranthane.
Company Identification:	Acros Organics BVBA Janssen Pharmaceuticalaan 3a 2440 Geel, Belgium
Company Identification: (USA)	Acros Organics One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	800-ACROS-01
For information in Europe, call:	+32 14 57 52 11
Emergency Number, Europe:	+32 14 57 52 99
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300
CHEMTREC Phone Number, Europe:	703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#:	207-08-9
Chemical Name:	Benzo[k]fluoranthene, 99+% (TLC)
%:	99%
EINECS#:	205-916-6

Hazard Symbols: T

Risk Phrases: 45

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Danger! May be fatal if swallowed. May be fatal if absorbed through the skin. Toxic. Carcinogen. May cause lung damage. Causes eye and skin irritation. Causes digestive and respiratory tract irritation. Cancer hazard. May be fatal if inhaled.
Target Organs: Lungs, respiratory system.

Potential Health Effects

Eye:	Causes eye irritation.
Skin:	Causes skin irritation. May be fatal if absorbed through the skin.
Ingestion:	May be fatal if swallowed. Causes gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation:	May be fatal if inhaled. Causes respiratory tract irritation.
Chronic:	May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower

eyelids. Get medical aid immediately.

Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Autoignition Temperature: Not available

Flash Point: Not available

Explosion Limits: Lower: Not available

Explosion Limits: Upper: Not available

NFPA Rating: Not published

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Do not breathe dust, mist, or vapor. Do not get on skin or in eyes. Do not ingest or inhale.

Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[k]fluoranthene, 99+% (TLC)	none listed	none listed	none listed

OSHA Vacated PELs: Benzo[k]fluoranthene, 99+% (TLC): None listed

Engineering Controls:

Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State:	Solid
Color:	yellow
Odor:	Not available
pH:	Not available
Vapor Pressure:	Not available
Vapor Density:	Not available
Evaporation Rate:	Not available
Viscosity:	Not available
Boiling Point:	480 deg C @ 760.00mm Hg (896.00°F)
Freezing/Melting Point:	216 - 218 deg C
Decomposition Temperature:	Not available
Solubility in water:	Not available
Specific Gravity/Density:	
Molecular Formula:	C20H12
Molecular Weight:	252.32

Section 10 - Stability and Reactivity

Chemical Stability:	Stable under normal temperatures and pressures.
Conditions to Avoid:	Incompatible materials, dust generation.
Incompatibilities with Other Materials	Not available
Hazardous Decomposition Products	Carbon monoxide, carbon dioxide.
Hazardous Polymerization	Has not been reported.

Section 11 - Toxicological Information

RTECS#:	CAS# 207-08-9: DF6350000
LD50/LC50:	RTECS: Not available.
Carcinogenicity:	Benzo[k]fluoranthene, 99+% (TLC) - California: carcinogen, initial date 7/1/87 NTP: Suspect carcinogen IARC: Group 2B carcinogen
Other:	See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:
Canada TDG
Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

USA RQ: CAS# 207-08-9: 5000 lb final RQ; 2270 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: T

Risk Phrases:

R 45 May cause cancer.

Safety Phrases:

S 53 Avoid exposure - obtain special instructions before use.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 207-08-9: Not available

Canada

Canadian WHMIS Classifications: Not available

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 207-08-9 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 207-08-9 is not listed on the TSCA Inventory. It is for research and development use only.

Section 16 - Other Information

MSDS Creation Date: 9/02/1997

Revision #6 Date 7/20/2009

ATTACHMENT 4 DAILY SAFETY MEETING FORM

Daily Safety Meeting Documentation Form

Project Name: Project Number: Meeting Date & Time: Meeting Leader:

Document Routing	
FSO	Retain copy in site health & safety file.

What work will be conducted on site today and by whom?

Work Task	Conducted By

What overlapping operations/simultaneous operations will occur today?

Any follow-up from previous Major Incidents, Near Misses, Unsafe Acts or Unsafe Conditions discussed today?

List any new / short-service personnel on site today?

Safety Meeting Core Topics – All Site Workers *and* Visitors

- ☐ What PPE is required in order to enter the work zone?
- ☐ What are the potential hazards associated with today's work. How will they be managed?
- ☐ What are the potential impacts of planned activities to: Visitors? Nearby workers? Public?
- ☐ Is everyone aware that they are empowered to stop work if something is questionable or unsafe?
- ☐ What happens and who do you contact if there is an injury or emergency? If working at an active facility, how will you be alerted of an emergency and what will you do?
- ☐ Who do you contact if you have questions, or before deviating from written procedures?
- ☐ Where is fire extinguisher, first aid kit, eyewash, safety shower located?
- ☐ Are any work permits required? Are permits completed and posted in plain view of workers?
- ☐ Have all excavation / borehole locations been cleared of underground utilities/structures, in accordance with ERM and client-specific subsurface clearance procedures?
- ☐ Have all tools / equipment / vehicles been inspected today to ensure safe operating condition?
- ☐ Will a follow-up safety meeting be conducted after lunch?
- ☐ Has anything unexpected or out-of-the-ordinary occurred on this job recently to share?
- ☐ What is the worst that could happen if something goes wrong today?

Daily Safety Meeting Documentation Form

Project Name: Project Number: Meeting Date & Time: Meeting Leader:

Safety Topics Related to ERM 2011/2012 Incident Trends – All Site Workers *and* Visitors

- ☐ What activities occurring today could result in hand injuries? Is everyone aware that the use of fixed open-blade knives is not permitted without cut-resistant gloves?
- ☐ Does the site pose natural hazards to be avoided? Thorny underbrush/ticks/poison ivy?
- ☐ What areas of the site have slip/trip/fall hazards? Are everyone's work boots in good shape?
- ☐ How will the on-site team avoid vehicle accidents? Is everyone aware that taking their eyes off the road for more than 2 seconds (for any reason) leads to vehicle accidents?

Who attended the safety meeting today (employees, subcontractors, visitors)?

Name	Company	Signature	Sign-In Initials*	Sign-Out Initials**

* Initials in this space verify that the employee is fit for performing work.
**Initials in this space verify that the employee was uninjured during the workday.

Who visited the site today but was not involved in work activities?

Name	Company	Arrival Time

Incident Report

FOR ERM MANAGEMENT INTERNAL USE ONLY
CONFIDENTIAL - WITHOUT PREJUDICE REPORT

Instructions: Aim to complete **Part 1 of this form within 24 hours** after the incident and complete **Part 2 within 3 working days** after the incident. In addition to the Project Manager and OpCo Health and Safety Coordinator, who are primarily involved with the investigation, please ensure that the following individuals are made aware of the incident at least verbally within 24 hours and receive the completed incident form as soon as it is completed: **Branch Manager**; **Corporate H&S Director**, **OpCo President**, and **Regional CEO**. Based on the requirements of the company's claims reporting procedure (which shall be updated from time to time), if necessary, the OpCo President will notify the company's Legal Department. The OpCo H&S Coordinator should keep paper or electronic copies of these reports. If a piece of information does not apply, put N/A in the block.

I. INJURY AND ILLNESS DATA AND SUMMARY

Date and time of incident Date: Time:	Location of incident (Name and address)	
Time injured employee started work on day of incident	Weather conditions	
Reported by	Date reported	List any witnesses
Project Number	Project Manager	Principal-in-Charge
Injured employee's name	Injured employee's department or practice area	
Injured sub-contractor's name	Injured sub-contractor's employer	
Injured person's sex Male ☐ Female ☐	Injured employee's date of hire at ERM	
Type of Incident (circle one) First aid/minor injury All other injuries Vehicle accident Property damage Near miss		

Incident Report

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What activity/task was taking place just prior to the incident? (Describe the activity/task as well as tools, equipment and material involved that set the stage for the incident. What was the worker doing?)
What changed about the situation or task to cause the incident? How did the incident happen? (Describe in detail the incident.)
If the incident involved an injury, describe it. (e.g., cut to left ring finger, sprained right ankle, snake bite to left shin, pulled muscles in the lower back)
Immediate actions taken (Describe actions taken and by whom immediately after the incident occurred.)
What object or substance directly harmed the employee? (Examples, concrete floor, chlorine, H2S, manhole cover. If this question does not apply to the incident, write N/A.)
If medical treatment was given away from worksite, state name and mailing address of both the facility and treating health care professional.
Did employee receive prescription for medication? Yes ☐ No ☐

Was employee treated in an emergency room? Yes ☐ No ☐	Was employee hospitalized overnight as an in-patient? Yes ☐ No ☐

Incident Report

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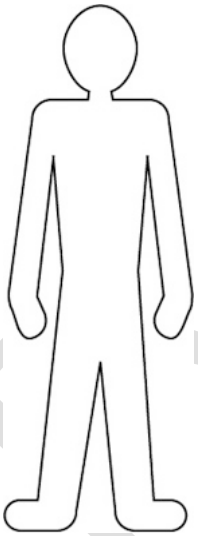
Additional Consequences of incident (Describe damage to property/equipment, consequences to other employees or community, schedule.)
If the employee died, give date of death.
Is the incident recordable/reportable under any governmental requirement? (To be completed by OpCo Health and Safety Coordinator) Yes ☐ No ☐ Name of person making determination
How many photos of the scene were taken?
(If completed manually) Please note the position of the injury on the diagram and sketch any other instructive diagrams here as well. 

Name of person completing form (print)	Signature of person completely form

Title of person completing form	Phone number of person completing form	Date form completed

Incident Report

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Instructions: This side of the form will be completed as directed by the OpCo Health and Safety Coordinator

II. CAUSES AND PLANS TO PREVENT RECURRENCE

Actions leading to incident. (Circle all that apply and explain.)

Failure to observe warning	Failure to use PPE	Failure to warn	Other
Delayed discovery	Procedure not followed	Abuse/misuse of equipment	

Conditions leading to incident. (Circle all that apply and explain.)

Temperature/weather	Inadequate maintenance	Nature (animal, insects, plants)
Lack of PPE	Lack of proper instructions	Construction deficiencies
Improper design/engineering	Improper/defective tools/ equipment	Other

Job factors leading to incident. (Circle all that apply and explain.)

Leadership/supervision	Work practices	Defective tools/equipment
Inadequate communication	Inadequate training	Inadequate inspections
Inadequate work procedures/practices		Other

Personal factors leading to incident. (Circle all that apply and explain.)

Physical capability	Physical stress/fatigue	Mental stress
Knowledge of task	Employee skills	Attention to details
Other		

Incident Report

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Corrective Actions	Person responsible	Deadline	Date completed
1)	1)	1)	1)
2)	2)	2)	2)
3)	3)	3)	3)
4)	4)	4)	4)