

**NRG Potomac River LLC**  
1400 North Royal Street  
Alexandria, Virginia 22314

# **HEALTH AND SAFETY PLAN**

**Potomac River Generating Station**  
**Alexandria, Virginia**

*Prepared by*



**engineers | scientists | innovators**

10220 Old Columbia Road, Suite A  
Columbia, Maryland 21046

Project Number: MEM1108

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**TABLE OF CONTENTS**

EHS Incident Response Procedures.....	iii
Route to Hospital.....	iv
Route to Urgent Care.....	v
Site Map.....	viii
1. INTRODUCTION.....	1
2. SIGNATURES.....	1
2.1 Preparers and Reviewers.....	1
2.2 Site Workers.....	2
3. EMERGENCY CONTACT INFORMATION.....	3
4. APPLICABILITY OF THIS HASP.....	4
5. SITE/TASK/HAZARD DESCRIPTION.....	4
5.1 Site Background.....	4
5.2 Task Descriptions.....	5
5.3 Chemical Hazards.....	6
5.4 Physical Hazards.....	6
5.5 Biological Hazards.....	7
6. GENERAL SAFE WORK PRACTICES.....	8
7. EMERGENCY RESPONSE.....	9
7.1 Injury and Emergency Response Procedures.....	9
7.2 Emergency Response Equipment.....	9
8. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITY.....	10
9. WORKER TRAINING AND MEDICAL SURVEILLANCE.....	11
9.1 Pre-Assignment and Annual Refresher Training.....	11
9.2 Site Supervisor Training.....	11
9.3 Initial Site Safety Orientation and HASP Review.....	12
9.4 Baseline Medical Surveillance Exam.....	12
9.5 Periodic/Annual/Biennial Medical Exam.....	13
9.6 Exposure/Activity/Project-Specific Medical Testing.....	13

9.7	Exit Exam.....	13
9.8	Exit/Termination .....	13
10.	MAPS AND SITE CONTROL.....	14
10.1	Routes to Hospital and Urgent Care Facility.....	14
10.2	Site Map .....	14
10.3	Buddy System.....	14
10.4	Controlled Work Zones .....	14
10.5	Site Access .....	15
10.6	Inspections.....	15
11.	TAILGATE MEETINGS .....	15
12.	STOP WORK AUTHORITY .....	15
13.	AIR MONITORING.....	16
14.	PERSONAL PROTECTIVE EQUIPMENT .....	16
15.	DECONTAMINATION .....	16
16.	SPILL CONTAINMENT .....	17
17.	CONFINED SPACE ENTRY .....	18
18.	GLOBALY-HARMONIZED SYSTEM FOR HAZARD COMMUNICATION ...	18
19.	HASP AMENDMENTS .....	19

## **APPENDICES**

Appendix A: HASP Amendments  
Appendix B: Task Hazard Analyses  
Appendix C: Summary of Chemical Hazards  
Appendix D: Air Monitoring  
Appendix E: Personal Protective Equipment  
Appendix F: Safety Data Sheets

## **ATTACHMENTS**

Attachment A: NRG Corporate Safety Manual – Contractor Safety

# EHS Incident Response Procedures

CHOOSE THE RIGHT PATH



## For more Information:

All work-related injuries, illnesses, and near-miss situations, to include vehicle accidents and general liability claims, must be documented and reported to the Environmental, Health & Safety (EHS) Team.

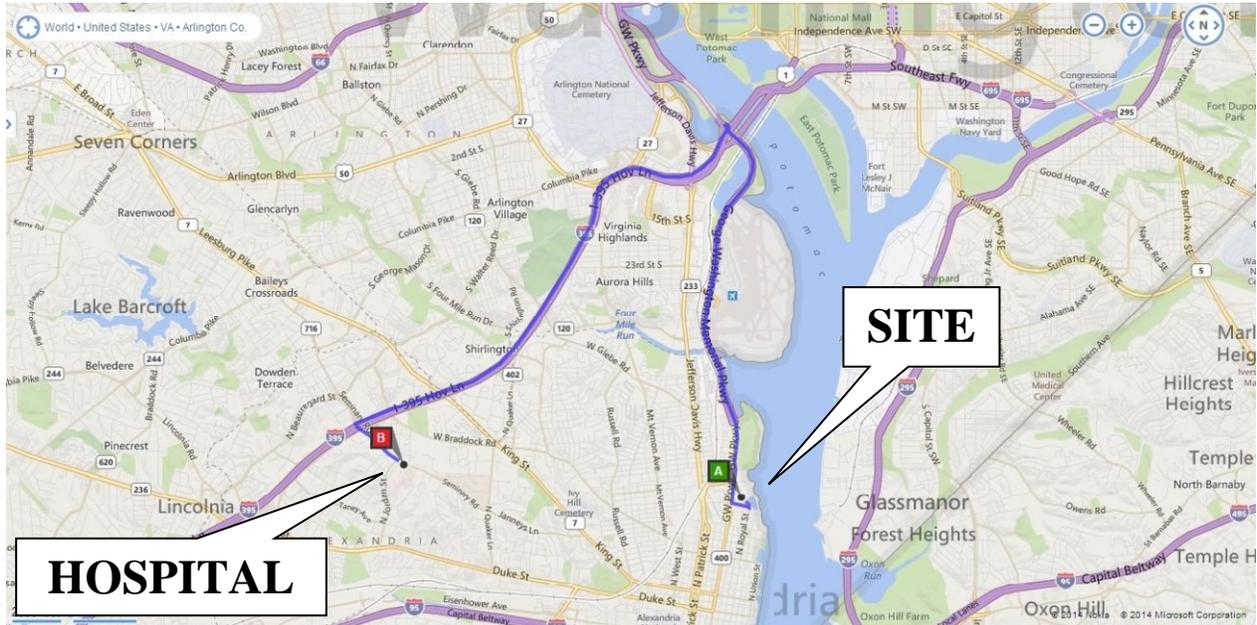
Dale Prokopchak  
804-349-8067

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Visit the EHS Team on the intranet:  
<http://home.geosyntec.com/Corp/EHS/>

Geosyntec<sup>®</sup>  
consultants

## ROUTE TO HOSPITAL



Distance: 10.5 miles

Travel Time: 16 minutes

### Inova Alexandria Hospital

703-504-3000

4320 Seminary Road

Alexandria, VA 22304

### Written Directions to Hospital from Site:

**A**

1400 N Royal St, Alexandria, VA 22314

- Depart N Royal St toward Bashford Ln
- 0.1 mi

Turn right onto Bashford Ln

- 0.2 mi

Turn right onto E Abingdon Dr

- 0.4 mi

Keep straight onto George Washington Memorial Pkwy / GW Pkwy



3.7 mi

Take ramp right for I-395 South toward Richmond

- 5.0 mi

At exit 4, take ramp right for Seminary Rd East toward Seminary Road

• 420

0.5 mi

Road name changes to VA-420 E / Seminary Rd

- 0.2 mi

Keep straight onto VA-420 / Seminary Rd

- 0.4 mi

Arrive at 4320 Seminary Rd, Alexandria, VA 22304

The last intersection is N Ivanhoe St. If you reach N Howard St, you've gone too far

**B**

4320 Seminary Rd, Alexandria, VA 22304

## ROUTE TO URGENT CARE FACILITY



Distance: 3.9 miles

Driving Time: 12 minutes

### Patient First – Alexandria

703-647-6087

6311 Richmond Highway

Alexandria, VA 22306

### Written Directions to Urgent Care Facility from Site:

**A**

1400 N Royal St, Alexandria, VA 22314

- Depart N Royal St toward Bashford Ln
- 0.7 mi

Turn right onto Pendleton St

- 0.2 mi

Turn left onto VA-400 / N Washington St

- 0.8 mi

Turn right onto Gibbon St

- 0.2 mi

Turn left onto US-1 S / S Patrick St

- 2.0 mi

Turn left onto S Kings Hwy, and then immediately turn right onto Richmond Hwy

- 280 ft

Arrive at 6311 Richmond Hwy, Alexandria, VA 22306

The last intersection is S Kings Hwy

**B**

6311 Richmond Hwy, Alexandria, VA 22306

**SITE MAP**



## 1. INTRODUCTION

This site-specific Health and Safety Plan (HASP) was prepared to address project-specific hazards known or suspected to be present associated with the existing conditions and work to be performed at the work site(s). This HASP was prepared to meet the requirements specified in Occupational Safety and Health (OSHA) Hazardous Waste Operations Emergency and Response (HAZWOPER) program, Geosyntec's Health and Safety (H&S) Procedure HS 301, and the H&S requirements of the client.

## 2. SIGNATURES

### 2.1 Preparers and Reviewers

This HASP must be maintained on site when field work is being performed. The Site Health and Safety Officer (SHSO) can change or amend this document, in agreement with the Health and Safety Coordinator (HSC) or Project Manager. Amendments (e.g., changes in personal protective equipment, addition of tasks, etc.) must be documented in Section 19 and in Appendix A. This HASP must be reviewed and amended on an annual basis for projects lasting more than one year.

**Prepared by:**

SHSO \_\_\_\_\_ Date \_\_\_\_\_

**Reviewed by:**

HSC \_\_\_\_\_ Date \_\_\_\_\_

**Approved by:**

Project Manager \_\_\_\_\_ Date \_\_\_\_\_

**This HASP has been given to the following H&S approved subcontractor(s).**

Subcontractor: \_\_\_\_\_ Representative: \_\_\_\_\_ Date: \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Representative: \_\_\_\_\_ Date: \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Representative: \_\_\_\_\_ Date: \_\_\_\_\_

2.2 Site Workers

This HASP must be reviewed by personnel prior to site work. Workers not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing.

After reading the HASP and attending a pre-entry briefing, Geosyntec employees and other parties covered under this HASP must sign the following acknowledgment statement.

*“I have read, understand, and will perform my work in accordance with the information set forth in this HASP.”*

<b>Signature</b>	<b>Printed Name</b>	<b>Date</b>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**3. EMERGENCY CONTACT INFORMATION**

<i>Contact</i>	<i>Telephone Numbers</i>	
	<i>Office</i>	<i>Alternate (Type)</i>
Fire Department	703-746-5200	
Police Department	911	703-746-4444
Site Emergency Response (if applicable)		
Hospital - Inova Alexandria Hospital	703-504-3000	
Director of H&S– <i>Dale Prokopchak</i>	804-665-2811	804-349-8067 (Cell)
H&S Regional Manager – <i>Mark Malchik</i>	978-206-5777	781-392-5440 (Cell)
Project Manager – <i>Mark Johnson</i>	410-381-4333	410-382-4438 (Cell)
Site Health & Safety Officer -	To Be Determined	To Be Determined
H&S Coordinator – <i>Mike Hansen</i>	410-910-7640	443-812-1430
Principal- or Associate-in-Charge – <i>Mike Houlihan</i>	410-910-7641	410-707-8550 (Cell)
Utility Emergencies	811	
Work Care	888-449-7877	714- 978-7488
Facility Contact – <i>Burt McCullough</i>	678-641-2503	
Client Contact – <i>Burt McCullough</i>	678-641-2503	
Subcontractor -		
Subcontractor -		
Other -		

**4. APPLICABILITY OF THIS HASP**

This HASP was prepared in accordance with Geosyntec Consultants’ H&S Procedures for use by Geosyntec project staff and subcontractors. Subcontractors, at a minimum, shall ensure that their employees, and those of its lower tier subcontractors, comply with these procedures and other health, safety and security provisions in the Subcontract. Compliance with this HASP shall represent the minimum requirements to be met by subcontractors, who shall be responsible for examining all requirements and determining whether additional or more stringent health, safety and security provisions are appropriate for their portion of the work and implementing them accordingly. Therefore, for firms executing all or any portion of the work, this document and its contents should not be used without a thorough peer review by their health and safety managers. Prior to commencing work, such firms are responsible for reviewing and supplementing the HASP to add appropriate procedures specific to their portion of the work.

**5. SITE/TASK/HAZARD DESCRIPTION**

5.1 Site Background

The following is a brief description of the site, including information as to the location, approximate size, previous usage, and current usage. A description of the tasks to be performed is also presented.

- Site Location: 1400 Royal Avenue, Alexandria, Virginia
- Previous Site Usage: Coal-Fired Power Plant
- Current Site Usage: Not-in Service

- Description of Surrounding Property/Population:

North	Residential	East	National Park Service Trail and Potomac River
South	Residential/Commercial	West	Residential

- Summary of previous site investigations (if available/applicable):

The site has been previously investigated to assess petroleum hydrocarbon contamination of soil and groundwater related to an historical release of No. 2 fuel oil from two former under-ground storage tanks (USTs) located beneath the plant building. Based on prior investigations, non-aqueous phase liquid (NAPL) and dissolved phase constituents, typical of fuel oil, have been identified in site soil and groundwater.

## 5.2 Task Descriptions

### Task 1: Well Abandonment

Abandonment will be performed either by removing the well casing and grouting/backfilling the borehole to meet regulatory requirements or grouting/backfilling in place to meet regulatory requirements.

### Task 2: Well Installation

Monitoring and recovery wells will be installed in various study areas to determine the vertical and horizontal extent of impacts at the site.

Task 3: Groundwater Sampling, Monitoring, and Gauging

Quarterly groundwater sampling will take place at existing and newly installed wells at the site. In addition, weekly groundwater and LNAPL gauging/recovery will be performed until LNAPL thicknesses are less than 0.1 feet thick.

Task 4: Visual Inspection of Bulkhead/Retaining Wall and Geophysical Survey

Inspection of the bulkhead/retaining wall on the eastern boundary of the site will be performed by boat to develop a detailed evaluation of the interface with the Potomac River.

A geophysical survey will be performed by boat as part of ongoing site characterization activities at the site to develop a detailed evaluation of the bulkhead/retaining wall interface with the Potomac River.

Task Hazard Analyses (THAs) associated with these tasks are presented in Appendix B

### 5.3 Chemical Hazards

The classes of chemicals that are known or suspected to be present that may be encountered while performing site work include the following:

- Total petroleum hydrocarbon (TPH)
- Polycyclic aromatic hydrocarbons (PAHs)

Controls for these hazards are presented in the THAs included in Appendix B. A summary of these chemical hazards is presented in Appendix C.

### 5.4 Physical Hazards

The following physical hazards have been identified associated with the work to be performed and the site conditions.

- Boating
- Cold Stress
- Compressed Gases

- Downhole Logging
- Drilling (including Indoor)
- Drum and Container Handling
- Electrocutation
- Eye Injury
- Fall Protection
- Hand/Foot Injury
- Heat Stress
- Heavy Equipment
- Knives / Blades
- Lifting Heavy Loads
- Loud Noise/Vibration
- Portable Power/Hand Tool
- Slips, Trips, and Falls
- Thoroughfares / Traffic
- Utility Protection
- Other:

Controls for these hazards are presented in the THAs included in Appendix B.

### 5.5 Biological Hazards

The following biological hazards have been identified associated with the work to be performed and the site conditions.

- Biting/stinging insects
- Poisonous plants
- Waste water
- Other:

Controls for these hazards are presented in the THAs included in Appendix B.

## 6. GENERAL SAFE WORK PRACTICES

The following general safe work practices must be adhered to while performing site work:

- Basic PPE shall be worn, including hard hats, safety glasses, hard-toed boots, and high-visibility vests. If conditions allow, the requirement for hard hats and hard-toed boots may be reduced with approval of the SHSO and Project Manager.
- Minimize contact with impacted materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before personal decontamination is not allowed. Employees who are suspected of being under the influence of illegal drugs or alcohol will be removed from the site. Workers taking prescribed medication that may cause drowsiness shall not operate heavy equipment and are prohibited from performing tasks where Level C or B personal protective equipment is required.
- Practice good housekeeping.
- Use of contact lenses is not allowed under certain hazardous working conditions.
- The following conditions must be observed when operating a motor vehicle:
  - Wearing of seat belts is mandatory
  - The use of headlights is mandatory during periods of rain, fog, or other adverse weather or low-light conditions
  - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
  - Posted traffic signs and directions from flagmen must be observed
  - Equipment and/or samples transported in vehicles must be secured from movement
  - The use of vehicles acquired by Geosyntec by non-Geosyntec personnel is prohibited
- In an unknown situation, always assume the worst reasonable conditions.
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.

- Conflicting situations may arise concerning safety requirements and working conditions. These must be addressed and resolved rapidly by the SHSO and PM to relieve motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol are not allowed. Workers unwilling or unable to comply with established procedures will be asked to leave the work site.

Please refer to Attachment A for NRG specific health and safety procedures.

## 7. EMERGENCY RESPONSE

This section discusses emergency response procedures and response equipment to be maintained on site. A table presenting a list of contacts and telephone numbers for the applicable local and off-site emergency responders is provided inside the front cover of this HASP (after figures).

### 7.1 Injury and Emergency Response Procedures

In the event of an **injury** to an employee, the instructions for injury response and reporting, located in the front of this HASP, must be implemented immediately. In the event that an **emergency** develops, the following procedures are to be implemented:

- The Site Health and Safety Officer (SHSO), or designated alternate, should be immediately notified via the on-site communication system. The SHSO assumes control of the emergency response.
- If applicable, the SHSO must immediately notify off-site emergency responders (e.g., fire department, hospital, police department, etc.) and must inform the response team of the nature and location of the emergency on site.
- If applicable, the SHSO may call for evacuation of the site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map.
- For small fires, flames should be extinguished using the appropriate type of fire extinguisher. Large fires should be handled by the local fire department.
- If a worker is injured, the procedures presented in “Instructions for Injury Response”, located in the front of this HASP, must be implemented immediately.
  - After an incident has stabilized, the procedures presented in “Instructions for Incident Reporting”, located in the front of this HASP, must be followed.

### 7.2 Emergency Response Equipment

Emergency response equipment will be maintained in the work area as necessary for this project. Examples of emergency response equipment include first aid kits, fire extinguishers (Type ABC), and eyewash bottles.

## 8. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITY

Project personnel and their responsibilities in regard to health and safety concerns on this project are as follows:

Project Manager (PM): Mark Johnson

- Approve this HASP and amendments, if any;
- Monitor the field logbooks for health and safety work practices employed;
- Coordinate with SHSO so that emergency response procedures are implemented;
- Check that corrective actions are implemented;
- Check and document that qualified personnel receive this plan and are aware of its provisions and potential hazards associated with site operations, and that they are instructed in safe work practices and familiar with emergency response procedures; and
- Provide for appropriate monitoring, personal protective equipment, and decontamination materials.

Site Health and Safety Officer (SHSO): [To Be Determined]

- Prepare and implement project HASP and amendments, if any, and report to the Project Manager for action if deviations from the anticipated conditions exist and authorize the cessation of work if necessary;
- Check that site personnel meet the training and medical requirements;
- Conduct pre-entry briefing and daily tailgate safety meetings;
- Check that monitoring equipment and personal protective equipment are operating correctly according to manufacturer's instructions and such equipment is utilized by on-site personnel.
- Calibrate or check calibration of monitoring equipment and record results;
- Check that decontamination procedures are being implemented;
- Implement site emergency response and follow-up procedures;
- Notify the HSC in the event an emergency occurs; and
  - Perform and document weekly inspections.

Health and Safety Coordinator: Mike Hansen

- Review and audit HASP and amendments;
- Notify Director of Health & Safety when an emergency occurs;
- Assist with the implementation of the corporate health and safety program; and
- Consult with staff on health and safety issues.

Site Workers

- Provide verification of required health and safety training and medical surveillance prior to arriving at the site;
- Notify supervisors of workplace accommodation requirements as the result of physical limitations or medical conditions;
- Attend pre-entry briefings and daily tailgate safety meetings;
- Immediately report accidents and/or unsafe conditions to the SHSO;
- Be familiar with and abide by the HASP; and
- Be ultimately responsible for his or her own safety.

**9. WORKER TRAINING AND MEDICAL SURVEILLANCE**

Personnel involved in field activities subject to OSHA HAZWOPER 29 CFR 1910.120 will be required to participate in both a health and safety training program that complies with criteria primarily set forth by the OSHA HAZWOPER in 29 CFR 1910.120(e) and a medical surveillance program covered under 29 CFR 1910.120(f), or equivalent regulations based on the jurisdiction in which the project is performed.

**9.1 Pre-Assignment and Annual Refresher Training**

Prior to arrival on site, the Geosyntec Project Manager will be responsible for monitoring that their staff meet the requirements of pre-assignment training (40/24 hours per Procedure HS 301). In addition, personnel must be able to document dates of attendance at an annual 8-hour refresher and three days of fieldwork under a qualified supervisor. Failure to provide this documentation will prohibit entry to the active work area(s) (i.e., Exclusion Zone).

**9.2 Site Supervisor Training**

Consistent with OSHA 29 CFR 1910.120 (e)(4), prior to arrival on site, individuals designated as site supervisors require an additional eight hours of specialized training.

### 9.3 Initial Site Safety Orientation and HASP Review

In addition to complying with 29 CFR 1910(e), site personnel will attend an initial safety orientation during which the HASP and applicable THAs will be reviewed prior to initiating field activities. This review will include the following:

- Understanding the lines of authority regarding health and safety and site personnel roles and responsibilities;
- Information of specific hazard agents related to the site and site operations will be discussed, such as health hazards of site chemicals and specific safety hazards of processes, tools, and equipment;
- Training in the proper use, maintenance, and decon protocol of PPE and Level(s) of Protection;
- Appropriate work practices and engineering controls to reduce/eliminate exposures to site hazards will be reviewed;
- Personnel will be informed of means for normal site and emergency communication(s);
- Air monitoring strategies will be discussed to include the frequency/types, action levels, sampling techniques, pre/post calibration techniques;
- Unique/site specific medical surveillance requirements that need to be considered based on site contaminants;
- Understanding site control measures, work zones, and proper decontamination procedures for personnel/tools/vehicles, etc. to reduce the potential for both on/off site contamination;
- Personnel will be trained to respond quickly and properly in the event of an emergency; and
- Personnel involved in specific hazardous activities, such as confined space entry, drum handling, sampling unknowns, etc. will receive specialized training in the appropriate techniques to employ prior to commencing these operations.

### 9.4 Baseline Medical Surveillance Exam

The baseline medical examination is used to identify physical capabilities and certain medical limitations that may have an impact on the candidate's ability to perform in the position and/or job activity for which he/she is being considered, as well as to establish certain baseline medical parameters. The initial test results can then be compared against future periodic or project-specific monitoring results.

#### 9.5 Periodic/Annual/Biennial Medical Exam

The periodic medical examination is used to evaluate an employee's continued fitness for duty and to assess possible impact(s) occupational exposures may have had on their health status.

The periodic examination includes an update to the medical and work history, results of previous occupational exposure assessments, and a detailed medical exam tailored to the job description.

The Medical Director from WorkCare determines the frequency of the periodic medical exams based on regulatory requirements, the position/work activities of the employee, and the level of exposure to physical, chemical, and biological agents.

#### 9.6 Exposure/Activity/Project-Specific Medical Testing

Exposure-specific medical tests and/or evaluation of biological indices may be conducted to establish a baseline for certain project-specific parameters, to monitor the effectiveness of hazard controls, and/or to assess the impact of occupational exposures associated with a particular work activity or project. The Medical Director, in coordination with the EHS Department, will require or recommend an exposure-specific exam when deemed appropriate based on knowledge of project hazards, occurrence of employee health symptoms, or an unexpected exposure event. Requests for exposure-specific examinations will be forwarded to the EHS Department, who will process the requests in collaboration with the Medical Director. The Medical Director will determine the type and frequency of the exposure-specific medical exams for employees designated to participate based on sound medical practice, latest toxicology information, and current regulatory requirements.

#### 9.7 Exit Exam

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment with Geosyntec or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination may be used to assess potential changes in medical status that have occurred during the course of employees' previous work activities, and to establish a medical baseline at the time of departure.

#### 9.8 Exit/Termination

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment with Geosyntec or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination assesses potential adverse impacts occupational exposures may have contributed to the employee's health status.

## 10. MAPS AND SITE CONTROL

### 10.1 Routes to Hospital and Urgent Care Facility

A hospital and an urgent care facility near the site have been identified. Maps to the hospital and urgent care are included after the Table of Contents of this HASP. Both figures also include the facility name and phone number.

### 10.2 Site Map

A site map is located inside the cover of this HASP. The site map is intended to show the location of the work zone(s), to provide on-site orientation, and to delineate evacuation routes. Changes may be made to the site map by the SHSO based on changing site conditions. The site map should be accessible in the work area.

### 10.3 Buddy System

The buddy system is required when work is performed in hazardous areas. The buddy system includes maintaining regular contact with one or more onsite Geosyntec personnel, clients, and/or contractors to periodically check on the condition of site workers such that each employee in the work group is observed by (or in verbal contact with) at least one other employee in the work group. For field visits with only one employee onsite, the buddy system shall be implemented via periodic telephone contact with offsite Geosyntec personnel. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

### 10.4 Controlled Work Zones

APPLIES TO TASK: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧  Not Applicable

Three controlled work zones, including an Exclusion Zone, a Contaminant Reduction Zone (CRZ), and a Support Zone, are required for the task(s) indicated above. Geosyntec employees must not be allowed into the CRZ or Exclusion Zone or the Work Zone until they have received the proper personal protective equipment (PPE) and they have read, understand, and meet the requirements outlined in this HASP. The Exclusion Zone is defined as the area on site where contamination is suspected and tasks are to be performed. The CRZ is defined as the area where equipment and workers are to be decontaminated as they leave the Exclusion Zone. The Support Zone is defined as the command area and may serve as a staging and storage area for supplies. The location and extent of the work zones may be modified as necessary as site investigation information becomes available. For sites that do not require the three controlled work zones, the area(s) where work is to be performed shall be called the Work Zone.

Visitors to the site may need to be continually escorted for safety purposes. Visitors under Geosyntec's direction need to check in with the SHSO upon visiting the site.

For the tasks identified above, the boundaries of the Exclusion Zone, CRZ, and Support Zone, or the Work Zone, shall be marked using appropriate methods, including but not limited to warning tape, signs, traffic cones, fencing, or other appropriate means.

#### 10.5 Site Access

Certain sites require controlled access to the work area. Examples of access controls include sign in/sign out logs, checking in with guards, and donning identification badges. Geosyntec personnel will adhere to the site-specific access requirements and monitor that subcontractors and other Geosyntec visitors abide by site-specific access control requirements.

#### 10.6 Inspections

APPLICABLE     NOT APPLICABLE

Based on the hazards identified for the project, periodic health and safety inspections may be performed. The Health & Safety Inspection Checklist records should be kept on file at the project site. The frequency for periodic inspections is:

- Weekly  
 Monthly  
 Other: \_\_\_\_\_

### 11. **TAILGATE MEETINGS**

Tailgate meetings must be held daily prior to starting work to discuss important health and safety issues concerning tasks to be performed during that shift. Non-Geosyntec site workers should also communicate health and safety concerns associated with the tasks they will be performing. Topics discussed in the tailgate meetings must be documented.

### 12. **STOP WORK AUTHORITY**

In accordance with the Company's Procedure HS 203 - Stop Work Authority, Geosyntec personnel and subcontractor personnel have the authority and responsibility to issue a Stop Work Order if unsafe actions and/or conditions are identified. The Stop Work Authority (SWA) process involves a stop, notify, correct, and resume approach for resolving observed unsafe work actions or conditions. The person issuing the work stoppage will first notify workers engaged in or affected by the unsafe activity or condition and require that associated work be stopped. After this Stop Work Order is issued, the Geosyntec project manager and the supervisors for affected or concerned contractors will also be notified. The Geosyntec project manager will document the issuance of the Stop Work Order on the form provided in Procedure HS 203. Work will not resume until the issues and concerns of the Stop Work Order have been adequately addressed.

### 13. AIR MONITORING

APPLIES TO TASK: ① ② ③ ④ ⑤ ⑥ ⑦ ⑧  Not Applicable

Air monitoring will be performed to evaluate airborne chemical and/or dust exposure levels within the breathing zone of site workers. Hazardous conditions may include concentrations that may cause acute or chronic illness, potential oxygen deficient environments, or potential explosive environments. Air monitoring may also be performed to evaluate the adequacy of engineering, administrative, and/or PPE controls. Air monitoring may be “real-time” (e.g., the instrument provides immediate results at the project), using multi-gas meters, photoionization detectors (PIDs), or colorimetric tubes. Personal monitoring may also be performed by collecting samples and forwarding to a laboratory for analysis and quantification.

The type(s) of air monitoring equipment required and associated action levels are outlined in Appendix D. Monitoring equipment must be calibrated based on the manufacturer’s requirements. Calibration results and air monitoring measurements must be documented. Based on the results noted and site activities or scope of work changes, the frequency of air monitoring may be adjusted on site by the SHSO with the consent of the Project Manager and communication with the HSC.

### 14. PERSONAL PROTECTIVE EQUIPMENT

The levels of PPE required for each task are presented in Appendix E. Required equipment and types of protective clothing materials, as well as an indication of the initial level of protection to be utilized, are listed. The level of protection may be upgraded or downgraded by the SHSO according to controls requirements in Appendix E or according to action levels provided in Appendix D.

If respirators are worn, workers must abide by the company’s Respiratory Protection Program in accordance with company’s Respiratory Protection Program (EHS 112).

### 15. DECONTAMINATION

The SHSO and Project Manager will determine the type and level of decontamination procedures for both personnel and equipment based on evaluation of specific work activities in the controlled work zones. Medical treatment will take precedence over decontamination in the event of a life threatening and/or serious injury/illness. Personnel will perform decontamination in designated and identified areas upon leaving “hot zones” where the potential exists for exposure to hazardous chemical, biological, or environmental conditions.

Decontamination of personnel in Level D (modified) will consist of proper containerization and disposal of coveralls, disposable boots, and gloves (if applicable).

Decontamination of personnel in Level C, if applicable, will consist, at a minimum, of:

- Removal and cleaning/disposal of boot covers, coveralls, and outer gloves;
- Removal, cleaning, and storage of respiratory protection;
- Washing of non-disposable PPE suspected of being contaminated using a soap solution followed by a water rinse; and
- Removal and disposal of inner gloves.

Hand tools and sampling equipment shall be decontaminated as needed by washing in decontamination basins with appropriate solutions, or, if possible, by dry decontamination. Wash solutions and PPE may require disposal at a licensed waste facility.

## **16. SPILL CONTAINMENT**

The task(s) for this project may involve the handling of drums and/or containers that contain stored chemicals, hazardous materials, and/or wastes. The drums and/or containers may have been spilled/dislodged during site activities due to compromised construction of the drum/container, transportation accidents, improper packaging practices, and improper handling of hazardous materials during on/off loading. Containers shall be inspected and their integrity assured prior to being moved and/or handled. If the integrity of the container is in question, the container shall be over packed or its contents transferred. Operations shall be organized and coordinated to minimize movement of such containers. Where spills, leaks, or ruptures may potentially occur, a supply of sorbents shall be located in the immediate area. Additional preventative measures include:

- UN-approved 55-gallon drums, bins, and/or Baker tanks will be inspected for visible defects upon delivery to the site;
- UN-approved 55-gallon drums will also be inspected to ensure each drum includes a resealable lid with a small resealable sampling port near the top, or on the side of the drum and that the enclosure is not deformed and/or distorted;
- Drums will not be completely filled to allow for possible expansion of liquid and will be set on wooden pallets to facilitate transport by forklift;
- The storage area will be inspected to check for leaks weekly while the containers are being filled and immediately after a relocation to a temporary on-site storage area; and
- Flat areas will be selected for temporary storage away from high-traffic work areas/zones and storm/sewer drains.

In the event of an unplanned release or spill of unknown or hazardous substances, the site supervisor will designate personnel who will support the spill containment, control, and/or clean-

up procedures. The team will request additional off-site emergency response assistance if necessary based on the type of spill, volume, potential toxicity, etc.

The spill area will be isolated and restricted to only authorized personnel designated to assist with the containment, control, or clean-up activity. Authorized personnel will be trained to contain and clean spills from typical materials and quantities used at the project location. Physical barriers will be set up to warn unauthorized personnel to stay clear and evacuate the affected area. The spill, leak, or incident will be assessed by the team and characterized to determine the appropriate course(s) of action(s) to consider:

- Small spills (i.e., maximum volume of 55 gallons of a liquid or 100 pounds of a solid) may be remediated using absorbent materials by designated personnel;
- Large spills (i.e., liquid volumes > 55 gallons or solid weights > 100 pounds) and/or spills of highly toxic materials may require assistance by off-site hazardous materials (HAZMAT) teams;
- Attempts shall be made to identify and stop the source(s) of spillage immediately while donning proper PPE (based on action levels and the air monitoring program) and performing air monitoring;
- The site supervisor will direct spill-response operations and stay at the spill area until it has been cleaned, inspected, and cleared for re-entry; and
- The site supervisor will prepare a spill incident and clean-up report and will communicate findings to the Project and Branch Manager and EHS Department.

#### 17. **CONFINED SPACE ENTRY**

APPLICABLE     NOT APPLICABLE

The task(s) for this project involve confined-space entry. Workers must abide by the company's Confined Space Entry Program (Procedure HS 118).

#### 18. **GLOBALY-HARMONIZED SYSTEM FOR HAZARD COMMUNICATION**

APPLICABLE     NOT APPLICABLE

The following procedures must be followed for chemicals brought onto the site by Geosyntec personnel or by subcontractors (i.e., decontamination solution, sampling preservatives, KB-1 solution, sodium permanganate, etc.) while performing the tasks of this project:

- Labels on primary chemical containers must not be defaced;
- Chemicals must be stored in appropriate storage containers;
- Secondary containers and storage cabinets must be correctly and clearly labeled;
- Chemicals incompatible with each other must not be stored together;

- Workers must receive training on the chemical hazards; and
- Safety Data Sheets (SDSs) must be added to Appendix F.

When chemicals are used on site, workers must abide by Geosyntec's GHS Hazard Communication Program (Procedure HS 115).

## 19. HASP AMENDMENTS

Over the course of this project, it is possible that the project-specific hazards and working conditions will change. This HASP may be reviewed and amended as necessary to effectively describe the changing working conditions and measures to mitigate the potential health and safety issues that may arise during the project. Amendments to the HASP should be briefly described in the following spaces provided. The full text of the amendments should be provided in Appendix A and/or additional THAs should be added to Appendix B.

### AMENDMENT 1:

Date: \_\_\_\_\_ Project Manager: \_\_\_\_\_ HSC: \_\_\_\_\_

Brief description of amendment:

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### AMENDMENT 2:

Date: \_\_\_\_\_ Project Manager: \_\_\_\_\_ HSC: \_\_\_\_\_

Brief description of amendment:

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**AMENDMENT 3:**

Date: \_\_\_\_\_ Project Manager: \_\_\_\_\_ HSC: \_\_\_\_\_

Brief description of amendment:

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## Appendix B: Task Hazard Analyses

TASKS		
①	Well Abandonment	⑤
②	Well Installation	⑥
③	Groundwater Monitoring	⑦
④	Visual Inspection of Bulkhead and Geophysical Survey	⑧

THAs for these tasks are presented in the following pages.

**INSERT THAs HERE**

## Appendix C: Summary of Chemical Hazards

### Petroleum Hydrocarbons

Petroleum hydrocarbons likely at the site include tar and/or fuel-related materials in soils and sediments. Gasoline, diesel, oil, and heavier hydrocarbons, such as grease, may be present. Volatile components of gasoline include benzene, toluene, ethylbenzene, and xylenes (BTEX).

The primary exposure routes for petroleum hydrocarbons during site activities are inhalation, dermal contact, and ingestion of contaminated soil, sediment, dust, or water. Lighter petroleum hydrocarbons such as gasoline and benzene readily volatilize and are primarily an inhalation concern, whereas the primary route of exposure to heavier petroleum hydrocarbons such as aromatic hydrocarbons, oil, and grease is dermal contact. The target organs primarily affected by prolonged exposure to petroleum hydrocarbons are the respiratory system, central nervous system, kidneys, liver, and skin. Prolonged dermal contact with petroleum hydrocarbons can cause irritation or dermatitis. The BTEX compounds are known or suspected human carcinogens.

Petroleum hydrocarbons such as gasoline are also flammable and can be a physical hazard when present in high concentrations. Combustion of petroleum hydrocarbons can produce carbon dioxide, carbon monoxide, aldehydes, fumes, smoke (particulate matter) and other products of incomplete combustion. Intentional and inadvertent combustion of petroleum hydrocarbons is not expected during sampling activities; however, personnel will evacuate the area should a fire occur. The table below summarizes BTEX exposure limits.

Chemical Name	PEL <sup>1</sup>	TLV <sup>2</sup>
Benzene	1	0.5
Toluene	200	50
Ethylbenzene	100	100
Xylene	100	100

<sup>1</sup> OSHA Permissible Exposure Limit (in parts per million)

<sup>2</sup> ACGIH Threshold Limit Value (in parts per million)

### Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are produced during combustion events due to inadequate oxidation of fuel. PAHs in the pure state are yellowish crystalline solids. They are found in coal tar and in products of incomplete combustion. These chemicals have varying degrees of potency for causing cancer, with benzo(a)pyrene being among the most potent. The PAHs are evaluated collectively as

COAL TAR PITCH VOLATILES. Coal tar pitch volatiles may cause photo-sensitization and a rash where sunlight strikes the skin. Exposure may also cause cancer of lungs, skin, bladder or kidneys. Benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3,c,d)pyrene have been identified as carcinogenic.

This information on PAH compounds is presented for site contaminant awareness. While the potential for site personnel sustaining significant inhalation exposures to volatilized PAH compounds during the site activities of this project is minimal, there is the potential for inhalation of PAH-contaminated dust, and handling of contaminated soils presents skin exposure hazards. Use of dust suppression techniques (as appropriate) and the proper use of the PPE will adequately protect personnel. Some significant PAH compounds include:

- Anthracene
- Benzo(a)pyrene Benzo(a)anthracene
- Chrysene Benzo(b)fluoranthene
- Fluoranthene Benzo(k)fluoranthene
- Fluorene Benzo(g,h,i)perylene
- Indeno(1,2,3,c,d)pyrene Benzo(d,e,f)phenanthrene
- Phenanthrene

OSHA PEL for coal tar pitch volatiles is 0.2 mg/m<sup>3</sup> and NIOSH REL is 0.1 mg/m<sup>3</sup> , TLV 0.2 mg/m<sup>3</sup> is for 8 hour time weighted average (TWA).

## Appendix D: Air Monitoring

Applies to Task:     ①     ②     ③     ④     ⑤     ⑥     ⑦     ⑧

<input checked="" type="checkbox"/> <b><i>Photoionization Detector (PID)</i></b> Brand/Model No.: <u>MiniRAE 3000 (or similar)</u> eV: <u>10.6</u> Monitoring Frequency: <u>Constant</u>	<input type="checkbox"/> <b><i>Oxygen (O<sub>2</sub>) Meter</i></b> Brand/Model No.: _____ Monitoring Frequency: _____	<input type="checkbox"/> <b><i>Explosimeter</i></b> Brand/Model No.: _____ Monitoring Frequency: _____																								
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Breathing Zone</th> <th style="text-align: left;">Action</th> </tr> </thead> <tbody> <tr> <td><u>0</u> to <u>25</u></td> <td>Level D PPE</td> </tr> <tr> <td><u>-</u> to <u>-</u></td> <td>Level C PPE</td> </tr> <tr> <td>Greater than <u>50</u></td> <td>Stop work. Evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.</td> </tr> </tbody> </table> Note: _____	Breathing Zone	Action	<u>0</u> to <u>25</u>	Level D PPE	<u>-</u> to <u>-</u>	Level C PPE	Greater than <u>50</u>	Stop work. Evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Reading (%)</th> <th style="text-align: left;">Action</th> </tr> </thead> <tbody> <tr> <td>Less than 19.5</td> <td>Stop work. Evacuate the area.</td> </tr> <tr> <td>19.5 to 23.5</td> <td>Continue to work with caution.</td> </tr> <tr> <td>Greater than 23.5</td> <td>Stop work. Evacuate the area.</td> </tr> </tbody> </table> Note: _____	Reading (%)	Action	Less than 19.5	Stop work. Evacuate the area.	19.5 to 23.5	Continue to work with caution.	Greater than 23.5	Stop work. Evacuate the area.	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Source (% LEL)</th> </tr> <tr> <th style="text-align: left;">Reading</th> <th style="text-align: left;">Action</th> </tr> </thead> <tbody> <tr> <td>1 to 10</td> <td>Continue with caution.</td> </tr> <tr> <td>Greater than 10</td> <td>Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to &lt;10% LEL.</td> </tr> </tbody> </table> Note: _____	Source (% LEL)		Reading	Action	1 to 10	Continue with caution.	Greater than 10	Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.
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<input type="checkbox"/> <b><i>Flame Ionization Detector (FID)</i></b> Brand/Model No.: _____ Monitoring Frequency: _____	<input type="checkbox"/> <b><i>Chemical Detector Tube</i></b> Brand/Model No.: _____ Monitoring Frequency: _____	<input type="checkbox"/> <b><i>Other</i></b> Brand/Model No.: _____ Monitoring Frequency: _____																								
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### Appendix E: Personal Protective Equipment

	Task ①	Task ②	Task ③	Task ④	Task ⑤	Task ⑥	Task ⑦	Task ⑧
<b>Potential PPE Level per Task:</b>	<input checked="" type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D	<input type="checkbox"/> D			
	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C	<input type="checkbox"/> C
<i>Modified Level D</i>				<i>Level C</i>				
<i>Equipment</i>		<i>Material/Type</i>		<i>Equipment</i>		<i>Material/Type</i>		
<input checked="" type="checkbox"/> Safety glasses				<input type="checkbox"/> Full-face air-purifying respirator		Cartridge Type:		
<input checked="" type="checkbox"/> Hard-toed boots				<input type="checkbox"/> Half-mask air-purifying respirator		Cartridge Type:		
<input checked="" type="checkbox"/> Protective clothing				<input type="checkbox"/> Safety glasses				
<input checked="" type="checkbox"/> Hard hat*				<input type="checkbox"/> Hard-toed boots				
<input checked="" type="checkbox"/> Hearing protection*				<input type="checkbox"/> Protective clothing				
<input checked="" type="checkbox"/> High-visibility vest*				<input type="checkbox"/> Hard hat				
<input type="checkbox"/> Outer boots*				<input type="checkbox"/> Hearing protection*				
<input checked="" type="checkbox"/> Outer gloves*		Nitrile		<input type="checkbox"/> High-visibility vest*				
<input type="checkbox"/> Other:				<input type="checkbox"/> Outer boots*				
				<input type="checkbox"/> Outer gloves*				
				<input type="checkbox"/> Inner gloves*				
				<input type="checkbox"/> Other:				

\* PPE items may be downgraded (only with concurrence of SHSO and PM)

## Appendix F: Safety Data Sheets

Included in this HASP	Chemical
<input type="checkbox"/>	Acetone
<input checked="" type="checkbox"/>	Alconox
<input type="checkbox"/>	Ammonia
<input checked="" type="checkbox"/>	Bentonite
<input type="checkbox"/>	Diesel Fuel Oil No. 2-D
<input checked="" type="checkbox"/>	Gasoline
<input type="checkbox"/>	Helium
<input type="checkbox"/>	Hexane
<input type="checkbox"/>	Hydrochloric Acid
<input type="checkbox"/>	Hydrogen
<input checked="" type="checkbox"/>	Isobutylene Calibration Gas
<input type="checkbox"/>	Isopropyl Alcohol
<input type="checkbox"/>	KB-1
<input type="checkbox"/>	Methane Calibration Gas
<input type="checkbox"/>	Nitric Acid
<input type="checkbox"/>	Permanganate
<input type="checkbox"/>	Portland Cement
<input type="checkbox"/>	Sulfuric Acid
<input checked="" type="checkbox"/>	Other: <u>Diesel Fuel</u>
<input type="checkbox"/>	Other: _____
<input type="checkbox"/>	Other: _____
<input type="checkbox"/>	Other: _____

Note: SDSs are for chemicals that used to perform project work, not site contaminants.

**INSERT SDSs HERE**