

# **ENVIRONMENTAL WORK PLAN**

## **For Geotechnical Investigations Over Quarry 1 and Quarry 2**

**CRATER RESOURCES SUPERFUND SITE  
UPPER MERION TOWNSHIP  
MONTGOMERY COUNTY, PA**

*Prepared for:*

**Renaissance Land Associates, L.P., Renaissance Land Associates II, L.P. and Renaissance  
Land Associates III, L.P.  
King of Prussia, Pennsylvania**

*Prepared by:*

**Synergy Environmental, Inc.  
Royersford, Pennsylvania**

**Synergy Project No. 14-00151-01**

**March 2016**

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## **1.0 Introduction**

Synergy Environmental, Inc. (Synergy) prepared this Environmental Work Plan (EWP) on behalf of Renaissance Land Associates, L.P., Renaissance Land Associates II, L.P. and Renaissance Land Associates III, L.P. (collectively “RLA”) to address activities associated with proposed geotechnical investigations including impacted material handling and capping changes related to a revised development plan for the properties located at 2901 and 2501 Renaissance Boulevard, King of Prussia, PA. These properties are located within the Crater Resources Superfund Site and due to a number of changed conditions the proposed development of the remaining undeveloped portions of the property has changed from non-residential to residential. Furthermore, the development of the sites will involve more than one construction season during which capping of at least one quarry will require a phased approach.

This EWP addresses geotechnical borings that must be completed within the former quarries to collect samples and data for the engineering calculations necessary to design the foundations for the proposed future development. Some of these borings may be advanced into potentially impacted materials.

### **1.1 Previous Superfund Remedial Action Construction**

The Crater Resources Superfund Site has been thoroughly investigated by multiple regulatory agencies over the past 40 years. These investigations have ranged from exhaustive intrusive on-Site soil sampling programs to file reviews that included historical aerial photograph and document studies, to in-depth interviews with local land-owners, site workers, local officials, and responsible party representatives. The results of these studies defined specific Areas of Concern (AOCs) located throughout the Site, each characterized by tar-like sludge or Waste Ammonia Liquor (WAL) impacted soils. Impacted soils consisted of soil and fill with concentrations of site specific contaminants of concern (COC) above the site specific soil cleanup standards. Within the RLA portion of the Site, the AOCs have been defined, investigated, delineated, and remediated to a non-residential clean-up standard. The remediation work performed to date included relocation of contaminated soils to Quarry 2 and the installation of temporary caps over Quarry 1 and Quarry 2.

### **1.2 Approved Activities**

Construction of the permanent engineered caps over Quarries 1 and 2 must still be completed. This work will be performed in accordance with the final 100% Remedial Design Report (100%RDR) as approved by EPA, or as subsequently modified pursuant to work plans submitted to and approved by EPA. The existing temporary capping systems over the quarries consist of a geotextile barrier and PENNDOT 2A modified stone. During construction, these temporary caps may be left in place in areas where the development requires fill but it is expected that they will also be breached in multiple locations for geotechnical testing, footers, and foundations.

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## **1.3 Proposed Activities**

This EWP addresses work associated with the collection of approximately 30 additional geotechnical borings. An estimated 14 are required to design the foundations of those portions of future residential buildings planned to be located within the limits of the former quarries.

This EWP does not change any other aspects of the previously approved work plans or the Health and Safety Plan except as described in this document. The new task described in this document is:

- Geotechnical borings and sample collection within the Quarry limits for structural design purposes. The implementation of geotechnical boring is planned to occur during the 2<sup>nd</sup> quarter of 2016.

## **2.0 Planned Construction Changes**

Synergy field construction over-sight staff will be used to assure compliance with the EPA approved design documents, Health and Safety, and work plans developed for compliance with the ROD. RLA's geotechnical engineers will perform all of the geotechnical boring work under the oversight of Synergy.

Where any workers may be at risk of possible contact with site contaminants, those personnel at risk will comply with OSHA 29 CFR 1910.120 safety and training requirements and Synergy personnel will be available to provide site specific training as needed.

## **2.1 Geotechnical Borings within the Quarry limits**

Geotechnical borings will be required in order to design the building foundations and parking lot for this development. Data will be collected by advancing borings in the area covered by the building to collect soil samples for testing. Some of these borings have been completed in areas surrounding the quarries during previous remedial construction events however, additional borings are now required due to the changed building location.

The drilling program includes deep borings at the northern end of Quarry 1 that coincide with the proposed building footprint. These borings are planned to extend to bedrock. Based on existing borings completed in this vicinity by others the depth to the bottom of the quarry pit in this area is anticipated to be approximately 25 to 35 feet below existing grade. In addition there are shallow (10 feet deep) test borings planned within the Quarry 1 locations for the proposed parking area. The proposed boring locations are provided in Attachment 1.

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These test borings are to be drilled using a 6 inch solid stem auger or an 8 inch hollow stem auger if borehole collapse is a concern. Coring of the underlying bedrock is not anticipated. Soil samples are to be collected from these boring locations using a 2-inch OD split spoon sampler at the following frequency - continuous within existing fill soils and at a maximum 5 foot interval in undisturbed soils. It is anticipated that the drilling spoils will be used to backfill the borehole at each location. The backfilling process should utilize all the spoils generated. However, the contractor will provide measures for on-site containment of a limited amount of excess drilling spoils.

## **2.2 Soil & Material Handling for Geotechnical Borings**

At each proposed boring location, the temporary cover material of PENNDOT 2A modified stone will be carefully removed to uncover and expose the geotextile fabric. A small portion of the exposed geotextile fabric will be cut so that drilling may commence into the quarry fill without damaging the surrounding geotextile fabric. The area immediately surrounding the borehole will be covered with 6 mil plastic to facilitate separation of clean areas from potential contamination during the drilling and sampling activities.

As the borings are advanced, spoils will be shoveled into drums for temporary containment until they can be placed back down the borehole. Once the borings have been backfilled any excess spoils from all of the borings will be consolidated in drums for temporary storage.

After the borings have been backfilled, a new piece of geotextile fabric will be cut to completely cover the exposed geotextile in the cleared work area and placed over the exposed geotextile. This fabric will be re-covered with 2A modified stone to blend evenly with the surrounding grades.

Any excess impacted materials will be staged on site for re-use or off-site disposal as described in section 2.3 below.

## **2.3 Temporary Impacted Soil Staging and Disposal**

Under all circumstances, any excavated impacted materials will be managed on plastic and covered as appropriate to minimize dusting and odors. Details of handling methods, health & safety requirements, air monitoring, etc are described in the approved work plans.

Upon completion of the day's activities all impacted materials will be containerized either in DOT approved drums or roll off containers with tarps. Appropriate security measures shall be implemented to secure the work areas and any temporary staging areas. All excess impacted materials shall be removed from the site prior to or in coordination with the final demobilization of the contractor who generated the material.

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It is expected that the geotechnical borings will only generate one or two drums of material that will not be able to be placed back into the bore holes. Given the small amount of waste, it would not be reasonable to open up any other areas of the cap. Therefore, prior to mobilization for the work, a waste disposal application and profile will be completed for Waste Management's GROWs facility located in Tullytown, PA. This facility has previously accepted wastes from the Crater site and it is expected that minimal effort will be required to renew or update a previously approved waste profile. Provisions for disposal and transportation of the drummed waste will be established so that any excess spoils can be promptly removed from the site.

Synergy will be providing environmental oversight for all intrusive activities on the property and, as the owner's authorized representative, will prepare the necessary waste profile application for off-site disposal of drummed waste generated by the geotechnical boring program.

## **2.4 Documentation and Reporting**

Documentation and reporting will include the following:

- Health and Safety Plan Implementation Documentation,
- Waste profile documentation, shipping manifests, and
- Daily logs/field file documents by the Synergy construction surveillance field engineer;

### **2.4.1 Field Documentation**

The Synergy field engineer will maintain a bound field notebook and a field file that documents daily records of significant events, observations, and measurements during the geotechnical and construction activities. Each log-book page is numbered and is to be signed and dated. This notebook and field files will be kept as a permanent record. Information in field notebooks and field files will include but not be limited to the following items:

- Names and affiliations of personnel on site involved in remediation related tasks.
- General description of each day's field activities.
- Daily health and safety monitoring and awareness briefings.
- Documentation of weather conditions during construction work.
- Records of site visitations.
- Air monitoring records.
- Environmental sampling and analyses of soil, if performed
- Soil or waste management activities
- Photos

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## **3.0 Site Controls**

### **3.1 General Site Security**

Appropriate security measures shall be implemented to secure the work areas and any temporary staging areas in accordance with the requirements set forth in the plans previously approved by EPA. The existing site fencing will be maintained by RLA and / or their sub-contractors at all times, including during the planned site activities.

### **3.2 Notifications**

RLA will prepare a formal notification of construction activities for distribution to Renaissance Business Park building owners and tenants located within the proximity of the construction work areas.

### **3.3 Health and Safety**

All work will be performed in accordance with the Site-specific HASPs. A copy of Synergy's HASP is included in Attachment 2 of this Plan. Copies of the geotechnical contractor's health and safety plans are provided in Attachments 3 and 4.

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## **ATTACHMENTS**







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**Health & Safety Plan  
For  
2015-2016 Residential Developments  
Over  
Quarry 1 and Quarry 2**

Prepared for:

Crater Resources Superfund Site  
Upper Merion Township, Pennsylvania

Synergy Environmental, Inc.

March 2016

Synergy Project No. 14-00151-01

# SYNERGY ENVIRONMENTAL, INC.

## HASP APPROVAL

Scheduled Start-up Date: \_\_\_\_\_ Scheduled Start-up Time: \_\_\_\_\_

Project: Crater Resources Site: Crater Resources

Project Number: 03-00151 Site Location: Upper Merion Township

We have reviewed the attached HASP, including the Project Information Sheet, for the above referenced site. We recognize that when this form is completed, the attached HASP is approved for the field activities on the above referenced site. Changes to this HASP shall be documented in writing and approved.

Ryan Stauffer \_\_\_\_\_  
Name and Signature of HASP Author Date

Hazem Hijazi \_\_\_\_\_  
Name and Signature of HASP Reviewer Date

Mitchell Moss \_\_\_\_\_  
Name and Signature of Project Manager Date

Adam Harbaugh \_\_\_\_\_  
Name and Signature of Field Team Leader Date

Adam Harbaugh \_\_\_\_\_  
Name and Signature of Site Health & Safety Officer Date

# SYNERGY ENVIRONMENTAL, INC.

## HASP ACKNOWLEDGEMENT

Project: Crater Resources

Site: Crater Resources

Project Number: 03-00151

Site Location: Upper Merion Township

I acknowledge that I understand the requirements of this HASP, and agree to abide by the procedures and limitations specified herein. I also acknowledge that I have been given an opportunity to have my questions regarding the HASP and its requirements answered prior to performing field activities. Health and safety training and medical surveillance requirements applicable to my field activities at this site are current and will not expire during on-site activities.

Signature

Employee Number

Date

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I acknowledge that I have verified that the employees listed above have fulfilled the health and safety training requirements for this site. I have also verified that the above employees have fulfilled the medical surveillance requirements and any client requirements to participate in a substance abuse screening program for this site and do not have any medical restrictions that would prohibit them from working at this site.

Project Manager's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

# SYNERGY ENVIRONMENTAL, INC.

## CONTRACTOR COORDINATION

Project: Crater Resources

Site: Crater Resources

Project Number: 03-00151

Site Location: Upper Merion Township

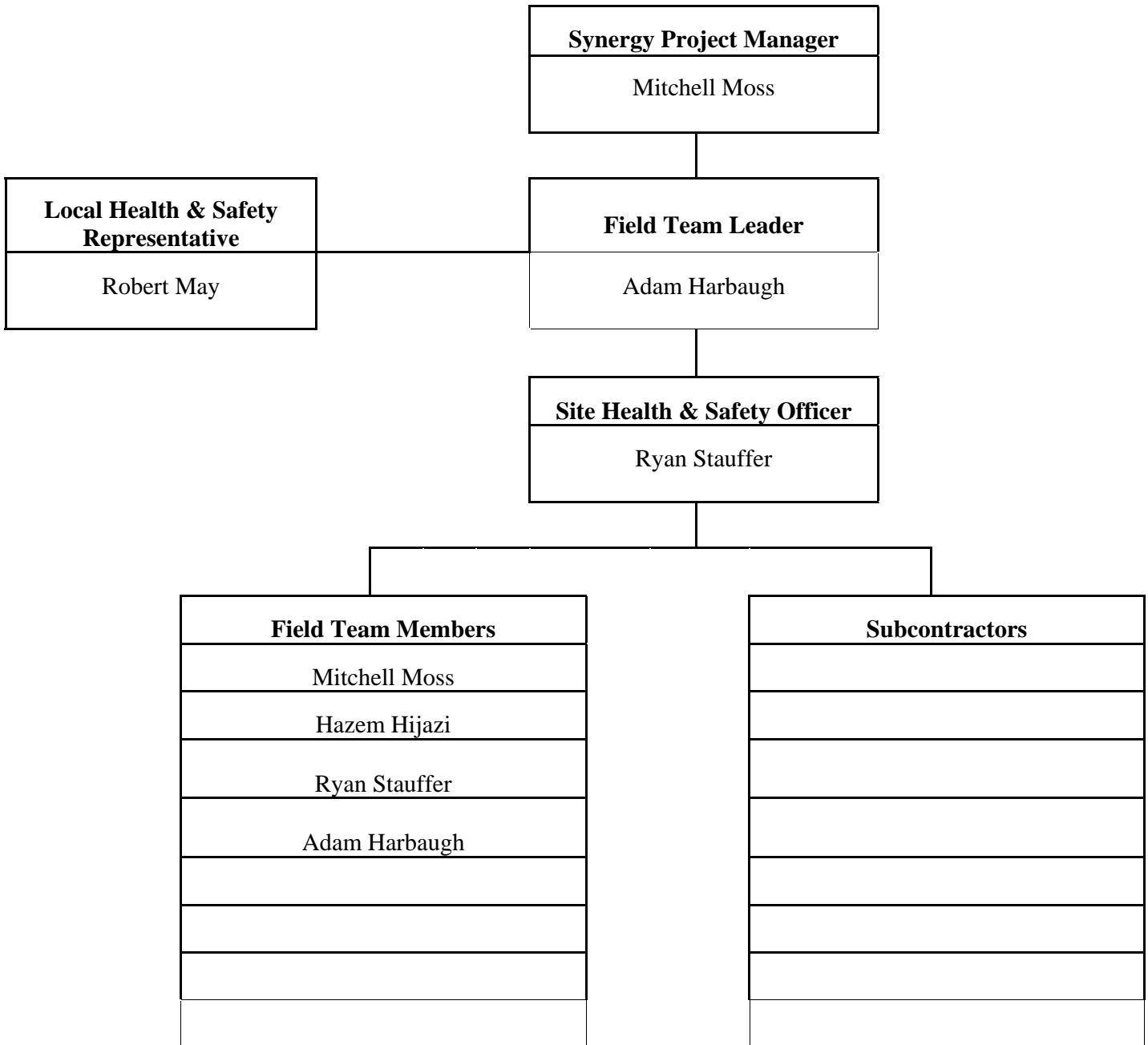
I acknowledge that:

- I have provided subcontractors who will be performing field activities on this site with a copy of this HASP, and I have informed the subcontractors that OSHA 29 CFR 1910.120 applies to their field activities.  
☐ Applicable ☐ Not Applicable
- I have verified that all subcontractors have a method to comply with the client's drug surveillance procedure.  
☐ Applicable ☐ Not Applicable
- I have informed all subcontractors that copies of their written HASP and any applicable Material Safety Data Sheets must be on site at all times.  
☐ Applicable ☐ Not Applicable
- For lockout/tagout operations: I have obtained information on the subcontractor's lockout/tagout program (from the subcontractor or LHSR) and have provided that information to the FTL/SHSO for use in field health and safety training.  
☐ Applicable ☐ Not applicable
- I have verified that all subcontractors have Workers' Compensation Insurance (see your Contracts Specialist).

Project Manager's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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## HASP ORGANIZATION CHART



\* No single Field Team Member is assigned to this field project at all times; therefore, any Field Team Member listed above who is qualified to be a Field Team Leader (FTL) and Site Health and Safety Officer (SHSO) (see the Local Implementation Sheet in the Synergy Environmental, Inc. Health and Safety Manual for a list of qualified personnel) can be designated at the FTL and SHSO. The buddy system will be used and may consist of a combination of Synergy employees, subcontractors, or client representatives as appropriate. When a single Synergy employee is working at a site, that employee is the FTL and SHSO. If two or more employees are working on the site at the same time, the employee who has been with Synergy Environmental, Inc. for the longest period is the FTL and SHSO unless otherwise stated in this HASP.

# **SYNERGY ENVIRONMENTAL, INC.**

## **TASK IDENTIFICATION**

A summary of the site history and Scope of Work are presented in the 2015 Residential Development Remediation Plans for Quarry 1 and Quarry 2. This work is being performed for Renaissance Land Associates, L.P., Renaissance Land Associates II, L.P. and Renaissance Land Associates III, L.P. (RLA).

This HASP is applicable for Synergy staff and Synergy direct subcontract personnel. Synergy will provide construction surveillance services during the RLA Remedial Construction Subcontractor's performance of the work.

For this project no confined space entry is to be performed by Synergy personnel or any of its subcontractors. All work performed will be conducted in Level D protection.

All personnel performing this work will be trained in the recognition of Waste Ammonia Liquor (WAL) contaminated material and be instructed to avoid contact with this material. In the event that visibly impacted materials are encountered, they should not be handled until the on-site Synergy H&S officer is notified and appropriate handling procedures are reviewed.

### Task 1 – Geotechnical borings to be completed for foundation designs of the residential apartment buildings

Several geotechnical borings will be advanced into the former quarries to collect samples for the engineering calculations necessary to design the foundations for the proposed apartments. These borings will remove soil samples from the boreholes for laboratory analysis and may contact impacted materials.

# SYNERGY ENVIRONMENTAL, INC.

## IDENTIFIED/SUSPECTED SITE CONTAMINANTS

	<b>Appearance &amp; Physical Form (Pure substance)</b>	<b>OSHA PEL/ACGIH TLV</b>	<b>STEL</b>	<b>IDLH</b>	<b>Routes of Entry</b>	<b>Potential Health Effects (Acute &amp; Chronic)</b>	<b>PID Ionization Potential</b>
Arsenic (inorganic)	METAL-silver-grey or tin-white, brittle, odorless solid	0.01 mg/m <sup>3</sup> (TLV)	NE	5 mg/m <sup>3</sup>	Inhalation Ingestion Contact	Ulceration of nasal septum, derm, GI disturbances, peri neur, resp irrit, hyperpig of skin (carc)	9.89
Hydrogen Cyanide	Colorless to pale blue liquid or gas (above 78 F) with a bitter, almond-like odor	NE	4.7 ppm Ceiling	50 ppm	Inhalation Absorption Ingestion Contact	Asphy; weak, head, conf; nau, vomit; incr rate and depth of respiration slow and gasping; thyroid, blood changes	13.60
Chromium Metal	Blue-white to Steel-grey, lustrous brittle, hard, odorless solid	0.5 mg/m <sup>3</sup> (TLV)	NE	250 mg/m <sup>3</sup>	Inhalation Ingestion Contact	Irrit eyes, skin, lung fib (histologic)	NA
Mercury	Metal: silver-white heavy, odorless liquid	0.025 mg/m <sup>3</sup> (TLV)	0.1 mg/m <sup>3</sup> (ceiling)	10 mg/m <sup>3</sup>	Inhalation Absorption Ingestion Contact	Irrit eyes, skin, cough, chest pain, dysp, bron pneuitis; tremor, insom, irrt, indecision, head, ftg, weak; stomatitis, salv; GI dist, anor, low-wgt; prot	NA
Naphthalene	Colorless to brown solid with an odor of mothballs	10 ppm	15 ppm	250 ppm	Inhalation Absorption Ingestion Contact	Irrit eyes; head, conf, excitement, mal; nau, vomit, abdom pain, irrit bladder, profuse sweat; jaun; hema, hemog, renal shutdown; derm; optical neuritism corn damage.	8.12
2-methylnaphthalene	Colorless solid, odor of mothballs		NE		Inhalation Absorption Ingestion Contact	Irrit eyes; head, conf, excitement, mal; nau, vomit, abdom pain, irrit bladder, profuse sweat; jaun; hema, hemog, renal shutdown; derm; optical neuritism corn damage.	NA
Benzo(a)anthracene	Colorless, odorless solid	NE	NE	NE	Inhalation Absorption Ingestion Contact	Suspected carcinogen. Direct evidence of non-carcinogenic acute and chronic effects to humans is not available. Sub-chronic exposures of PAHs to skin may cause dermatitis in humans.	NA
Benzo(b)fluoranthene	Colorless, needle-shaped solid	0.2 mg/m <sup>3</sup> (PEL) (as coal tar pitch volatiles)	NE	80 mg/m <sup>3</sup>	Inhalation Ingestion Contact Adsorbition	Irrit skin and eyes. Probable human carcinogen.	NA
Benzo(a)pyrene	Pale yellow crystalline solid or powder	0.2 mg/m <sup>3</sup> (PEL) (as coal tar pitch volatiles)	NE	80 mg/m <sup>3</sup>	Inhalation Ingestion Contact Adsorbition	Irrit. Skin, cause rash an /or burning sensation. Probable human carcinogen.	NA
Dibenz(a,h)anthracene	Colorless, crystalline powder	NE	NE	NE	Inhalation Ingestion Contact	Photosensitization to skin. Probable human carcinogen.	NA



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IDENTIFIED/SUSPECTED SITE CONTAMINANTS							
	Appearance & Physical Form (Pure substance)	OSHA PEL/ACGIH TLV	STEL	IDLH	Routes of Entry	Potential Health Effects (Acute & Chronic)	PID Ionization Potential
					Adsorbition		
Dibenzofuran	White, crystalline powder	None	NE	NE	Inhalation Absorption Ingestion Contact	Irrit eyes, nose, throat, skin. Skin growths, rashes, changes in skin color. Rashes may be worse upon increased exposure to sun light.	NA
Indeno(1,2,3-c,d) pyrene	Yellow solid crytsals	0.2 mg/m <sup>3</sup> (PEL) (as coal tar pitch volatiles)	NE	NE	Inhalation Absorption Ingestion Contact	Probable human carcinogen	NA
Manganese (elemental and inorganic compounds)	Metal: lustrous, brittle, silvery solid	0.2 mg/m <sup>3</sup> (TLV)	3 mg/m <sup>3</sup>	500 mg/m <sup>3</sup>	Inhalation Ingestion	Parkinson's; asthenia, insom, mental conf; metal fume fever; dry throat, cough, chest tight, dysp; rales, flu-like fever, low-back pain; vomit; mal fig; kidney damage	NA
Waste Ammonia Liquor (WAL) residue	Hardened black tar resembling roadway asphalt, if broken open it emits a slight creosote odor.	0.2 mg/m <sup>3</sup> (PEL) (as coal tar pitch volatiles)		80 mg/m <sup>3</sup>	Inhalation Ingestion Contact Adsorbition		

Note: ACGIH = American Conference of Governmental Industrial Hygienists

STEL = Short Term Exposure Limit (STEL)

IDLH = Immediately Dangerous to Life and Health

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit

TLV = Threshold Limit Value

ppm = parts per million

NIOSH = National Institute of Occupational Safety and Health

ND = Not Determined

NA = Not Applicable

NE - Not Established

mg/m<sup>3</sup> = milligrams per cubic meter

Ca/carc = Carcinogen

Abbreviations in table taken from the NIOSH *Pocket Guide to Chemical Hazards*

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TASK	HAZARDS				
	Drilling/Boring	Heavy Equipment	Temperature--Heat	Electrical	Biological--Plants/Animals
Soil Sampling and/or Excavation of soils	Noise	Vehicular	Lockout/Tagout	Chemical	

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## LEVELS OF PROTECTION

TASK (Describe)	Anticipated LOP		Upgrade LOP*	
	LOP	Sustained Airborne Levels	LOP*	Sustained Airborne Levels
Parking Lot Expansion, geotechnical Borings, General Construction	D	< 5 ppm** organic vap. above background.	None: Stop work and leave the area.	>5 ppm organic vap. above background.
<p>*Based on historical vapor monitoring performed during past work at the site, it is not expected that organic vapors will exceed 5 ppm above background within the breathing zone of Site workers or any areas outside of the work zone. Should sustained organic vapors reach this threshold, work is to be stopped and the Project Manager is to be notified. Soils exposed will be secured to reduce fugitive emissions, and surfaces will be covered or sealed to minimize vapor emissions.</p> <p>** The action level of 5 ppm was established using the following rationale:  Naphthalene has the highest volatility of the site contaminants of concern. A conservative value one-half the PEL for naphthalene is assumed reasonable. The OSHA PEL for naphthalene is 10 ppm therefore the action level is 5 ppm.</p>				

# **SYNERGY ENVIRONMENTAL, INC.**

## **HAZARD MITIGATION & CONTROL**

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### **General Safety Rules:**

- Eating, drinking, chewing gum or tobacco, smoking, and applying lip balm or make-up is prohibited in any area designated as contaminated.
  - Contact with contaminated surfaces should be avoided. Whenever possible, Field Team Members should not walk through puddles, mud, or discolored surfaces; kneel on the ground; or lean, sit, or place themselves or equipment on drums, vehicles, or the ground.
  - Contact lenses may be worn inside full-face NIOSH-approved respirators.
  - Smoking and other sources of ignition are prohibited in the vicinity of heavy equipment and flammable or contaminated material, including flammable vapors. Smoking is also prohibited on boats.
  - Personnel must wash hands and face prior to eating and drinking. Field personnel must shower as soon as possible after leaving the site.
  - Horseplay is prohibited in all work areas. Recreational swimming and/or fishing is prohibited on all work sites.
  - Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited.
  - Good housekeeping procedures shall be followed to reduce slips, trips, and falls.
  - Operations shall be restricted to daylight hours unless adequate lighting is provided.
- 

### **Temperature Hazards:**

- When work is being performed under high temperatures and humidity, implement a heat stress monitoring program. Monitoring should include heart rate and body temperature measurements.
- Work/rest periods should be modified as necessary based on the results of the monitoring program.
- Preventative measures should be taken to avert employee illness, including rest periods, work slowdowns, job rotation, and/or performing work during cooler hours of the day. Shade or air-conditioned shelter should be provided for employees during rest periods.
- Potable, cool water will be provided for employees. Workers should be encouraged to drink 16 ounces of water prior to their shift, and drink at every rest break (or every 15 to 20 minutes).
- The SHSO or FTL will discuss the signs and symptoms of heat related illnesses with workers and document on the Daily Safety Meeting Checklist.

Following are procedures for managing heat stress if temperatures exceed 80 degrees F:

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Proper training and preventative measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries.

To avoid heat stress, take the following steps:

- . Adjust work schedules.
- . Modify work/rest schedules according to monitoring requirements
- . Mandate work slowdowns as needed
- . Rotate personnel: alternate job functions to minimize over stress or overexertion at one task
- . Add additional personnel to work teams
- . Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided
- . Provide shelter (air-conditioned, if possible) or shaded areas to protect
- . Maintain workers body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e. 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs encourage the worker to drink more. The following strategies may be useful:
  - . Maintain water temperature at 50°F to 60° F (10°C to 15.6°C)
  - . Provide small disposable cups that hold about 4 ounces (0.1 liter)
  - . Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work
  - . Urge workers to drink a cup or two every 15 – 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
  - . Encourage workers to maintain an optimal level of physical fitness:

Where indicated acclimatize workers to site work conditions: temperature, protective clothing and workload. Acclimatization can occur after just a few days of exposure to a hot environment. NIOSH recommends a progressive 6 - day acclimatization period for the unacclimatized worker before allowing him/her to do full work on a hot job. Under this regimen, the first day of work on site is begun using only 50 percent of the anticipated workload and exposure times, and 10 percent is added each day through day 6. With fit or trained individuals, the acclimatization

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period may be shortened 2 or 3 days. However, workers can lose acclimatization in a matter of days, and work regimens should be adjusted to account for this.

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- . Urge workers to maintain normal weight levels
- . Provide cooling devices to aid natural body heat exchange during prolonged work or service heat exposure
- . Cooling devices include:
  - . Field showers or hose-down areas to reduce body temperature and/or to cool off protective clothing
  - . Cooling jackets, vests or suits

### **Electrical Hazards:**

- Have buried electric lines located and marked by the local authority (e.g., PA One Call) before initiating all subsurface work.
- For voltages 50 kV or less, maintain at least 10 feet of clearance from overhead power lines. For voltages exceeding 50 kV, the clearance shall be increased by 4 inches for every 10 kV over 50 kV. Contact the electric utility concerning blanketing of overhead power lines if these distances cannot be obtained.
- Electrical equipment, including pumps, sampling equipment, and power tools will be inspected prior to use to ensure that they are in good repair and have no frayed or loose connections.
- All electrical equipment used on site will be properly grounded or bonded.
- Ground Fault Circuit Interrupters (GFCI) will be used with electrical equipment on all outdoor and subsurface tasks.
- If electrical equipment must be connected by splicing wires, use properly insulated connectors and wrap with electrical tape.
- Do not perform work on electrical hook-ups and/or equipment when they are located in standing water or any wet location. When water is present, either drain/dry the area or move the equipment to a dry location.
- Only properly trained personnel should make electrical connections. If necessary, a master electrician should be subcontracted.
- See the Energy Isolation Program in the Synergy Environmental, Inc. Health & Safety Manual for additional requirements.
- All electrical pumps will be unplugged from the generator and the plug will be in the exclusive control of the person performing the repair/work to the pump.
- All electrical equipment will be shut off during fueling operations.

# SYNERGY ENVIRONMENTAL, INC.

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## Soil Excavation Hazards:

- Synergy's Lockout/Tagout Program shall be followed during maintenance or repair activities for any equipment. Synergy personnel shall not touch, render an opinion about, or attempt to repair or operate any subcontractor equipment.
  - **All** personnel shall maintain clearance from any machine's work area and shall make positive eye contact with the operator of the machine before entering into any area within its reach.
  - Loose fitting clothing and long hair that is not adequately tied up are not allowed when working in the vicinity of drilling or sampling equipment.
  - Synergy personnel should not attempt to obtain samples from operating equipment.
- 

## Heavy Equipment Hazards:

- A *warning device or signal person* shall be provided to protect employees from moving drilling/boring equipment. *For signal person:* Where hand signals are used, only one person shall be the designated signal person, and shall be located to see the load and be clearly visible to the operator. The Field Team Leader will ascertain the method that the subcontractors use for warning and communicate that method to all Synergy site personnel.
  - Employees are not permitted underneath loads handled by lifting or digging equipment. Employees shall also stay clear of any vehicle being loaded or unloaded.
  - Seatbelts shall be worn if available, except for equipment designed for stand-up operation.
  - Equipment shall be shut down during refueling.
  - Loose fitting clothing and long hair that is not adequately tied up are not allowed when working in the vicinity of heavy equipment.
- 

## Vehicular Hazards:

- The local traffic control authority shall be contacted prior to interrupting the flow of public travel.
- Employees exposed to public vehicular traffic shall wear warning vests marked with or made of reflective or high-visibility material.
- Public traffic shall be protected from site hazards by placing traffic cones, barricades, construction fencing, etc. at a safe distance around the work site.
- Seatbelts shall be worn when driving or a passenger in a vehicle.

## **SYNERGY ENVIRONMENTAL, INC.**

- Always remember that when you are trailering equipment, once underway it is easy to lose a feel for the tow. Allow more room to stop and greater clear distance for overtaking and passing other vehicles.
  - Be alert for signs restricting trailers.
  - Continually check and/or monitor that the trailer features (i.e., wheel bearings, tie downs, lights) are in good shape and proper working condition during the trip.
  - A warning or signal shall be provided to protect employees from a moving truck and boat trailer. For signal person: where hand signals are used, only one person shall be the designated person, and shall be located to see the trailer and be clearly visible to the truck operator.
- 

### **Chemical Hazards:**

#### ***Air Monitoring***

#### **EQUIPMENT REQUIRED**

Air monitoring equipment to be used on site includes:

- PID (11.7 or 11.8 ev lamps)

#### **FREQUENCY**

- Upon initial site entry, air monitoring shall be performed in order to properly characterize the site and obtain adequate information on hazardous air conditions.
- Additional monitoring shall be conducted whenever work begins on a different portion of the site; when different contaminants are handled, encountered, or suspected to be encountered; when a different operation is initiated; in the event of a spill or leak; and whenever the SHSO or FTL determines that additional monitoring is warranted.

#### **AIR MONITORING TECHNIQUES**

- Air monitoring shall be conducted on the employee(s) who have the potential for the highest exposure to the contaminant(s). Monitoring shall be performed in such a way that personal exposures to the contaminants may be calculated. Airborne levels of contaminants shall be noted periodically in the field log book, and every reading shall be recorded on the appropriate Personal Monitoring Form. If only representative employees will be monitored, the names of other employees represented by the monitoring shall be noted in the field log book and on the Personal Monitoring Forms. Integrated, full-shift monitoring requiring laboratory analysis shall not be relied on as the sole means of exposure assessment for any work area or task where conditions may change rapidly.



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### **CALIBRATION**

- All air monitoring instruments shall be calibrated according to manufacturer's instructions and standard industrial hygiene practice. Direct reading instruments shall be calibrated prior to and after (each day's) use, and at any time the operator of the instrument suspects instrument drift or malfunction. Air sampling pumps shall be calibrated prior to and after each use. Each calibration shall be recorded in the individual instrument log book, as well as on the appropriate Personal Monitoring Forms.

## **SYNERGY ENVIRONMENTAL, INC.**

### ***Levels of Protection***

**LEVEL C: WORK IS NOT TO PROCEED WITHOUT PRIOR APPROVAL BY THE PROJECT MANAGER IN LEVEL C. WORK IS TO BE TERMINATED AND THE AREA SECURED AS PERMISSIBLE PRIOR TO REQUIRING LEVEL C PERSONNEL PROTECTION.**

- Full-face air purifying respirator (cartridge type: organic vapor/P100) **See cartridge change schedule below.**
- Chemical resistant clothing (type: tyvek or equivalent)
- Outer chemical resistant gloves (type: heavy nitrile)
- Inner chemical resistant gloves (type: nitrile)
- Chemical resistant outer boots and steel toe inner boots, or  
Chemical resistant, steel toe boots (type: rubber)
- Hard hat when heavy equipment is used on site and whenever overhead hazards exist.
- Hearing protection when heavy equipment is used on site and whenever noise levels are sustained at or above 85 dBA.
- Optional items: disposable boot covers.

### **LEVEL D:**

- Coveralls or appropriate work clothing (e.g., long sleeve shirt, long pants)
- Gloves (type: Outer nitrile, inner nitrile )
- Steel toe boots
- Safety glasses with side shields
- Splash goggles will be the minimum eye protection worn when handling concentrated acids or caustics
- Hard hat when heavy equipment is used on site and whenever overhead hazards exist.
- Hearing protection when heavy equipment is used on site and whenever noise levels are sustained at or above 85 dBA.

## **SYNERGY ENVIRONMENTAL, INC.**

- A full-face shield if the Synergy Field Team Member has the potential to contact flying debris from the clearing or grubbing equipment.
- Optional items: disposable boot covers.

### **Cartridge Change Schedule:**

Synergy Field Team Members will change their cartridges at the following frequency:

- If signs or symptoms of breakthrough occur
- At least at the end of every shift, or 8-hours which ever is less time. Synergy Field Team Members must install a new set of cartridges at the beginning of every shift.
- If humidity levels are greater than 85%, cartridges must be changed every 4 hours.

# SYNERGY ENVIRONMENTAL, INC.

## Certification of PPE Hazard Assessment

I certify that the hazard assessment regarding personal protective equipment for Synergy's work at Crater Resources was completed on \_\_\_\_\_ by Synergy personnel in accordance with 29 CFR 1910.132 and Synergy's Personal Protective Equipment Program. Site conditions have not changed since the 2001 assessment. The results of the hazard assessment are incorporated in the PPE requirements noted above.

---

Signature of Project Manager

## *Engineering Control*

- Measures shall be taken on site to reduce airborne dust levels when visible airborne dust becomes present. Water or other appropriate dust suppressant materials shall be applied to work and traffic areas as appropriate to reduce the amount of dust generated.

---

## Biological Hazards:

- Review the identification and habitat characteristics of rodents, snakes, spiders, ticks, and bees/hornets to avoid bites or stings. Identify site personnel with a known reaction to any such bites or stings. Avoid nesting areas and habitats when possible, and wear protective clothing and/or insect repellent. Always wear protective gloves when reaching into enclosed spaces where animals and/or insects are likely to hide.
- Keep all piping off the ground unless the ends are sealed against animals and insects.
- Review the identification characteristics of poison ivy and poison oak. Avoid contact with these plants and any unknown plants, and wear protective clothing. If exposure is suspected, shower or wash all exposed skin as soon as possible after leaving the site.
- Avoid animal and bird droppings. These materials often contain mold, fungus, or bacteria which can cause respiratory problems such as lung disease and allergies. When entering nesting areas, wear protective clothing and use a dust mask or respirator with HEPA cartridges.

---

## Noise:

- Noise monitoring should be conducted on a periodic basis to determine the need for hearing protection. Alternatively, the use of hearing protection can be based on historical data for a similar project. Hearing protection, with the appropriate attenuation factor, will be worn by all employees in the area when noise levels meet or exceed 85 dB(A). The Field Team Leader shall strictly enforce the use of appropriate hearing protection when noise levels exceed 90 dB(A).
-

# SYNERGY ENVIRONMENTAL, INC.

## Site Specific/Additional Hazards:

### *Lockout/Tagout*

- All hazardous sources of energy, including electrical, mechanical, pressure, thermal, stored energy, and hazardous chemicals or other agents, must be locked out in accordance with Synergy's Lockout/Tagout Program. Lockouts may only be performed by Authorized Employees who have successfully completed training.
- Locks and tags shall be used whenever the equipment is capable of handling a lock. Tags alone are only permitted where the equipment was designed without the capability of being locked. Every energy source associated with the equipment must be locked/tagged out. Every individual working on the equipment shall apply his/her own lock. All lockout/tagout equipment must be approved by Synergy for use. The lockout/tagout procedures outlined in Synergy's Lockout/Tagout Program shall be followed.

### *Confined Space Entry*

- Synergy personnel shall not enter into confined spaces.
- Personnel shall not stand in an area where the sidewall may give way.

---

## Decontamination Procedures:

### *Level C*

- Station 1: Outer boot and glove wash (tap water with Alconox)
- Station 2: Outer boot and glove rinse (tap water)
- Station 3: Outer boot and glove removal
- Station 4: Coverall removal
- Station 5: Respirator removal and wipe down
- Station 6: Inner glove removal and hand wash/rinse

All disposable items will be bagged for appropriate disposal.

### *Level D:*

- Station 1: Outer boot and glove wash (tap water with Alconox<sup>7</sup>)
- Station 2: Outer boot and glove rinse (tap water)
- Station 3: Outer boot and glove removal
- Station 4: Inner glove removal and hand wash/rinse

All disposable items will be bagged for appropriate disposal.

All field sampling equipment will be properly decontaminated prior to taking that field equipment off site. Large equipment including drills, backhoes, excavators, dump trucks, etc will be decontaminated only if used for impacted material handling.

## **SYNERGY ENVIRONMENTAL, INC.**

### **Medical Surveillance Requirements:**

- All Synergy site personnel shall be actively participating in Synergy's Medical Surveillance Program, including baseline and annual examinations at an EMR clinic and in accordance with 29 CFR 1910.120 and 29 CFR 1910.134. A copy of each employee's Medical Summary form will be retained in the project file. At least one field team member will be trained and certified in CPR and First Aid.
  - For any exposure incidents while rendering first aid or CPR, the exposed individuals shall receive a medical evaluation and Hepatitis B vaccination in accordance with Synergy's Bloodborne Pathogen Program. The LHSR and EMR shall be notified **immediately** of any exposure incidents.
  - Synergy's OSHA 300 Log is kept on file at the Royersford office at 155 Railroad Plaza, , PA.
- 

### **Training Requirements:**

- All workers will complete 40-hour training in accordance with SOP 200 prior to working on site. This training shall be kept current via 8-hour refresher training in accordance with SOP 201.
  - SHSOs and FTLs shall also have successfully completed 8 hours of supervisor training in accordance with Synergy's corporate HASP.
  - At least one field team member shall be trained and certified in first aid and CPR. Personnel who have received this training must also receive the appropriate level of bloodborne pathogen training in accordance with Synergy's corporate HASP.
  - All workers shall have successfully completed respirator training in accordance with Synergy's corporate HASP for the appropriate type(s) of respirator.
  - All workers shall have successfully completed personal protective equipment training in accordance with Synergy's corporate HASP and Synergy's Personal Protective Equipment Program.
  - Prior to commencement of site activities and daily thereafter, site specific training will be provided in accordance with Synergy's corporate HASP and will include an overview of HASP requirements. The Daily Safety Meeting Checklist included as part of this HASP will be used to document this training.
  - Employees involved in any lockout and/or tagout procedure on site shall have successfully completed training for Authorized Employees in accordance with Synergy's corporate HASP. Employees working nearby or otherwise affected by the lockout/tagout activities shall receive training for Affected Employees in accordance with Synergy's corporate HASP.
-

## **SYNERGY ENVIRONMENTAL, INC.**

### **Site Control:**

#### ***Site Work Zones***

- Three work zones shall be established on site as appropriate and feasible by the FTL: Exclusion Zone, Contamination Reduction Zone, and Support Zone. Site work zone delineation will be based on the site activities and on the size and configuration of the site. Support zones shall be established upwind of the Exclusion Zone and field activities. Wind direction may be determined by visual observation or field instrumentation. Work zones shall be delineated using barrier tape or other effective means.
- The Exclusion Zone will be the immediate area around field activities where contamination does or could occur. The Contamination Reduction Zone is the transition between the contaminated area and the clean area. The Contamination Reduction Zone should be designed to limit, as much as possible, the probability of the Support Zone becoming contaminated. The Support Zone is considered to be a "clean" area; all administrative and other support services should be performed in the Support Zone.

#### ***Buddy System***

- All site personnel must practice the buddy system of at least 2 people who maintain visual or verbal contact. Contact should be either constant or at some frequent interval during field work (frequency should depend on the nature of hazards present). The buddy may be an Synergy employee, subcontractor, or client representative as appropriate.

#### ***Site Communications***

- Site communications will be primarily verbal. Communications between heavy equipment operators and supervisors will be performed via hand signals.

**SYNERGY ENVIRONMENTAL, INC.****EMERGENCY INFORMATION****LOCAL RESOURCES****Address & Phone Numbers**

Police: 911

Fire: 911

Ambulance: 911

Medical Facility Name: Bryn Mawr Hospital

Route (also attach map showing route): Proceed east on Renaissance Blvd. to Swedeland Road (Rte. 320) approx.

1 mile. Turn right onto Swedeland Road and travel approx. 5 miles to Bryn Mawr Avenue (just past Shipley School on left). Turn right onto Bryn Mawr Avenue and go 5 blocks. Bryn Mawr Hospital is on the left.

FTM Who Drove Route:

Date:

Poison Control Center: 215-386-2100 (Philadelphia)

Waste Clean-up Contacts: N/A

National Spill Response Center: (800) 424-8802

USCG: N/A

**SITE RESOURCES****Equipment****Location on Site**

First Aid

First aid kit and eyewash (15 minute flush minimum)

Vehicle

Fire Control

ABC 10 lb. fire extinguisher

Vehicle

Transportation

Vehicle driven by FTL.

Communication

Verbal, pre-defined hand signals. Cell phone for contact with emergency services.

Spill Control

N/A

Rescue

N/A

Other

N/A

**SYNERGY RESOURCES**

SHSO: Ryan Stauffer

Phone: 484-369-2011

LHSR: Robert May

Phone: 484-369-2007

HSC: Mitchell Moss

Phone: 484-369-5000



# **SYNERGY ENVIRONMENTAL, INC.**

## **CONTINGENCY PLAN**

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### **Emergency Communication Procedures:**

Emergency communications will be performed verbally. All Synergy personnel carry cell phones which have 911 emergency service. The Synergy project manager will be immediately notified. The project manager will then notify the local contact for Crater Resources. In the event an evacuation is necessary, the evacuation procedures outlined in the following section will be performed.

---

### **Evacuation Procedures:**

In the event of any emergency situation all work will cease. All personnel shall be notified by the evacuation alarm notification by 3 short blasts on an air horn, and if necessary, will evacuate to a predetermined location. The emergency will then be assessed and emergency support services will be summoned as necessary. The local contact for Crater Resources and the project manager will be immediately notified.

The Field Team Leader will ensure that a predetermined location is identified off-site prior to site activities. The location may need to be changed depending on the area of work, wind direction, and accessibility. The Field Team Leader will determine a evacuation location prior to each day's work.

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### **Fire or Explosion Response:**

In the event of a fire or explosion, the area will be immediately evacuated and the Fire Department will be summoned as soon as possible. If at all possible, workers in the exclusion zone will exit through the contamination reduction zone and will, at a minimum, remove or scrub their outer boots and remove their outer layer of protective clothing prior to proceeding to the assembly location. Site personnel will gather at a designated location upwind of the fire/explosion (use predominant wind direction). The location shall be established during the daily safety meeting, and a head count will be taken at the location. Upon their arrival, notify the fire department of the location and nature of the fire/explosion. Also provide information on the location and identification of hazardous and flammable materials on site.

If it can be done safely, site personnel who have had the appropriate training may perform the following:

- Use available on-site fire extinguisher to control or extinguish the fire if it is small and localized;
  - Remove or isolate flammable or other hazardous materials that may contribute to the fire;
  - Begin containment and recovery of any spilled materials (see below).
-

## **SYNERGY ENVIRONMENTAL, INC.**

### **Spill Response:**

In the event of a spill, the SHSO shall be notified immediately. Procedures for exposure monitoring and control as outlined in this HASP shall be followed, including upgrading the LOP for spill containment/clean-up if necessary. FTMs should stop the spill source and contain and cleanup the spill as necessary and appropriate. After the cleanup is completed, air monitoring will be conducted by the SHSO to ensure that airborne levels of the contaminant(s) are at a safe or appropriate level.

### **Spill Reporting Procedures:**

In the event of a spill, the spill and circumstances surrounding the spill shall be documented in the field log by the SHSO. The spill shall be immediately reported to the Synergy project manager. The project manager will report the spill to the Crater Resources contact.

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### **For a Medical Emergency:**

If trained and willing, initiate first aid and get medical attention for the injured person(s) immediately. Have the injured person(s) transported to the nearest medical facility (see above) or call ambulance as necessary. As soon as possible, notify the injured person's supervisor or the project manager. Supervisors/PM's notify your LHSR and, in the event of a chemical or bloodborne pathogens exposure, EMR immediately.

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## SYNERGY ENVIRONMENTAL, INC.

### Emergency Decon Procedures

The level of decon in a medical emergency will be determined by the extent of the injury. For minor injuries, personnel must go through the proper decontamination sequence as stated in this HASP.

In life-threatening emergencies or when decontamination may aggravate the condition, decontamination procedures may be omitted. If decon cannot be performed, a FTM should accompany the injured worker to the medical facility, if possible, to provide information to medical response personnel regarding the contaminants and decon procedures. In lieu of decontamination, actions such as removal of the outer layer of protective clothing or wrapping the victim in plastic (during treatment) can be taken if they will not delay or interfere with the treatment of the injury. In the event the victim has been splashed with a corrosive material, the affected area should always be flushed with water (see below).

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#### For a Chemical Exposure Emergency:

- EYE CONTACT: Flush eyes with copious amounts of water for 15 minutes.
- SKIN CONTACT: Remove contaminated clothing. Flush skin with copious amounts of water for 15 minutes.
- INHALATION: Remove to fresh air.
- INGESTION: Consult Poison Control Center, MSDS or other appropriate medical resource (see above).  
**Follow Acute Chemical Exposure Procedures.**

# SYNERGY ENVIRONMENTAL, INC.

## DAILY SAFETY MEETING CHECKLIST

Project:	Crater Resources	Site:	Crater Resources
Project Number:	03-00151	Date:	Upper Merion Township
<b>To be reviewed on the first day of site activities and when new workers arrive on site:</b>			
Site Health & Safety Officer:			
Alternate for Health & Safety:			
Location of on-site HASP:			
Site training requirements:			
Specific medical surveillance requirements:			
<i>During the project, one or more of the agenda items could be selected for the required daily site training.</i>		Date:	<div style="display: flex; justify-content: space-around; width: 100px;"> <div>—</div> <div>—</div> <div>—</div> <div>—</div> </div>
<b><u>Agenda:</u></b>		<b><u>Check-off:</u></b>	
1.	Planned work for this day (discuss)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
2.	Physical hazards and controls (discuss/review)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
3.	Chemical hazards and controls (discuss/review)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
4.	Biological hazards and controls (discuss/review)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
5.	Level of protection required (specify A, B, C, D) _____	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
6.	Personal protective equipment required per the hazard assessment:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<b>SPECIFY TYPE</b>			
	Respirator		
	Protective coveralls		
	Safety glasses/goggles		
	Hard hat	ANSI approved	
	Foot protection	Steel Toe Safety boots	
	Inner gloves		
	Outer gloves		
	Hearing protection		
	Other		
7.	Review inspection, decontamination, and maintenance procedures and the limitations of the above stated PPE.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
8.	Decontamination procedure (discuss/review)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
9.	Exclusion zone established. Radius _____ ft (specify)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
10.	Site emergency response plan (discuss/review)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
11.	Signs and symptoms of overexposure to chemicals anticipated on site	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
12.	General health and safety rules	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

# SYNERGY ENVIRONMENTAL, INC.

13. Specific health and safety requirements relating to site activities including: (discuss/review)

Drilling/boring

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

UST

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Excavations

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Heavy equipment

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Confined space entry

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Lockout/tagout

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Working in temperature extremes

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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14. Other health & safety issues (discuss/note)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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I have participated in the daily safety meeting discussing the topics indicated on the reverse and fully understand my responsibility for complying with all health and safety requirements. I have had the opportunity to have my questions on site health and safety issues and procedures answered.

**Employee**

**Employee Number**

**Date**

_____	_____	_____
_____	_____	_____
_____	_____	_____

\_\_\_\_\_  
Signature of person conducting training

\_\_\_\_\_  
Date

# SYNERGY ENVIRONMENTAL, INC.

## SITE CHEMICAL INVENTORY

**Project:** Crater Resources

**Project Number:** 03-00151

Chemical Name (Match to MSDS)	Estimated Quantity on Site at Any Given Time	Location on Site
Liquinox	1 gallon	FTM vehicle – decon equipment
Diesel Fuel	200 gallons	AST for Drill Rig & construction equipment
Gasoline	10 gallons	gas cans for small pumps & portable generators
A current MSDS must be present on site for each chemical listed above. All chemical containers must be labeled in accordance with SOP 150. Subcontractors must maintain their own chemical inventory.		



**Health & Safety Plan  
Geotechnical Drilling  
2015-2016 Residential Development  
Over Quarry 1 and Quarry 2 at the  
Crater Resources Superfund Site  
David Blackmore & Associates**

**BACKGROUND:**

This Health and Safety Plan has been developed to accomplish completion of certain geotechnical borings at the referenced site. These borings are necessary to design the structural elements of proposed buildings to be erected on the site.

David Blackmore & Associates, Inc (DBA) has been contracted by the developer to provide certain structural design elements for the proposed buildings. DBA will utilize the services of Corcoran Drilling to accomplish the drilling work. Corcoran Drilling's Health and Safety Program Manual is attached and describes their standard procedures and requirements for drilling activities.

**PLAN DEVELOPMENT:**

This plan has been developed in conjunction with new and previously approved documents for construction activities on the Site and is intended to address the Health & Safety issues related to drilling activities. Note that current plans only call for borings to be conducted in Quarry 1.

The *Environmental Work Plan, 2015-2016 Residential Developments Over Quarry 1 and Quarry 2, Crater Resources Superfund Site, Upper Merion Township, Montgomery County, PA*, dated September 2015, more fully describes the planned work activities for borings in Quarry 1. The *100% Remedial Design Report, Quarries 1 and 2, Crater Resources Superfund Site, Upper Merion Township, Montgomery County, PA* (the 100% RD) was approved by EPA on March 27, 2008 (with changes) and describes the required site specific controls and work practices that will be implemented as appropriate for this task.

**PROJECT SPECIFIC CONSIDERATIONS:**

Project specific issues to be addressed are provided in the 100% RD. Those items are listed below with DBA's response to the requirement.

- Exclusion zone locations and boundaries
  - The area surrounding the drilling locations will be identified as the Hot Zone. The area will be marked using yellow safety tapes and / or construction fencing.
  - Entry and exit from the Hot Zone will follow PPE and decontamination procedures appropriate for the conditions and as approved by the Site Safety Officer.

- Air monitoring
  - Synergy Environmental will conduct air monitoring for the contaminants of concern identified for the Site.
  - DBA and their subcontractors will utilize the air monitoring results to adjust or stop work activities as necessary for compliance with the safety standards for the Site.
- Dust controls
  - There are no soil moving activities planned that would generate dust
  - Vehicular movement over the temporary cap will be minimal due to the limited access requirement
- Renaissance Blvd. Vehicle and Pedestrian Safety Traffic Controls
  - The proposed drilling locations are all within the bounds of the existing fenced property. Pedestrian and vehicular traffic controls are not anticipated other than temporary flaggers during mobilization and demobilization of the drilling equipment through the gate at Renaissance Blvd.
- Construction worker (equipment operators, laborers, inspectors) personal protective equipment (PPE)
  - PPE for drilling operations is described in Corcoran's HASP (generally described as Level D PPE)
  - Level C PPE will be utilized if appropriate based upon site conditions and the Site Safety Office's determination.
- Construction equipment and dump-truck decontamination procedures
  - The drilling rig will be decontaminated via pressure washing as necessary. It is anticipated that the rig will be working on top of the temporary cap and therefore the tires and body will remain clean and uncontaminated.
  - Decon of the drill components that have contacted any quarry fill will be performed over the open drill hole. Wash water will be allowed to drain back into the quarry before the rig is moved from the work area.
  - Should weather or site conditions likely cause vehicular traffic (ie, employee vehicles, service trucks, etc) to track mud from the site onto Renaissance Blvd, a wheel wash will be implemented.
- Spill response and contingency planning
  - Safety equipment such as fire extinguishers, spill pads, sorbents, etc are carried with the drill rigs and service trucks



# **CORCORAN DRILLING**

## **HEALTH AND SAFETY PROGRAM MANUAL**

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

## PUBLIC SAFETY AND SECURITY

Contractors are responsible for the perimeter of the work area to be appropriately fenced to safeguard the public. In addition, warning signs posted on the site fence and gate.

## GENERAL HEALTH & SAFETY PLAN FOR ENVIRONMENTAL DRILLING OPERATIONS

This health and safety plan applies to all personnel working on or near the drilling operation:

Conduct site safety meeting with on-site consultant before setting up

Familiarize drill crew with contaminants which may be encountered and level of protection required

Deploy fire extinguisher at rear of rig in an easily visible location

First Aid kit is located in the cab of the drill rig on the rear wall between the driver and passenger seat

## HEALTH & SAFETY GUIDELINES

General Procedures - The following personal hygiene and work practice guidelines are intended to prevent injuries and adverse health effects. This guideline is the minimum standard procedures for reducing potential risks associated with work projects.

Eating, Drinking, smoking, taking medication, chewing gum or tobacco is prohibited in the immediate vicinity of the work.

Hands and face will be thoroughly washed prior to eating, smoking or putting anything in the mouth.

Personal visitors are not allowed on site

Whenever possible, the employee shall stand upwind of the work (borehole, test pit, etc.)

Always be alert to potential changes in exposure conditions such as strong odors, unusual appearance in cuttings, oily sheen on water, etc.

Establish pre-arranged hand signals or other means of emergency communication when wearing respiratory equipment, when working around noisy equipment or when working at some distance from fellow workers.

Always be alert as to unusual behavior, dizziness or other symptoms exhibited by you or by other workers at the site as this may indicate exposure to harmful substances.

Noise may pose a health and safety hazard, particularly during drilling, test pitting and construction activities. A good rule of thumb is that is you have to shout in order to communicate at a distance of three feet in continuous noise; you should be wearing hearing protection. Likewise, any impact noise from activities such as driving casing on drilling operation which is loud enough to cause discomfort would indicate the use of hearing protection. Hearing protection is available and should be included in your standard field kit, along with hard hats, safety glasses, steel toed boots, etc.

Always use the appropriate level of personal protection, lesser levels of protection can result in preventable exposure: excessive levels of safety equipment can impair efficiency and increase potential for accidents to occur.

## SAFETY EQUIPMENT on VEHICLES

All Corcoran Drilling vehicles must be equipped with a first aid kit and a fire extinguisher. All personnel on site, including the client, should be aware of the location of all safety equipment. The following lists the class of vehicle and the minimum safety equipment requirements:

- DRILL RIGS: Level 1 FIRST AID KIT 20 lb ABC fire extinguisher EYE WASH BOTTLE
- HEAVY TRUCKS: BASIC FIRST AID KIT 10 lb ABC fire extinguisher

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

- OTHER VEHICLES : PERSONAL FIRST AID KIT 2.5 Ib ABC fire extinguisher

### DRILLING SAFETY...IT'S EVERYONE'S RESPONSIBILITY

Geotechnical drilling is inherently a dangerous occupation. Most accidents still can be attributed to human error. Human error can be further subdivided into: inexperience, carelessness, being tired or substance abuse accidents from these causes can be greatly reduced by taking the obvious preventative measures.

**The following is a list of DO's and DON'Ts...which may help avoid unnecessary accidents:**

./ Do - Everyone, not just the driller, should know how to turn off the rig .

./ Do -Wear gloves, your skin is to delicate to leave unprotected .

./ Do - Keep equipment and tools in good working order and condition .

./ Do - Regular scheduled safety meetings

./ Do - Wear your hard hat, it doesn't take much metal falling to do serious harm

./ Do - Wear your safety belt while driving.

X Don't drill too close to overhead power lines or underground power sources.

X Don't re-fuel the engine while it is running. Leaking gasoline and a spark can cause a serious explosion.

X Don't wear loose clothing around a drill rig. Clothing caught in turning machinery will pull the rest of your body into the machine.

X Don't drill out of control. There is a direct correlation between accidents and drilling to fast.

X Don't do things that require excessive strength i.e.) breaking pipe joints, moving heavy tools, etc., this is a precursor to getting hurt suddenly or causing long term health problems. Let the tools and the rig do the work.

X Don't drill while lighting is seen or thunder is heard. Drill masts are excellent lightning rods.

X Don't use a cathead with a wet rope, it is too unpredictable.

### DRILLING SAFETY GUIDE

We care about your safety not only when you are working on or around a drill rig, but also when you are travelling to and from site, moving the drill rig and tools from location to location on a site, or providing maintenance on a drill rig or drilling tools. This safety guide is for your benefit. Failure to heed the safety procedures contained in this manual could result in serious injury or death.

Every drill crew should have a designated safety supervisor who has the authority to enforce safety on the drilling site/ a rig worker's first responsibilities are to obey the directions of the safety supervisor.

The safety supervisor- Is the drill rig operator. The safety supervisor must:

Consider the responsibility for the safety and the authority to enforce safety to be a matter of first importance.

Be the leader in using proper personal protective safety equipment and take appropriate corrective action when proper personal protective safety equipment is not being used.

Understanding that proper maintenance of tools and equipment and general housekeeping on the drill rig will provide an environment that will promote and enforce safety.

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

Before drilling is started with a particular drill, ensure that anyone operates the drill has had adequate training and is thoroughly familiar with the drill rig, its controls, and its capabilities.

Inspect the drill rig at least daily for structural damage, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, damaged hoses, and/or damaged pressure gauges and pressure relief valves.

Check and test all safety devices, such as emergency shutdown switches, at least daily and preferably at the start of a drilling shift. Drilling must not be permitted until all emergency shut down and warning systems are working correctly. Do not allow any emergency device to be passed or removed.

Check that all gauges, warning lights and control levers are functioning properly and listen for unusual sounds each time an engine is started.

Ensure that every drill rig worker is informed of safe operating practices on and around the drill rig.

Provide every drill rig worker with a copy of the organization's drilling operations safety manual, operations manual and maintenance manual.

Carefully instruct a new worker in drilling safety and observe the new workers progress towards understanding safe operating practices.

Assess the mental, emotional and physical capability of each worker to perform the assigned work in a proper and safe manner. Remove any worker from the drill site whose mental and physical capabilities might cause injury to the worker or co-workers.

Ensure that a first aid kit and fire extinguisher which are properly maintained are on each drill rig and each additional vehicle.

Be well trained in and capable of using first aid kits, fire extinguishers and all other safety devices and equipment, train crew members.

Maintain a list of addresses and telephone numbers of emergency assistance units and inform other members of the existence and location of the list.

#### FIRE PREVENTION ... The danger of fire cannot be under estimated!

Fire can be the most devastating of accidents that can occur. Employees must be very conscious of fire prevention measures at all times.

The following points must be observed:

- All vehicles must be equipped with a fire extinguisher.
- No smoking or open flame where flammable liquids, solvents, or fuels are stored, transported, handled, or used.
- No smoking while operating any equipment.
- No smoking on work sites except in designated areas.
- Equipment powered by internal combustion engines (except diesel powered) must be shut off

#### IN THE EVENT OF FIRE OR EXPLOSION:

If the situation is readily controllable with available resources, take immediate action to do so. If not:

- a.) Clear the area of all personnel working in the immediate vicinity.
- b.) Cease operation of all equipment. No cigarettes, cutting torches or other flame or spark sources shall be permitted in the area.
- c.) Immediately notify the designated Site Health and Safety Officer / Coordinator.

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d.) Keep all personnel and the general public away from the hazard.

#### FIRE EXTINGUISHERS

Vehicles are equipped with one 20lb fire extinguisher. Fire extinguishers are inspected in an annual basis and tagged accordingly; tags are weather resistant. All employees are to be familiar with the proper use of fire extinguishers.

#### OTHER SAFETY CONSIDERATIONS:

- All electrical equipment should be explosion-proof and properly grounded.
- When dealing with heavier-than-air materials, vertical exhausts and spark arrestors should be employed.
- Extra care must be exercised when working topographic lows, at the toes of landfills, and when employing windscreens and barriers.
- Do not keep gasoline cans around the hole.
- Have the right kind of fire extinguisher for the job and make sure it's in working condition.

#### PHYSICAL HAZARDS... BE AWARE!!

##### TRAFFIC

When drilling on the street there is significant potential for "stuck-by" accident, make certain that you are wearing a high visibility vest or uniform.

##### NOISE

Large equipment and engines such as the drill rig generate significant noise during operation which could affect workers in close proximity to the operating equipment.

##### HEAT and SUN

Projects done during the summer months can have an effect on workers. Remain well hydrated and wear protective sun blocking agents.

##### HEARING CONSERVATION

Because hearing damage is irreversible, it is crucial that measures be taken to preserve the hearing of all personnel. The steps required to implement a hearing conservation program are minor compared to the impact of the damage or loss of one's hearing.

##### MEDICAL PROGRAM

OSHA recommends a medical evaluation for employees required to wear a respirator. A medical program is developed for each site based on the specific needs, location and potential exposures of employees at the site. A site medical program should provide the following components:

##### SURVEILLANCE

- Pre-Employment screening
- Periodic medical examinations (and follow-up examinations when appropriate)
- Termination examinations

##### TREATMENT

- Emergency
- Non-Emergency (on a case by case basis)

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

## RECORD KEEPING

- Program review

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

The last line of defense in hazard control is Personal Protective Equipment (PPE). PPE is used when engineering or procedural controls cannot completely eliminate a hazard. The purpose of PPE clothing and equipment is to shield or isolate individuals from the chemical, physical and biological hazards that may be encountered at a hazardous waste site.

## MINIMUM REQUIREMENTS WHEN WORKING ON OR AROUND DRILLING EQUIPMENT

Personal protective equipment provides a final barrier between the worker and a potential hazard, which could threaten personal health and safety. All PPE must be in accordance with CSA standards or an approved equivalent and be visually inspected prior to use.

All Corcoran Drilling Employees working on or around drilling equipment must wear the following PPE:

- Individual Protective Equipment - For most geotechnical, mineral and or groundwater drilling projects, individual protective equipment must include a safety hat, safety shoes, and safety glasses and close fitting gloves and clothing. Rings and jewelry must not be worn during a work shift.
- Hardhat that meets ANSI Standard Z89.1-1986. Safety hats must be worn by everyone working or visiting at or near the drilling site. All safety hats must be kept clean and in good repair with the headband and crown straps properly adjusted for the individual drill rig worker or visitor.
  - Safety boots must be worn by all drilling personnel and all visitors to the drill site that observe drilling operations within close proximity of the drill rig.
- Gloves. Leather provides protection against most physical characteristics like sharp objects, radiant heat and hot objects. The usual application is for general work. Leather gloves are acceptable unless working on a project in which there is a chance of chemical or contaminant exposure.
- All drilling personnel must wear gloves for protection against cuts and abrasions that could occur while handling wire rope or cable and from contact sharp edges and burns on drill rods and other drilling or sampling tools. All gloves must be close fitting and not have large cuffs or loose ties that can catch on rotating translating components of the drill rig.
- Safety Glasses. **All** drilling personnel must wear safety glasses when working within 5 m of drill table. Safety glasses must have side shields. Contact lenses are generally discouraged at work sites and shall not be worn during any work which would expose the wearer to chemical, gases, vapors, dust or other materials that may harm the eyes or cause irritation. Contact lenses should not be worn when wearing self contained breathing apparatus.
- Hearing protection that meets. When working within 15 ft of drill table
- Reflective vest.

## CARE OF PPE

Employees are expected to insure that their PPE is safe, clean, and functional. The following is a guide to the care of PPE:

Hardhat suspension must be replaced every year.

Hardhats must be replaced every 5 years.

Respirators should be disinfected periodically and they must be kept in a labeled, sealed container.

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

Rubber boots must free of holes.

Rubber boots should be steam cleaned regularly.

Rainwear should be free of holes and tears.

Rainwear should be steam cleaned or pressure washed regularly.

### CLOTHING GUIDELINES

Dressing for appropriate weather conditions is very important. The following are some guidelines for dressing for extreme cold. It is not just a matter of comfort, but in an emergency situation, it could be a matter of life or death.

Cold weather clothing should consist of a three-layer system.

- The first layer is the base layer. This layer should be long underwear made of polypropylene or thin fleece. This layer transports moisture away from the skin. Propylene maintains most of its insulating properties even when it is wet. Some people use silk for the base layer, but silk has poor durability and is hard to care for.
- The second layer is the insulating layer. This layer traps air to keep you warm. It also transports moisture away from your body. This layer is typically fleece. Fleece maintains most of its insulating properties even when wet.
- The third layer is the protection layer. This layer protects you from wind and snow. In outdoor recreation, this layer is often a waterproof breathable material like Gortex. For our purposes, this layer will be the insulated coveralls.
- The three-layer system should apply to your hands as well. Wearing a thinner liner glove will provide additional insulation. Also, it will allow you to take off the outer work glove for short periods of time if you need dexterity to do delicate work or handle small parts.
- No cotton! Cotton is extremely poor insulation. It traps moisture and it takes a very long time to dry. Having a wet layer against your skin will conduct heat away from your body very rapidly. Cotton and cotton blends should be avoided for all items of clothing.
- Wool is OK, but manufactured materials like fleece are superior for moisture transport and warmth when wet.

### MAINTENANCE ON AND AROUND THE DRILL RIG

The first requirement for safe field operations is that the safety supervisor understands and fulfills the responsibility for maintenance on and around the drill rig. The safety supervisor must:

- a.) Provide suitable storage locations for all tools, materials and supplies so that these items can be conveniently and safely handled without hitting or falling on a member of the drill crew or a visitor.
- b.) Avoid storing or transporting tools, materials or supplies within or on the mast of the drill rig.
- c.) Stack pipe, drill rods, casing, augers and similar drilling tools in orderly fashion on racks or sills to prevent spreading, rolling or sliding.
- d.) Place penetration or other driving hammers in a safe location on the ground or secure them to prevent movement when not in use.
- e.) Keep work areas, platforms, walkways, scaffolding and other access ways free of materials, debris, obstructions and substances such as ice, grease or oil that could cause a surface to become slick or otherwise hazardous. Keep all controls, linkages, warning and operation lights and lenses free of oil, and grease..

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

f.) Store gasoline only in a non-sparking, red container with a flame arrester in the fill spout and having the word "gasoline" easily visible.

### HAND TOOLS

Since there are almost an infinite number of hand tools that can be used on or around a drill rig and in repair shops, there are an equal number of instructions for proper use. "Use the tools for its intended purpose" is the most important rule. The following suggestions apply to safe use of several hand tools that frequently are used on and around drill rigs:

- a.) When a tool becomes damaged, either repair it before using it again or get rid of it.
- b.) When using a hammer, any kind of hammer for any purpose, wear safety glasses.
- c.) When using any kind of chisel or punch, for any purpose, wear safety glasses.
- d.) Keep all tools cleaned and stored appropriately when not in use.
- e.) Use wrenches, not pliers, on nuts. Use screwdrivers with blades that fit the screw.
- f.) When using a wrench on a tight nut, first use some penetrating oil and then use the largest wrench available that fits the nut. When possible pull on the wrench handle rather than push on it; apply force to the wrench with both hands when possible and with both feet firmly placed. Always assume that you may lose your footing; check the place that you may fall for sharp objects.
- g.) Keep all pipe wrenches clean and in good repair. Use a wire brush frequently to clean the jaws of pipe wrenches. An accumulation of dirt can cause wrenches to slip.
- h.) Never use pipe wrenches in place of a rod-holding device.
- i.) Replace hook and heel jaws when they become visibly worn
- j.) When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform if the wrench should slip or the joint suddenly let go.

### GENERAL PROCEDURES

#### General Health and Safety Plan for Environmental Drilling Operations

The following personal hygiene and work practice guidelines are intended to prevent injuries and adverse health effects. These guidelines present the minimum standard procedures for reducing potential risks associated with this and other projects and is to be followed by all Corcoran Drilling employees.

Familiarize drill crew with contaminants which may be encountered and level of protection required.

- Safety expectations
- Safety policies and general requirements
- Site specific Safety Method Statements
- Protective clothing and equipment

Deploy fire extinguisher at rear of rig in an easily visible location.

First aid kit is located in cab of drill truck on the rear wall between the driver and passenger seat.

### SITE

All personnel entering a site must observe minimum Personal Protective Equipment requirements.

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*



All personnel working near a drill rig should be made aware of the exclusion zone.

A clean and organized site not only looks more professional but also is a safer situation. Site organization should include:

- Placing drill pipe on blocks or timbers.
- Returning tools to their proper place. Leaving a tool lying around is not only a tripping hazard but may result in losing or forgetting the tool.
- Picking up garbage as it is created.

### CLEARING THE WORK AREA

Prior to drilling, adequately clear and level the site to accommodate the drill rig and supplies and provide a safe working area. Do not begin drilling if tree limbs, unstable ground, or site obstructions cause unsafe tool handling conditions.

### OPERATION RULES

During the operation of company owned, leased, or personal vehicles on Company business, the operator shall:

- Require all occupants to wear seat belts
- Follow safe Cell Phone use guidelines
- Obey all local, state, federal and client traffic laws/rules
- Not operate vehicles in "hazardous" areas or past "do not enter" barricades
- Use extreme caution around congested areas where personnel and or equipment are working
- Not leave engines running if vehicle is unattended
- Lock vehicle unless prohibited by client (while on client's property)
- Assure that transporting samples or other items in vehicle will only be done in a safe manner and in accordance with 49CFR
- Not use personal vehicles to transport regulated materials and hazardous waste. 40 CFR and 49 CFR shall be consulted for the requirements

### START-UP

Instruct all drill rig personnel and visitors to "stand-clear" of the drill rig immediately prior to starting the engine.

a.) Make sure brakes are set, all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers or air controls are in the correct positions, and the cathead rope is not on the cathead before starting a drill rig engine.

b.) Start all engines according to the manufactures manual.

### PROCEDURES & PRECAUTIONS

Having and following Standard Operating Procedures for critical tasks plays an important role in the Corcoran Drilling safety program. Employees are expected to know the details of all Standard Operating Procedures that relate to their job duties.

Raising the Drilling Tower - Before raising the drilling tower, the operator must observe the following precautions:

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

- The surface that the leveling stabilizers will rest on must be reasonably even.
- The surface that the stabilizers will rest on must be able to adequately support the weight of the drill rig. If the surface is soft, timber or boards must be used under the stabilizers in order to spread the weight over a larger area.
- On a sloping surface the stabilizers must be able to extend far enough so that the drill rig is level.
- Blocking or timbers under the stabilizers may be necessary to meet this condition.
- If possible, the operator should avoid lifting the drill rig completely off of the ground with the stabilizers. It is preferable to have the wheels support some of the weight of the drill rig.
- The drill rig must be level.
- Clearance from overhead obstructions including buildings, bridges, power lines and other overhead utilities must be established. Legal offsets from overhead power lines must be observed and measured prior to raising the tower. Both supervisors and members of the exploration must take special precautions when a drill rig will be used on a site or project within the vicinity of electrical power lines and other utilities. Electricity can shock, burn and cause death.
- Clearance from underground utilities must be established. Although it is the responsibility of the client to locate all underground utilities, the operator has responsibilities to be observant and to look for indicators of possible underground utilities such as storm drains, manhole covers, natural gas meters, etc.
- Locate, note and emphasize overhead and buried utilities on all boring location plans and boring assignment sheets. When overhead electrical power lines exist at or near drilling site consider all wires to be alive and dangerous. Watch for sagging power lines before entering a site. Do not lift power lines to gain entrance. Call the utility and ask them to lift or raise the lines or turn off power. Before raising the drill mast on a site in the vicinity of power lines, walk completely around the drill rig, determine the minimum horizontal distance from any point on the drill rig to the nearest power line when the mast is raised and/or being raised. If this horizontal distance is less than 100ft, first consult the local utility company and refer to OSHA 1910.180 before commencing. Keep in mind that both hoist lines and overhead power lines can be moved toward each other by the wind. In order to avoid contact with power lines only move the drill rig with the mast down.
- If there are any questions concerning the safety of drilling on sites in the vicinity of overhead power lines, call the power company. The power company will provide expert advice at the drilling site as a public service and at no cost.
- The pins that secure the tower when it is the raised position must be removed until after the tower is raised.
- Once the drill rig is leveled with the stabilizers, the drill head must be moved to or below the pivot point of the tower. Under no circumstances should the operator attempt to raise the tower with the drill head above the pivot point of the tower.
- When the operator is confident that the ground surface is supporting the stabilizers (i.e. not sinking into the ground) and when the drill head is at or below the tower pivot point, the operator may raise the tower. As the tower is being raised, operator must scan the entire tower to insure that there is no interference with people, equipment, buildings or utilities. If the operator observes any interference or potential interference between the tower and any object or person, the operator must stop raising the tower and re-evaluate the situation.
- Once the tower is raised to its full upright position and the operator is satisfied that tower is safe operating distance from structures and is the legal distance from overhead power lines, the tower securing pins should be put in place.
- After the tower is secured with the tower securing pins and all safety conditions have been met, the drill head may be moved up the tower and drilling may proceed.

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

- The operator must insure that all drill rod, core barrels, casing and drill bits disconnected from the drill head. All drilling guides and collars must be removed from the drilling table. The drill head must be lowered so that it is at or below the drilling tower pivot point. The tower securing pins must be removed.

### MATERIAL HANDLING

Accidents while handling materials is the most likely source of injury for Corcoran Drilling Co Employees. Muscle strains, pinched fingers, and metal slivers can occur during drilling operations.

The following steps can be taken to reduce the risk of injuries when handling drill pipe and other heavy items:

- Do not lift anything that may exceed your abilities. Always get assistance when lifting heavy items.
- Always use safe lifting practices when lifting heavy items.
- Be very conscious of the placement of your hands and fingers are when you are handling drill rod and casing. Make sure that hands and fingers are not placed in vulnerable locations between drill pipe and solid objects.
- Burrs on drill pipe should be flattened with a hammer or removed with a grinder.

The following steps can be taken to reduce the risk of injury when handling hazardous materials:

- Employees must insure that they are familiar with the Material Safety Data Sheets (MSDS) for all materials that they handle in the course of their job, including: solvents, fuels, hydraulic fluids, lubricating oils, cement products, and bentonite products.
- Materials that are vapor harmful, including gasoline and solvents, must be handled in well-ventilated conditions.
- Fuels, such as gasoline and diesel fuel, must never be used as cleaning solvents.
- Anyone who enters a hazardous waste site must recognize and understand the potential hazards to health and safety associated with the cleanup of that site.
- Employees must be conscious of spill response when handling and storing hazardous liquids. Each drill rig should have 1 bag of sorbent material and several sorbent pads available in the event of a spill of any hazardous liquid.

### INCIDENT ANALYSIS AND FOLLOW-UP

Regardless of the procedural, engineering, and personnel controls implemented, there will always be the possibility of worker injury or equipment failure. In the event of an 'incident', an analysis or investigation must be conducted to minimize the chance that the same situation will occur again.

There are varying degrees of incident seriousness. Minor incidents, referred to as Class II, must be recorded and reported. Serious incidents, referred to as Class I, must be recorded, reported, and investigated. In both situations, an Incident Report must be completed.

### OVERHEAD AND BURIED UTILITIES

The use of equipment on a work site within the vicinity of electrical power lines and other utilities requires special precautions to be taken by both operators and members of the crews. Electricity can shock, burn and cause death.

1. Before working with equipment at a site, look up to check for overhead obstructions.
2. Overhead and buried utilities should be located, noted and emphasized prior to the start of all jobs.

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

3. If a sign warning of underground utilities is located on a site boundary, do not assume that underground utilities are located on or near the boundary of property line under the sign, the utilities may be a considerable distance away from the warning sign.
4. Always make sure that the owners of utility lines or the nearest underground utility location service have been contacted before working. Determine jointly with client or utility personnel the precise location of underground utility lines, mark and flag the locations and what specific precautions must be taken to assure safety.
5. When overhead electrical power lines exist at or near a work site or project, consider all wires to be alive and dangerous.
6. Equipment, or any part, does not have the capability of coming within the following minimum clearance from energized overhead lines, or the equipment has been positioned and blocked to assure no part, including cables, can come within the following minimum clearances.

#### POWER LINES MINIMUM

Nominal System kv	Required Clearance
50 or under	10 feet (3.05 m)
69	12 feet (3.66 m)
115 161	15 feet (4.57 m)
230 285	20 feet (6.10 m)
345	25 feet (7.62 m)
500	35 feet (10.67 m)

7. Watch for sagging power lines before entering a site. Do not lift power lines to gain entrance. Call the utility and ask them to lift or raise the lines or de-energize (turn off) the power.
8. Keep in mind that both hoist lines and overhead power lines can be moved toward each other by wind.
9. If there are any questions whatsoever concerning the safety of working on sites in the vicinity of overhead power lines, call the power company and they will provide expert advice at the work site at no cost.
10. Underground electricity and gas are as dangerous as overhead electricity. Be aware and always suspect the existence of underground utilities such as electrical power, gas petroleum, telephone, sewer and water. Ask for assistance.

**REACT TO CONTACT WITH Electric** *If a rig makes contact with electrical wires, it may or may not be insulated from the ground by the tires of the carrier. Under either circumstance the human body, if it simultaneously comes in contact with the drill rig and the ground, will provide a conductor of the electricity to the ground. Death or serious injury can be the result.*

***If a rig or a rig carrier makes contact with overhead or underground electrical lines:***

1. Under most Circumstances, the operator and other personnel on the seat of the vehicle should remain seated and not leave the vehicle. Do not move or touch any part, particularly a metallic part, of the vehicle or the rig.
2. If it is determined that the rig should be vacated, then all personnel should jump clear and as far as possible from the rig. Do not step off the vehicle, but rather jump off and do not hang onto the vehicle or any part of the rig when jumping clear.
3. If you are on the ground, stay away from the vehicles and the rig, do not let others get near the vehicle and the rig and seek assistance from local emergency personnel such as the police or fire department.

**Note:** *This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*

4. When an individual is injured and in contact with the rig or with power lines, attempt rescue with extreme caution. If a rescue is attempted, use a long, dry, unpainted piece of wood or a long, dry, clean rope. Keep as far away from the victim as possible and do not touch the victim until the victim is completely clear of the rig or electrical lines.
5. When the victim is completely clear of the electrical source and unconscious, and a heartbeat (pulse) cannot be detected, begin cardiopulmonary resuscitation (CPR) immediately.

### PROPER LIFTING TECHNIQUES

Proper lifting takes the hazard out of moving heavy objects. Whenever you lift something:

1. Make sure you can lift the load safely, otherwise get help.
2. Use a mechanical lifting device, if available.
3. Inspect route to be traveled, making sure of sufficient clearance.
4. Look for any obstruction or spills.
5. Inspect the object to decide how it should be grasped.
6. Look for sharp edges, slivers, or other things that might cause injury.

### PROPER LIFTING PROCEDURES

1. Keep feet parted - one alongside and one behind object for better balance,
2. Keep back straight, vertical, with spine, back muscles, and body in correct alignment,
3. Tuck chin into chest,
4. Bend knees and assume squatting position,
5. Tuck elbows and arms close to body,
6. Keep body weight directly over feet,
7. Start lift with thrust of rear foot,
8. Move slowly and carefully, avoid twisting the body.

### FIRE AND CHEMICAL SAFETY

1. Fire extinguishers in good condition will be on all Company vehicles.
2. All employees shall know the location of the FIRE fighting EXTINGUISHERS and how to use them properly.
3. Do not remove, alter or deface any HAZARD WARNING LABELS.
4. Change your clothing immediately should it become soaked with any flammable liquid or chemical.
5. Never pour FLAMMABLE LIQUIDS down drains or sewers.
6. Store flammable liquids in proper containers in separate area with warning labels.
7. Use metal containers for disposal of rags soaked with flammable liquids.

*Note: This manual cannot cover every possible hazard one might encounter on the job, please use common sense when working.*