



ESP Associates, P.A.
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APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
 DATE 6/1/04 BY SLC

May 25, 2004



State of North Carolina
 Department of Environment and Natural Resources
 Division of Waste Management
 401 Oberlin Road
 Raleigh, North Carolina

ATTENTION: Mr. Donald "Jim" Barber

Reference: **LINER REPAIR, CMS LANDFILL V, CELL 2E**
Gas Extraction Well EW-116
 Concord, North Carolina

Mr. Barber:

On behalf of BFI Waste Systems of North America, Inc. (BFI), ESP Associates, P.A. (ESP) is submitting this liner repair certification and documentation as a follow up to the liner repair plan dated April 18, 2004. The liner system repair was performed by American Environmental Group, Ltd on May 18, 2004 under the full time monitoring and observation of ESP. The following presents a summary of events causing the damage to the liner system, subsequent excavation of waste, liner repair activities and certification of the repair.

During the most recent construction of the gas extraction expansion at CMS Landfill V, more specifically installation of extraction well EW-116, the base composite liner system was breached by the drill rig auger bucket. This occurred at approximately 11:15 am on April 15, 2004. The liner section was breached to a depth including the uppermost 8-inches of the compacted soil liner based on inspection of the drill rig auger bucket at the surface. The section of HDPE liner, geocomposite and compacted soil liner removed from the auger bucket were photographed and documented. ESP notified the Division of Waste Management and BFI following this discovery on April 15, 2004. An approximately 3-foot thick bentonite plug was installed at the bottom of the open borehole on April 15, 2004 and the well casing remained in-place for location purposes.

Landfill personnel excavated waste to the base liner system of Cell 2E surrounding the well casing for EW-116. Excavation of waste was completed on May 17, 2004 by performing some "hand work" with shovels to remove operational cover. Waste was excavated to construct an approximately 3H:1V slope from the top of the landfill to the base liner system. Landfill personnel excavating waste wore personal air monitors during this process to ensure appropriate air quality and safe working conditions. A photo of the excavation and repair location follows (Figure 1).

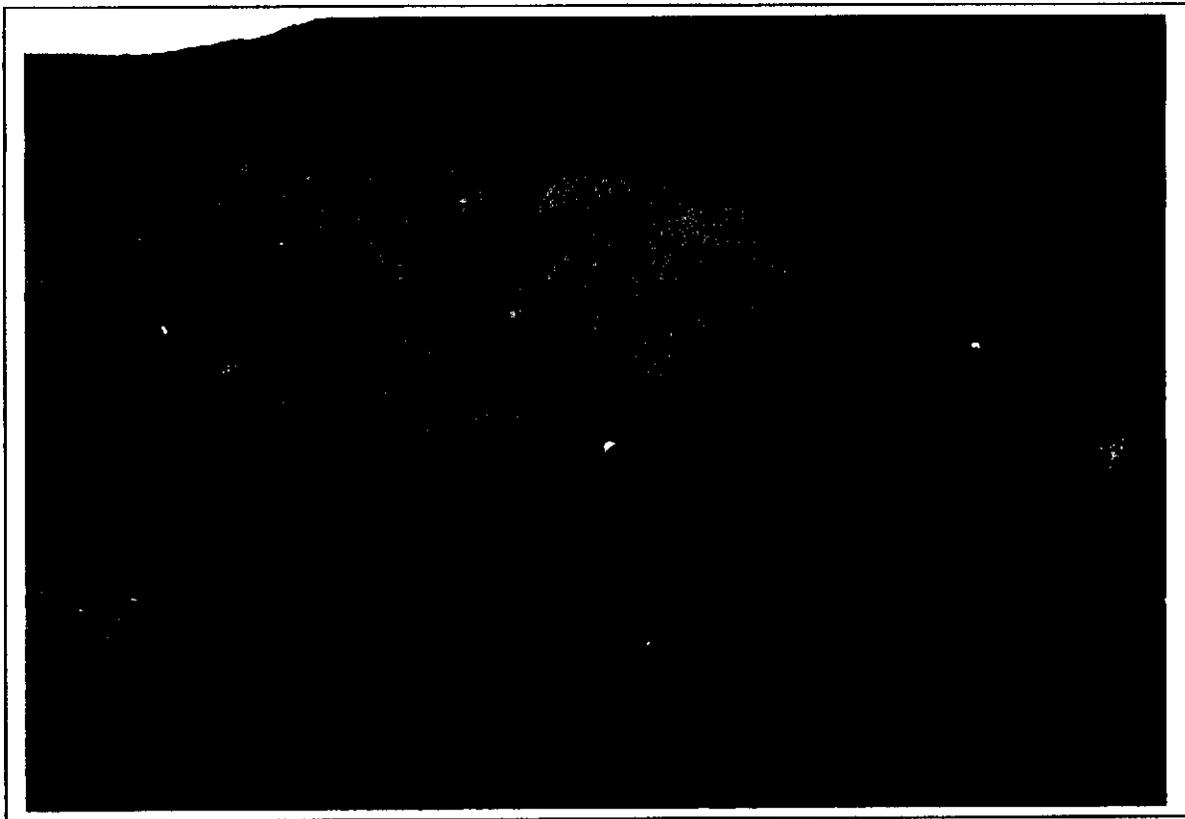


Figure 1 – Excavation and Repair Location, Initial Air Quality Testing for Repair

American Environmental Group, Ltd (AEG) and ESP arrived on-site at 6:15 am on May 18, 2004 to perform the repair. AEG and ESP conducted a safety meeting at 6:30 am to review the health and safety plan prepared by AEG for the project. A copy of the health and safety plan is attached for reference.

Prior to beginning any work, the air quality in the excavated area was tested using a photo ionization detector (PID) to ensure a safe working environment. Following testing of the ambient air quality, the work area was deemed safe with no levels of explosive gases detected. The PID remained at the repair location throughout the duration of repair activities to monitor air quality.

The repair area was inspected and documented by ESP and AEG personnel. The geocomposite and 60-mil high density polyethylene (HDPE) liner surrounding the damaged area (approximately 3 feet diameter) were cut and removed to form an approximately five-foot diameter circle. A photograph of the HDPE liner removed from the damaged area is shown in Figure 2.

Bentonite placed around the EW-116 well casing was in-place to the liner surface and slightly hydrated. In order to provide a clean repair working area, a geosynthetic clay liner (Bentomat) was placed above the bentonite and compacted soil liner. A Photograph of the prepared repair area including the GCL is shown in Figure 3. All materials used to perform the repair were taken from Cell 2L surplus material certified during construction of Cell 2L by ESP. All materials have been stored properly and were visually inspected prior to use.



Figure 2 – HDPE liner removed from repair area



Figure 3 – Prepared Repair Area including GCL

A test seam using AEG's extrusion gun # 10 set at a temperature of 254 degrees was performed prior to performing the repair. Once the test seam was performed, three 1-inch wide specimens were cut from the test seam and tested in the on-site tensiometer for peel adhesion seam strength. All specimens achieved passing test results with values ranging from 75.1 to 86.5 pounds per inch and exhibiting Film Tear Bond (FTB) break mode. ESP approved the equipment and personnel to perform the repair.

An approximately 6-ft X 6-ft HDPE patch was prepared and placed over the damaged area. The patch was heat bonded in place to perform grinding of the edges for extrusion welding. An edge grinder was used to "scuff" the surface of the patch edges and the underlying HDPE liner to provide an acceptable surface for extrusion welding. No over grinding was observed during preparation of the patch.

AEG performed extrusion welding of the patch to the underlying HDPE liner using the same personnel and equipment used to perform the test seam. All grinding was covered by the extrusion bead around the entire patch perimeter. A photograph of the extrusion welding of the patch is shown in Figure 4.



Figure 4 – Extrusion Welding of Patch

Following completion of extrusion welding, the entire perimeter of the patch was vacuum box tested to detect any leaks. ESP monitored vacuum box testing and detected no leaks around the entire perimeter of the patch. A photograph of vacuum box testing is shown in Figure 5 below.

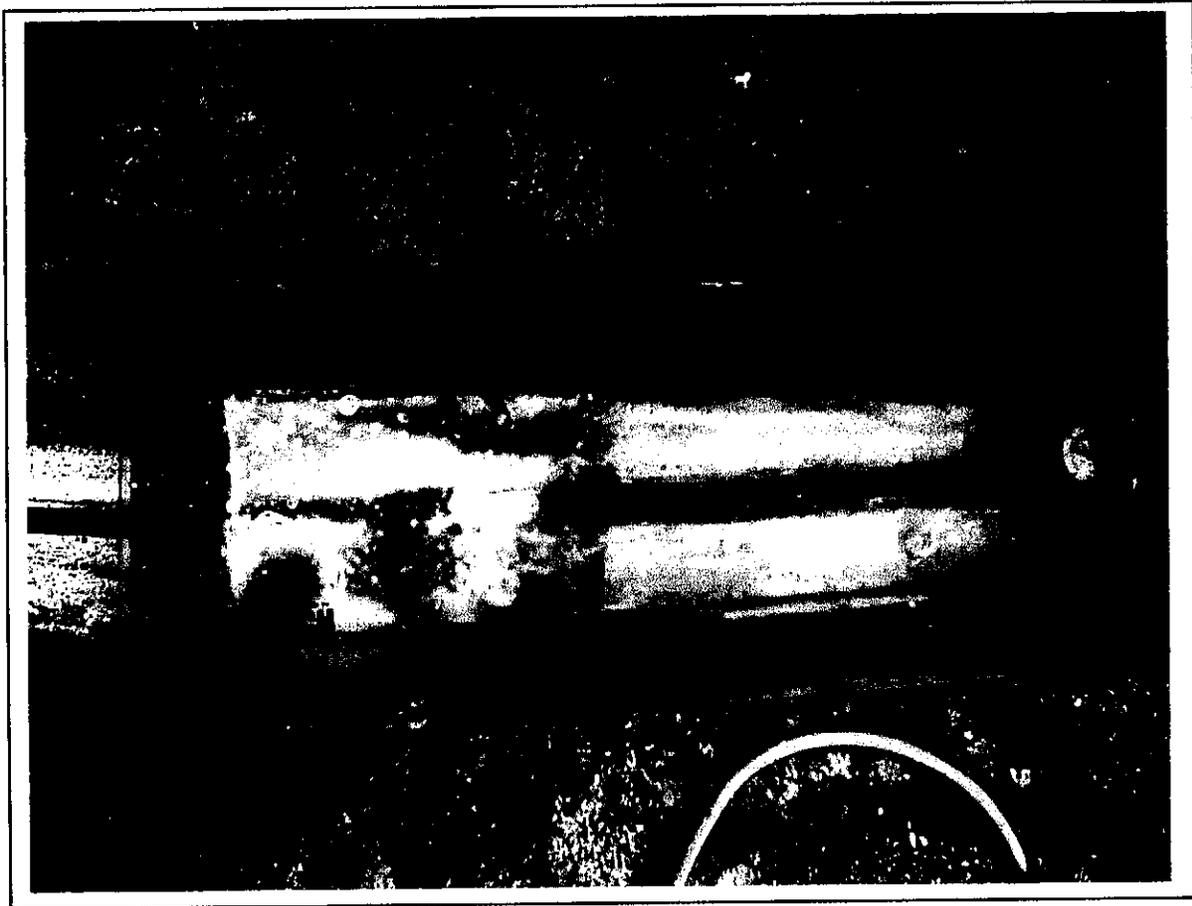


Figure 5 – Vacuum Box Testing Repair

Following completion of vacuum box testing, geocomposite taken from the Cell 2L surplus material was placed over the repaired area. The newly placed geocomposite overlaps the existing geocomposite a minimum of 2 feet in each direction. The geocomposite was held in place with soil placed around the edges until operational cover could be placed.

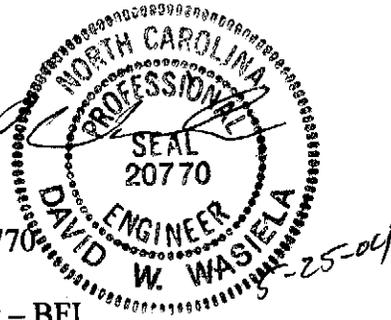
A minimum of 2 feet of clean soil was placed over the repair area as operational cover on May 18, 2004 to complete the repair.

ESP Associates, P.A. was on-site full-time to monitor and document the repair of the base liner system for gas extraction well EW-116. We hereby certify that the repair has been performed to meet or exceed the requirements of the Facility's technical specifications and construction quality assurance plan for the base liner system, leachate collection system and operational cover. If you should have any questions or require additional information concerning this submittal, please contact me.

Sincerely,

ESP Associates, P.A.


David W. Wasiela, P.E.
Project Engineer
NC Registration No. 20770



Cc: Mr. Mike Gurley – BFI

Atch: Health & Safety Plan

HEALTH & SAFETY PLAN

SUPPLEMENTAL HEALTH AND SAFETY PLAN
LINER REPAIR AT CHARLOTTE MOTOR SPEEDWAY LANDFILL
WORK COMMENCING ON OR ABOUT MAY 18, 2004
AMERICAN ENVIRONMENTAL GROUP LTD.

Work Description: A liner penetration caused by a landfill gas well drilling rig has created the need to repair a three (3) foot diameter hole in the HDPE liner system at the bottom of the landfill cell. The depth of the liner penetration is approximately forty (40) feet below the top of the waste. The location of the hole is on the southwest corner of Cell 2E.

American Environmental Group (AEG) plans to establish a work area around the damaged liner section of approximately 100 square feet. The liner will be exposed initially by heavy equipment excavating and eventually by hand shoveling of the two (2) foot sand layer. All waste material surrounding the repair location will be excavated and sloped back at a minimum of 3H:1V prior to the repair work commencing. The Owner's personnel and equipment will perform the waste excavation.

It is anticipated that the repair site will not be adversely affected by excessive amounts of leachate.

Work Plan: Once the liner repair site has been excavated to the extent possible with the heavy equipment, a staging area will be established. The staging area will be established no further than one hundred feet from the liner repair site. The staging area will be situated upwind from the liner repair site and will be placed on a flat or suitably benched area. Depending on site conditions, plywood sheets, or an equivalent strategy, may be used to provide a stable working/walking surface in the staging area.

All personnel (repair crew, rescue crew, project coordinator) will work from the staging area. All equipment used for the repair will also be placed in the staging area including the generators, air blowers, and respirator control boards. All communications to the workers performing the liner repair will initiate from the staging area. The generators, and other noise-producing equipment, will be positioned so as to minimize the noise impact to personnel in the staging area. A listing of project equipment is contained in Appendix A of this document.

Personnel Requirements: The initial work plan will require two AEG workers to perform the liner repair. An additional three workers will be stationed in the staging area. Two of the workers in the staging area will be prepared, equipped and available to enter the work area to affect rescue of the work crew. The third person in the staging area will



coordinate the work and remain in the staging area during the entire duration of the liner repair.

Personal Protective Equipment: The two workers performing the liner repair will be equipped with supplied air respiratory equipment, specifically full face-piece Type C pressure demand supplied air respirators equipped with a 5-minute emergency escape air cylinder (e.g. MSA Hip-Air Breathing Apparatus). The airline hoses will be limited to 100 feet.

In addition, the two workers performing the liner repair will wear Nomex suits, or equivalent, work boots and gloves. If excessive leachate is present rubber overboots, and rubber gloves will be utilized. Finally, the two workers performing the repair will wear a retrieval body harness.

The two personnel at the staging area will be identically equipped. They will be dressed in the gear with the exception of the respirator face-piece. The respirator face-piece will only be donned in the event of a rescue operation.

The project coordinator in the staging area will not be required to wear any specific personal protective equipment for this work activity.

Training: The two workers performing the liner repair will be qualified to perform the liner repair. They will display proficiency, and have documented training, in the following:

- Use of the specific direct reading instruments used for air monitoring
- Use of specific supplied air respiratory equipment used on the project
- Hand signals used to communicate with the staging area

The rescue team will display proficiency, and have documented training, in those same elements in addition to being qualified to perform rescue and provide first aid and CPR.

Air Monitoring: Each of the two workers performing liner repair will wear a direct-reading air-monitoring instrument. There will be an additional two working air monitoring instruments placed within the staging area. A spare instrument shall also be available in the staging area.

The instrument will be capable of measuring real-time oxygen concentration, lower explosive limit, and hydrogen sulfide concentrations. The instruments shall be set to monitor continuously throughout the duration of the work.

The instrument shall be set to alarm at the following levels:

- 19.5% oxygen or less
- 10% lower explosive limit or more
- 10 ppm hydrogen sulfide or more

The instruments shall be calibrated at the site using the appropriate calibration gas (e.g., 50% LEL methane, 25 ppm hydrogen sulfide or equivalent).

The workers shall be capable of hearing the audible alarms produced by the instruments at all times. In the event of an instrumentation alarm, the work crew will immediately evacuate to the staging area.

Descent to Liner Level: All equipment will be moved to the staging area only after air monitoring has shown the acceptability of the atmosphere. The generators, air blowers and respirator control board will operate from the staging area. Electrical cords, flexible ducting, and airlines shall be used to deliver electricity, dilution ventilation, and respirable air to the liner repair site, respectively.

All personnel moving from the staging area to the liner repair site will wear supplied air respiratory equipment and be equipped with an air-monitoring instrument.

The need for dilution ventilation at the liner repair site will be determined by the project coordinator based on initial readings obtained by personnel as they approach the liner repair site.

Since the equipment used to perform the liner repair is not intrinsically safe, no work will be conducted if the LEL readings cannot be maintained continuously below 10 percent LEL. The design of the excavation and natural ventilation through the working space is the primary element in reducing the potential for LEL concentrations. Supplemental dilution ventilation may be provided based on the results of the air monitoring.

Communications: Personnel descending to the liner repair site will remain in contact with personnel in the staging area through the use of Nextel cellular phones.

The hand signals will be used to supplement the communications through the cell phones. Workers at the site will be briefed on these signals prior to work activities. A list of hand signals can be found in Appendix B.

Rescue: Two suitably trained and equipped personnel will be positioned in the staging area to serve as the rescue team. These personnel will be qualified in first aid and CPR. These personnel will be equipped with a suitable first aid kit.

An AEGL vehicle will be positioned at the closest possible point to the staging area in the event transport to a medical facility is necessary. This vehicle will remain in this position at all times during liner repair work.

Cabarrus County fire and rescue service is available through the '911' system. The closest fire station is approximately three miles from the site. The supervisor shall communicate with this fire station prior to this work effort commencing to brief the



station on the pending work effort and to coordinate, in advance, for any potential rescue services.

A map to the nearest hospital is contained in Appendix C.

APPENDIX A
Safety Equipment List

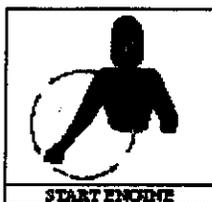
Safety Equipment List

Item		Number
Air Hose for masks - 100 ft	EA	4
MSA Hip-Air Breathing Apparatus		
Air Supply Mask with 5 min Escape bottle	EA	4
Passport Monitor		
Gas monitor - CB/OX/CO/HS Passport	EA	5
Life line 100 ft	EA	4
Miller Retrieval Harness		
4 Point Harness LG	EA	2
Miller Retrieval Harness		
4 Point Harness XL	EA	1
Vent Blowers with 100 LF hose	EA	2
Disposable booties LG	Box	1
Disposable booties xxl	Box	1
Disposable latex gloves LG	Box	1
Disposable latex gloves XL	Box	1
FIT TEST	EA	1
Nomex COVERALLS		
	XL EA	3
	XXL EA	1
Multi-gas Calibration bottle	EA	1
Alcohol wipes	Box	1
PD Air System		
Compressor,	EA	1

APPENDIX B

Hand Signals

START ENGINE



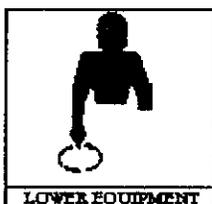
Simulate cranking of vehicles by moving arm in circular motion at waist level.

STOP ENGINE



Draw either hand, palm down across the neck in a "throat-cutting" motion.

LOWER EQUIPMENT



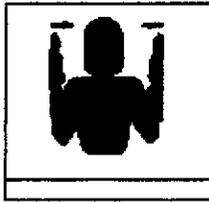
Make circular motion with either hand pointing to the ground.

RAISE EQUIPMENT



Make circular motion with either hand at head level.

THIS FAR TO GO



Place palms at ear level, facing head, and move laterally inward to indicate remaining distance to go.

COME TO ME



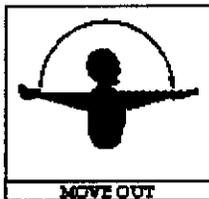
Raise the arm vertically overhead, palm to the front, and rotate in large horizontal circles.

MOVE TOWARD ME



Point toward person(s), vehicle(s), unit(s); beckon by holding the arm horizontally to the front, palm up, and motioning toward the body.

MOVE OUT



Face the desired direction of movement; hold the arm extended to the rear; then swing it overhead and forward in the direction of desired movement until it is horizontal palm down.

STOP



STOP

Raise the hand upward to the full extent of the arm, palm to the front. Hold that position until the signal is understood.

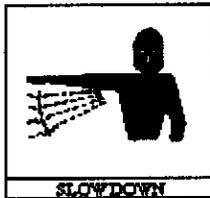
SPEED UP



SPEED UP

Raise the hand to the shoulder, fist closed; thrust the fist upward to the full extent of the arm and back to the shoulder rapidly several times.

SLOW DOWN



SLOWDOWN

Extend the arm horizontally sideward, palm down, and wave arm downward 45 degrees minimum several times, keeping the arm straight. Do not move arm above horizontal.

APPENDIX C
DIRECTIONS TO HOSPITAL

SITE-SPECIFIC HEALTH AND SAFETY PLAN

FOR

**SPEEDWAY LF REPAIR
CONCORD, NORTH CAROLINA**

Prepared for

ESP & Associates

Prepared by

AEGL
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5/12/04

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1 INTRODUCTION

The purpose of this Site-Specific Health and Safety Plan (HASP) is to:

- Identify the health and safety hazards of each phase of site operations, and
- Identify the procedures to be implemented to ensure employee protection.

The information in this HASP has been developed in accordance with applicable standards and generally recognized industry practices. This document is, to the extent possible, based on site characterization information provided to American Environmental Group Ltd (hereafter AEGL).

This written program shall be made available to any contractor or subcontractor or their representatives who will be involved with site operations; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.

Inspections shall be conducted by AEGL to determine the effectiveness of this HASP. Any deficiencies in the effectiveness of the HASP shall be corrected by AEGL.

In the event of conflicting safety procedures or requirements, AEGL personnel shall implement those safety practices which afford the highest level of protection.

Additional records and procedures to support the requirements of this HASP are available upon request from the Site Superintendent.

2 SCOPE OF WORK

AEGL will perform the following activities at this site:

- Site mobilization
- Repair Existing Geomembrane – See Task Specific HASP

If the scope of work is altered or if additional tasks are assigned, an addendum to this HASP shall be developed to address the specific hazards associated with these changes.

3 ORGANIZATIONAL STRUCTURE AEGL EMPLOYEES

The requirements of this HASP will be implemented through an effective organizational structure that includes the Corporate Health and Safety Officer, Site Superintendent, employees, equipment operators, and subcontractors.

Corporate Health and Safety Officer

The Corporate Health and Safety Officer (CHSO) shall be responsible for the overall implementation of the HASP. This shall include, but is not limited to, review and approval of the HASP, communication of this HASP to Subcontractor personnel, consultation with the Client/Owner regarding appropriate changes to the HASP, and relating any changes through the affected organizational structure.

Site Superintendent

A Site Superintendent (SS) shall be appointed by the CHSO prior to the commencement of field activities. The SS is the person who, under the supervision of the CHSO, is responsible for implementing site health and safety requirements. Specific duties of the SS include:

- Perform and document a safety orientation for all AEGL site personnel which will serve to familiarize all personnel with the procedures, requirements, and provisions of this HASP.
- Providing for the safety of any visitors who enter the work area.
- Orders the immediate shutdown of site activities in the case of a medical emergency, unsafe condition, or unsafe practice.
- Provide the safety equipment, personal protective equipment, and other items necessary for AEGL employees.
- Enforce the use of required safety equipment, personal protective equipment, and other items necessary for employee or community safety.
- Conduct job site inspections as a part of quality assurance for safety and health.
- Report safety and health concerns to management as necessary.

Employees

All employees are responsible for their own safety as well as the safety of those around them. All employees shall use any equipment provided in a safe and responsible manner, as directed by their supervisor.

All employees have the obligation and right to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

Employees are expected to take the following actions as appropriate:

- Suspend any operations which may cause an imminent health hazard to employees, subcontractors, or others.
- Correct job site hazards when possible to do so, without endangering life or health.
- Be vigilant for any ill effects experienced by any crew member, especially those symptoms caused by heat stress or chemical exposure.
- Report safety and health concerns to the SS.

Equipment Operators

All equipment operators are responsible for the safe operation of heavy equipment under their control. Operators are responsible for inspecting their equipment to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected during site mobilization. Equipment will be taken out of service if an unsafe condition occurs. All equipment operators are required to wear seat belts during operation.

3.1 Subcontractors

All AEGL subcontractors shall be expected to execute their specific job duties in a safe manner, and to provide sufficient resources, personnel and equipment to meet this expectation. To facilitate subcontractor preparation for this work effort, a copy of this HASP will be provided to each subcontractor. AEGL subcontractors are expected to take this information, combine it with their own experiences, procedures, and expertise, to produce an effective health and safety plan suitable for their work at this site. All HASPs produced by AEGL subcontractors shall be made available to AEGL upon request.

4 HAZARD EVALUATION

This section identifies and evaluates the potential chemical, physical, and biological hazards which may be encountered during the work activities identified in Chapter 2.

4.1 Chemical Hazards

The potential chemical hazards of concern include components of landfill gas and leachate. These contaminants may include methane, hydrogen sulfide, and other organic vapors. The routes of exposure from these contaminants are primarily through inhalation of organic vapors and dusts, and by direct contact with contaminated media.

Methane

Methane is usually a component of landfill gas. Pure methane is a colorless and odorless gas. It has practically no toxic effects below the flammable limits. While methane has no noticeable toxic effects, high concentrations can displace oxygen and serve as a simple asphyxiant. Methane has a lower explosive limit (LEL) of 5 percent, and a upper explosive limit (UEL) of 15 percent by volume in air.

OSHA does not regulate exposure to methane by a specific standard. However, methane is a flammable gas and must be controlled at least 20 percent below its LEL. Below 10 percent of the LEL in excavations and confined spaces.

Hydrogen Sulfide

Hydrogen sulfide is a colorless, toxic gas that is identified by the offensive odor of rotten eggs. It is heavier than air, flammable, and is generally a component of landfill gas. Hydrogen sulfide can cause irritation of eyes, nose and throat, beginning at approximately 10 ppm. Long-term exposure (30 minutes or longer) to high concentrations can cause drowsiness, staggering and nausea which can lead to death, due to respiratory system failure.

The odor of hydrogen sulfide can be detected at approximately 0.03 ppm, becomes offensive at 3 ppm, and causes irritation at 10 ppm. An especially dangerous situation is brief exposure to concentrations of 50 ppm, which can cause a person to lose the sense of smell. This has been described in accident reports as "I first smelled hydrogen sulfide, then it went away." This is called olfactory fatigue. The toxic effect of hydrogen sulfide paralyzes the respiratory control center, which leads to suffocation and then death.

Hydrogen sulfide has a wide flammable range (LEL 4.0%, UEL 44.0%). This property, coupled with its heavier-than-air density, makes it a hazard in trenches and low-lying areas.

Hydrogen sulfide is regulated by OSHA on a 20 ppm ceiling concentration. A ceiling concentration means that this level can not be exceeded during any part of the work period. OSHA has also established a Permissible Exposure Limit (PEL) concentration at 10 ppm, and an Immediately Dangerous to Life or Health (IDLH) concentration of 100 ppm.

Employees are directed to shut down ignition sources and leave the area if hydrogen sulfide is detected above 10 ppm. Generally, natural cross-ventilation will reduce hydrogen sulfide to acceptable levels. Re-entry and continuation of work may be done only under controlled conditions involving monitoring equipment and in supplied air respirators if levels exceed, or are likely to exceed, 10 ppm.

Leachate

As refuse decomposes, a liquid material forms which can combine the chemical properties of all materials involved. The resulting fluid, referred to as leachate, could have a wide range of hazardous properties such as being flammable, toxic, or corrosive. However, the liquid normally is comprised mainly of water or other non-hazardous ingredients.

Workers will avoid direct contact with the leachate. In situations where contact is possible, workers are to wear modified Level D protective clothing, as described in Chapter 6.

4.2 Physical Hazards

Physical hazards that may be present during project work include potential for close proximity to heavy equipment, working in trenches and excavations, noise, overhead and underground utilities, slip/trip/hit/fall injuries, heat stress/cold stress and other potential adverse weather conditions. In addition, personnel must be aware that the protective equipment worn may limit dexterity and visibility and may increase the difficulty of performing some tasks.

4.2.1 Utility Clearances

- Elevated superstructures (e.g., drill rigs, cranes) shall remain a distance of 10 feet away from utility lines (50 Kv or less), and 20 feet away from power lines (>50 Kv).
- Prior to all intrusive activities (e.g., excavating), locator line services will be contacted to mark underground lines.
- Personnel involved in intrusive work shall determine the minimum distance from marked utilities which work can be conducted with the assistance of the Local Agency.

4.2.2 Heavy Equipment

Working around heavy equipment can be dangerous because of the size and power of the equipment, the limited operatory field of vision and the noise levels that can be produced by the equipment. Heavy equipment to be utilized at the site shall include a variety of backhoes, dozers, track loaders, and off-road trucks.

The following practices shall be followed by operators when using heavy equipment:

- Equipment should be inspected daily by the operator to ensure that the equipment is in safe operating condition.
- When not in use, hydraulic and pneumatic components should be left in down or "dead" position.
- Roll-over protection shall be provided on uneven terrain sites.
- No riding on vehicles or equipment except in fixed seats.
- Seat belts should be worn at all times.
- Backup alarms, automatically activated and loud enough to be heard above background noise, are required to be operational on all heavy equipment.
- Parking brakes should always be applied on parked equipment.

- Equipment should never be operated closer than 10 feet from utility lines.
- Windshields must be maintained clean and free of visual obstructions.

To ensure the safety of all personnel in the work area, the following safety procedures regarding heavy equipment must be reviewed prior to and followed during work activities:

- Ensure that equipment operators are trained and/or experienced in the operation of the specific equipment.
- Personnel should never approach a piece of heavy equipment without the operators acknowledgment and stoppage of work or yielding to the employee.
- Never walk under the load of a bucket or stand beside an opening truck bed.
- Maintain visual contact with the operator when in close proximity to the heavy equipment.
- Wear hearing protection while on or around heavy equipment, when normal conversation cannot be heard above work operations.
- Steel-toed shoes, safety glasses, and a hard hat shall be worn for all work conducted near heavy equipment.

4.2.3 Excavation and Trenching

The following safety guidelines shall be adhered to while conducting excavation and trenching operations:

- Prior to opening an excavation, effort shall be made to determine whether underground installation (i.e., sewer, telephone, water, fuel electric lines, etc.), will be encountered and the estimated location. When the excavation approaches the estimated location of such installation, the exact location shall be determined and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.
- Ladders will be used in any trench greater than 4 feet in depth, and must be available with every 25 feet of lateral travel. The ladders must extend above the trench at least 3 feet or greater.
- Protective systems (i.e., shoring/bracing, sloping or benching) shall be used if personnel are to enter an excavation with a depth greater than 5 feet.

- Sloping, or benching shall be in accordance with the OSHA standard and shall correspond to the proper ratio (i.e., 1½:1) as per soil type.
- Air monitoring for potential hazardous atmospheres (i.e., combustible gases, volatile organics, and oxygen deficient environments) shall be conducted prior to personnel entering the trench with a depth at 4 feet or greater.
- Barriers shall be erected around excavations in remote work locations. Backfill all excavations, temporary wells, pits, and shafts when work is completed.
- Vehicular traffic and heavy equipment shall remain at least 4 feet from the face of the excavation. All excavated or other materials shall be stored and retained at least 2 feet from excavation.
- The excavation shall be inspected by the selected competent person throughout the work day, during any change in conditions (i.e., rain, cracking/fissures), and at a minimum twice daily.

4.2.4 Heavy Lifting

When lifting objects, use the following proper lifting techniques:

- Keep your feet shoulder width apart to get the best footing possible.
- Bend at the knees, not at the waist.
- Tighten stomach muscles to offset the force of the load.
- Grasp the object at opposite corners.
- Lift with the legs instead of the back muscles.
- Keep the back upright and avoid twisting.
- Most importantly, think before lifting.

4.2.5 Electrical Hazards

No employee shall be permitted to work on any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or has been locked and tagged out:

- All electrical wiring and equipment shall be intrinsically safe for use in potentially explosive environments and atmospheres.
- All electrical wiring and equipment shall be a type listed by Underwriters' Laboratories (UL) or Factory Mutual (FM) for the specific application.
- All installations shall comply with the National Electric Code (NEC) and the National Electric Safety Code (NESC).
- All electrical circuits shall be grounded according to NEC and NESC Code. Ground fault circuit interrupters shall be used in the absence of properly grounded circuitry or when portable tools must be used around wet areas.
- All live wiring or equipment shall be guarded to protect all persons or objects from harm.

4.2.6 Adverse Weather Conditions

The SS shall decide on the continuation or discontinuation of work based on current and pending weather conditions. Electrical storms, tornado warnings, and strong winds are examples of conditions that would call for the discontinuation of work and evacuation of site.

- No work will be permitted during any type of electrical storm.

4.2.7 Slip/Trip/Hit/Fall

Slip/trip/hit/fall (S/T/H/F) injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot check the work area to identify hazards.
- Establish and utilize a pathway which is most free of slip and trip hazards.
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads which you can see over.

- Keep work areas clean and free of clutter, especially in storage rooms and walkways.
- Communicate hazards to on-site personnel.
- Secure all loose clothing, ties, and remove jewelry while around machinery.
- Report and/or remove hazards.
- Keep a safe buffer zone between workers using equipment and tools.

4.2.8 Heat Stress

Recognition and Symptoms

Temperature stress is one of the most common illnesses at hazardous waste sites. Acclimatization and frequent rest periods must be established for conducting activities where temperature stress may occur. Below are listed signs and symptoms of heat stress. Personnel should follow appropriate guidelines if any personnel exhibit these symptoms:

Heat Rash — Redness of skin. Frequent rest and change of clothing.

Heat Cramps — Painful muscle spasms in hands, feet, and/or abdomen. Administer lightly-salted water by mouth, unless there are medical restrictions.

Heat Exhaustion — Clammy, moist, pale skin, along with dizziness, nausea, rapid pulse, fainting. Remove to cooler area and administer fluids.

Heat Stroke — Hot dry skin; red, spotted or bluish; high body temperature of 104°F, mental confusion, loss of consciousness, convulsions or coma. Immediately cool victim by immersion in cool water. Wrap with wet sheet while fanning, sponge with cool liquid while fanning; treat for shock. **DO NOT DELAY TREATMENT. COOL BODY WHILE AWAITING AMBULANCE.**

Work Practices

The following procedures will be carried out to reduce heat stress:

- Acclimatization
- Work/rest regimes
- Liquids that replace electrolytes/salty foods available during rest
- Use of buddy system

Acclimatization

The level of heat stress at which excessive heat strain will result depends on the heat tolerance capabilities of the worker. Each worker has an upper limit for heat stress beyond which the resulting heat strain can cause the worker to become a heat casualty. In most workers, appropriate repeated exposure to elevated heat stress causes a series of physiologic adaptations called acclimatization, whereby the body becomes more efficient in coping with the heat stress. Work/rest regimes will be partially determined by the degree of acclimatization provided.

4.2.9 Cold Stress

Recognition and Symptoms

Ambient air temperatures during site activities may create cold stress for on-site workers. Procedures for recognizing and avoiding cold stress must be followed. Cold stress can range from frostbite to hypothermia. Below are listed the signs and symptoms of cold stress. Personnel should follow the appropriate guidelines if any personnel exhibit these symptoms:

Frostbite — Pain in the extremities and loss of manual dexterity. "Frostnip" or reddening of the tissue, accompanied by a tingling or loss of sensation in the extremities. Continuous shivering.

Hypothermia — Pain in the extremities and loss of manual dexterity. Severe, uncontrollable shivering. Inability to maintain level of activity. Excessive fatigue, drowsiness, irritability, or euphoria. **Severe hypothermia:** clouded consciousness, low blood pressure, pupil dilation, cease of shivering, unconsciousness, and possible death.

Remove the patient to a warm, dry place. If clothing is wet, remove and replace with dry clothing. Keep patient warm. Re-warming of patient should be gradual to avoid stroke symptoms. Dehydration or the loss of body fluids may result in cold injury due to a significant change in blood flow to the extremities. If patient is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep patient warm and calm, remove to a medical facility as soon as possible.

Work Practices

The reduction of adverse health effects from cold exposure is achieved by adopting the following work practices:

- Providing adequate insulating dry clothing to maintain core temperature above 98.6°F to workers if work is performed in air temperature below 40°F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- If the air temperature is of 32°F or less, hands should be protected.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve.
- Heated warming shelters should be available nearby (e.g., use of on-site trailer). The workers should be encouraged to use these at regular intervals, the frequency depending on the severity of the environmental exposure. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit heat evaporation or a change of dry work clothing provided.
- Warm sweet drinks and soups shall provide the correct caloric intake and fluid volume. The intake of caffeinated coffee should be limited because of the diuretic and circulatory effect.
- The weight and bulk of clothing should be included in estimating the required work performance and weights to be lifted by the worker.

As with heat stress:

- Implementing a buddy system in which workers are responsible for observing fellow workers for early signs and symptoms of cold stress.
- Unacclimatized employees should not be required to work full-time in cold until they become accustomed to the working conditions and required protective clothing.

4.3 Biological Hazards

4.3.1 Tick-Borne Diseases

Lyme disease is caused by a bacterial parasite called spirochete, and is spread by infected ticks that live in and near wooded areas, tall grass, and brush. Once the tick deposits the spirochete, it must feed on the host blood for 12 to 24 hours before it can transmit the disease. The ticks that cause the disease in the Northeast and Midwest are often no bigger than a poppy seed or a comma in a newsprint. The peak months for human infection are June through October. There are many other tick borne diseases such as Rocky Mountain Spotted Fever which can be carried by a variety of ticks. The prevention and treatment of these diseases are similar to those of Lyme disease.

Prevention

Ticks hang on blades of grass or shrub waiting for a host to come by. When a host brushes against the vegetation, the tick grabs on. They usually first climb onto a persons legs and then crawl up looking for a place to attach. Preventative measures include wearing light-colored clothing, keeping clothing buttoned, tucking pant legs in socks, and keeping shirt tails tucked in. Periodic checks for ticks should be made during the day, and especially at night. Hair should also be checked by parting it and combing through it to make sure that no ticks have attached to the scalp. Also, check clothing when it is first removed, before ticks have a chance to crawl off.

The most common repellent recommended for ticks is N,N-dimethyl-m-toluamide, or DEET. It is important to follow the manufacturer's instructions found on the container for use with all insecticides especially those containing DEET.

In general, DEET insect repellent should only be applied to clothing, not directly on the skin. Do not apply to sunburns, cuts or abrasions. Use soap and water to remove DEET once indoors.

Removal

The best way to remove a tick is removal by tweezers. If tweezers are not available, cover your fingers (tissue paper) while grasping the tick. It is important to grasp the tick as close as possible to the site of attachment and use a firm steady pull to remove it. When removing the tick, be certain to remove all the mouth parts from your skin so as not to cause irritation or infection. Wash hands immediately after with soap and water, and apply antiseptic to the area where tick was removed.

Testing and Symptoms of Lyme Disease

A variety of tests exist for determining Lyme Disease infection. However, most of these tests are not exact. The first symptoms of Lyme Disease usually appear from 2 days to a few weeks after a person is bitten by an infected tick. Symptoms usually consist of a ring-like red rash on the skin where the tick attached. The rash is often bull's eye-like with red on the outside and clear in the center. The rash may be warm, itchy, tender, and/or "doughy". Unfortunately, this rash appears in only 60 to 80 percent of infected persons. An infected person also has flu-like symptoms of fever, fatigue, chills, headaches, a stiff neck, and muscle aches and pains (especially knees). Rashes may be found some distance away from original rash. These symptoms often disappear after a few weeks.

4.3.2 Poisonous Plants

Common Poison Ivy (Rhus radicans) grows as a small plant, a vine, and a shrub. Poison Ivy occurs in every state. The leaves always consist of three glossy leaflets. Poison Sumac (Rhus vernix) grows as a woody shrub or small tree 5 to 25 feet tall. It usually contains nine leaves, with eight paired leaves and one on top, and is common in swampy areas. The plants are potent sensitizers and can cause a mild to severe allergic reaction. This reaction is called contact dermatitis.

Dermatitis, in Rhus-sensitive persons, can result from contact with the milky sap found in the roots, stems, leaves, and fruit. The sap may retain its potency for months or years in a dry atmosphere, and can occur during any time of the year. The sap may also be carried by animals, equipment or apparel.

The best form of prevention is to avoid contact. This can occur by wearing long sleeves and gloves if necessary. Disposal clothing, such as Tyvek, is recommended in high risk areas to avoid exposure from contaminated apparel. Barrier creams and cleaners are also recommended.

4.3.3 Blood Poisoning

Blood poisoning is a term used to indicate a large number of bacteria present in the circulating blood. The most common symptom of blood poisoning is the reddening of skin which advances towards the heart. For example, if the point of contact is the hand than a red line will appear at the hand and extended up the arm.

Personnel protective equipment shall be worn to prevent direct contact with media which may be contaminated with bacteria or viral agents.

Signs and symptoms include swelling, stiffness and tenderness in the affected area, fatigue, chills and fever, pustules, and abscesses. If allowed to progress, the organisms may multiply and cause an overwhelming infection and death.

5 TRAINING REQUIREMENTS

5.1 Worker Competency and Experience

All personnel conducting work at this site shall have demonstrated competency in the skills and activities relevant to their work at the site. This competency may be demonstrated through continuing education, work experience, or a combination thereof. The relevant subject matter may include, but is not limited to, heavy equipment operation, hand signals, first aid, hand tool safety, electrical safety, personal protective equipment usage, material handling, and trenching and excavation.

5.2 Site-Specific Training

An initial site-specific safety briefing shall be conducted by the Site Superintendent prior to commencement of work and/or entering the site. During this initial training session, employees shall be instructed on the following topics:

- Content and implementation of the HASP.
- Site hazards and controls.
- Intended use of personal protective equipment.
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, and emergency response procedures.

The site safety orientation shall be documented on the form contained in Appendix A.

During the project, at intervals not to exceed seven calendar days, supplemental safety meetings shall be conducted by the Site Superintendent to discuss work performed to date, safety incidents (if any), potential health and safety hazards associated with upcoming tasks, and necessary precautions to be taken.

All site training shall be documented on the form contained in Appendix B.

7 MEDICAL SURVEILLANCE REQUIREMENTS

AEGL administers an ongoing, effective medical surveillance program in accordance with 29 CFR 1910.120 (f). Employees who participate in this program include:

- Employees who are exposed to hazardous substances or health hazards at or above the established permissible exposure limit for 30 days or more per year,
- Employees who wear a respirator for 30 days or more per year, and
- Any employees who are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards.

The content of medical examinations made available to employees is determined by the attending physician, and in general, follow the guidelines contained in the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*.

Additional information on the medical surveillance program is available from the Corporate Health and Safety Officer.

Medical information relevant to the administration of first aid to on-site employees is contained on the Medical Data Sheet, which is kept under the control of the Site Superintendent (see Appendix C).

Site-specific additions to the medical surveillance program are not contemplated for this work effort.

8 DECONTAMINATION

All site personnel shall follow the decontamination procedures outlined below.

8.1 Contamination Prevention

One of the most important aspects of decontamination is the prevention of the spread of contamination. Good contamination prevention will minimize employee exposure, and ensure good personal hygiene. Proper decontamination procedures and the following procedures of contamination avoidance shall reduce the potential exposure and the spread of contamination include:

- Do not walk through areas of obvious or known contamination.
- Do not handle or touch contaminated materials directly.
- Fasten all closures on suits, covering with tape if necessary.
- Take particular care to protect any skin injuries.
- Stay upwind of airborne contaminants, when possible.

8.2 Personal Decontamination

All PPE will be disposed of and/or decontaminated at the conclusion of each work day as described below. Decontamination procedures will follow the concept of deconning the most contaminated PPE first.

All disposable equipment shall be doffed before meal breaks and at the conclusion of the work day and replaced with new equipment prior to commencing work. Non-disposable equipment will be fully decontaminated and then placed in a clean storage area.

8.2.1 Level D and Modified Level D Decontamination

Level D decontamination procedures are as follows:

- **Step 1** — Remove all visible contamination and loose debris.
- **Step 2** — Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse.
- **Step 3** — Remove protective clothing; dispose of in disposable container.
- **Step 4** — Wash and rinse hands.

8.3 Equipment Decontamination

8.3.1 Heavy Equipment

All vehicles and heavy equipment used (e.g., trucks, backhoe, bulldozer) that encounter waste materials will be decontaminated prior to leaving the project site using procedures dictated by the SS.

When possible, vehicles should be parked off site or in a non-contaminated area of the site to minimize contamination and thus, avoid the need to decontaminate.

9 EMERGENCY RESPONSE CONTINGENCY PROCEDURES

9.1 On-Site Emergencies

The Site Superintendent is responsible for contacting local emergency services in the event of an emergency situation.

Emergency contact information, including the hospital location, directions, and emergency phone numbers is contained on the form in Appendix E .

9.1.1 Accident, Injury, and Illness Reporting and Investigation

Any work-related incident, accident, injury, illness, exposure, vehicle incident, or property loss must be reported to the Site Superintendent. All incidents shall be documented on the form contained in Appendix F and forwarded to the CHSO.

The report must be filed for the following circumstances:

- Accident, injury, illness, or exposure of an employee.
- Injury of a subcontractor.
- Damage, loss or theft of property
- Any incident, regardless of fault, which involves company equipment, a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.

All incidents will be investigated by the CHSO, or designee. This investigation will focus on determining the cause of the accident and modifying future work activities to eliminate the hazard.

9.2 Emergency Equipment/First Aid

Basic first aid supplies (bandages, gauze, tape) will be located in the first aid box. The first aid box along with first aid manuals and Medical Data Sheets, will be located in the Site Trailer or Site Superintendent vehicle. Other on-site emergency equipment includes an emergency alarm (i.e., air horn), emergency eyewash, fire extinguisher, potable water and drinking cups, anti-bacterial soap, and walkie-talkies.

9.3 Site Evacuation

In the event of an emergency situation such as fire, explosion, significant release of toxic gases, etc., an air horn or other appropriate device will be sounded for approximately 10 seconds indicating the initiation of evacuation procedures. All personnel in both the restricted and non-restricted area will evacuate and assemble near the Support Zone or other safe area as identified by the Site Superintendent prior to the beginning of field operations. The location shall be upwind of the area where the hazard originated, if possible.

For efficient and safe evacuation and assessment of the emergency situation, the Site Superintendent will have authority to initiate proper action if outside services are required.

Under no circumstances will incoming personnel or visitors (other than designated responders) be allowed to proceed into the work area once the emergency signal has been given.

The Site Superintendent shall ensure that access for emergency equipment is provided and that all combustion apparatus has been shut down once the alarm has been sounded.

**SITE-SPECIFIC TRAINING
ACKNOWLEDGMENT FORM**

ESP – SPEEDWAY LF REPAIR

SAFETY MEETING TOPIC - _____

Each employee conducting field work shall sign this form after each site-specific training activity is completed. This form shall be kept at the site during the work effort. At the conclusion of the project, the form shall be sent to the CHSO for inclusion into the project file.

Site Personnel Sign-off

By affixing your signature to the space below, you acknowledge that you have been briefed on the safety topic identified at the top of this form.

I understand this briefing and will comply with the safety requirements for this project.

Signature: _____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____
_____	Date: _____

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all personnel potentially working on-site and will be kept in the Support Zone during the conductance of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to a medical service facility is required:

Site: _____

Name: _____ Home Telephone: _____

Address: _____

Age: _____ Height: _____ Weight: _____

Person to Contact in Case of Emergency:

_____ Phone No. _____

Drug or other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? YES NO

Provide a Checklist of Previous Illnesses or Exposures to Hazardous Chemicals:

What Medications are you Presently using? _____

Do you have any Medical Restriction? _____

Name, Address, and Phone Number of Personal Physician:

EMERGENCY CONTACT INFORMATION

ESP – SPEEDWAY LF REPAIR

EMERGENCY INFORMATION		
Agency, Contact, Facility Name	Phone Number	Hospital Directions
Local Police:	911	Carolinas Medical Center – University 8800 North Tryon Street Charlotte NC 28262 704-548-6000
Fire Department:	911	
Ambulance:	911	
Local Hospital:	704-548-6000	
Health and Safety Officer: Leo Hearn	904-220-0387	
Site Superintendent: John Beeman	330-352-2915	
Client Contact: Dave Wasiela	704-564-4795 Cell 704-504-1015 Office	

*****Post this information in a conspicuous place at the site*****

*****Retain this form in the project files*****

INCIDENT REPORT

Person Completing This Report _____ Phone Number () _____

Date of Report _____ Date of Incident _____
month/day/year month/day/year

Employee's Information:

Name _____ Home Office _____

Occupation/Job Title _____

Where did the incident occur?

What was the employee doing when the incident occurred?

What was the type of injury or illness?

What object or substance directly harmed the employee?
