GROUNDWATER REMEDIATION PLAN
and
HEALTH AND SAFETY PLAN
for
MERRICK CLEANERS, INC.
5640 MERRICK ROAD
EAST MASSAPEQUA, NEW YORK
NYSDEC SITE 1-30-065

Prepared by:

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FEBRUARY 2004

Project: 04803

GROUNDWATER REMEDIATION PLAN
MERRICK CLEANERS
5640 MERRICK ROAD
EAST MASSAPEQUA, NEW YORK

I. INTRODUCTION

EEA, Inc. has been operating a soil gas vapor extraction system at Merrick Cleaners, 5640 Merrick Road in East Massapequa, New York. The system has operated successfully since March 2002. Initially, the removal of contaminants was at a rate of 1.46 gm/min (March 19, 2002). Since that time, the removal rate of contamination has decreased: 004 gm/min (October 3, 2002). It is estimated that 226 pounds of volatile organic compounds have been removed as of October 3, 2002.

Based upon the results of a subsurface investigation conducted by EEA in December 2003, the New York State Department of Environmental Conservation (NYSDEC) recommended that the system be turned off (letter from Gerard Burke to Allen Serper, January 24, 2003). Measurements of the groundwater conducted in January 2003 indicated levels of chlorinated solvents above groundwater standards (see Table 1). In a letter of December 2003, the NYSDEC directed the owner of the property to remediate the groundwater in the parking lot.

II. REMEDIATION PLAN

EEA intends to utilize in-situ anaerobic bioremediation of the chlorinated hydrocarbons in the groundwater at Merrick Dry Cleaners. A polyacetate ester which is formulated for the slow release of lactic acid is injected into the groundwater. The lactic acid, upon contact with the water, is metabolized by microbes to produce hydrogen which is used to reduce the chlorinated hydrocarbons. The reductive dechlorination results in the step-by-step biological degradation of the chlorinated contaminants (see Addendum I, which further describes the HRC bioremediation process).

Implementation of HRC Compounds

Based upon information provided by Regenesis Corporation, the HRC compounds will be injected into the ground water at locations at the boundary of the site (see Figure 1). The Hydrogen Release Compounds (HRC) are provided by Regenesis Corporation. The process has been used successfully to degrade chlorinated compounds, PCEs, TCE, TCAs, and their breakdown products. The dechlorination process will continue at an accelerated rate for up to one year.

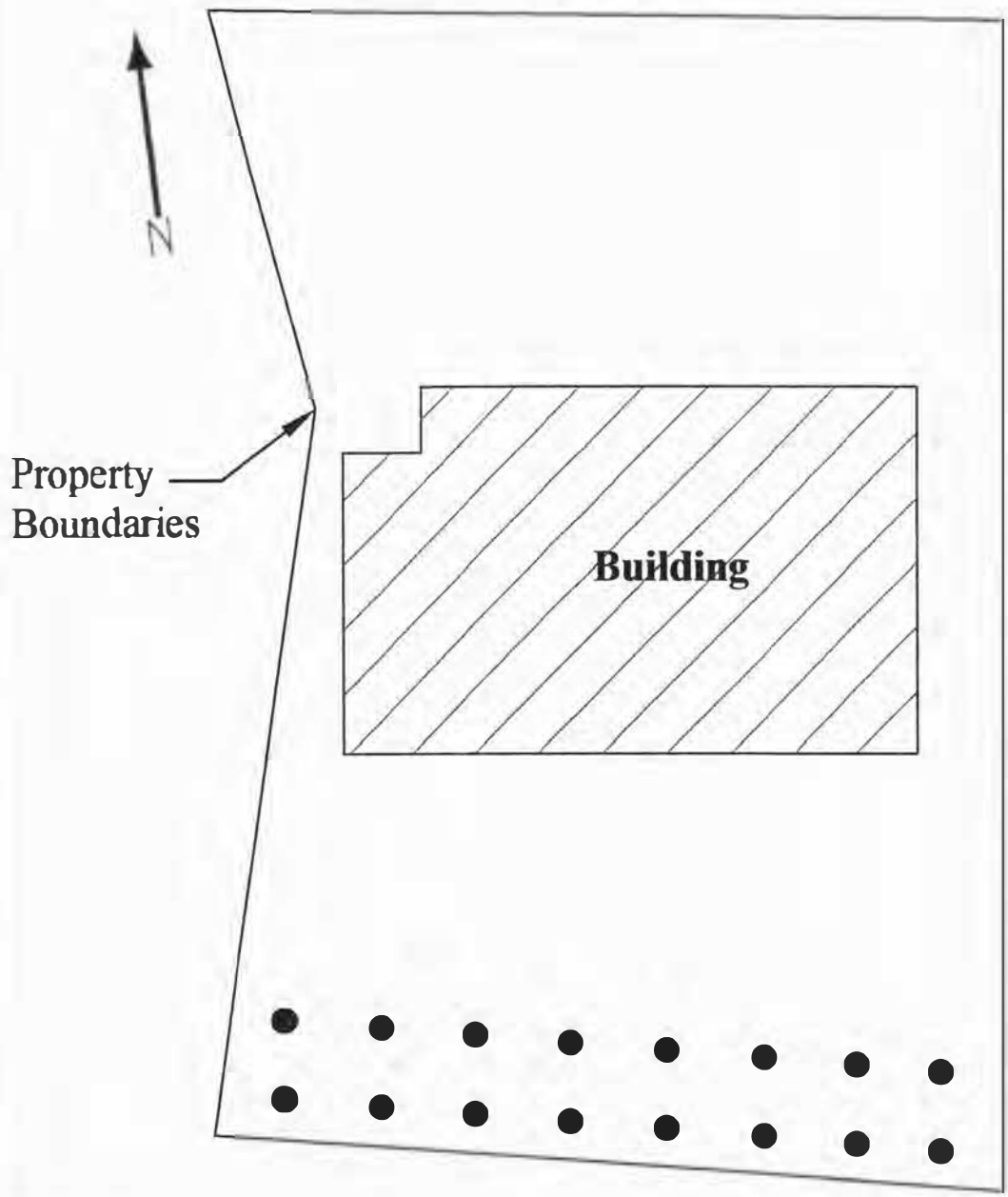
Design Information for Injection of HRC Compounds

The HRC Compounds will be injected using a Geoprobe (equipment with an injection pump). It is anticipated that the HRC Compounds will be heated prior to injection. The Compounds will be injected at 16 points to a depth of 20 feet below grade level (see Figure 1). The following is a

TABLE 1

SUMMARY OF COMPOUNDS DETECTED IN THE GROUNDWATER WELLS AT MERRICK CLEANERS

Compounds (ug/l)	MW-3	MW-4	MW-5	MW-6
Vinyl Chloride	<5	<1	<1	<1
t-1, 2-Dichloroethene	27	<1	<1	<1
c-1,2-Dichloroethene	5,600	52	<1	10
Trichloroethylene	150	4	<1	<1
Tetrachloroethene	87	2	<1	<1
Ethyl Benzene	<5	19	<1	<1
m+p Xylene	<10	26	<2	<2
o Xylene	<5	32	<1	<1
135 Trimethylbenzene	<5	14	<1	<1
124-Trimethylbenzene	<5	15	<2	<1
ter ButylMethylEther	<5	<1	<1	<1
p-Ethyltoluene	<5	24	<1	<1
1245 Tetramethylbenzene	<5	3	<1	<1



● HRC INJECTION POINTS

Scale: 1" = 25'

EEA, Inc. *55 Hilton Avenue* *Garden City, New York* *(516) 746-4400*	**Proposed HRC Injection Plan** Merrick Cleaners 5640 Merrick Road Massapequa, New York	Job No.: 04708 Drawn By: FI **Figure 1**

tabulation of the design parameters. The configuration selected for the injection points will reduce on-site contamination and act as a barrier for off-site migration.

Spacing between injection points	14 feet
Number of points per row	8
Number of rows	2
Spacing between rows	10 feet
HRC application rate (lb/feet)	3.5
Corresponding amount of HRC Compounds per point	60 lbs.
Total amount of HRC for 16 points	960 lbs.

It is planned to obtain current water quality data to determine site conditions prior to the start of remediation after HRC injection, as well as other parameters that effect natural attenuation (see below table).

Groundwater samples will be obtained from MW-3 and analyzed by USEPA Method 8260 monthly. If required, a second round of HRC Compounds will be injected.

NATURAL ATTENUATION PARAMETERS

Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)
Total iron (mg/L)	Total manganese (mg/L)
Dissolved iron (mg/L)	Dissolved manganese (mg/L)
Nitrate (mg/L)	Sulfate (mg/L)
Methane (mg/L)	Ethene/Ethane (mg/L)
Hydrogen (nM)	pH
Temperature (°F)	

Addendum 1: About HRC®

Hydrogen Release Compound (HRC®) offers a passive, low-cost option for *in situ* anaerobic bioremediation of chlorinated hydrocarbons. HRC is propietary, environmentally safe, food quality, polyactateester specially formulated for the slow release of lactic acid upon contact with water. This source of lactic acid is then metabolized by microbes to produce hydrogen which is then used in a natural process known as reductive dechlorination. Reductive dechlorination results in the step-by-step biological degradation of chlorinated contaminants. HRC can be used to degrade a range of chlorinated compounds including degreasing agents (PCE, TCE, TCA and their breakdown products), carbon tetrachloride, chloroform, Methylene chloride, certain pesticides/herbicides, perchlorate, nitrate, nitroaromatic explosives and dyes, chlorofluorocarbons, certain metals and radionuclides.

Reductive dechlorination is a term used to describe the mechanism by which chlorinated hydrocarbons are biologically degraded under anaerobic conditions. In this natural process, anaerobic microbes substitute hydrogen for chlorine on chlorinated contaminant molecules, thus dechlorinating the compound. Being a natural process, reductive dechlorination usually proceeds at very slow, unsustainable rates. HRC increases the rate of dechlorination up to several orders of magnitude, rapidly taking the contaminant through a step-wise dechlorination process that ultimately results in the production of non-toxic compounds such as ethene and ethane. Under the influence of HRC, this process may continue at an accelerated rate for up to 18 months.

HRC offers an efficient, low-cost and effective method of treating *in-situ*, chlorinated compounds. Application of HRC is accomplished inexpensively using push-point or borehole delivery methods. Once in the subsurface, HRC continues to stimulate the biodegradation of contaminants for an extended period of time (up to 18 months) eliminating the need for multiple, more frequent injections. A combination of low-cost application, an extended release profile, no operations and maintenance, minimal site disturbance and lack of dependence on external power source gives HRC a substantial cost advantage over other treatment technologies. HRC is a sensible, economical solution for treating chlorinated contaminants in saturated soils and groundwater.

HEALTH and SAFETY PLAN
CONSTRUCTION and REMEDIATION
at
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1.0 Introduction

This Health and Safety Plan addresses the site specific health and safety requirements for the Merrick Cleaners site, located in East Massapequa, Long Island, New York.

This Phase of Work involves furnishing labor and materials to inject Priority Hydrogen Release Compounds (HRC) into the groundwater at the subject property. EEA will inject the HRC Compounds at sixteen locations using a Geoprobe equipped winch specially designed injection pump.

In addition, groundwater samples will be obtained from the existing wells for laboratory analysis.

2.0 Health and Safety Personnel and Responsibilities

The following personnel are primary responders for the health and safety project:

Project Manager: Jeffrey B. Shelkey
Technicians: Not specified
Safety Officer: Nicholas Recchia

3.0 Industrial Hygiene Monitoring

Industrial hygiene monitoring is an important component of the Health and Safety Plan. Industrial hygiene monitoring evaluates potential exposure to harmful chemicals or physical agents. Heat street/cold exposure evaluation is required to determine worker acclimatization and to determine work/rest regimes for heat stress. Exposure to high levels of noise during drilling, and operation of mechanical equipment needs to be evaluated. Personnel need to be advised on the use of ear muffs and may have to be evaluated with audiometry testing depending on the nature and severity of the noise levels. Photoionization detectors, flame ionization detectors, combustible gas indicator (LEL meter, oxygen detection meters) will be used during every step of the site investigation and remediation. This monitoring will provide worker safety against exposure to combustible gases, oxygen deficient atmospheres, and other hazards. This monitoring will also identify the type and level of Personal Protective Equipment required to carry out the task.

4.0 Training of Personnel

Personnel of EEA, Inc. undergo extensive training in hazardous materials management. All EEA personnel undergo 40 hours of OSHA training under OSHA regulations, Title 29, Code of Federal Regulations, Part 1910.120 before being assigned to any field job. As part of the training, personnel learn the use, maintenance, and limitations of PPE. EEA supervisory personnel undergo eight hours of supervisor's training in addition to the regular 40-hour training. Other areas covered during the training are the types of hazards that personnel may encounter, hearing protection against noise, respiratory protection, eye protection, decontamination, various levels of protection, site emergency responses and site control. In addition, site specific hazards and requirements will be reviewed at daily safety meetings.

5.0 Health and Safety Hazards

Hazards that may be encountered at hazardous waste sites can be broadly divided into four general categories: Physical, Chemical, Biological, and Mechanical Hazards (Electrical Hazards should also be accounted for).

5.1 Physical Hazards

Physical hazards that may be encountered at the hazardous waste site include hazardous waste drums, underground storage tanks containing hazardous chemicals, heat and cold stress, noise induced hearing loss. Drums and tanks can leak or explode under pressure, heat stress can cause heat exhaustion, heat syncope and heat stroke. Cold stress can cause hypothermia and frostbite. Machinery and mechanical nosie can cause hearing impairment.

5.2 Chemical Hazards

Chemical hazards may include toxic dusts, volatile organic vapors, semi-volatile organic vapors, toxic metals and compounds in soil, and potentially flammable atmospheres. The presence of toxic and corrosive liquids in drums and tanks has to be considered.

5.3 Biological Hazards

Biological hazards may vary with the season during which the work is conducted. Vegetation, insects, and wildlife may present a potential hazard. Personnel allergic to poison ivy, pollen, etc. may have to receive allergy shots before going on-site. Personnel not current with Tetanus shots should be inoculated before going on-site.

5.4 Mechanical Hazards

Mechanical, safety, and electrical hazards may be encountered at any hazardous waste site. The hazards include moving or swinging machinery, uneven terrain, ditches, rusty objects, glass and other sharp objects, overhead power lines, buried electrical sources, faulty electrical tools, and other hazards. All mechanical hazards on-site will be addressed by the EEA site Health and Safety Officer. All personnel will be fully trained to deal with mechanical hazards on-site.

6.0 Chemical Substances of Concern and Basic Toxicological Profiles

The following are the compounds/chemicals that are anticipated to be of concern. A brief toxicological profile of each chemical and symptoms and signs of overexposure is presented below. These compounds are the ingredients found in the generic compounds, namely mixed solvents, petroleum hydrocarbons, alcohol mixtures, ketones, terpene hydrocarbons (Reference: *Material Safety Data Sheets*, provided by Sunnyside Corporation, Illinois).

6.1 Xylene

Xylene is a human eye irritant. It causes some transient conjunctival and corneal irritation. It is an experimental skin and eye irritant. It causes irritation of the mucous membrane and is a moderate irritant via the oral inhalation and subcutaneous routes. It is a moderate toxin via dermal exposure. It is a dangerous fire hazard from heat, flame, and powerful oxidizers. The OSHA permissible exposure limit (PEL) is 100 ppm. The ACGIH threshold limit value (TLV) is 100 ppm as a time weighted average.

6.2 Ethyl Benzene

It is a moderate irritant to the skin, eyes, and mucous membrane. It is toxic via the oral and inhalation routes. Liquid Ethyl Benzene is an irritant to the skin and mucous membrane. The vapor is an irritant, first to the eyes, then causes dizziness, irritation of the noise and throat, and a sense of constriction in the chest. Chronic exposure causes congestion of the brain and edema of the lungs. Contact with the liquid can cause erythema and inflammation of the skin. It is a dangerous fire hazard from heat, flame, and powerful oxidizers. The OSHA permissible exposure limit (PEL) is 100 ppm. The ACGIH threshold limit value (TLV) is 100 ppm as an eight-hour time weighted average.

6.3 1,1,1 Trichloroethane

It is a colorless liquid, causes adverse psychotropic, gastrointestinal and central nervous system effects in humans. It is a moderate irritant to the skin and a severe eye irritant. It is a moderate toxin via the oral route. It is narcotic in high concentrations. It may sensitize the heart to epinephrine-induced arrhythmias. Acute inhalation of large quantities may cause cardiac arrest. It reacts violently with N204, 02, NaOH, Na-K alloy. Heat decomposition emits very toxic chlorine

fumes. The OSHA permissible exposure limit (PEL) is 350 ppm. The ACGIH threshold limit value (TLV) is 350 ppm as an eight-our time weighted average.

6.4 Tetrachloroethylene

It is a colorless liquid with a chloroform-like odor. It is moderately toxic via the inhalation, oral, subcutaneous and dermal routes. The liquid can cause damage to the cornea and conjunctiva, ingestion causes irritation of the gastrointestinal tract, with vomiting, nausea, diarrhea, and bloody stools. Acute intoxication causes adverse effects to the nervous system. It is an experimental carcinogen and mutagen. Heat decomposition emits very toxic chlorine fumes. The OSHA permissible exposure level is 25 ppm. The ACGIH threshold limit value (TLV) is 50 ppm as an eight-hour time weighted average.

6.5 Trichloroethene

Trichloroethene is a colorless, nonflammable, non-corrosive liquid and has the "sweet" odor characteristic of some chlorinated hydrocarbons. It boils at 86° to 87° C. Exposure to trichloroethene vapor may cause irritation of the eyes, nose, and throat. The liquid, if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged skin contact with the liquid may cause dermatitis. The compound is incompatible with strong caustics and other active metals, barium, lithium, sodium.

Acute exposure to trichloroethene depresses the central nervous system exhibiting such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular heart beat, sleepiness, fatigue, blurred vision, and intoxication similar to that of alcohol. Unconsciousness and death have been reported. Alcohol may make the symptoms of trichloroethene overexposure worse. If alcohol has been consumed, the overexposed worker may become flushed. Trichloroethene addiction and peripheral neuropathy have been reported. The Federal standard is 100 ppm (535 mg/m^3) as an 8-hour TWA with an acceptable ceiling concentration of 200 ppm; acceptable maximum peaks above the ceiling of 300 ppm are allowed for 5 minutes duration in a 2-hour period. The NIOSH Criteria for a Recommended Standards recommends limits of 100 ppm as a TWA and a peak of 150 ppm determined by a sampling time of 10 minutes.

6.6 Vinyl Chloride

Vinyl chloride is a flammable gas at room temperature (boils at -14°C), and is usually encountered as a cooled liquid. The colorless liquid forms a vapor which has a pleasant, ethereal odor. Vinyl chloride is a skin irritant, and contact with the liquid may cause frostbite upon evaporation. The eyes may be immediately and severely irritated.

Vinyl chloride depresses the central nervous system causing symptoms which resemble mild alcohol intoxication. Lightheadedness, some nausea, and dulling of visual and auditory responses may develop in acute exposures. Death from severe vinyl chloride exposure has been reported.

The Federal standard for exposure to vinyl chloride sets a limit of 1 ppm (2.6 mg/m^3) over an 8-hour period, and a ceiling of 5 ppm averaged over a period not exceeding 15 minutes. ACGIH (1993/94) lists vinyl chloride as a human carcinogen, and gives a proposed TWA value of 5 ppm (10 mg/m^3) but no STEL value.

6.7 Dichloroethene

Dichloroethene is a liquid at room temperature with slight acrid ethereal odor. In the liquid state, it is flammable.

The routes of entry are inhalation of the vapor, ingestion, skin and eye contact. Harmful effects and symptoms are: this liquid can act as a primary irritant producing dermatitis and irritation of mucous membranes.

Dichloroethylene acts principally as a narcotic, causing central nervous system depression. Symptoms of acute exposure include dizziness, nausea and frequent vomiting, and central nervous system intoxication similar to that caused by alcohol. Renal effects, when they do occur, are transient.

Permissible exposure limits in the air are: a Federal standard is 200 ppm (790 mg/m^3). The ACGIH (1983/1984) STEL value is 250 ppm (1,000 mg/m^3). The IDLH level is 4,000 ppm.

6.8 Toluene

Toluene is an experimental mutagen. It is a skin and eye irritant. It causes human central nervous system psychotropic effects. It is a moderate toxin via the inhalation and subcutaneous routes. Toxicity is low via dermal exposure. The compound is derived from coal tar and commercial grades and usually contains small amounts of Benzene as an impurity. Chronic exposure to repeated small doses can cause headache, nausea, eye irritation, loss of appetite, bad taste, lassitude, impairment of coordination and reaction time. Acute fatal exposure causes the victim to go from intoxication to coma. It is a dangerous fire and explosion hazard from heat, flame and powerful oxidizers. The OSHA permissible exposure limit (PEL) is 100 ppm. The ACGIH threshold limit value (TLV) is 100 ppm as a time weighted average.

6.9 Benzene

Benzene is a clear, colorless liquid with a characteristic odor. It is slightly soluble in water. Benzene is a known human carcinogen. It is poisonous via the inhalation route of exposure. It also causes adverse effects via dermal absorption. It is a central nervous system narcotic. Dermal contact products severe irritation, erythema, burns, edema and blisters. Chronic poisoning can cause fatigue, headache, dizziness, nausea, loss of appetite and weight, weakness, pallor, nosebleeds, bleeding gums, menorrhagia in women, petechiae, and purpura. It is a dangerous fire hazard and reacts violently with oxidizers. It has an OSHA PEL of 0.1 ppm.

7.0 Real-Time Air Monitoring

Air monitoring will be conducted at the site with the required instrumentation for organic vapors and combustible gases. Air monitoring for specific compounds will be conducted based on the results of the preliminary air monitoring data.

Monitoring on-site will be conducted using the following field instruments:

- Photoionization detector (PID): The PID shall be calibrated before use following the instrument manufacturer's recommendation. The PID will be maintained in operational condition at all times. The use of a PID is limited during humid atmospheric conditions, and the results may not be accurate. An OVA should be used under such conditions. During the use of the PID, the UV lamp should be cleaned frequently, calibration checked regularly, and battery recharged after each use.

- Combustible gas and oxygen meter will be used to detect any combustible and explosive gases and oxygen deficient atmospheres at the worksite. The instrument shall be calibrated and used as per manufacturer's specifications. Results obtained as a result of such monitoring will determine the level of respiratory protection required.

- The detector will be calibrated and used as per manufacturer's specifications.

Real-time monitoring will be conducted during the drywell excavation. Monitoring will also be conducted at perimeter locations, including an upwind and downwind location. A background reading will be established at all locations of the site on a daily basis when worker or technicians are present at the site.

If established action levels are exceeded at the perimeter location for organic vapors, work will be suspended and engineering controls implemented to bring concentrations back to acceptable levels.

GUIDE TO CONTAMINANT LEVELS AND LEVELS OF PROTECTION

Monitoring Instruments	Contaminant Levels (above background)	Level of Protection or Prescribed Action
HNU or OVA	0 to 1 ppm	Level D
	1 to 50 ppm	Level C
	Above 50 ppm	Level B or evacuate site

8.0 Documentation Monitoring

Documentation monitoring will be conducted at the five areas of potential environmental concern. The areas are groundwater, storm drains, septic systems, trash dumpster, and former underground storage tank area. Monitoring will be conducted forvolatile organic compounds, semi-volatile organic compounds, combustible gases, and atmospheric oxygen levels.

Documentation monitoring will be conducted during drilling, sampling and remediation procedures. Monitoring for organic vapors will be conducted twice daily around the site perimeter, and each area of concern using a photoionization meter. This will yield immediate quantitative data on airborne organic vapors. Monitoring for organic vapors will also be conducted, eight hours/day on a weekly basis.

9.0 Site Safety

EEA shall provide a full time Health and Safety Officer at the site. The Health and Safety Officer shall be knowledgeable regarding the health and safety requirements of the site-specific plan, OS HA and the USEPA health and safety guidelines. The Health and Safety Officer shall be trained and certified in cardiopulmonary resuscitation (CPR) and shall fully understand hazardous waste handling precautions. The Health and Safety Officer, under the guidance from the CIH/CSP, and Health and Safety Manager, shall be responsible for all final safety requirements. The Health and Safety Officer will be on-site at all times during work and shall implement the Health and Safety Plan, monitoring the environment, calibrating instruments, and enforcing all the health and safety requirements.

General health and safety procedures have been developed by EEA, and will be implemented by the EEA project manager and/or safety officer. OSHA standards and regulations contained in the Department of Labor, Title 29 Code of Federal Regulations, Parts 1910 and 1926, and the applicable recommendations by the National Institute for Occupational Safety and Health (NIOSH) regarding procedures to assure safe operations, represent the basis for EEA's health and safety program. All EEA personnel, subcontractors, state and federal representatives, and visitors shall abide by the site health and safety requirements.

10.0 General Safety Rules

1. Prior to the start of each work day, a meeting shall be held for all EEA personnel, subcontractors, and representatives. Safety procedures, safe work practices, site evacuation and escape procedures, and the planned daily activities will be reviewed during these meetings.

2. Provisions will be made for first aid for all on-site personnel. At a minimum, a standard industrial-type first aid kit will be on-site. The location of the first aid supplies will be posted on-site, and this information will be reviewed at the daily meetings.

3. Eating, drinking, smoking, and other similar activities, are strictly prohibited in both the work zones and the decontamination (contamination reduction) zones.

4. Fire extinguishers shall be provided at active locations within the contaminated zone. At a minimum, fire extinguishers shall be 20 pound, ABC dry chemical, halon or carbon dioxide. Class D extinguishing agents shall be available, if necessary.

5. All tools and equipment, where necessary, shall be spark proof, explosion proof, and/or grounded and bonded.

6. All atmosphere-supplied respiratory devices shall meet at least the requirements of the specifications for Grade D Breathing Air as described in *Compressed Gas Association Commodity Specification* G-7.1-1966.

7. All staff shall have medical clearance which includes a physical exam and appropriate clinical tests.

8. No person shall be assigned to a task that requires the use of respiratory protection until it is determined that he/she is physically capable of using such devices. This judgement shall be made by a physician.

9. When respirators are required, beards, facial hair, and sideburns (which may interfere with the sealing portion of a respirator) are to be removed.

10. Parking of vehicles, other than those required for emergency purposes outside the designated parking area, shall be prohibited, since safe egress and ingress areas may be obstructed.

11. All personnel shall use one entrance and exit only from the work zone (except in an emergency or a life threatening situation).

12. The project manager shall have the authority to remove anyone from the site and prohibit his/her re-entry should it be determined that the person threatens site security or the safety of on-site personnel.

13. High pressure, low volume cleaning shall be used at the decontamination pad. Steam cleaning shall be required on all heavy equipment prior to leaving the site. At a minimum, two personnel with adequate protection as required by this plan shall be stationed in the decontamination area during decontamination of equipment. The decontamination pad shall be cleaned as necessary at least once per working day. No ice, snow, or soil is to be allowed to build on the pad.

14. All prescription eyeglasses in use will be ANSI approved safety glasses. All eyeglass inserts shall be compatible and proper for the full face respirator.

15. Respirator cartridges shall be changed upon breakthrough or daily. Each person shall wash and disinfect his/her respirator daily.

16. Workers who have worked in a hazardous work zone will shower at the end of the work day.

17. No alcohol, drugs, or weapons will be allowed on-site at any time.

10.1 Electrical Installations

All electrical installations will comply with state code, National Electrical Code (NEC) and the United States Coast Guard Regulations. All portable generators used on-site will be grounded. Extension cords will be the hard usage type or better, and will contain the number of conductors required for the service plug and equipment ground wire. Ground-fault circuit interrupters shall be used as necessary. All electrical tools, fuse boxes, and other equipment with conducting surfaces that could be energized, will be grounded.

10.2 Hand and Power Tools

All hand and power tools will be inspected, tested, and determined to be in safe operating condition and properly maintained. Circular saws will be equipped with guards that automatically and completely enclose the cutting edges, splinters, and anti-kickback devices. Power saws will not be left running unattended.

Safety clips or retainers will be installed and maintained on pneumatic impact tools. Pressure will be shut off and exhausted from the line before disconnecting the line from any tool or connection. Safety lashing will be provided at connections between tool and hose, at all quick make-up type connections. Impact wrenches will be provided with a locking device for retaining the socket.

10.3 Safety Meetings

On-site personnel will meet daily to discuss safety matters, appropriate personal protection, and site conditions related to safety. All on-site EEA personnel, subcontractors, and representatives will receive site-specific safety training before work begins.

10.4 Warning Signs and Signaling

All points of entry to a hard hat or other protective equipment area will have a hard hat caution sign posted.

Slow moving vehicle emblems will be used on all vehicles or equipment which move at 25 mph or less on public roads.

Warning signs will be placed to provide adequate warning of hazards to employees and the public. Signs will be removed when hazards no longer exist.

Accident prevention tags will be used to warn employees of any existing hazards, such as defective tools and equipment.

The following emergency signals will be used:

1. For severely injured personnel requiring an ambulance, the signal will be a single blast of 3 to 5 seconds in duration repeated after a silent period of 5 to 10 seconds.

2. To evacuate the site (to an upwind location), the signal will be five short (one second) blasts followed by five seconds of silence, followed by five short blasts.

All work site neighbors will be formally notified of all alarm signals utilized by EEA,

10.5 Material Handling and Storage

- Cylindrical materials will be stacked and blocked to prevent spreading or tilting.

- Lumber will be stacked level, in piles no more than 10 feet high, on stable sills. Crushed stone and rip rap will be stored in piles in a safe manner.

- Fuel oil will be stored in approved storage tanks and barges. No smoking signs will be posted. Storage tanks will be bermed to prevent the spread of fuel oils due to spillage and leakage.

- Miscellaneous parts and tools will be stored in trailers or suitable buildings. All accessways to the work area will be kept clear at all times.

10.6 Machinery, Mechanized and Heavy Equipment

Any machinery or mechanized equipment shall be brought on-site only after it has been checked for any mechanical defects. Machinery will not be operated in a manner that will endanger persons or property, nor will the safe operating speeds or loads be exceeded. Machinery left on-site overnight will be rendered unusable or will be guarded. Heavy equipment, such as bulldozers, will be provided with seat belts and roll-over protective devices.

10.7 Motor Vehicles

Every motor vehicle operator will possess a valid operators license. Vehicles used to transport personnel will be properly equipped with seats. All tools and equipment will be guarded, stowed, and secured when transported with personnel.

10.8 Pressurized Equipment and Systems

Pressurized equipment and systems will be inspected and performance tested. Pressure vessels will be equipped with safety valves set at no more than 10 percent over working pressure. Every air compressor will automatically cease operating prior to exceeding the maximum working pressure allowable in the system. Compressed gas cylinders will be secured in an upright position at all times, except when being hoisted.

10.9 Excavations

The sides of all excavations in which employees are exposed to danger from moving ground will be adequately sloped or shored. Excavated material will be stockpiled at least four feet from the side of the excavations. Barriers will be placed at the excavation adjacent to the path, walkways, sidewalks, driveways, and other pedestrian or vehicle thoroughfares. Ramps will be provided for access to excavation. A proper route of egress shall be maintained.

10.10 Heat and Cold Stress

Heat stress can occur at any hazardous waste site. Chemically resistant protective clothing prevents the evaporation of perspiration. The wearing of vapor barrier clothing greatly increases the potential for heat stress and heat-induced illness. A heat stress disorder can result if minerals and liquids are not adequately replaced, especially after long work hours with loss of body water and electrolytes. Heat stress is a combination of environmental and physical work factors that can cause heat rash, heat cramps, heat exhaustion, and heat stroke. It may be necessary to acclimatize workers and to monitor workers at frequent intervals, and to provide a work rest regimen to ensure that heat stress disorders do not occur.

Environmental conditions may be monitored by determining the atmospheric temperature, a measurement of the radiant heat and corresponding relative humidity. Personal worker condition can be monitored by heart rate, body temperature, and loss of body water and electrolytes.

Cold-related injuries may occur at hazardous waste site locations due to exposure to extremely low temperatures. Frost bite injury can occur due to exposure to extreme cold conditions. Hypothermia can occur when workers are exposed to extreme cold and in situations where workers are wearing wet or damp personal protective equipment. Cold-related injuries can be avoided by using layers of clothing and providing adequate heating equipment at the support zone on-site.

The EEA Health and Safety Officer will monitor the ambient air temperature, if the ambient air temperature exceeds 80° F for one hour. The Safety Officer will begin monitoring personnel for signs and symptoms of heat stress. A fluid/electrolyte/water replacement will be made available in the support zone for the workers on-site.

10.11 Accident Reporting and Recordkeeping

All accidents will be reported, investigated, and analyzed by EEA's project manager or his designated representative. Any deaths, fires, or explosions will be reported to appropriate emergency personnel. Fatalities will be reported to the OSHA regional office within 24 hours.

10.12 Site Engineering Controls - Air Emissions

EEA shall provide all equipment and personnel necessary to monitor and control air emissions.

In the event total organic vapors are detected at levels exceeding 5 ppm above background, EEA shall observe all precautions to minimize emissions in the air. These will include, but are not limited to:

1. Excavating the areas in small parts and covering it up before excavating the next area.

2. Upgrading the level of protection for workers.

3. Removing any excavated material from the ground, staging, and covering it.

4. The use of vapor suppressing foam.

If the level of total organic vapors exceed 5 ppm above background, or greater than 20 percent of the LEL, the work will be immediately suspended and workers evacuated.

11.0 Site Control

Access to the site shall be restricted with a single access point. A written log of all contractors, subcontractors, state and federal representatives, and visitors shall be kept by the site Health and Safety Officer. The exclusion zone and all contaminated areas will be indicated by red barrier tape or red snow fencing and accessible through personal and equipment decontamination facilities. A contamination reduction zone will be designated, between a contaminated area and the clean area.

11.1 Access and Egress

Safe access and egress will be provided to all work areas. Accessways will be kept clear of operating or construction materials, or debris that would obstruct passages or cause a tripping hazard. Haul roads will be constructed to widths suitable for safe operation of the equipment. Erection, moving, dismantling, or alteration will be under the supervision of a competent employee. A ladder will be provided as access to all scaffolds or platforms.

11.2 Site Security

Each visitor must adhere to the site control and safety guidelines established in this plan.

All site visitors and subcontractors must meet the educational and medical requirements of 29 CFR 1910.120. This requirement shall be met by presenting appropriate documentation to EEA's site officer, prior to entry into the work zone.

Authorized visitors who work for regulatory agencies shall receive approval to enter the site from the Department. EEA shall maintain a chronological log of all persons entering and leaving the work site.

11.3 Site Plan and Designated Control Zones

If contamination is detected at the site, the three work zone approach, outlined below may be utilized.

- Exclusion (Contaminated) Zone

For all areas of remediation, the Exclusion Zone consists of at least a fifteen-foot extension of the horizontal limits of the area, and may need to be expanded where heavy equipment is operating so that the equipment remains wholly within the Exclusion Zone. The Exclusion Zone will be clearly marked with traffic cones and safety tape throughout the execution of the work.

The level of personnel protective equipment required in the Exclusion Zone shall be in accordance with the specified requirements as a minimum, or as determined by the site health and safety coordinator after monitoring and on-site inspection. No eating, drinking, or smoking will be allowed in this zone. No personnel will be allowed in the Exclusion Zone without: 1) a "buddy," 2) the proper PPE, and 3) specified task responsibilities.

- Contamination Reduction (Buffer) Zone

This zone will serve as a general entry and egress zone to and from the Exclusion Zone. This area will be designated for the decontamination of personnel and equipment prior to re-entering the Support Zone, and also for physical segregation of the Support and Exclusion zones.

The level of PPE required in this zone shall be in accordance with the specified requirements as a minimum or as determined by EEA's SHSO, after monitoring and on-site inspection. No eating, drinking, or smoking will be allowed in this area. The contamination reduction station will also contain appropriate safety and emergency equipment, such as a first aid kit and fire extinguisher.

- Support (Safe or Clean) Zone

This zone is the area outside the zone of significant contamination. The Support Zone shall be protected from work site contamination. Eating and drinking will be allowed only in this zone. The function of the Support Zone is to provide an entry area for personnel, material, and equipment to the Exclusion Zone.

12.0 Respiratory Protection Program

EEA's Respiratory Protection Program has been prepared in accordance with the OSHA Act (Title 29 CFR), Section 1910.134. The program is maintained at EEA's offices, and a copy will be available on-site. All EEA personnel entering the site shall be trained in the proper selection, use, and limitations of air purifying respiratory protective devices. A facial hair policy has been instituted in accordance with Section 1910.134(5) (e) (1). All EEA personnel entering the site shall be fit tested. All EEA personnel required to use atmosphere supplied devices, such as airlines, respirators, and self-contained breathing devices, shall be properly trained in their use and limitations. All respiratory protective devices worn shall be cleaned, and sanitized once per day, and more often as needed, in accordance with OSHA 1910.134 requirements.

13.0 Noise Control and Hearing Conservation

Whenever employees are subjected to noise levels exceeding the OSHA Action Level (85 dBA), engineering controls will be investigated. If engineering control methods are not feasible or practical, hearing protection will be provided and used. The EEA Hearing Conservation Program is in accordance with 29 CFR 1910.95.

14.0 Sanitation and Decontamination

The personnel decontamination and emergency medical facilities shall be properly maintained and shall be kept clean and sanitary at all times.

An adequate supply of drinking water will be obtained from a source approved by local health authorities. Drinking water will be dispensed from clearly marked containers by means which prevent contamination. Paper cups dispensed from a sanitary container and a waste receptacle for used cups will be provided.

The decontamination facility shall consist of clean and dirty lockers in separate areas. Shower facilities and a lunch/break room shall be available. Dirty and contaminated work clothes shall not be stored with clean clothes.

Contaminated clothing, used respirator cartridges, and other disposable items will be put into lined drums/containers and transported for proper disposal.

Personal protective clothing donning will consist of the following:

1. Put on inner gloves and put on coveralls
2. Put on outer gloves
3. Secure interfaces with tape
4. Put on respirator and test fit with the positive and/or negative pressure test

EEA shall supply a minimum of two sets of uniforms/work clothes per person to allow for changing out of contaminated clothing. The work clothing shall include a minimum of work pants, work shirts, and other work clothing, such as jackets as dictated by the weather.

14.1 Equipment Decontamination

All equipment and material used on-site will be thoroughly decontaminated before it is removed from the project. All material such as contaminated debris, and contaminated clothing, with the exception of the excavated materials which cannot be decontaminated, shall be disposed of by a method permitted by regulatory agencies.

All vehicles and equipment used in the Exclusion Zone will be decontaminated to the satisfaction of the Safety Officer who shall certify that each piece of equipment has been decontaminated prior to removal from the site.

Decontamination shall take place within designated equipment and materials decontamination areas. EEA shall provide suitable barriers. The decontamination shall consist of high pressure water cleaning, supplemented by detergent as appropriate. Wash units shall be portable high pressure with a self-contained water storage tank and pressurized system (as required). Each unit shall be capable of heating wash water to 180° F and providing a nozzle pressure of 150 psi.

Personnel involved in vehicle and equipment decontamination shall wear Level C protective clothing. At the close of the project, EEA shall completely decontaminate and clean the decontamination area.

14.2 Decontamination Pad

The decontamination pad shall be located in the contamination reduction zone and shall be used for cleaning all vehicles leaving the Exclusion Zone prior to entering the Support Zone or leaving the site.

15.0 Site Personal Protective Equipment

The levels of personal protective equipment warranted by any given situation are dependent on the hazard, situation, area, and to a lesser degree, temperature. The goal of protective equipment is to offer the highest level of protection to the employee. The degree and kind of known or unknown chemical, the situation or the nature of work being done, the general area full of inherent or potential dangers, as well as the physiological stress factors, determine the types of protective equipment required.

An effective program must address the human element. Temperatures, either hot or cold, dramatically affect the employee wearing protective equipment. The resistance to breathing offered by respirators and the appreciable weight of some units define the amount of time that respiratory protection can be used daily. Other factors, like the need for flexible clothing that will not impede movement or limit body action influence the selection of protective equipment.

Acknowledgment of the human stress factor is important, for it will determine the amount of cooperation and strict adherence to the safety guidelines that can be expected from the employee.

Generally, protection is necessary to provide protection for the exposed person for three modes of contamination: ingestion, inhalation, and dermal absorption.

The protection from contamination due to ingestion is simply managed. Eating, drinking, and smoking are prohibited in the work area. All employees must leave the contaminated work area completely for breaks, remove protective clothing, wash their hands, and spend the rest of the break time in an uncontaminated, designated area.

The question of protection from contamination due to inhalation and absorption is complex. The appropriate protective equipment to be used on-site is determined by hazardous levels, work area conditions, and specific tasks. It remains the responsibility of the project manager to define, uphold, and maintain the appropriate level of protective equipment.

If contact with liquid is possible, then the coveralls shall be chemically resistant with chemically resistant gloves with interfaces taped. Supplied air respiratory protection will be available if protection must be upgraded.

The following sections describe the levels of protection developed by OSHA and EPA. The equipment will be selected based upon the hazards and to a lesser extent the environmental conditions and job tasks.

15.1 Level A - Personal Protective Equipment

- Pressure-demand, full-face SCBA or pressure-demand supplied-air respirator with escape SCBA

- Fully-encapsulating, chemical-resistant suit
- Inner chemical-resistant gloves
- Chemical-resistant safety boots/shoes
- Two-way radio communications

Optional:

- Cooling unit
- Coveralls
- Long cotton underwear
- Hard hat
- Disposable gloves and boot covers

The highest available level of respiratory, skin, and eye protection. Fully encapsulated suits are primarily designed to provide a gas or vapor tight barrier between the wearer and atmospheric contaminants. Until air surveillance data become available to assist in the selection of appropriate level of protection, the use of Level A may have to be based on indirect evidence of the potential for atmospheric contamination or other means of skin contact with severe skin affecting substances.

Conditions that may require Level A protection include:

- Confined space which presents a severe skin hazard
- Suspected/known highly toxic substances
- Totally unknown substances are present

It is not anticipated that Level A protection will be required during performance of work at this site.

15.2 Level B

- Pressure-demand, full-face SCBA or pressure-demand supplied-air respirator with escape SCBA
- Chemical-resistant coveralls; hooded, one-piece disposable chemical-resistant one piece suit. Coveralls shall be Saranex when liquid splashes may occur.
- Inner and outer chemical-resistant gloves
- Chemical-resistant safety boots/shoes
- Hard hat (under suit)

- Two-way radio communications

Optional:

- Disposable gloves and boot covers
- Face shield
- Long cotton underwear

The same level of respiratory protection, but less skin protection as Level A. It is the minimum level recommended for initial site entries until the hazards have been further identified.

15.3 Level C

- MSHA/NIOSH approved full-face, air-purifying, canister-equipped respirator
- Chemical resistant clothing (overalls and long-sleeved jacket; hooded, one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit). Coveralls shall be Tyvek poly-coated or Saranex when liquid splashes may occur.
- Inner and outer chemical-resistant gloves
- Chemical resistant safety boots/shoes
- Hard hat (comply with 29 CFR 1910.135)

Optional:

- Two-way radio communications
- Disposable boot covers
- Face shield
- Long cotton underwear, cotton glove liners

Level C protection must meet several criteria. These criteria are:

1. Measured air concentrations of substances will be reduced by the respirator to below the substance's Threshold Limit Value.
2. The substance must have good warning properties (taste, smell, or irritation below the Threshold Limit Value).
3. Atmospheric concentrations do not exceed the IDLH levels (IDLH = Immediately dangerous to life and health).

4. Total vapor readings register between background and 5 ppm above background as measured by an organic vapor detector (PID).

5. Air will be monitored continuously.

6. Oxygen content of the air is at least 19.5 percent.

7. An appropriate cartridge is available that will remove the contaminant.

8. The individual has been fit-tested in the particular respirator.

9. The substance(s) present are known, do not present a severe skin absorption or contact hazard and the concentrations are within acceptable limits.

10. The job functions have been determined not to require Level "B" PPE.

15.4 Level D

- A minimum of two sets of work clothing/uniforms
- Safety boots/shoes
- Safety glasses or chemical splash goggles
- Hard hat

Optional:

- Gloves
- Escape mask
- Face shield

Level D protection provides no respiratory protection and minimal skin protection.

Level D protection will only be worn when no splash hazards or vapor hazards exist.

The following are the anticipated Task-Specific initial levels or PPE:

Task	Level of PPE
Soil Sampling	D
Well Installation	D
Groundwater Sampling	D

Note: Respirator shall be immediately available in the event of air monitoring indicates an upgrade to Level C is required.

16.0 Action Levels

In the absence of additional air monitoring information, the following levels of respirator protection will be required:

Maximum Total Organic Vapors in the Breathing Zone (ppm)	Level of Protection
0 to 1 ppm	D
1 to 250 ppm	C
Above 250 ppm	Level B or Suspend Work and Use Engineering/Work Practice Controls

OVA or PID readings must be taken simultaneously with Benzene colormetric tubes. If Benzene is present, the action levels will be:

0 to 0.1 ppm	Level D
0.1 to 5.0 ppm	Level C
Above 5.0 ppm	Level B or Evacuate

In addition to the above action levels, the following action levels will be established for perimeter monitoring. If the following action levels are attained in the Exclusion Zone perimeter, then work will stop until engineering controls are implemented to reduce levels to acceptable limits.

Parameter	Action Level
Total Organic Vapors (with PID)	5 ppm

17.0 Medical and First Aid Facilities

Arrangements for medical personnel, medical facilities, and ambulance service will be made for all projects. An industrial-type first-aid kit will be provided and stored in a clean, weatherproof container. An emergency eyewash will be located at a convenient location at the work site.

18.0 Accident Reporting and Recording

All accidents will be reported, investigated, and analyzed by the project manager or his designated representative. Any serious injury to personnel or property, fires or explosions, will be reported to the appropriate agencies. Fatalities will be reported to the regional OSHA office within 24 hours.

19.0 Emergency and Contingency Plan

The primary goal in designing the site operational procedures, strategies, and work plan are to minimize the potential for introduction of hazardous waste constituents to the air, soil, or water.

No personnel shall be permitted in the clean area while wearing contaminated clothing. All water used in decontamination and contaminated PPE will be handled as hazardous waste. Prior to any on-site operations, EEA personnel will develop emergency procedures, preparedness, and contingency plans for the specific operations. The plans will follow the guidelines set forth under the Resource Conservation and Recovery Act (RCRA), and OSHA and address possible emergency situations. Topics to be addressed will include, but will not be limited to, emergency telephone numbers, specific response actions for on-the-screen personnel, emergency coordinators, employee training, implementation and evacuation plans. Emergency numbers for fire, rescue, police, and hospital will be posted in a conspicuous location.

Before on-site operations begin, EEA personnel will be trained in the contents of the site-specific safety and health plan and the procedures established for the site. Training for on-site personnel will include emergency procedures, individual responsibilities, and the health and safety rules that will be enforced.

In the case of an emergency, all personnel will be notified by three short blasts of an ir horn repeated after 5 to 10 seconds. All personnel will cease activities and direct their attention to the support zone where the Project Manager and/or Safety Officer will give them directions.

If evacuation becomes necessary, the Project Manager and/or Safety Officer will determine the direction of evacuation based on wind direction, ease of access, and the location of the incident. He will communicate his decision to site employees by radio and/or hand signals.

In the case of personal injury on site, the injured person will be decontaminated and administered first aid until professional help arrives or until the injured person can be transported to the hospital.

EEA shall establish a signaling system for emergency purposes. This signaling system shall use air horns which, at a minimum, shall be placed at:

1. For severely injured persons requiring an ambulance, the signal will be a signal blast of 3 to 5 seconds in duration repeated after a silent period of 5 to 10 seconds.

2. Warning signal of three short blasts repeated after 5 to 10 seconds.

3. To evacuate the site (to an upwind location), the signal will be continuos short (one second) blasts for one minute.

Emergency Contacts

• **Ambulance:**	911
• **Police**:	911
• **Fire:**	911
• **Poison Information:** (New York)	(800) 962-1253
• **Chem Trec**:	(800) 424-9300

Hospital Directions:

The nearest hospital is Brunswick Hospital Center located on Route 110 Broadway at the intersection of Sunrise Highway. In the event of the need for medical attention, the Brunswick Hospital Emergency Center or paramedical emergency response team will be called by dialing 911. At no time will any person be transported to the emergency room by private automobile.

LOG FOR ALL PERSONNEL ENTERING THE MERRICK CLEANERS SITE

SITE: **Merrick Cleaners**

LOCATION: 5640 Merrick Road, East Massapequa, New York

The undersigned certify that they have read this Health and Safety Plan document, understand it, and will comply with its provisions.

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LOG FOR ALL PERSONNEL ENTERING THE MERRICK CLEANERS BROTHERS SITE

SITE: **Merrick Cleaners**

LOCATION: 5640 Merrick Avenue, East Massapequa, New York.

The undersigned certify that they have read this Health and Safety Plan document, understand it, and will comply with its provisions.

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