1170 ATLANTIC AVENUE
BALDWIN, NEW YORK 11510
VCP SITE #V00523

INTERIM REMEDIAL MEASURE
WORK PLAN

ON BEHALF OF:

Safeguard Self Storage
105 Maxess Road
Melville, NY 11747

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

James P. Rhodes, Vice President — JimR@pwgrosser.com
John D. Eichler, Project Manager — JohnE@pwgrosser.com

PWGC Project Number: SSS1101

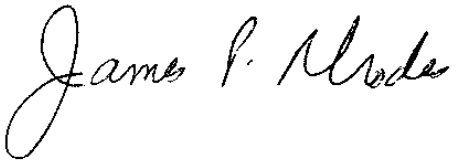
REVISED AUGUST 2011

P.W. GROSSER CONSULTING INC.
PROJECT No. SSS1101

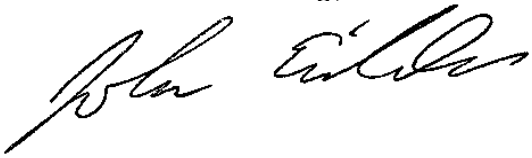
INTERIM REMEDIAL MEASURE
WORK PLAN

1170 ATLANTIC AVENUE
BALDWIN, NEW YORK

Revised AUGUST 2011



James P. Rhodes, P.G.
Vice President
P.W. Grosser Consulting, Inc.



John D. Eichler
Project Manager
P.W. Grosser Consulting, Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION 1
- **1.1 Site Location and Description** 1
- **1.2 Background** 1
- **1.3 Summary of PWGC Remedial Investigation** 2
  - 1.3.1 *Sub-Slab Vapor and Indoor Air Sampling* 2
  - 1.3.2 *Surface Soil Sampling* 3
  - 1.3.3 *Drywell Investigation* 4
  - 1.3.4 *Groundwater Investigation* 4

2.0 DESCRIPTION OF INTERIM REMEDIAL MEASURE 6
- **2.1 Mobilization and Site Preparation** 6
- **2.2 Soil Excavation** 6
- **2.3 Enhanced Bioremediation** 7
- **2.4 Soil Disposal** 7
- **2.5 Backfill and Site Restoration** 8

3.0 ENGINEERING CONTROLS 9
- **3.1 Dust Suppression** 9
- **3.2 Stormwater Management** 9
- **3.3 Fencing** 9

4.0 MONITORING AND MAINTENANCE 10
- **4.1 Remediation Phase Monitoring** 10
- **4.2 Post-Remediation Monitoring and Verification** 10
- **4.3 Waste Characterization** 10
- **4.4 Post IRM Monitoring and Sampling** 11
  - 4.4.1 *Laboratory Analysis* 12
  - 4.4.2 *Quality Assurance / Quality Control* 12

5.0 HEALTH AND SAFETY PLAN 14

6.0 COMMUNITY AIR MONITORING PLAN 15

7.0 SCHEDULE 16

8.0 REFERENCES 17

LIST OF FIGURES

Figure 1 Site Location Map
Figure 2 Site Plan with Proposed Remediation Area
Figure 3 Site Plan with Proposed Monitoring Well Locations
Figure 4 IRM Schedule

LIST OF ATTACHMENTS

Attachment A References on HRC®
Attachment B Health & Safety Plan
Attachment C Community Air Monitoring Plan

1.0 INTRODUCTION

This Interim Remedial Measure (IRM) Work Plan has been prepared by P.W. Grosser Consulting Inc. (PWGC) on behalf of Safeguard Self Storage for the property located at 1170 Atlantic Avenue in Baldwin, New York (**Figure 1**). The purpose of the IRM is to remove impacted soils which are acting as a source of chlorinated volatile organic compounds (VOCs), and to chemically treat impacted groundwater.

1.1 Site Location and Description

The subject site consists of a 2.7-acre parcel of land on the south side of Atlantic Avenue in the Hamlet of Baldwin, Town of Hempstead, Nassau County, New York. A Site Vicinity Map is included as **Figure 1**. The property is identified on Nassau County Tax maps as Section 54, Block 46, Lot 62. The property is improved with a 44,600 square foot two-story steel frame commercial building with sheet metal siding. The building is currently used for self storage. The interior is divided into individual self storage units ranging in size from 25 to 300 square foot spaces. The remainder of the site consists of asphalt-paved driveway/parking areas and grass.

The site was reportedly built up from the Millburn Creek streambed. The creek was rerouted around the resulting peninsula. The site is bounded on four sides by wooden bulkheads, except for the site's access driveway at the northeast corner of the property. The property's soil is apparently comprised of dredge spoils from the stream bed of Milburn Creek. These sediments are subject to impacted runoff from roadway traffic and asphalt pavement as well as impact from boat traffic (i.e. diesel and gasoline). Site sediments are generally characterized as dark brown and black silty sand with a high organic content evidenced by an organic odor.

The property is generally bounded by commercial and residential properties. East of the site, across Milburn Creek, are commercial structures and residential structures which are currently under construction. South of the site, across Milburn Creek, is a boat storage yard. North of the site is a portion of a boat canal connected to Milburn Creek, followed by a commercial building facing Atlantic Avenue. West of the site, across a boat canal connected to Milburn Creek, is a residential area.

1.2 Background

The site was formerly used as a boat storage and repair yard dating back to at least 1941.

In 1974, the currently-existing building was constructed and used as an indoor tennis facility. The usage of the building changed in 1983 (according to building department records), as Lightalarms Electronics Corporation (LEC) took over the site. LEC manufactured emergency lighting equipment at this facility until the operation moved in 1998. LEC was known to have used paints and solvents in their operation. LEC's operations included the use of a spray booth, with a permitted exhaust to the outside, to spray paint light fixtures and other components. Xylene and toluene were reported to have been used to clean the paint spray guns. Prior to painting, the facility utilized a solvent dip tank containing 1,1,1-trichloroethane to clean metal parts in preparation for paint.

Information regarding the site was compiled from the various Phase I Environmental Site Assessments (ESAs) and subsurface investigations performed at the site. These past investigations are documented in the *Remedial Investigation Report*, ATC Associates Inc. (ATC), May 2005.

Based on the results of previous subsurface investigations, it was determined that chlorinated solvents had been discharged to a drywell located on the east side of the subject building. The drywell, in turn, impacted the surrounding soils and groundwater. The detected compounds were attributable to the former use of the property as a lighting equipment manufacturer. Based on the historical use of the property and the confirmed presence of chlorinated solvents in the subsurface, the site was accepted into the New York State Voluntary Cleanup Program (VCP).

According to the ATC *Remedial Investigation Report*, the drywell was remediated and closed. Analytical results from endpoint samples collected from the base of the drywell indicated that the drywell had been cleaned out.

1.3 Summary of PWGC Remedial Investigation

A comprehensive remedial investigation was performed at the subject site which included sub-slab vapor and indoor air sampling, surface soil sampling, a drywell investigation, and a groundwater investigation.

1.3.1 Sub-Slab Vapor and Indoor Air Sampling

In February 2007, PWGC performed a sampling of the sub-slab vapor and indoor air at the subject building. The work was performed pursuant to the requirements of the NYSDEC, as detailed in the NYSDEC-approved "Sub-Slab Vapor and Indoor Air Sampling Plan," which was previously submitted under separate cover by PWGC in October 2006. The sampling was performed in accordance with the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," October 2006.

Analytical results were evaluated utilizing the Soil Vapor / Indoor Air Matrices contained in the NYSDOH Vapor Intrusion Guidance document. The recommendation derived from the matrices, given the analytical results, was no further action. Based on this, PWGC recommended no further action regarding sub-slab vapors and indoor air at the subject site. In a letter dated July 11, 2007 the NYSDEC concurred with PWGC's conclusions.

A detailed account of sampling activities, analytical results, and conclusions and recommendations are included in the "Sub-Slab Vapor and Indoor Air Sampling Report," which was previously submitted under separate cover by PWGC in April 2007.

1.3.2 Surface Soil Sampling

Results of a previous site investigation conducted by ATC Associates, Inc. (ATC) in March 2005 indicated elevated concentrations of semi-volatile organic compounds (SVOCs) and metals in surface soil samples collected from locations surrounding the site's building. The NYSDEC determined that SVOC and/or mercury concentrations at three locations warranted further investigation.

To address surface soil quality at the selected areas, PWGC collected additional surface samples in October 2007 from locations which required further investigation.

Analytical results were compared to NYSDEC NYCRR Environmental Remediation Programs Part 375 Commercial Soil Cleanup Objectives.

Detected concentrations of mercury were well within cleanup objectives.

Surface soil sampling analytical data indicated concentrations of SVOCs above cleanup objectives in samples collected to the north of the building, and in the grass area to the east of the building. The soils which the property is comprised of, was most likely dredged from Milburn Creek (the surrounding waterway). The SVOCs detected in these soils may be traced to biological decay inherent in stream beds, and/or diesel fuel from boat traffic in the waterway.

The surface soils at the site are either capped with asphalt pavement, or stabilized with grass. There are no unstabilized surface soils observed at the subject site. Based on this, the risk of airborne exposure to the SVOCs appears to be low.

The grass areas of the site are not regularly utilized by facility customers or employees, as regular access to the building is through paved areas. Only some emergency exits from the building exit to grass areas. Furthermore, access to the site is restricted to employees and customers with fencing and a gate. Based on this, exposures from soil contact would be limited.

Mercury concentrations were within the cleanup objective and, therefore, do not represent a risk of exposure.

PWGC recommended no further action regarding surface soils at the subject site.

1.3.3 Drywell Investigation

According to historical ATC documents, the drywell located to the east of the site building was remediated and closed as a result of elevated concentrations of chlorinated solvents detected during sampling. A site plan indicating the drywell location is included as **Figure 2**.

Endpoint sampling results documented the remediation. The presence of these chlorinated solvents was apparently a result of discharge from past site usage. ATC prepared a Drywell Closure Report dated March 14, 2005. The Nassau County Department of Health (NCDH) reviewed the report and recommended that soil borings be performed around the drywell so that soil samples could be collected and analyzed for VOCs in order to determine if contamination from the drywell had migrated laterally.

To address the NCDH comments, PWGC conducted a subsurface investigation of the immediate area of the abandoned drywell in October 2007. A direct-push Geoprobe® was utilized to advance samplers in order to collect soil samples from selected locations around the abandoned drywell. At each location, the 7.5' to 10' interval was submitted for analysis.

Analytical results of the drywell investigation indicated that detected concentrations of VOCs were within NYSDEC 6 NYCRR Part 375 Commercial Cleanup Objectives. However, concentrations of 1,1-DCA and chloroethane were detected at levels which may impact the groundwater.

1.3.4 Groundwater Investigation

To further investigate groundwater quality, water table monitoring wells were installed at the subject site in October 2007. The three previously-existing wells (MW-1, MW-2, and MW-4) were supplemented by three additional wells (MW-3, MW-5, and MW-6). Monitoring well locations are indicated on **Figure 2**. Well MW-3 replaced a destroyed MW-3 and served to monitor water quality to the south of the building. Wells MW-5 and MW-6 were located in the vicinity of the drywell, where groundwater impact was most likely to be present. The previously-existing wells would serve to monitor water quality on the north, east, and west sides of the building.

PWGC collected groundwater elevation data, using an electronic interface probe, over a tidal cycle. The groundwater elevation data indicated a strong tidal influence at each well location with the exception of MW-2. Monitoring well MW-2 was installed by ATC and, based upon the slow rate of recharge and a relatively high water elevation, does not

appear to be representative of groundwater conditions. The tide in the surface water surrounding the site was noted to have a differential of approximately four feet. The influence of this tide was most prevalent in the wells nearest the bulkhead (i.e., MW-3 and MW-5). Due to the strong tidal influence at the site, a prevailing groundwater flow direction could not be determined. Since the site is almost entirely surrounded by surface water, subsurface water at the site appeared to flow in a radial pattern as influenced by the tide.

Since a strong tidal influence was measured at the subject site, PWGC proposed a salinity assessment to determine if saltwater intrusion was occurring into the site's subsurface. In order to measure salinity, conductivity measurements were collected by a PWGC hydrogeologist from each of the site wells and from the surface water at half hour intervals throughout half a tidal cycle. Results of the salinity assessment indicated a strong intrusion of surface water into the site at well locations MW-3 and MW-5, and a moderate conductivity at locations MW-1, MW-4, and MW-6.

Analytical results indicated that the highest concentrations of VOCs were detected in MW-5, the monitoring well located between the abandoned drywell and the bulkhead. The compounds detected in MW-5 (1,1,1-trichloroethane, 1,1-dichloroethane, chloroethane) are consistent with the compounds detected in the drywell soil boring samples and in historical sampling results.

Two subsequent rounds of groundwater sampling were performed at the subject site in July and October 2010.

VOC concentrations have decreased in monitoring wells MW-3 and MW-5. This decrease appears to be the result of natural attenuation by reductive dechlorination. At MW-5, the concentrations of 1,1-dichloroethane and chloroethane have decreased to approximately half of their July 2010 concentrations, and vinyl chloride had decreased to an undetectable concentration. The 1,1,1-trichloroethane concentration had increased, but not near the 2008 and 2009 levels. No other VOCs were detected in MW-5.

In MW-3, the 1,1-DCA concentration has decreased to near the NYSDEC Standard, and the chloroethane concentration has also substantially decreased. No other VOCs were detected in MW-3.

Historical VOC concentrations at the subject site indicate a process of natural attenuation. Dissolved oxygen (DO) concentrations were generally low, indicating an anaerobic natural attenuation process of reductive dechlorination, in which the chlorine atoms of parent compounds are replaced by hydrogen atoms, a process performed by bacteria in the subsurface. ORP is negative at each location, indicating that VOCs are either in the process of reductive dechlorination, or have undergone reductive dechlorination in the

past.

The highest DO concentrations were detected in MW-5, which varied between 0.81 mg/L (a DO concentration which supports anaerobic attenuation) and 3.71 mg/L (a concentration which most likely would not support anaerobic attenuation). This variation in DO is most likely caused by the intrusion of surface water on a tidal basis. The unstable oxygen concentration may be slowing the attenuation process of the chlorinated compounds at MW-5 and perhaps MW-3 which is also located in close proximity to surface water.

2.0 DESCRIPTION OF INTERIM REMEDIAL MEASURE

The IRM will consist of the excavation of the VOC-impacted soils surrounding the closed drywell which formerly acted as the source of the VOC impact, and the chemical treatment of the impacted groundwater through the open excavation. The soil removal program will coincide with bulkhead replacement work, which also involves excavation in the area of the subject drywell. Remedial activities will be performed in accordance with the NYSDEC Division of Environmental Remediation's, *DER-10, Technical Guidance for Site Investigation and Remediation*, May 2010.

2.1 Mobilization and Site Preparation

Mobilization will include the delivery of construction equipment, support facilities, and equipment and materials to the site. Construction personnel will receive site orientation and training in accordance with the site specific Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP) and established policies and procedures to be followed during the implementation of the IRM. The remediation contractor and all associated subcontractors will each receive a copy of the IRM Work Plan, HASP, and CAMP and will be briefed on their contents.

Site preparation will include the set-up of an impacted soil staging areas.

The impacted soils will be stockpiled in an area on site capable of holding over 40 cubic yards of material. The area will be lined with 20-mil polyethylene and will be graded to prevent discharge to the surface below. The stockpiled soil will be covered to prevent soil saturation which may prevent soil disposal and cause leaching of VOCs into the surface soils, and to prevent fugitive vapors and dust. Runoff from the stockpile will be returned to the excavation for future chemical treatment.

2.2 Soil Excavation

The Remedial Investigation identified the soils surrounding the closed drywell as being impacted with 1,1-dichloroethane (1,1-DCA) and chloroethane at concentrations that appear to be acting as a source of groundwater impact at that location. The drywell is indicated on **Figure 2**. These soils will be removed utilizing an excavator.

Based on the tide evaluation performed at the site, the groundwater elevation varies between 2.5 feet and 7 feet below ground surface at the MW-5 location, and between 3 feet and 5 feet at the MW-6 location. The drywell is located near MW-5 and MW-6, so a tidal influence is expected to be encountered in the excavation. In order to remove the mass of impacted soils in the smear zone while limiting the water infiltration, excavation of the deepest soils will coincide with the low tide. Excavation will extend to as deep as 10 feet below ground surface as conditions allow. An effort will be made to limit the amount of water in the removed soils.

Impacted soils will be stockpiled on-site pending disposal.

The material will be analyzed according to the procedures described under section 4.3 of this Work Plan to meet the waste acceptance criteria of the disposal facility. After characterization, the soil will be loaded into trucks for transport to a licensed off-site disposal facility which meets State and Federal standards. It is estimated that approximately 40 cubic yards of contaminated soil will be removed for disposal.

Clean soil, present above the impacted smear zone soil will be removed and stockpiled separately for return as backfill into the excavation. Additional clean fill, as defined by 6NYCRR Part 360, will be brought in from off-site to backfill the excavations.

2.3 Enhanced Bioremediation

Following excavation of soil, Hydrogen Release Compound (HRC®) will be placed in the excavation to address residual VOCs in the groundwater. HRC® is an electron donor material that, when hydrated, produces lactic acid. The lactic acid is made available for fermentation by microbes that generate hydrogen. The hydrogen degrades the 1,1,1-TCA, 1,1-DCA, and chloroethane to ethane through a process of reductive dechlorination. HRC® can produce lactic acid up to 24 months after its application.

The HRC® will arrive at the site as a viscous liquid contained in five 30-gallon buckets. 150 gallons of HRC® will be evenly distributed in the base of the excavation during low tide. Regenesis®, the manufacturer of HRC®, performed an evaluation of site subsurface conditions to determine an appropriate amount of HRC® to reduce VOC concentrations in the vicinity of the drywell to within Groundwater Standards. The Regenesis evaluation

form for the site is included in Attachment A along with references regarding HRC®. An excavator will be utilized to mix the HRC with the residually impacted soils and groundwater. The excavation will then be backfilled to promote an anaerobic condition which will favor the reductive dechlorination process.

2.4 Soil Disposal

Impacted soil will be sampled in accordance with the procedures described under **Section 4.3** of this document to meet the waste acceptance criteria of the disposal facility. Impacted soil to be removed from the site will be loaded into polyethylene-lined dump trailers provided by a licensed waste transport company. Loading will be performed with an excavator. Loaded trailers will be covered with a tarp. It is estimated that approximately 60 tons of impacted soil will be shipped off site.

2.5 Backfill and Site Restoration

Following collection of verification samples and the installation of HRC® within the excavation, the excavation will be backfilled and compacted with clean fill. Additional clean fill, as defined by 6NYCRR Part 360, may be brought in from off-site to backfill the excavations. The remedial excavation will be performed in a section of the broader bulkhead replacement excavation work. Therefore, final backfilling and site restoration will be a function of the completion of the bulkhead replacement project, rather than the remedial excavation.

3.0 ENGINEERING CONTROLS

3.1 Dust Suppression

Dust generation from site soils will be monitored as described in the Community Air Monitoring Program (CAMP, Attachment C). If dust generation approaches action levels, suppression will be accomplished by the application of water. Soils that have the potential of generating dust will be sprayed with water at the end of each work day, and as deemed necessary by the supervisor.

3.2 Stormwater Management

Efforts will be made to prevent stormwater pollution from occurring due to project work. During excavation activities, stormwater runoff from excavation areas will be minimized by using proper control measures such as silt fence, if appropriate.

Stockpiles will be covered during rain events to prevent saturation and sediment-laden runoff.

The remedial excavation will be performed in a section within the broader bulkhead replacement work. Therefore, sediment control measures for the bulkhead replacement work, if appropriate, will also act for the remedial work.

3.3 Fencing

Orange safety fencing will be installed around open excavations for on-site worker safety and to restrict access to the excavation by the public.

4.0 MONITORING AND MAINTENANCE

4.1 Remediation Phase Monitoring

Monitoring during soil excavation will be performed to protect the health of site workers and the surrounding community. A Health and Safety Plan (HASP, **Attachment B**) and Community Air Monitoring Plan (CAMP, **Attachment C**) have been developed for this project. These plans specify the monitoring procedures, action levels, and contingency measures that are required to protect public health. Generally, air monitoring would include real-time measurement of volatile emissions and dust levels.

4.2 Post-Remediation Monitoring and Verification

The verification sampling of the excavated areas will be performed prior to the addition of HRC® to document that cleanup goals are being met.

As recommended by NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, the verification soil sampling approach will include a sampling frequency of one sample from the bottom of each sidewall for every 30 linear feet of sidewall, and one sample from the excavation bottom for every 900 square feet of bottom. PWGC anticipates the collection of a minimum of five verification soil samples.

Verification soil samples will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified analytical laboratory for analysis of VOCs according to United States Environmental Protection Agency (USEPA) method 8260B in accordance with NYSDEC Analytical Sampling Protocol with Category-B deliverables (ASP-B) and third party data validation. The QA/QC program will include the preparation and analysis of field and laboratory QA/QC samples such as trip blanks and matrix spike duplicates.

Soil sampling and equipment decontamination will be performed in accordance with USEPA *SOP # 2001 General Field Sampling Guidelines*, *SOP# 2012 Soil Sampling,* and *SOP# 2006 Sampling Equipment Decontamination*.

4.3 Waste Characterization

The initial waste characterization will be performed by collecting a composite soil sample from the excavated soils. Sample analysis will be as specified by the requirements of the disposal facilities waste acceptance criteria (WAC). After the results of the analysis are complete, the disposal contractor will prepare a waste profile form which will be signed by

the property owner representative. This form will then be submitted to the waste disposal facility for evaluation and final approval.

Soil sampling and equipment decontamination will be performed in accordance with USEPA *SOP # 2001 General Field Sampling Guidelines*, *SOP# 2012 Soil Sampling,* and *SOP# 2006 Sampling Equipment Decontamination*.

4.4 Post IRM Monitoring and Sampling

Following the completion of the soil excavation, HRC® application, bulkhead replacement in the remediation area, and backfilling, post IRM sampling and monitoring activities may commence. It is anticipated that, due to the bulkhead replacement work, three water table monitoring wells (MW-3, MW-5, and MW-6) will need to be replaced. These new wells, along with existing monitoring well MW-4, will be used to monitor the effectiveness of the IRM. Monitoring wells MW-3 and MW-5 will be installed in the same locations. Monitoring well MW-6 will be re-located to the location of the former drywell to measure groundwater quality in the center of the treatment area. The proposed monitoring well locations are indicated on **Figure 3**. Analytical data has indicated that the current location of MW-6 is consistently outside the area of impact.

The monitoring wells will be constructed of two-inch diameter, schedule 40 PVC casing and screen with 0.010 inch slot. Each of the wells will be screened at the water table to monitor the groundwater which has historically been the most impacted. These wells will be constructed with 10 feet of screen and riser to grade. The screen will be set at a depth between 2 feet and 10 feet below ground surface in order to intersect the water table through a range of elevations caused by the tide. A gravel pack of No. 2 Morie sand will be placed in the annulus around the screen. A bentonite seal will be installed above the gravel pack. Above the bentonite layer, the annulus around the well will be backfilled with clean sand.

The wells will be set flush to grade with a protective locking manhole cover. The riser will be fitted with a water tight cap. Drill cuttings will be monitored for VOC vapors with a photo-ionization detector (PID). Soils in which VOCs are not detected may be used to backfill the annulus of the wells. Soils in which VOCs are detected will be containerized for off-site disposal.

The new monitoring wells will be developed by a low stress (low flow) method to restore the hydraulic properties of the aquifer, while preserving soil horizons, water quality, and sample integrity. Development will be performed with dedicated instruments to prevent cross-contamination between well locations. The development of each well will continue until the turbidity is less than or equal to 50 Nephelometric Turbidity Units (NTUs), and when pH,

temperature, and conductivity measurements stabilize. Stabilization will be considered achieved when three consecutive readings within five percent of each other are collected in five minutes. Portable field instruments will be used to collect measurements. If turbidity cannot be reduced to 50 NTUs, but other parameters stabilize, the well will be considered developed.

The monitoring wells will be surveyed so that groundwater elevations can be calculated. Water level measurements will be obtained and converted into groundwater elevation. The measuring points on the well casings will be marked.

The initial round of water level measurements and groundwater sampling will be performed at least two weeks after installation of the new monitoring wells. Groundwater samples will be collected from monitoring wells MW-4 and the newly-installed MW-3, MW-5, and MW-6.

The monitoring wells will be sampled by a low stress (low flow) method to collect representative samples while producing a minimal amount of purge water. Sampling will be performed with dedicated instruments to prevent cross-contamination between well locations. Purging of each well will continue until the turbidity is less than or equal to 50 Nephelometric Turbidity Units (NTUs), and when pH, temperature, and conductivity measurements stabilize. Stabilization will be considered achieved when three consecutive readings within five percent of each other are collected in five minutes. Portable field instruments will be used to collect measurements. If turbidity cannot be reduced to 50 NTUs, but other parameters stabilize, the well will be considered developed. Samples will be collected directly from the polyethylene tubing into laboratory-supplied glassware upon stabilization of field parameters.

During the sampling event, depth to bottom and depth to water measurements will be collected at each monitoring well. Water level measurements will be obtained with an electronic water level probe relative to the marked measuring point. Measurements will be recorded in a dedicated bound project field notebook along with the time collected. Measuring equipment will be decontaminated between wells using a laboratory-grade detergent and water solution and tap water rinse.

4.4.1 Laboratory Analysis

Collected groundwater samples will be placed in laboratory supplied glassware and placed in a cooler packed with ice for transport to the laboratory. Sample analysis will be provided by an ELAP-certified environmental laboratory and will consist of VOCs by EPA Method 8260B in accordance with NYSDEC Analytical Sampling Protocol with Category-B deliverables (ASP-B) and third party data validation. The QA/QC program will include the preparation and analysis of field and laboratory QA/QC samples such as trip blanks and matrix spike duplicates.

4.4.2 Quality Assurance / Quality Control

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or "cold-paks" to maintain a temperature of 4^{o}C.

If dedicated disposable materials are used to collect groundwater samples (polyethylene tubing, dedicated samplers), field equipment (rinsate) blanks will not be part of the QA/QC program. Trip blanks will accompany samples each time they are transported to the laboratory.

5.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan (HASP) takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting Inc. (PWGC), its subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. A HASP has been prepared and is provided in **Attachment B**.

PWGC sub-contractors will have the option of adopting this HASP or developing their own site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in the site HASP prepared by PWGC and must be made available to PWGC and NYSDEC.

Activities performed under the HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926, and the PWGC Corporate Environmental Health and Safety policy. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM).

6.0 COMMUNITY AIR MONITORING PLAN

The Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities.

The action levels specified require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

The primary concerns for this site are odors and dust particulates. A CAMP has been prepared and is provided in **Attachment C**.

7.0 SCHEDULE

Remediation activities will be coordinated with bulkhead replacement work. Excavation of the impacted soils will be initiated following an evaluation of the location of the closed drywell in relation to the bulkhead structures (i.e., tie rods and deadmen). Remedial excavation will generally coincide with low tide and is expected to be completed in one or two days, at which time verification endpoint samples will be collected. The HRC® application will occur immediately following excavation and verification. Standard turnaround time for analytical results is one to two weeks. Additional soil excavation may be appropriate based upon analytical results.

Installation and development of the monitoring wells is expected to be completed in two days and will occur following remediation and the completion of bulkhead replacement. Bulkhead replacement work will be completed in approximately eighteen weeks. The initial post-remediation groundwater sampling event will occur approximately two weeks following the installation of the monitoring wells. Subsequent sampling rounds will occur on a quarterly basis.

A conceptual schedule is provided as **Figure 4**.

8.0 REFERENCES

6 NYCRR Part 376 - Land Disposal Restrictions

29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response

NYSDEC, Division of Environmental Restoration, December 2002, *Draft DER-10, Technical Guidance for Site Investigation and Remediation.*

NYSDEC, Division of Environmental Remediation, December 2006*, 6 NYCRR Part 375 Environmental Remediation Programs.*

NYSDEC, DEC Policy, October 2010, *CP-51 / Soil Cleanup Guidance.*

NYSDEC, Division of Technical and Administrative Guidance, June 1, 1992, *Memorandum # 4042, Interim Remedial Measures.*

December 9, 1992, *Memorandum # 4048, Interim Remedial Measures - Procedures.*

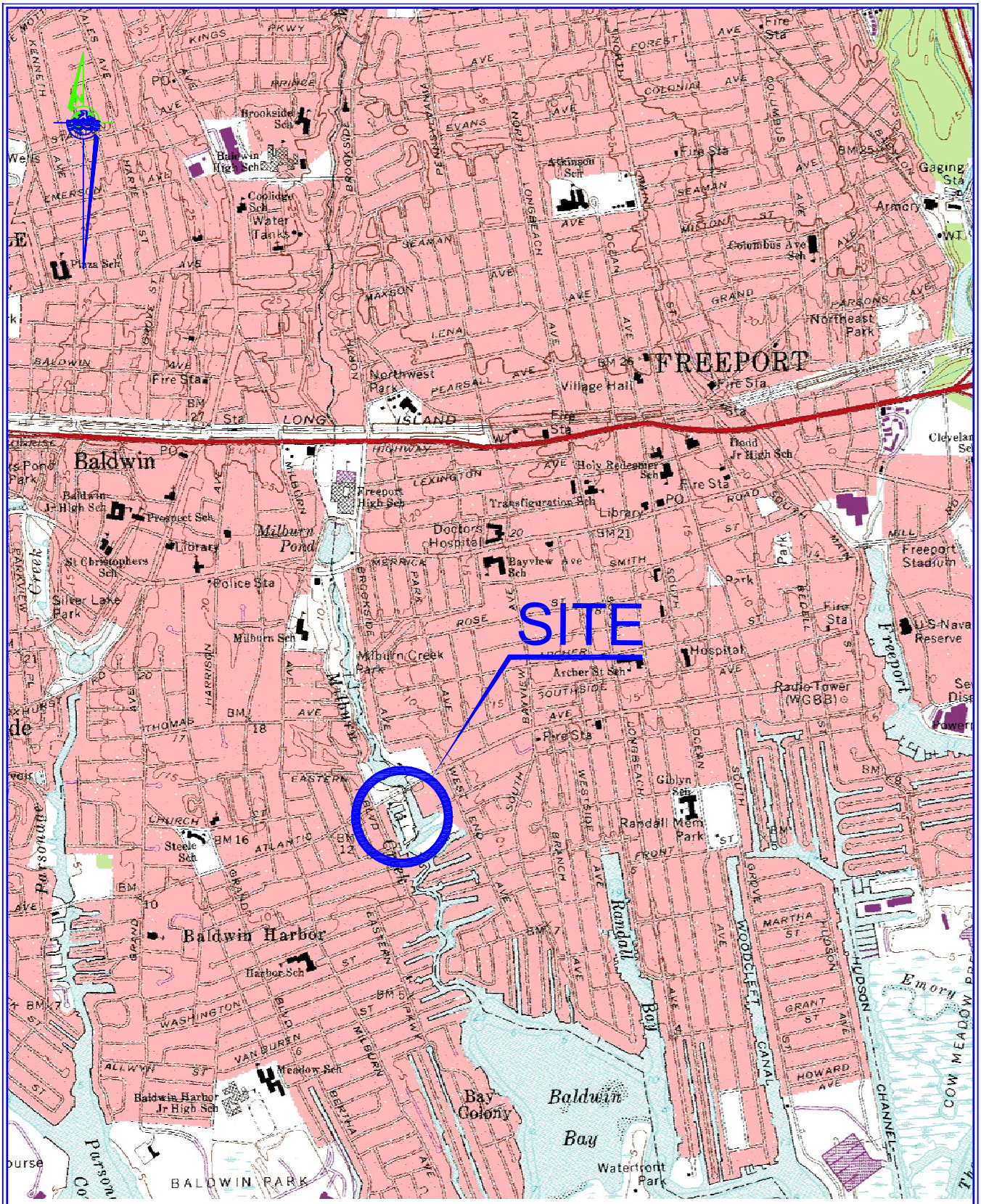
NYSDEC, Division of Technical and Administrative Guidance, October 27, 1989, *Memorandum #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites*

NYSDEC, Division of Water, June 1998, Addendum April 2000, *Technical and Administrative Guidance Series 1:1:1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.*

P. W. Grosser Consulting, Inc., June 2008, *Supplemental Remedial Investigation Report, 1170 Atlantic Avenue, Baldwin, New York.*

ATC Associates Inc., May 2005*, Remedial Investigation Report*, *1170 Atlantic Avenue, Baldwin, New York.*

FIGURES



VICINITY MAP

SCALE: 1:24,000

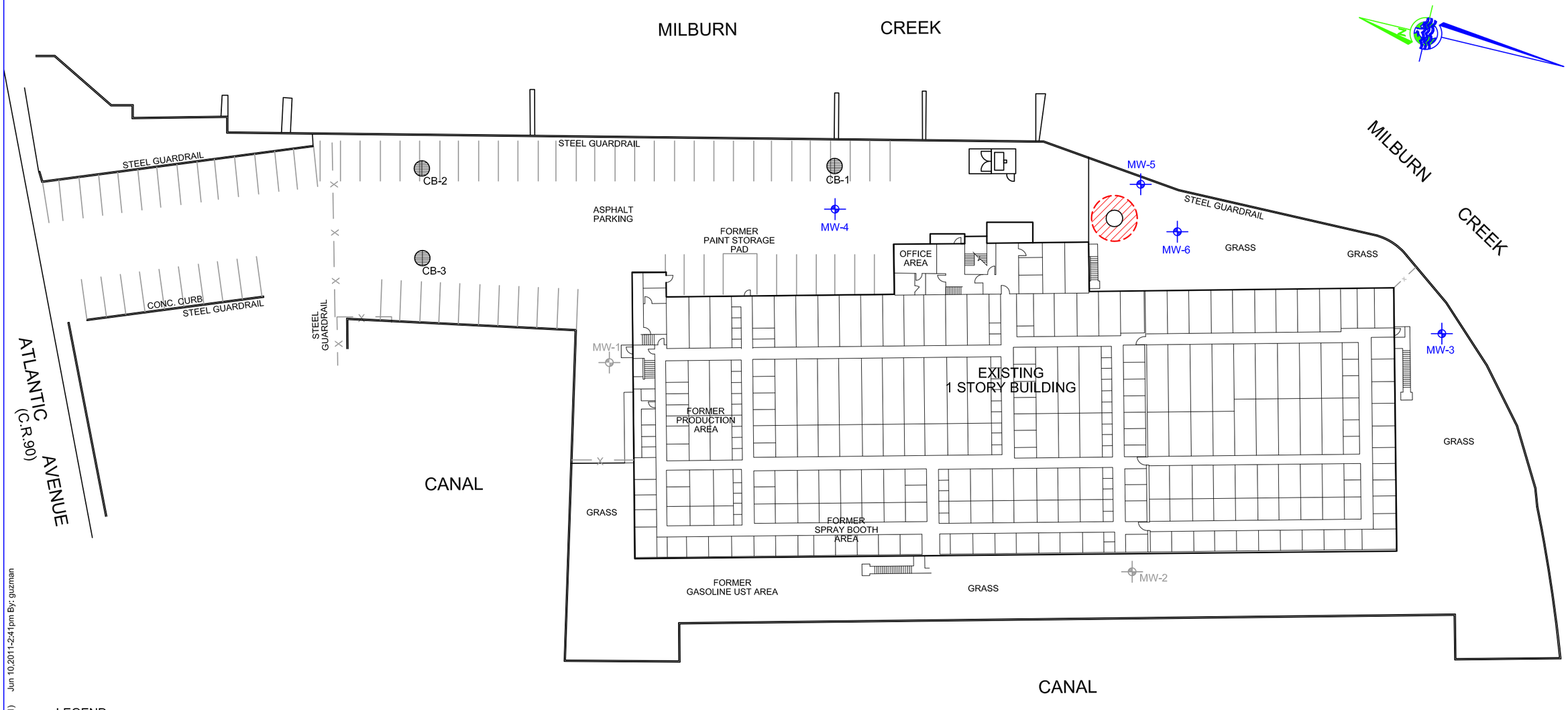
Mapped, edited, and published by the Geological Survey
Revised in cooperation with New York
Department of Transportation
Control by USGS, USC&GS, and New Jersey Geodetic Survey

J:Projects S-Z\sss\SSS0601\Cad\Vicinity Map.dwg

PWGC
Strategic Environmental & Engineering Solutions
630 Johnson Ave. Suite 7 Bohemia, N.Y. 11716-2618
Ph: 631 589-6353 Fx: 631 589-6705 E-mail: info@pwgrosser.com

1170 ATLANTIC AVENUE
BALDWIN, NY 11510

Project No:	SSS0601
Designed By:	JPR
Approved By:	PWG
Drawn By:	LLG
Figure No:	1
Date:	10/05/06



LEGEND

- PROPOSED EXCAVATION AND TREATMENT AREA
- EXISTING MONITORING WELL
- DRYWELL OF CONCERN
- CATCH BASIN
- CHAIN LINK FENCE
- STORAGE UNIT

BASEMAP PROVIDED BY:
ATC ASSOCIATES INC.
ENVIRONMENTAL, GEOTECHNICAL AND
MATERIALS PROFESSIONALS
104 E.25th ST. 10th FLOOR
NEW YORK, NY 10010

0 40 80
SCALE: 1" = 40'

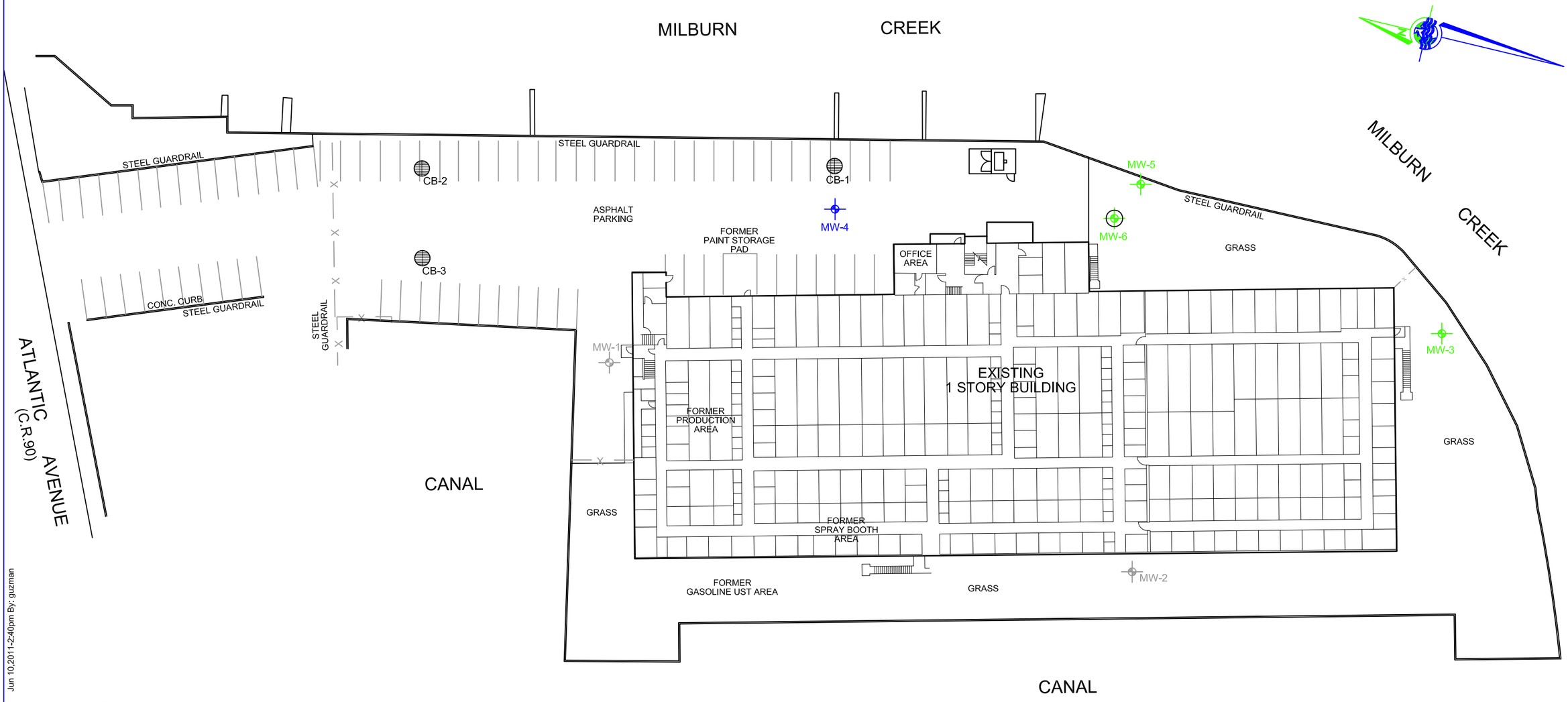
INTERIM REMEDIAL MEASURE
1170 ATLANTIC AVENUE
BALDWIN, NY 11510

PWGC
Strategic Environmental & Engineering Solutions
630 Johnson Ave. Suite 7 Bohemia, N.Y. 11716-2618
Ph: 631 589-6353 Fx: 631 589-8705 E-mail: info@pwgrosser.com

Project:	Designed By:	Figure No:
SSS1101	ZY	2
CADD Operator: LLG	Approved By: PWG	Date: 6/9/11

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

J:\Projects S-Z\SSS\1101\IRM\IRM Work Plan\CAD\Fig 2.dwg (Layout1) Jun 10,2011-2:41pm By: guzman



LEGEND

- PROPOSED MONITORING WELL
- EXISTING MONITORING WELL
- DRYWELL OF CONCERN
- CATCH BASIN
- CHAIN LINK FENCE
- STORAGE UNIT

BASEMAP PROVIDED BY:
ATC ASSOCIATES INC.
ENVIRONMENTAL, GEOTECHNICAL AND
MATERIALS PROFESSIONALS
104 E.25th ST. 10th FLOOR
NEW YORK, NY 10010

0 40 80
SCALE: 1" = 40'

PROPOSED MONITORING WELLS
1170 ATLANTIC AVENUE
BALDWIN, NY 11510

PWGC
Strategic Environmental & Engineering Solutions
630 Johnson Ave. Suite 7 Bohemia, N.Y. 11716-2618
Ph: 631 589-6353 Fx: 631 589-8705 E-mail: info@pwgrosser.com

Project:	Designed By:	Figure No:
SSS1101	ZY	3
CADD Operator: LLG	Approved By: PWG	Date: 6/9/11

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING AND RELATED DOCUMENTS IS A VIOLATION OF SEC. 7209 OF THE N.Y.S. EDUCATION LAW

J:\Projects S-Z\SSS\1101\RM\RM Work Plan\CAD\Fig 3.dwg (Layout1) Jun 10,2011-2:40pm By: guzman

Figure 4

IRM Schedule
1170 Atlantic Avenue
Baldwin, New York
VCP # 00523

WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
TASK																											
NYSDEC Approval of Work Plan			■																								
Bulkhead Replacement	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■									
Remedial Excavation				■																							
Verification Soil Sampling				■																							
HRC® Application				■																							
Verification Soil Sampling Analysis				■	■																						
Additional Remedial Excavation (if appropriate)						■																					
Monitoring Well Installation and Development																			■								
Initial Post-Remediation Monitoring Well Sampling																						■					
Groundwater Laboratory Analysis																						■	■				
IRM Report Preparation																								■	■	■	■

Monitoring well sampling will continue on a quarterly basis.

ATTACHMENT A

HRC® References

REGENESIS

Hydrogen Release Compound (HRC®) Installation Instructions

GENERAL GUIDELINES

The best method to deliver HRC into the subsurface is to inject the material through direct push rods using hydraulic equipment. This approach increases the spreading and mixing of HRC into the aquifer. This set of instructions is specific to direct push equipment.

Regenesis has found that very few pumps can adequately deliver HRC to the subsurface. Although other pumps may inject HRC, we have developed the following instructions specifically for use with an R.E. RUPE Company Model ORC/HRC 9-1500 mixing and pumping machine.

Note: We have strong evidence that the recently developed Geoprobe GS-2000 pump can effectively deliver HRC to the subsurface.

The installation of HRC should span the entire vertical contaminated saturated thickness. If the vertical extent of HRC application is confined to a limited interval, then the HRC material should be placed across a vertical zone extending a minimum of 2 feet above and below the screened Interval of monitoring wells to be used to evaluate the performance of the bioremediation project.

MATERIAL OVERVIEW, HANDLING, AND SAFETY

HRC is shipped in 4.25-gallon buckets and each bucket has a gross weight of approximately 32 pounds (net weight of HRC is 30 pounds). At room temperature HRC is a sticky gel with a viscosity of approximately 20,000 centipoise (roughly equivalent to cold honey). The HRC material has a nominal density of 1.3 grams/cubic centimeter or approximately 10.8 pounds per gallon. The viscosity of HRC is temperature sensitive, significant changes in HRC's viscosity are observed with large changes in product temperature. It should be noted that the temperature/viscosity relationship is not linear.

For ease of installation, HRC should be stored in a warm, dry place that is protected from direct sunlight. It is common for stored HRC to settle somewhat in a container. Care should be taken to mix the HRC into a relatively uniform fluid prior to installation. Product uniformity is most easily achieved by pre-heating HRC before pouring it into the pump hopper. Care should be taken to scrape any separated material from the bottom of each bucket. Do not use any "rocky material" in the bottom of the bucket because it could potentially clog the check valves in the machine. Use the Rupe pump's mixing and recirculation features to homogenize the HRC. Pre-heating HRC makes it easier to pour and remix the separated material. Although HRC is manufactured as a food-grade

material that is safe to ingest, field personnel should take precautions while handling and applying HRC. Field personnel should use appropriate safety equipment, including eye protection. The low pH when dissolved in water and the products viscosity make eye protection mandatory. Gloves should be used as appropriate based on the exposure duration and field conditions. A Material Safety Data Sheet is provided with each shipment. Personnel who operate field equipment during the installation process should have appropriate training, supervision, and experience

For direct assistance or answers to any questions you may have regarding these instructions, contact Regenesis Technical Services at 949-366-8000.

REGENESIS, 2003
www.regenesis.com.

; Design Software for Excavation Applications

May 2005

HRC HYDROGEN RELEASE COMPOUND

nesis Technical Support: USA (949) 366-8000 www.regenesis.com

llantic Avenue

Location: Baldwin, NY

Consultant: PW Grosser (1CF11707)

Site Conceptual Model/Extent of Plume Requiring Remediation

Planned Excavation:	Width of planned excavation	28	ft		
	Length of planned excavation	28	ft	784	ft^2
	Thickness of saturated zone to be excavated	5	ft	3,920	ft^3
GW Plume:	Width of plume area containing contaminant	30	ft		
	Length of plume area containing contaminant	30	ft	900	ft^2
	Thickness of contaminated saturated zone	10	ft	9,000	ft^3
	Total porosity	0.4			
	Nominal aquifer soil (gravel, sand, silty sand, silt, clay)	silty sand			
	Treatment Zone Pore Volume	3,600	ft^3	26,932	gallons

Dissolved Phase Electron Donor Demand

	Contaminant Conc. (mg/L)	Contaminant Mass (lb)	Stoichiometry cont/H_2 (wt/wt)	H_2 Req. (lb)
Tetrachloroethene (PCE)	0.00	0.0	20.7	0.00
Trichloroethene (TCE)	0.00	0.0	21.9	0.00
cis-1,2-dichloroethene (DCE)	0.00	0.0	24.2	0.00
Vinyl Chloride (VC)	0.00	0.0	31.2	0.00
1,1,1-Trichloroethane (TCA)	0.01	0.0	22.2	0.00
1,1-Dichlorochloroethane (DCA)	1.27	0.3	24.7	0.01
User added, also add stoich. demand and Koc (see pull-down)	0.00	0.0	0.0	n/a
User added, also add stoich. demand and Koc (see pull-down)	0.70	0.2	22.0	0.01

trichlorotrifluoroethane <- pull-down menu

Sorbed Phase (SP) Electron Donor Demand

Soil bulk density	1.76	g/cm^3 =	110	lb/cf
Fraction of organic carbon (foc)	0.003	range: 0.0001 to 0.01		

(Values are estimated using SP = foc*Koc*Cgw) (Adjust Koc as necessary to provide realistic estimates)	Koc (L/kg)	Contaminant Conc. (mg/kg)	Contaminant Mass (lb)	Stoichiometry cont/H_2 (wt/wt)	H_2 Req. (lb)
Tetrachloroethene (PCE)	371	0.00	0.0	20.7	0.00
Trichloroethene (TCE)	122	0.00	0.0	21.9	0.00
cis-1,2-dichloroethene (DCE)	80	0.00	0.0	24.2	0.00
Vinyl Chloride (VC)	2.5	0.00	0.0	31.2	0.00
1,1,1-Trichloroethane (TCA)	304	0.01	0.0	22.2	0.00
1,1-Dichlorochloroethane (DCA)	33	0.13	0.1	24.7	0.00
User added, also add stoich. demand and Koc (see pull-	0	0.00	0.0	0.0	n/a
User added, also add stoich. demand and Koc (see pull-	100	0.21	0.1	22.0	0.01

Competing Electron Acceptors (CEAs):

	CEA Conc (mg/L)	CEA Mass (lb)	Stoich. (wt/wt) e⁻ acceptor/H_2	H_2 Req. (lb)
Oxygen Demand	5.00	1.1	8.0	0.14
Nitrate Demand	5.00	1.1	12.4	0.09
Bioavailable Manganese Demand	5.00	1.1	27.5	0.04
Bioavailable Iron Demand	25.00	5.6	55.9	0.10
Sulfate Demand	50.00	11.2	12.0	0.94

Microbial Demand Factor	3	Recommend 1-4x
Additional Demand Factor	2	Recommend 1-4x

Project Summary	
Approx HRC Dose (lb)	128
Total Number of 30 lb Buckets	5
Total Amt of HRC (lb)	150
Volume of HRC (gal)	13
% of excavation backfill pore space (assuming 30% por	0.2%

Other Project Cost Estimates	
Design	$ -
Permitting and reporting	$ -
Excavation contractors	$ -
Construction management	$ -
Laboratory costs	$ -

ATTACHMENT B

Health and Safety Plan

1170 ATLANTIC AVENUE
BALDWIN, NEW YORK 11510
VCP SITE #V00523

HEALTH AND SAFETY PLAN

ON BEHALF OF:

Safeguard Self Storage
105 Maxess Road
Melville, NY 11747

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

James P. Rhodes, Vice President JimR@pwgrosser.com
John D. Eichler, Project Manager JohnE@pwgrosser.com

PWGC Project Number: SSS1101

REVISED AUGUST 2011

PWGC
Strategic Environmental Engineering Solutions

HEALTH AND SAFETY PLAN

Table of Contents

1170 Atlantic Avenue, Baldwin, New York

Page

STATEMENT OF COMMITMENT SC-1
1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS 1
1.1 Training Requirements 1
1.2 Medical Monitoring Requirements 1
1.3 Fit-Testing Requirements 2
1.4 Site Safety Plan Acceptance, Acknowledgment and Amendments 2
1.5 Daily Safety Meetings 2
1.6 Key Personnel - Roles and Responsibilities 3
2.0 SITE BACKGROUND AND SCOPE OF WORK 5
3.0 HAZARD ASSESSMENT 5
3.1 Activity-Specific Hazards and Standard Operating Procedures 6
3.1.1 Operation of Heavy Equipment 6
3.1.2 Excavation/earthwork 6
3.1.3 Work in Extreme Temperatures 7
3.1.4 Dust Control and Monitoring 7
3.1.5 Dust Control and Monitoring During Earthwork 7
3.1.6 Drilling and Probing Operations 8
3.2 Chemical Hazards 8
3.2.1 Respirable Dust 9
3.2.2 Organic Vapors 9
3.3 General Site Hazards 10
4.0 PERSONAL PROTECTIVE EQUIPMENT 11
4.1 Level D 11
4.2 Level C 11
4.3 Level B 12
4.4 Activity-Specific Levels of Personal Protection 13
5.0 AIR MONITORING AND ACTION LEVELS 14
5.1 Community Air Monitoring Requirements 14
5.2 Perimeter Air Monitoring 15
5.3 Activity-Specific Air Monitoring 16

PWGC
Strategic Environmental Engineering Solutions

Table of Contents (Continued)

6.0 SITE CONTROL 17
6.1 Work Zones 17
6.2 General Field Safety and Standard Operating Procedures 18
6.3 Decontamination Procedure 18
7.0 CONFINED SPACE 21
8.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN 23
8.1 Emergency Equipment On-site 23
8.2 Emergency Telephone Numbers 23
8.3 Personnel Responsibilities During an Emergency 24
8.4 Medical Emergencies 24
8.5 Fire or Explosion 25
8.6 Evacuation Routes 25
8.7 Spill Control Procedures 26
8.8 Vapor Release Plan 26

FIGURES

No.	Description
1	Vicinity Map
2	Route to Hospital (Appendix H)

APPENDICES

APPENDIX A	SITE SAFETY ACKNOWLEDGMENT FORM
APPENDIX B	SITE SAFETY PLAN AMENDMENTS
APPENDIX C	HEAT/COLD STRESS PROTOCOLS
APPENDIX D	DRILLING PROTOCOLS
APPENDIX E	CHEMICAL HAZARDS
APPENDIX F	DAILY AIR MONITORING RECORD FORM
APPENDIX G	CONFINED SPACE ENTRY CHECKLIST/PERMIT
APPENDIX H	EMERGENCY TELEPHONE NUMBERS
	HOSPITAL INFORMATION AND MAP
	FIELD ACCIDENT REPORT

PWGC
Strategic Environmental Engineering Solutions

STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from low level contaminated soil during the planned remedial activities to be performed at the 1170 Atlantic Avenue in Baldwin, New York project site. P.W. Grosser Consulting Inc.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical and chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document.

It should be noted that this document has been prepared specifically to address potential worker exposure to the contaminants identified at the proposed construction site during the earthwork activities. It is not intended to address the standard health and safety concerns related to general construction practices. Contractors and suppliers are responsible for ensuring the health and safety of their own employees.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by P.W. Grosser Consulting, Inc. (PWGC) at the request of Safeguard Self Storage for remedial activities to be performed at the 1170 Atlantic Avenue, Baldwin, New York site to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this HASP, including the attachments, addresses safety and health hazards relating to site operations associated with the excavation and disturbance and is based on the best information available. The HASP may be revised by PWGC at the request of Safeguard Self Storage and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by P.W. Grosser's project superintendent, site safety officer and/or the PWGC health and safety consultant.

1.1 Training Requirements

Personnel entering an area deemed an exclusion zone or decontamination zone must meet the training requirements for hazardous waste site operations and emergency response operations in accordance with OSHA 29 CFR 1910.120(e). The work associated with the proposed construction is not anticipated to require this training.

Each subcontractor and supplier working on the job must provide the site safety officer with training documentation for its personnel. This documentation will be reviewed by the site safety officer to ensure compliance with site-specific health and safety rules. The site safety officer may require modifications to the subcontractor or suppliers safety training documentation if it does not conform to site-specific requirements.

1.2 Medical Monitoring Requirements

PWGC personnel and visitors entering the exclusion zone or decontamination zone (if established) must have completed appropriate medical monitoring required under OSHA 29 CFR 1910.120(f). Medical monitoring enables a physician to monitor each employee's health, physical condition, and his fitness to wear respiratory protective equipment and carry out on-site tasks.

Evidence of compliance with additional medical monitoring requirements for this site must also be included. Subcontractors and suppliers working on the job must provide the site safety officer with documentation on their medical monitoring programs upon request.

1.3 Fit-Testing Requirements

Personnel and visitors entering the exclusion zone or decontamination zone using a negative pressure air purifying respirator (APR) must have successfully passed a qualitative respirator fit test in accordance with OSHA 29 CFR 1910.134 or the American National Standards Institute (ANSI).

Fit testing documentation is the responsibility of each subcontractor. Documentation of PWGC's personnel fit-testing is maintained on file.

1.4 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (P.W. Grosser employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in Appendix A.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in Appendix B.

1.5 Daily Safety Meetings

Each day, before work begins, the site safety officer will hold safety (tailgate or tool box) meetings to ensure that on-site personnel understand the site conditions and operating procedures and to address safety questions and concerns. Meeting minutes and attendance will be recorded. Personnel eligible to enter the exclusion and decontamination zones must attend the meetings. Project staff will discuss and remedy health and safety issues at these meetings.

1.6 Key Personnel - Roles and Responsibilities

The following PWGC key personnel are planned for this project:

- PWGC Project Director Mr. James Rhodes
- PWGC Project Manager Mr. John Eichler
- PWGC Site Safety Officer Ms. Jennifer Lewis
- PWGC Alternate Safety Officer Mr. Derek Ersbak

The PWGC project manager is responsible for overall project administration and, with guidance from the PWGC site safety officer, for supervising the implementation of this HASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The PWGC site safety officer is also responsible for coordinating and enforcing health and safety activities on-site. The site safety officer must meet the emergency response and hazardous materials training requirements of OSHA 29 CFR Part 1910.120; must have completed OSHA supervisor training, 29 CFR 1910.120 (e) 4; and must have appropriate experience to the related site work. The site safety officer is authorized to suspend the site work based on safety concerns, and is responsible for the following:

1. Educating personnel about information in this HASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.

2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.

4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this HASP.

5. Maintaining the work zone entry/exit log and site entry/exit log.

6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

2.0 SITE BACKGROUND AND SCOPE OF WORK

The subject site consists of a 2.7-acre parcel of land on the south side of Atlantic Avenue in the Hamlet of Baldwin, Town of Hempstead, Nassau County, New York. A Site Vicinity Map is included as Figure 1. The property is identified on Nassau County Tax maps as Section 54, Block 46, Lot 62. The property is improved with a 44,600 square foot two-story steel frame commercial building with sheet metal siding. The building is currently used for self storage. The interior is divided into individual self storage units ranging in size from 25 to 300 square foot spaces. The remainder of the site consists of asphalt-paved driveway/parking areas and grass.

The site was reportedly built up from the Millburn Creek streambed. The creek was rerouted around the resulting peninsula. The site is bounded on four sides by wooden bulkheads, except for the site's access driveway at the northeast corner of the property. The property's soil is apparently comprised of dredge spoils from the stream bed of Milburn Creek. These sediments are subject to impacted runoff from roadway traffic and asphalt pavement as well as impact from boat traffic (i.e. diesel and gasoline). Site sediments are generally characterized as dark brown and black silty sand with a high organic content evidenced by an organic odor.

The property is generally bounded by commercial and residential properties. East of the site, across Milburn Creek, are commercial structures and residential structures which are currently under construction. South of the site, across Milburn Creek, is a boat storage yard. North of the site is a portion of a boat canal connected to Milburn Creek, followed by a commercial building facing Atlantic Avenue. West of the site, across a boat canal connected to Milburn Creek, is a residential area.

3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general site operations which may also be conducted at site, and the standard operating procedures (SOPs) that should be implemented to reduce the hazards; identifies general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Activity-Specific Hazards and Standard Operating Procedures

3.1.1 Operation of Heavy Equipment

The use of heavy equipment will be implemented for this project; therefore, Occupational Safety and Health Administration (OSHA) guidelines will be followed for operating heavy equipment as outlined in 29 CFR 1926.602.

3.1.2 Excavation/earthwork

Soil excavation to a depth of approximately ten feet below grade may be required as part of the remediation. Excavation activities will follow the OSHA 29 CFR 1926.651 (February 20, 1990) construction industry standards relating to excavation work. These standards include shoring and cutback requirements, equipment specifications, entry requirements, etc. To avoid exposure to site-specific contaminants and to ensure acceptable atmospheric conditions, the following additional requirements apply when excavation work is performed:

- Air quality will be tested before employees enter excavations over four feet deep if a hazardous atmosphere exists or is suspected to exist. If the site safety officer determines that excavations are, by OSHA's definition, "confined space," the confined space entry policy (Section 7.0) will be followed.

- Open excavations will be backfilled as soon as practicable. While excavations remain open, appropriate warnings will be posted and barricades will be erected to protect pedestrian and worker safety. Where possible, excavation side walls will be cut at a gradual slope to maximize egress and access. Workers will not enter excavations unless absolutely required.

- To ensure atmospheric quality, tests shall be conducted as often as necessary as determined by the site safety officer. This includes tests for flammable gas and oxygen deficiency.

- When the site safety officer identifies hazardous atmospheres, emergency rescue equipment and PPE must be on the work site (Level C PPE) and readily accessible to employees (29 CFR 1926.651(g)(2)(I)).

- Daily site safety inspections will be conducted by the site safety officer.

3.1.3 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress. P.W. Grosser follows the heat and cold stress safety protocols described in Appendix C.

3.1.4 Dust Control and Monitoring

Dust generated during work activities may contain contaminants associated with the site characteristics. The PWGC site safety officer will be responsible for monitoring dust levels and requiring action when necessary as described in the following sections.

3.1.5 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 µg/m3 over site-specific background in the breathing

zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan. The primary sources of dust will be equipment, vehicular traffic, and construction activities.

3.1.6 Drilling and Probing Operations

Additional drilling operations at the site are not anticipated. However, if necessary PWGC will follow the drill rig/Geoprobe™ operation safety protocols described in Appendix D. In addition, PWGC and/or their subcontractor(s) will follow Geoprobe™ operation and sampling procedures Standard Operating Procedures.

3.2 Chemical Hazards

Soil sample results obtained during the Remedial Investigation at the site indicated concentrations of VOCs, SVOCs, and metals above the New York State Department of Environmental Conservation (NYSDEC) Unrestricted Use Soil Clean-up Objectives (SCOs) identified in 6NYCRR Part 375 and the CP-51 Guidance document.

VOCs reported above their respective unrestricted use SCOs include the following:

- 1,1-Dichloroethane
- Acetone
- Chloroethane

SVOCs reported above their respective unrestricted use SCOs include the following:

- Benzo (a) pyrene
- Benzo (b) fluoranthene

Mercury was the metal detected above the unrestricted use SCO.

Groundwater sample results obtained during site investigations revealed concentrations of VOCs detected above NYSDEC Groundwater Standards. VOCs reported above their respective Groundwater Standards include the following:

- 1,1,1-Trichloroethane
- 1,1-Dichloroethane
- Chloroethane
- Vinyl Chloride

The primary routes of exposure to suspected and identified contaminants in soil are inhalation, ingestion and absorption.

Appendix E includes information sheets for the known and suspected chemicals that may be encountered at the site.

PID Response	Action
Sustained readings of 5 ppm or greater	Shut down equipment and allow area to vent. Resume when readings return to background
Sustained readings of 5 ppm or greater that do not subside after venting	Implement Vapor Release Plan (Section 8.6). Re-evaluate respiratory protection as upgrade may be required.

3.2.1 Respirable Dust

Dust may be generated from vehicular traffic and/or other construction activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils will be mitigated with the implementation of nitrile gloves, hand washing, and decontamination exercises when necessary.

3.2.2 Organic Vapors

Excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer

will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown below.

3.3 General Site Hazards

Applicable OSHA 29 CFR 1910.120(m) standards for illumination shall apply. Work is to be conducted during daylight hours whenever possible.

Electrical power must be provided through a ground fault circuit interrupter. Equipment that will enter an excavation must be suitable and approved (i.e. intrinsically safe) for use in potentially explosive environments. Applicable OSHA 29 CFR 1926 Subpart K standards for use of electricity shall apply.

Work where there is a fall hazard will be performed using appropriate ladders and/or protection (e.g. body harness and lifeline). All work should be conducted at the ground surface or in trench excavations.

In accordance with 29 CFR 1910.151(c), workers involved in operations where there is the risk of eye injury, (chemical splash, etc.), must have ready access to an approved eye wash unit. Protective eye wear shall be donned in Level D, when directed by the site safety officer.

Operations where there is a potential for fire will be conducted in a manner that minimizes risk. Non sparking tools and fire extinguishers shall be used or available as directed by the site safety officer when work is in potentially explosive atmospheres. Ignition sources shall be removed from work areas. Explosion proof instruments and/or bonding and grounding will be used to prevent fire or explosion when the site safety officer directs their use.

Overhead and underground utilities shall be identified and/or inspected and appropriate safety precautions taken before conducting operations where there is potential for contact or interference.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. It is anticipated that work will be performed in Level D PPE.

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

4.3 Level B

Level B PPE shall be donned when the contaminants have not been identified and/or the concentrations of unknown measured total organic vapors in the breathing zone exceed 5 ppm (using a portable OVA, or equivalent). Level B PPE shall be donned if the IDLH of a known contaminant is exceeded. If a contaminant is identified or is expected to be encountered for which NIOSH and/or OSHA recommend the use of a positive pressure self-contained breathing apparatus (SCBA) when that contaminant is present, Level B PPE shall be donned even though the total organic vapors in the breathing zone may not exceed 5 ppm. Level B shall be donned for confined space entry, and when the atmosphere is oxygen deficient (oxygen less than 19.5%) or potentially oxygen deficient. If Level B PPE is required for a task, at least three people shall be donned in Level B at any one time during that task. PPE shall only be donned at the direction of the site safety officer. Level B PPE consists of:

- supplied air SCBA or air line system with five minute egress system;
- chemical resistant coveralls;
- steel-toe and steel-shank workboots;

- chemical resistant overboots or disposable boot covers;
- disposable inner gloves;
- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

The exact PPE ensemble is decided on a site-by-site basis by the PWGC Health and Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.4 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. It is expected that site work will be performed in Level D. If air monitoring results indicate the necessity to upgrade the level of protection, engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of excavations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Community Air Monitoring Requirements

During excavation work, fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor and air will be monitored for site-related VOCs with MiniRAE 2000 photo-ionization detector (PID) with an 11.7 eV lamp. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work; or
- before and during entry into confined spaces.

Continuous air monitoring will be conducted with a 15 minute running average at the downward site boundary during intrusive site activities as part of the CAMP.

The designated site safety officer will record air monitoring data. P.W. Grosser's site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. A daily log will be kept. Monitoring results will be recorded on the sheets contained in Appendix F.

Below are examples of site specific guidelines and actions which are taken based on routine air monitoring:

PID readings for VOCs sustained at background and 5 ppm over the site specific background in breathing zone: continue.

PID readings for VOCs sustained between 5 ppm and 25 ppm over the site specific background in breathing zone: Level C PPE. (See Note)

PID readings for VOCs sustained >25 ppm over the site specific background in breathing zone: Level B PPE. (See Note)

Total Respirable Dust at 150 mg/m3 in breathing zone:

Level C PPE - HEPA filters. Site safety officer can call for upgrades based on visual dust without metering total respirable dust.

Prior to site work, the P.W. Grosser site safety officer will compile a list of likely site contaminants, select appropriate air monitoring instrumentation and define action levels.

5.2 Perimeter Air Monitoring

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before drilling/excavation activities begin. These points will be monitored periodically in series during the site work. VOCs will be monitored with a Photo-ionization detector, or the equivalent. If appropriate, fugitive dust will be monitored using a MiniRam aerosol monitor.

The specific guidelines for actions to be taken based on air monitoring at the site perimeter are listed below:

PID readings for VOCs less than 5.0 ppm over background: continue.

PID readings for VOCs greater than 5.0 ppm over background: stop work and implement vapor release contingency plan until readings return to acceptable levels.

Total Respirable Dust below 100 µg/m3 : continue.

Total Respirable Dust above 100 µg/m3 in breathing zone: stop work and implement dust control

measures (Section 3.0) until readings return to acceptable levels.

5.3 Activity-Specific Air Monitoring

The monitoring of VOC concentrations present in the employees breathing zone will be periodically monitored during drilling/excavation activities using a PID. Air monitoring results will be recorded in the field log book. If additional monitoring is required, the protocols will be developed and appended to this plan.

6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book. It is expected that for remediation activities, identification of an exclusion zone, decontamination zone, and support zone will not be necessary.

Tasks requiring OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training are carried out in the exclusion zone. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

6.2 General Field Safety and Standard Operating Procedures

P.W. Grosser's policy is to control hazards at all site areas by limiting entrance to exclusion zones to essential personnel and by implementing the following rules:

- Non-essential (as judged by the site safety officer) personnel and unauthorized persons will not enter the exclusion or decontamination zone.

- Before entering the exclusion or decontamination zones, all personnel must be familiar with emergency response procedures (Section 8.0), site safety locations, first aid and communication equipment, and the location of the map to the hospital and the list of emergency telephone numbers.

- The buddy system will be used at all times by field personnel in the exclusion zone; no one is to perform work within the exclusion zone alone. When in Level D or C, visual contact or radio contact shall be maintained at all times.

- Contact with contaminated and potentially contaminated surfaces should be avoided. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or place equipment on the ground. Protect equipment from contamination.

- Eating, drinking, or smoking is permitted only in designated areas in the support zone.

- Each worker must be supplied with and maintain his/her own personal protective equipment.

6.3 Decontamination Procedures

All equipment and PPE exiting the exclusion zone must be decontaminated or properly discarded upon exit. All personnel must enter and exit the exclusion zone through the decontamination area. The exclusion and decontamination zones may change depending on the nature of the site work. Plastic bags containing personal protective clothing and equipment will be placed in designated receptacles.

All boots and other potentially contaminated garments that have come in contact with hazardous materials will be cleaned in wash tubs with detergent/water solution and rinsed with water and must remain on site. The wash water, rinse water, and residues will be collected and properly stored until sampling results are received and the final method of disposal can be determined. Disposable PPE, including spent respirator cartridges and canisters, will be properly bagged and disposed of. All contaminated boots, clothing, and equipment (e.g. leather boots, equipment carrying straps) that cannot be decontaminated will be disposed of with the disposable garments or left on site in the decontamination trailer.

The *minimum* measures for Level B doffing and decontamination are:

- deposit equipment on plastic drop cloths;
- scrub outer boots and gloves with a water and detergent solution and rinse;
- remove outer boots and outer gloves. Discard disposable outer garments in receptacle provided;
- remove SCBA and face piece and place on rack provided;
- remove tyvek/outer garment and place in receptacle provided;
- remove inner gloves and deposit in receptacle provided; and,
- shower/wash face and hands.

The *minimum* measures for Level C doffing and decontamination are:

- deposit equipment on plastic drop cloths;
- scrub outer boots and gloves (if worn) with a water and detergent solution and rinse;
- remove outer boots and outer gloves. Discard disposable outer garments in receptacle provided;
- remove tyvek/outer garment and place in receptacle provided;
- remove first pair of inner gloves;
- remove respirator (using "clean" inner gloves) and place on rack provided;
- remove last pair of inner gloves and deposit in receptacle provided; and,
- shower/wash face and hands.

The second to last item to be removed is the APR, and the last item to be removed is the last of several pairs of surgical gloves. Wearing several pairs of inner gloves permits layers to be removed as needed during various stages of the doffing procedure, and if the APR inadvertently becomes contaminated, inner gloves guard against bare hands contacting the APR.

Equipment that comes into contact with site contaminants is decontaminated according to manufacturer specifications. Decontamination is done in the exclusion or decontamination zones. Rented equipment is photographed after decontamination.

7.0 CONFINED SPACE

OSHA published a Final Rule on permit-required confined spaces on January 14, 1993, for General Industry at 29 CFR 1910.146 et seq., with an implementation date of April 15, 1993. The rule specifically excludes agriculture, construction, or shipyard employment. Confined space entry and work within confined spaces is not anticipated to be performed under the proposed scope of work. However, if confined space work is conducted it will be performed in accordance with the applicable OSHA regulations. OSHA defines confined space as:

1. is large enough and so configured that an employee can bodily enter and perform assigned work;
2. has limited or restricted areas for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited entry); and
3. is not designed for continuous worker occupancy.

OSHA further requires that an "entry supervisor" (the site designated safety officer) decide at the time of entry whether the space is permit-required or non-permit required space. The site safety officer will monitor the space two hours prior to entry and continuously during work to ensure that the atmosphere is not hazardous. OSHA defines as hazardous atmosphere as:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL);

2. Airborne combustible dust at a concentration that meets or exceeds its LEL;
   NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z. Toxic

and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

5. Any other atmospheric condition that is immediately dangerous to life or health.

6. A space is non-permit required if none of the above defined hazardous conditions are present. OSHA requires that an attendant (e.g., an individual stationed outside one or more spaces who monitors the entrants and who performs air monitoring of the space(s)) be assigned to each space. The attendant is not allowed to perform any direct rescue related duties, but is there to communicate with the entrant and call for rescue procedures if required.

The following protocol applies when P.W. Grosser employees must enter a confined space:

- The site safety officer evaluates the space and site conditions to determine whether the space must be considered "confined".

- If so, the site safety officer monitors the space for hazardous atmospheres prior to entry and fills out a pre-entry checklist (Appendix G) to determine whether an entry-permit is required.

- If there is no hazardous atmosphere, the space will be continuously monitored during the entry to assure that the atmosphere remains non-hazardous.

- If the space contains a hazardous atmosphere, an entry permit (Appendix G) will be prepared and the space will only be entered in accordance with 29 CFR 1910.146.

PWGC
Strategic Environmental Engineering Solutions

8.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment. These will be outlined in the site specific HASP.

8.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project manager or site safety officer.

8.2 Emergency Telephone Numbers

General Emergencies	911
Nassau County Police	911
NYSDEC Spills Division	1-800-457-7362
NYSDEC Hazardous Waste Division	1-718-482-4994
Baldwin Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-340-4494
Health and Safety Officer	1-631-589-6353
Alternate Health and Safety Officer	1-631-589-6353

A copy of this page shall be posted in the office and a copy is provided in Appendix H.

8.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager=s on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following PWGC key personnel are planned for this project:

- PWGC Project Director — Mr. James Rhodes (631) 589-6353
- PWGC Project Manager — Mr. John Eichler (631) 589-6353
- PWGC Site Safety Officer — Ms. Jennifer Lewis (516) 315-6028
- Alternate Site Safety Officer — Mr. Derek Ersbak (516) 852-6750

8.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent

possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (Appendix H) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital and information on the chemical(s) to which they may have been exposed (Appendix H).

8.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

8.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.

- Exit through the decontamination corridor if possible.

- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a

safe place.

- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

8.7 Spill Control Procedures

Spills associated with site activities may be attributed to project specific heavy equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

8.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two

successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.

- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

PWGC
Strategic Environmental Engineering Solutions

SITE SAFETY PLAN ACKNOWLEDGEMENT FORM

I have been informed and understand the procedures set forth in the health and safety plan and amendments:

Printed Name	Signature	Representing	Date

P.W. Grosser Consulting, Inc • P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7 • Bohemia, NY 11716 • Branch Location - Seattle, WA
PH 631.589.6353 • FX 631.589.8705 • www.pwgrosser.com

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

PWGC
Strategic Environmental Engineering Solutions

SITE SAFETY PLAN AMENDMENT FORM

SITE SAFETY PLAN AMENDMENT # _____: _____

SITE NAME: _____

REASON FOR AMENDMENT: _____

_____

_____

ALTERNATIVE PROCEDURES: _____

_____

_____

REQUIRED CHANGES IN PPE: _____

_____

_____

_____ _____
PROJECT SUPERINTENDENT DATE

_____ _____
HEALTH & SAFETY CONSULTANT DATE

_____ _____
SITE SAFETY OFFICER DATE

P.W. Grosser Consulting, Inc • P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7 • Bohemia, NY 11716 • Branch Location - Seattle, WA
PH 631.589.6353 • FX 631.589.8705 • www.pwgrosser.com

APPENDIX C

HEAT/COLD STRESS PROTOCOLS

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.

3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.

4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.

6. *Treatment for heat exhaustion*: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.

7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.

8. *Treatment of heat stroke*: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

TABLE 1

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2^{o}
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104^{o} or above
- Coma

TABLE 2

HEAT STRESS INDICATORS

Heat stress indicator	When to measure	If Exceeds…	Action
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes) 100.6°F	Shorten next work period by 33% Prohibit work in impermeable clothing
Body weight	1. Before workday begins (a.m.) 2. After workday ends (p.m.)		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

Frostbite

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-gray to gray

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.

2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.

3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. *DO NOT* squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.

4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100^{o}F to 106^{o}F water bath. Water temperature will

drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

NOTE: Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia*: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temperature	°C	Symptoms
99-96	37-35.5	Intense, uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, he has difficulty speaking.
90-86	32-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.4-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	26.6-18.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. *Treatment of hypothermia*: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

PWGC
Strategic Environmental Engineering Solutions

TABLE 3[(1)]
COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (^{o}F)P											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (^{o}F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and imersion foot may occur at any point on this chart											

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

APPENDIX D

DRILLING/GEOPROBE™ PROTOCOLS

SAFETY PROCEDURES DURING THE OPERATION OF DRILLING/PROBING MACHINES INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

- All site personnel should know the location of the rig emergency shut-off switch prior to beginning operations.
- The rig should be inspected prior to operation to ensure that it is in proper working condition and that all safety devices are functioning.
- Each rig should have a first-aid kit and fire extinguisher which should be inspected to ensure that they are adequate.
- All operators should wear, at a minimum, hard hats, steel-toe safety shoes or boots, gloves and safety glasses. Additional clothing and protective equipment may be required at sites where hazardous conditions are likely. Clothing must be close fitting, without loose ends, straps, draw strings or belts or other unfastened parts that might catch on moving machinery.
- Work areas should be kept free of materials, debris and obstruction, and substances such as grease or oil that could cause a surface to become slick or otherwise hazardous.
- Prior to drilling, the site must be checked to determine whether it can accommodate the rig and supplies and provide a safe working area.
- The drill rig mast (derrick) must be lowered prior to moving between drilling locations.
- The drill rig masts should not be raised if the rig will not be at least 20 feet away from overhead utilities.
- The location of underground utilities should be determined prior to erecting the rig.
- The drill rigs must be properly erected, leveled and stabilized prior to drilling.
- The operator must shut down the vehicle engine before leaving the vicinity of the machine.
- All personnel not directly involved in operating the rig or in sampling should remain clear of the drilling equipment when it is in operation.
- All unattended boreholes must be adequately covered or otherwise protected to prevent trip and fall hazards. All open boreholes should be covered, protected or backfilled as specified in local or state regulations.
- When climbing to or working on a derrick platform that is higher than 20 feet, a safety climbing device should be used.
- The user of wire line hoists, wire rope and hoisting hardware should be as stipulated by the American Iron and Steel Institute Wire Rope Users Manual.
- The rig should be operated in a manner which is consistent with the manufacturers' ratings of speed, force, torque, pressure, flow, etc. The rig and tools should be used for the purposes for which they were intended.

APPENDIX E

CHEMICAL HAZARDS

1,1,1-TRICHLOROETHANE

0079
October 1994

CAS No: 71-55-6
RTECS No: KJ2975000
UN No: 2831
EC No: 602-013-00-2

Methyl chloroform
Methyltrichloromethane
alpha-Trichloroethane
$C_2H_3Cl_3$ / CCl_3CH_3
Molecular mass: 133.4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible under specific conditions. Heating will cause rise in pressure with risk of bursting. See Notes. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			In case of fire: keep drums, etc., cool by spraying with water.

EXPOSURE		PREVENT GENERATION OF MISTS!	
Inhalation	Headache. Dizziness. Drowsiness. Nausea. Ataxia. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness.	Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Diarrhoea. Nausea. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING	
Ventilation. Collect leaking and spilled liquid in sealable, suitable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: self-contained breathing apparatus.	Xn Symbol N Symbol R: 20-59 S: (2-)24/25-59-61 Note: F UN Hazard Class: 6.1 UN Pack Group: III	Do not transport with food and feedstuffs. Marine pollutant.

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-61S2831 NFPA Code: H2; F1; R0	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Cool. Dry. Ventilation along the floor.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission
© IPCS 2005

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air.

Chemical dangers
The substance decomposes on heating or on burning producing toxic and corrosive fumes including phosgene and hydrogen chloride. Reacts violently with aluminium, manganese and their alloys, alkalis, strong oxidants, acetone and zinc. Attacks natural rubber. Mixtures of 1,1,1-trichloroethane with potassium or its alloys are shock sensitive. Reacts slowly with water releasing corrosive hydrochloric acid.

Occupational exposure limits
TLV: 350 ppm as TWA, 450 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued (ACGIH 2004).
MAK: 200 ppm, 1100 mg/m^3; Peak limitation category: II(1); skin absorption (H); Pregnancy risk group: C; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and by ingestion.

Inhalation risk
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20/C.

Effects of short-term exposure
The substance is irritating to the eyes, the skin and the respiratory tract. The substance may cause effects on the heart, central nervous system and liver, resulting in cardiac disorders and respiratory failure. Exposure at high levels may result in death. Medical observation is indicated.

Effects of long-term or repeated exposure
The liquid defats the skin. The substance may have effects on the liver.

PHYSICAL PROPERTIES

Boiling point: 74/C
Melting point: -30/C
Relative density (water = 1): 1.34
Solubility in water: none
Vapour pressure, kPa at 20/C: 13.3
Relative vapour density (air = 1): 4.6
Flash point: see Notes
Auto-ignition temperature: 537/C
Explosive limits, vol% in air: 8-16
Octanol/water partition coefficient as log Pow: 2.49

ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to air quality and ground water contamination.

NOTES

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions.
The substance burns only in excess oxygen or if a strong source of ignition is present.
Use of alcoholic beverages enhances the harmful effect.
Depending on the degree of exposure, periodic medical examination is suggested.
An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.
Aerothene, Algylen, Trichloran, Chlorylen, Genklene, Chlorothene NU, Chlorothene VG, and Solvent 111 are trade names.
Card has been partly updated in April 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

LEGAL NOTICE Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2005

Safety data for chloroethane



Glossary of terms on this data sheet.

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

General

Synonyms: ethyl chloride, anodynon, chelen, chlorene, chloryl, choryl anesthetic, cloretilo, dublofix, monochloroethane, narcotile
Use:
Molecular formula: C_2H_5Cl
CAS No: 75-00-3
EINECS No: 200-830-5

Physical data

Appearance: colourless gas
Melting point: -139 C
Boiling point: 12.3 C at 760 mm Hg
Vapour density: 2.22 (air = 1)
Vapour pressure: 19.2 psi at 20 C, 57.68 psi at 55 C
Density (g cm^{-3}):
Flash point: -50 C (closed cup)
Explosion limits:
Autoignition temperature:
Water solubility:

Stability

Stable. Highly flammable - may form explosive mixtures with air. Incompatible with strong oxidizing agents, alkali metals and their alloys.

Toxicology

Limited evidence of a carcinogenic effect. Typical OEL 100 ppm.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)
IHL-RAT LC50 152000 mg/m3/2h

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R12 R40 R52 R53.

Environmental information

Harmful in the environment.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 1037. Hazard class 2.

Personal protection

Safety glasses, good ventilation. Keep possible sources of ignition away from the working area.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)
S9 S16 S33 S36 S37 S61.

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

This information was last updated on March 23, 2004. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://msds.chem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for 1,1-dichloroethane



Glossary of terms on this data sheet.

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

General

Synonyms: ethylidene chloride, ethylidene dichloride
Use: solvent, floatation agent
Molecular formula: $C_2H_4Cl_2$
CAS No: 75-34-3
EC No: 200-863-5
Annex I Index No: 602-011-00-1

Physical data

Appearance: colourless aromatic viscous liquid
Melting point: -97 C
Boiling point: 57.2 C
Vapour density:
Vapour pressure: 230 mm Hg at 25 C
Specific gravity: 1.175 at 20 C
Flash point: -5 C
Explosion limits:
Autoignition temperature:

Stability

Stable. Highly flammable. Vapour/gas mixtures explosive. Incompatible with plastics, many organic materials. Reacts with metals, oxidizing agents.

Toxicology

Harmful if swallowed or inhaled and by skin absorption. Readily absorbed through the skin. May cause dermatitis. Skin and eye irritant. Causes CNS depression. Typical 8h TWA 200 ppm.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

ORL-RAT LD50 725 mg kg^{-1}

Risk phrases

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

R11 R20 R21 R22 R36 R38 R52 R53.

Environmental information

Harmful to aquatic organisms - may cause long-term environmental damage.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

Personal protection

Safety glasses and gloves. Adequate ventilation.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

S16 S23 S61.

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

This information was last updated on August 31, 2010. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL

begins "http://msds.chem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

VINYL CHLORIDE

0082
April 2000

CAS No: 75-01-4
RTECS No: KU9625000
UN No: 1086 (stabilized)
EC No: 602-023-00-7

Chloroethene
Chloroethylene
VCM
(cylinder)
C_2H_3Cl / $H_2C=CHCl$
Molecular mass: 62.5

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Extremely flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with powder, carbon dioxide.
EXPLOSION	Gas/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Use non-sparking handtools.	In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

EXPOSURE		AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
Inhalation	Dizziness. Drowsiness. Headache. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	ON CONTACT WITH LIQUID: FROSTBITE.	Protective gloves. Cold-insulating gloves. Protective clothing.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes.
Eyes	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Ventilation. Remove all ignition sources. Personal protection: complete protective clothing including self-contained breathing apparatus.	F+ Symbol T Symbol R: 45-12 S: 53-45 Note: D UN Hazard Class: 2.1

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-20S1086 NFPA Code: H 2; F 4; R 2	Fireproof. Separated from incompatible materials. (See Chemical Dangers.) Cool. Store only if stabilized.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2005

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS COMPRESSED LIQUEFIED GAS, WITH CHARACTERISTIC ODOUR.

Physical dangers
The gas is heavier than air, and may travel along the ground; distant ignition possible. Vinyl chloride monomer vapours are uninhibited and may form polymers in vents or flame arresters of storage tanks, resulting in blockage of vents.

Chemical dangers
The substance can under specific circumstances form peroxides, initiating explosive polymerization. The substance will polymerize readily due to heating and under the influence of air, light and on contact with a catalyst, strong oxidizing agents and metals such as copper and aluminium, with fire or explosion hazard. The substance decomposes on burning producing toxic and corrosive fumes (hydrogen chloride, phosgene). Attacks iron and steel in the presence of moisture.

Occupational exposure limits
TLV: 1 ppm as TWA; A1 (confirmed human carcinogen); (ACGIH 2004).
MAK: Carcinogen category: 1; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of short-term exposure
The substance is irritating to the eyes. The liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure could cause lowering of consciousness. Medical observation is indicated.

Effects of long-term or repeated exposure
The substance may have effects on the liver, spleen, blood and peripheral blood vessels, and tissue and bones of the fingers. This substance is carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: -13/C
Melting point: -154/C
Relative density (water = 1): 0.9 (liquid)
Density: 8 (vapour) at 15/C g/l
Solubility in water: none
Relative vapour density (air = 1): 2.2
Flash point: -78/C c.c.
Auto-ignition temperature: 472/C
Explosive limits, vol% in air: 3.6-33
Octanol/water partition coefficient as log Pow: 0.6

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to ground water contamination.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The odour warning when the exposure limit value is exceeded is insufficient.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.
An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.
Card has been partly updated in April 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

LEGAL NOTICE Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2005

BENZO(a)PYRENE

0104
October 2005

CAS No: 50-32-8
RTECS No: DJ3675000
EC No: 601-032-00-3

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	**See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.**	**AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	T Symbol N Symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Separated from strong oxidants.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2005

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
PALE-YELLOW CRYSTALS

Chemical dangers
Reacts with strong oxidants causing fire and explosion hazard.

Occupational exposure limits
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

Effects of long-term or repeated exposure
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 496/C
Melting point: 178.1/C
Density: 1.4 g/cm^3

Solubility in water: none (<0.1 g/100 ml)
Vapour pressure : negligible
Octanol/water partition coefficient as log Pow: 6.04

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.

NOTES

Do NOT take working clothes home.
Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

LEGAL NOTICE Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible for the use which might be made of this information

©IPCS 2005

BENZO(b)FLUORANTHENE

0720
March 1999

CAS No: 205-99-2
RTECS No: CU1400000
EC No: 601-034-00-4

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission
© IPCS 2005

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES

Boiling point: 481/C
Melting point: 168/C
Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.12

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality.

NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

LEGAL NOTICE Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible for the use which might be made of this information

©IPCS 2005

MERCURY

0056
April 2004

CAS No: 7439-97-6
RTECS No: OV4550000
UN No: 2809
EC No: 080-001-00-0

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.

EXPOSURE		**STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!**	**IN ALL CASES CONSULT A DOCTOR!**
Inhalation	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
Skin	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
Eyes		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	**PACKAGING & LABELLING**	
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	T Symbol N Symbol R: 23-33-50/53 S: (1/2-)7-45-60-61 UN Hazard Class: 8 UN Pack Group: III	Special material. Do not transport with food and feedstuffs.

EMERGENCY RESPONSE	**STORAGE**
Transport Emergency Card: TEC (R)-80GC9-II+III	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Well closed.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission © IPCS 2004

SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.

Chemical dangers
Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.

Occupational exposure limits
TLV: 0.025 mg/m^3 as TWA; (skin); A4; BEI issued; (ACGIH 2004).
MAK: 0.1 mg/m^3; Sh; Peak limitation category: II(8); Carcinogen category: 3B; (DFG 2003).

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20/C.

Effects of short-term exposure
The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
The substance may have effects on the central nervous system and kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. May cause inflammation and discoloration of the gums. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

PHYSICAL PROPERTIES

Boiling point: 357/C
Melting point: -39/C
Relative density (water = 1): 13.5
Solubility in water: none
Vapour pressure, Pa at 20/C: 0.26
Relative vapour density (air = 1): 6.93
Relative density of the vapour/air-mixture at 20/C (air = 1): 1.009

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.

NOTES

Depending on the degree of exposure, periodic medical examination is indicated.
No odour warning if toxic concentrations are present.
Do NOT take working clothes home.

ADDITIONAL INFORMATION

LEGAL NOTICE Neither the EC nor the IPCS nor any person acting on behalf of the EC or the IPCS is responsible

©IPCS 2004

Hydrogen Release Compound (HRC®)
MATERIAL SAFETY DATA SHEET (MSDS)

Last Revised: **October 9, 2007**

Section 1 - Material Identification

Supplier:

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Phone: **949.366.8000**
Fax: **949.366.8090**
E-mail: **info@regenesis.com**

Chemical Name:	**Propanoic acid, 2-[2-[2-(2-hydroxy-1-oxopropoxy)-1-oxopropoxy]-1-oxopropoxy]-1,2,3-propanetriyl ester**
Chemical Family:	**Organic Chemical**
Trade Name:	**Hydrogen Release Compound® (HRC®)** **Glycerol tripolylactate and Glycerol**
Product Use:	**Used to remediate contaminated soil and groundwater (environmental applications)**

Section 2 – Chemical Identification

CAS#	Chemical
201167-72-8	**Glycerol Tripolylactate**
56-81-5	**Glycerol**
50-21-5	**Lactic Acid**

Section 3 - Physical Data

Melting Point:	**Not Available (NA)**
Boiling Point:	**Not Determined (ND)**
Flash Point:	**ND**
Density:	**1.3 g/cc**

Section 3 – Physical Data (cont)

Solubility:	**Acetone and DMSO**
Appearance:	**Viscous amber gel/liquid**
Odor:	**Not detectable**
Vapor Pressure:	**None**

Section 4 - Fire and Explosion Hazard Data

Extinguishing Media: **Use Water Spray, Carbon Dioxide, Dry Chemical Powder or Appropriate Foam.**

Water may be used to keep exposed containers cool.

For large quantities involved in a fire, one should wear full protective clothing and a NIOSH approved self contained breathing apparatus with full face piece operated in the pressure demand or positive pressure mode as for a situation where lack of oxygen and excess heat are present.

Section 5 - Toxicological Information

Acute Effects: **May be harmful by inhalation, ingestion, or skin absorption. May cause irritation. To the best of our knowledge, the chemical, physical, and toxicological properties of the glycerol tripolylactate have not been investigated. Listed below are the toxicological information for glycerol and lactic acid.**

RTECS#: **MA8050000**
Glycerol

Irritation data:

SKN-RBT 500 MG/24H MLD	**BIOFX* 9-4/1970**
85JCAE-,207,1986	**85JCAE-,207,1986**
EYE-RBT 126 MG MLD	**85JCAE -,656,86**
EYE-RBT 500 MG/24H MLD	**AJOPAA 29,1363,46**
SKN-RBT 5MG/24H SEV	
EYE-RBT 750 UG SEV	

Section 5 – Toxicological Information (cont)

Toxicity data:	**ORL-MUS LD50:4090 MG/KG**	**NIIRDN 6,215,1982**
	FRZKAP (6),56,1977	**FEPRA7 4,142,1945**
	SCU-RBT LD50:100 MG/KG	**RCOCB8 56,125,1987**
	ORL-RAT LD50:12600 MG/KG	**ARZNAD 26,1581,1976**
	IHL-	**ARZNAD 26,1579,1978**
	RATLC50:>570MG/M3/1HBIO	**NIIRDN 6,215,1982**
	FX*9-4/1970 IPR-RAT LD50:	**JAPMA8 39,583,1950**
	4420 MG/KG	**DMDJAP 31,276,1959**
	IVN-RAT LD50: 5566 MG/KG	**BIOFX* 9-4/1970**
	IPR-MUS LD50: 8700 MG/KG	**NIIRDN 6,215,1982**
	SCU-MUS LD50: 91 MG/KG	**FMCHA2-,C252,91**
	IVN-MUS LD50: 4250 MG/KG	**FMCHA2-,C252,91**
	ORL-RBT LD50: 27 GM/KG	**FAONAU 40,144,67**
	SKN-RBT LD50:>10GM/KG	**JIHTAB 23,259,41**
	IVN-RBT LD50: 53 GM/KG	**FMCHA2-,C252,91**
	ORL-GPG LD50: 7750 MG/KG	**JIHTAB 23,259,1941**
	ORL-RAT LD50:3543 MG/KG	
	SKN-RBT LD50:>2 GM/KG	
	ORL-MUS LD50: 4875 MG/KG	
	ORL-GPG LD50: 1810 MG/KG	
	ORL-QAL LD50: >2250 MG/KG	
Target Organ data:	**Behavioral (headache), gastrointestinal (nausea or vomiting), Paternal effects (spermatogenesis, testes, epididymis, sperm duct), effects of fertility (male fertility index, post-implantation mortality).**	
RTECS#:	**OD2800000** **Lactic acid**	

Only selected registry of toxic effects of chemical substances (RTECS) data is presented here. See actual entry in RTECS for complete information on lactic acid and glycerol.

Section 6 - Health Hazard Data

Handling: **Avoid continued contact with skin. Avoid contact with eyes.**

In any case of any exposure which elicits a response, a physician should be consulted immediately.

First Aid Procedures

Inhalation:	**Remove to fresh air. If not breathing give artificial respiration. In case of labored breathing give oxygen. Call a physician.**
Ingestion:	**No effects expected. Do not give anything to an unconscious person. Call a physician immediately.**
Skin Contact:	**Flush with plenty of water. Contaminated clothing may be washed or dry cleaned normally.**
Eye contact:	**Wash eyes with plenty of water for at least 15 minutes lifting both upper and lower lids. Call a physician.**

Section 7 - Reactivity Data

Conditions to Avoid:	**Strong oxidizing agents, bases and acids**
Hazardous Polymerization:	**None known**
Further Information:	**Hydrolyses in water to form Lactic Acid and Glycerol.**

Section 8 - Spill, Leak or Accident Procedures

After Spillage or Leakage:	**Neutralization is not required. This material may be burned in a chemical incinerator equipped with an afterburner and scrubber.**
Disposal:	**Laws and regulations for disposal vary widely by locality. Observe all applicable regulations and laws. This material, may be disposed of in solid waste. Material is readily degradable and hydrolyses in several hours.**

No requirement for a reportable quantity (CERCLA) of a spill is known.

Section 9 - Special Protection or Handling

Should be stored in plastic lined, steel, plastic, glass, aluminum, stainless steel, or reinforced fiberglass containers.

Protective Gloves:	**Vinyl or Rubber**
Eyes:	**Splash Goggles or Full Face Shield** **Area should have approved means of washing eyes.**
Ventilation:	**General exhaust.**
Storage:	**Store in cool, dry, ventilated area. Protect from incompatible materials.**

Section 10 - Other Information

This material will degrade in the environment by hydrolysis to lactic acid and glycerol. Materials containing reactive chemicals should be used only by personnel with appropriate chemical training.

The information contained in this document is the best available to the supplier as of the time of writing. Some possible hazards have been determined by analogy to similar classes of material. No separate tests have been performed on the toxicity of this material. The items in this document are subject to change and clarification as more information becomes available.

APPENDIX F

DAILY AIR MONITORING RECORD FORM

PWGC
Strategic Environmental Engineering Solutions

DAILY AIR MONITORING RECORD FORM

Date: _____ Site Safety Officer

Printed Name: _____

Signature: _____

Time: _____ Air Monitor: _____

Tasks of day / Location: _____

_____

Remarks: _____

_____

Weather Condition – Wind Direction: _____ Sky Cover: _____

	Station Number	PID	DUST	LEL	H2S
Perimeter Monitoring Points					

Dust suppressant necessary: Yes or No

Calibration (date & background level): _____

Instruments used including model & serial number

PID	Model #	Serial #
Dust Meter	Model #	Serial #
4-Gas Meter	Model #	Serial #

Monitoring Results & Comments: _____

_____

P.W. Grosser Consulting, Inc • P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7 • Bohemia, NY 11716 • Branch Location - Seattle, WA
PH 631.589.6353 • FX 631.589.8705 • www.pwgrosser.com

APPENDIX G

CONFINED SPACE ENTRY CHECKLIST/PERMIT

PWGC
Strategic Environmental Engineering Solutions

CONFINED SPACE ENTRY PERMIT

_____ Confined Space _____ Hazardous Area _____ Non Permit Required

Note: No work will be performed unless the space meets non permit requirements.
Permit valid 8 hours only. All copies of permit will remain at this job site until job is completed.

Site location and description: _____

Purpose of entry: _____

Supervisor(s) in charge of crew: _____

Type of crew: _____ Phone: _____

* BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED & REVIEWED PRIOR TO ENTRY

Requirements Completed	*Date*	*Time*		*Requirements Completed*	*Date*	*Time*	
Lock Out/De-energize/try-out				Full Body Harness w/"D" Ring			
Line(s) Broken-capped-blanked				Emergency Escape Retrieval			
Purged-Flush and Vent				Lifelines			
Ventilation				Fire Extinguishers			
Secure Area (Post and Flag)				Lighting (Explosive Proof)			
Breathing Apparatus				Protective Clothing			
Resuscitator-Inhalator				Respirator(s) (Air Purifying)			
Standby Safety Personnel				Burning and Welding Permit			

Note: Items that do not apply enter N/A in the blank

Record Continuous Monitoring Results Every 2 Hours **

Continuous Monitoring to Test(s) to be taken	*Permissible Entry Level*	*Monitoring Results*									
Percent of Oxygen	19.5% to 23.5%										
Lower Flammable Limit	Under 10%										
Hydrogen Sulfide	+ 10 PPM* 15 PPM										

Notes: * Short-term exposure time: Employee can work in area up to 15 minutes
+ 8 hour time – Weighted average: Employee can work up to 8 hours (longer if appropriate respiratory protection).
** Record continuous monitoring results every 30 minutes starting ½ hour prior to beginning work.

REMARKS:

Gas Tester Name & Check #	Instrument(s) Used	Model &/or Type	Serial &/or Unit #
_____	_____	_____	_____
_____	_____	_____	_____

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK

Safety standby person(s)	Check #	Safety standby person(s)	Check #
_____	_____	_____	_____

Supervisor Authorizing Entry: _____

All Above Conditions Satisfied: _____

Emergency Number Posted in Job Trailer.

Note: A single entry permit can be filled out prior to start of daily work.

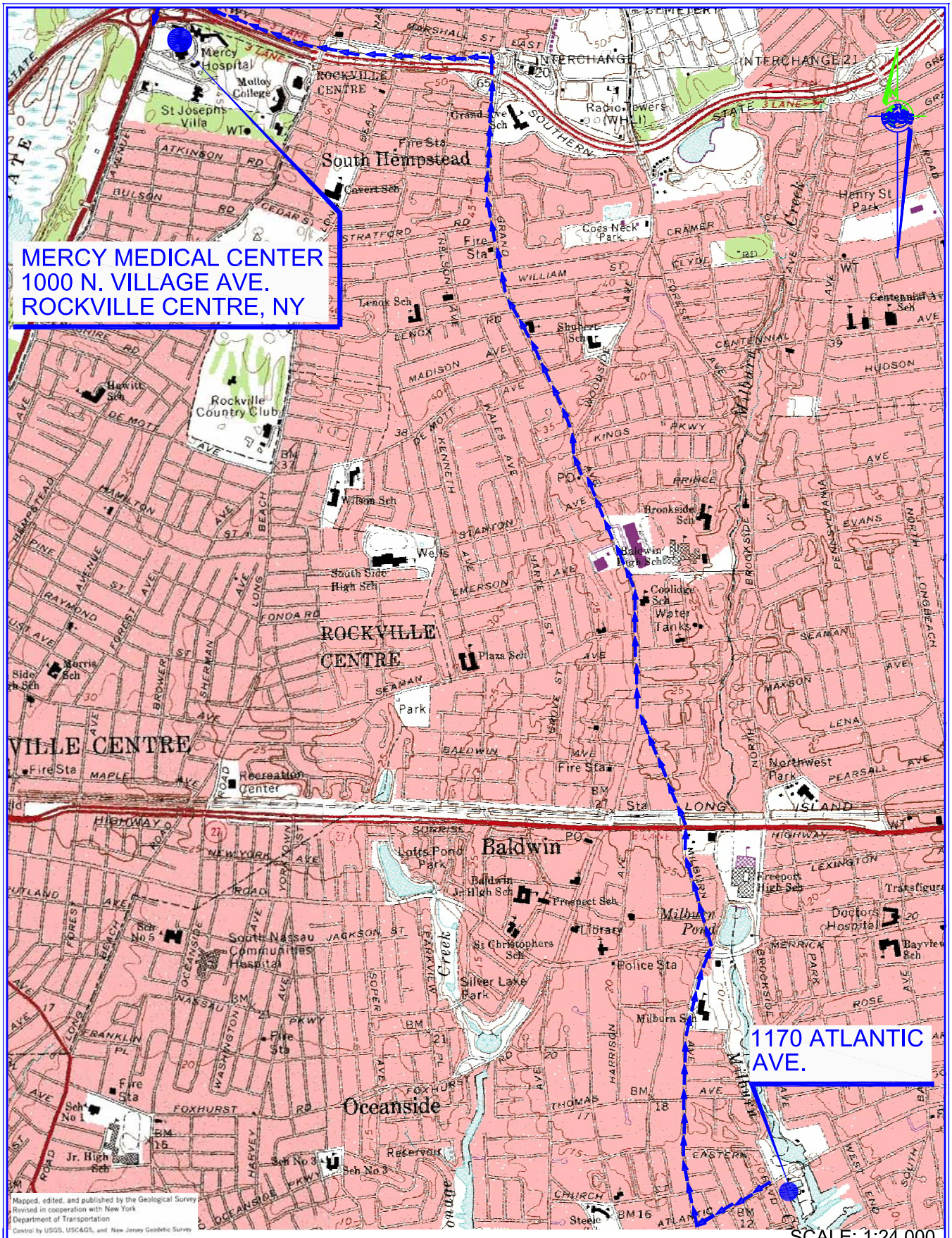
P.W. Grosser Consulting, Inc • P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7 • Bohemia, NY 11716 • Branch Location - Seattle, WA
PH 631.589.6353 • FX 631.589.8705 • www.pwgrosser.com

APPENDIX H

EMERGENCY TELEPHONE NUMBERS
HOSPITAL INFORMATION AND MAP
FIELD ACCIDENT REPORT

Emergency Telephone Numbers

General Emergencies	911
Nassau County Police	911
NYSDEC Spills Division	1-800-457-7362
NYSDEC Hazardous Waste Division	1-718-482-4994
Baldwin Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-340-4494
Health and Safety Officer	1-631-589-6353
Alternate Health and Safety Officer	1-631-589-6353



SCALE: 1:24,000

J:\Projects S-Z\SSS\1101\IRM\IRM Work Plan\CAD\Hospital Route Map.dwg (Layout1) Jun 13,2011-10:40am By: guzman

PWGC
Strategic Environmental & Engineering Solutions
630 Johnson Ave. Suite 7 Bohemia, N.Y. 11716-2618
Ph: 631 589-6353 Fx: 631 589-6705 E-mail: info@pwgroesser.com

HOSPITAL ROUTE MAP
1170 ATLANTIC AVENUE, BALDWIN TO
MERCY MEDICAL CENTER
1000 N. VILLAGE AVE., ROCKVILLE CENTRE, NY

Project: SSS1101	Figure No: 1
Designed by: JE	
Approved By: PWG	
Drawn By: LLG	Date: 6/13/11

PWGC
Strategic Environmental Engineering Solutions

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME: _____ PROJECT. NO.: _____

Date of Accident: _____ Time: _____ Report By: _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured: _____ DOB or Age _____

How Long Employed: _____

Names of Witnesses: _____

Description of Accident: _____

_____

_____

Action Taken: _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

_____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claims through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

_____

_____

_____

P.W. Grosser Consulting, Inc • P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Avenue, Suite 7 • Bohemia, NY 11716 • Branch Location - Seattle, WA
PH 631.589.6353 • FX 631.589.8705 • www.pwgrosser.com

ATTACHMENT C

Community Air Monitoring Plan

1170 ATLANTIC AVENUE
BALDWIN, NEW YORK 11510
VCP SITE #V00523

COMMUNITY AIR MONITORING PLAN

ON BEHALF OF:

Safeguard Self Storage
105 Maxess Road
Melville, NY 11747

PREPARED BY:

P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716
Phone: 631-589-6353
Fax: 631-589-8705

James P. Rhodes, Vice President JimR@pwgrosser.com
John D. Eichler, Project Manager JohnE@pwgrosser.com

PWGC Project Number: SSS1101

REVISED AUGUST 2011

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 Regulatory Requirements 1
2.0 AIR MONITORING 2
2.1 Real-Time Monitoring 2
2.1.1 Work Area 2
2.1.2 Community Air Monitoring Requirements 2
3.0 VAPOR EMISSION RESPONSE PLAN 4
4.0 MAJOR VAPOR EMISSION RESPONSE PLAN 5
5.0 VAPOR SUPPRESSION TECHNIQUES 6
6.0 DUST SUPPRESSION TECHNIQUES 7
7.0 DATA QUALITY ASSURANCE 8
7.1 Calibration 8
7.2 Operations 8
7.3 Data Review 8
8.0 RECORDS AND REPORTING 9

TABLES

Table 1-1 Frequency and Location of Air Monitoring
Table 1-2 Real-Time Air Monitoring Action Levels

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in remedial activity) from potential airborne contaminant releases resulting from remedial activities at the Safeguard Self Storage facility in Baldwin, New York.

Action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

The primary concerns for this site are VOCs and dust particulates.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan: This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air.

- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

The following sections contain information describing the types, frequency and location of real-time monitoring.

2.1 Real-Time Monitoring

This section addresses the real-time monitoring conducted within the work area, and along the site perimeter, during intrusive activities such as drilling, excavation, product recovery, manipulation of soil piles, extraction of sheet piling, etc.

2.1.1 Work Area

The following instruments shall be used for work area monitoring:

- Photoionization Detector (PID)
- Dust Monitor

Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. **Table 1-2** lists the Real-Time Air Monitoring Action Levels to be used in work areas.

2.1.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air quality monitoring shall be performed at several locations around the site perimeter before investigation activities begin. Air monitoring shall be continued periodically in series during work activities.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor or equivalent. Air will be monitored for site-related VOCs with a MiniRae 2000 photoionization detector (PID) with an 11.7 eV lamp. **Table 1-1** presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. **Table 1-2** lists the Real-Time Air Monitoring Action Levels to be used in work areas. Air monitoring data shall be documented in a site log book by the designated site safety officer. PWGC's site safety officer or delegate shall calibrate and maintain air monitoring instruments in accordance with manufacturer's specifications. Instruments shall be zeroed daily and checked for accuracy and a daily log shall be kept. If additional air monitoring is required, protocols shall be appended to this plan.

TABLE 1-1
FREQUENCY AND LOCATION OF AIR MONITORING

ACTIVITY	AIR MONITORING INSTRUMENT	FREQUENCY AND LOCATION
Drilling, Excavation	PID, Dust Monitor	Continuous in Breathing Zone (BZ) during intrusive activities or if odors become apparent, screening in the BZ every 30 minutes during non-intrusive activities; Continuous at downwind site boundary with a 15 minute running average

TABLE 1-2
REAL-TIME AIR MONITORING ACTION LEVELS

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
PID	Breathing Zone	0-25 ppm, non-transient	None	Exposure below established exposure limits
PID	Breathing Zone	25-100 ppm, non-transient	Don APR	Based on potential exposure to VOCs
PID	Breathing Zone	>100 ppm, non-transient	Don ASR or SCBA, Institute vapor/odor suppression measures, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas.
PID	Work Area Perimeter	< 5 ppm	None	Exposure below established exposure limits.
PID	Work Area Perimeter	> 5 ppm	Stop work and implement vapor release response plan until readings return to acceptable levels, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas
Aerosol Monitor	Work Area Perimeter	>100 but < 150 µg/m^3 for 15 minutes	Institute dust suppression measures, Notify HSM.	Work to continue if particulate concentrations remain below 150 µg/m^3
Aerosol Monitor	Work Area Perimeter	>150 µg/m^3	Don ASR or SCBA, Institute dust suppression measures, Notify HSM.	Stop work and implement dust suppression techniques until readings return to acceptable levels, Notify HSM.

3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for Community Air Monitoring Plan - Ground Intrusive Activities.

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities shall be halted and monitoring continued. Vapor suppression measures can also be taken at this time. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- Organic vapor levels 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If organic vapor levels exceed 25 ppm at the perimeter of the work area, work activities shall be halted. When work is halted, downwind air monitoring as directed by the Site Health & Safety Officer (SHSO) shall be implemented to determine whether vapor emission may impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan Section.

4.0 MAJOR VAPOR EMISSION RESPONSE PLAN

If organic vapor levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, work activities shall be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic vapor levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality shall be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source (see Section 5.0) are unsuccessful and if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed in effect if organic vapor levels are greater than 10 ppm above background.

Upon activation, the following activities shall be undertaken:

1. Emergency Response Contacts, as identified in the Health & Safety Plan, shall go into effect.

2. The local police authorities shall be contacted immediately by the Health & Safety Officer and advised of the situation.

3. Frequent air monitoring shall be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Health & Safety Officer.

5.0 VAPOR SUPPRESSION TECHNIQUES

Vapor suppression techniques shall be employed when action levels warrant their use. Techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation should include one or more of the following:

- cover with plastic
- cover with "clean soil"
- application of hydro-mulch material*
- limit working hours to favorable wind and temperature conditions

*This material is a seedless version of the hydro-seed product commonly used by commercial landscaping contractors to provide stabilization and rapid grow-in of grasses or wild flowers along highways, embankments and other large areas. Hydro-mulch can be sprayed over open excavation areas, temporary stockpile areas and loaded trucks, as necessary. This is a highly effective method for controlling odors, because the release of odors is sealed immediately at the source.

6.0 DUST SUPPRESSION TECHNIQUES

Reasonable dust-suppression techniques shall be employed during work that may generate dust, such as excavation, grading, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

Using atomizing sprays should prevent overly wet conditions, conserve water, and offer an effective means of suppressing fugitive dust. It is imperative that utilizing water for suppressing dust not create surface runoff.

7.0 DATA QUALITY ASSURANCE

7.1 Calibration

Instrument calibration shall be documented in the designated field logbook. Instruments shall be calibrated before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

7.2 Operations

Instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment shall be maintained on-site by the field team leader for reference.

7.3 Data Review

The Field Team Leader shall interpret monitoring data based on **Table 1-2** and his/her professional judgment. The field team leader shall review the data with the project manager to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with sample documentation shall be periodically reviewed by the project manager.

8.0 RECORDS AND REPORTING

Readings shall be recorded and available for review by personnel from NYSDEC and NYSDOH. Should any of the action levels be exceeded, the NYSDEC Division of Air Resources shall be notified in writing within five (5) working days.

The notification shall include a description of the control measures implemented to prevent further exceedances.