

CORNERSTONE SITE B-1

3100 THIRD AVENUE

BRONX, NEW YORK

Remedial Action Work Plan

NYSDEC BCP Number: C203044

Prepared for:

CS Melrose Site B LLC 1865 Palmer Avenue Suite 203 Larchmont, New York 10538

Prepared by:

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DECEMBER 2007; REVISED MAY 2009; 2ND REVISION JUNE 2009

CERTIFICATIONS

I, Stephen J. Osmundsen, am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for Cornerstone Site B1 (NYSDEC BCA Index No. W2-1126-08-10 Site No. C203044).

I certify that the Site description presented in this RAWP is identical to the Site descriptions presented in the Brownfield Cleanup Agreement for Cornerstone Site B-1 and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls, Engineering Controls, and plans for all operation and maintenance requirements applicable to the Site and provision for development of an Environmental Easement to be created and recorded pursuant ECL 71-3605 if Track 1 is not achieved. This RAWP requires that all affected local governments, as defined in ECL 71-3603, will be notified that such Easement has been recorded. This RAWP requires that a Site Management Plan must be submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, for approval by the Department if Track 1 is not achieved.

I certify that this RAWP has a plan for transport and disposal of all soil, fill, fluids and other material removed from the property under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that this RAWP has a plan for import of all soils and other material from off-Site and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify that that this RAWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, odor and vapor suppression plan and that such plan is sufficient to control dust, odors and vapors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

056136

NYS Professional Engineer #

Tune 15 Signature Date



It is a violation of Article 130 of New York State Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

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LIST OF ACRONYMS

Acronym	Definition
BCA	Brownfield Cleanup Agreement
ВСР	Brownfield Cleanup Program
САМР	Community Air Monitoring Plan
CP Plan	Citizen's Participation Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
DSAM	Division of Solid & Hazardous Materials
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Accreditation
	Program
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
NYCRR	New York Codes Rules and Regulations
NYSDEC	New York State Department of Environmental
	Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
PCBs	Polychlorinated Biphenyls
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
SCGs	Standards, Criteria, and Guidance
SCOs	Soil Cleanup Objectives
SMP	Site Management Plan
SOMP	Soil/Materials Management Plan
SVOCs	Semi-volatile Organic Compounds
SSD	Sub Slab Depressurization

Acronym	Definition
SWPPP	Storm-Water Pollution Prevention Plan
TAL	Target Analyte List
TOGS	Technical and Operational Guidance Series
USGS	United States Geological Survey
VOCs	Volatile Organic Compounds
QAPP	Quality Assurance Project Plan

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EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

Cornerstone Site B-1 is located at 3100 Third Avenue, which is in the Melrose section of the Bronx, NY (hereinafter referred to as the 'Site'). The Site is being redeveloped by CS Melrose Site B LLC, the BCP Volunteer, and has been assigned Brownfield Cleanup Program (BCP) ID number C203044. The Volunteer was accepted into the BCP on October 28, 2008 and the Brownfield Cleanup Agreement (BCA) was executed on December 18, 2008.

The Site is improved with a single story building with a basement totaling 7,613 square feet. The Site is located on the northeast corner of the intersection of East 158th Street with Third Avenue and spans westward. The Site is located in an urban setting and is currently zoned residential (R8) with a C1-4 overlay. Legally, the Site is designated as Block: 2364, Lot: 45. New York City Department of Housing Preservation and Development (NYCDHPD) have owned the Site since January 1999 when it was acquired through condemnation as part of the Melrose Commons Urban Renewal Plan. As part of the redevelopment plans for the Site, CS Melrose Site B LLC plans to purchase Block: 2364; Lot 45 from NYCHPD. A Site Location Map is included as Figures 1A and 1B. A Site Plan is included as Figure 2. The metes and bounds of the Site are enclosed as Appendix A.

Records indicate that the Site was originally developed circa 1951 with a single story building that included a basement. The building was initially occupied as a store, upholstery business and an undertaker. In 1969, the southwestern portion of the structure was occupied by a dry cleaner. A small medical center or clinic was added in 1989 which operated concurrently with the dry cleaner. The Site is currently unoccupied. Surrounding property uses include a vacant lot, residences, a church, a school, a public park and commercial shops.

There appears to have been releases of perchloroethylene (PCE) or dry cleaning fluid to the basement of the former dry cleaner which resulted in elevated concentrations of this chemical in the soil vapor and groundwater below the Site. In addition, mercury, silver, and lead were

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detected in the soil beneath the basement of the building above Part 375 Unrestricted Use Soil Cleanup Objectives (SCOs) (Ref. 1).

Summary of the Remedial Investigation

The Site is approximately 27 to 30 feet above mean sea level and slopes gently toward the northwest. Surficial geologic materials are characterized as ground moraine and/or historic fill consisting of brown sand, silt, clay, gravel and domestic debris. The bedrock underlying the Site is comprised of the Inwood Marble. During the monitoring well drilling program, the bedrock was observed to be a massive, creamy white marble formation. A geologic column is included on Figure 9. Where encountered, the soil above the bedrock was relatively sandy and transmits water. Very few fractures were noted during the bedrock drilling program and the rock was observed to have very low water transmitting properties. The regional direction of groundwater flow is believed to be to the south and towards the confluence of the Harlem and East Rivers. The water level elevations in the Site wells were erratic and are believed to reflect the accumulation of rainfall infiltration into the wells after storm events.

During the Summer and Fall of 2007 and in April 2009, a Remedial Investigation (RI) was performed (Ref. 2). The RI was conducted at the Site (Lot 45) as well as at its adjacent lots (Lot 49 and 70). All three lots (45, 49, and 70) are referred to as the "Study Area". The RI included the installation of five groundwater monitoring wells, 17 soil vapor points and numerous soil samples. Three media of concern were identified within the Study Area during the RI, these are: soil; soil vapor; and groundwater.

o Soil

VOCs – Several VOCs were detected in the soils within the Study Area. PCE was detected in soil samples collected below the basement floor of the building at concentrations ranging from 3.6 to 49 ug/kg. Detections of methyl ethyl ketone (a.k.a. 2-butanone and MEK) and acetone were also recorded. None of these

detections, however, exceeded the Part 375 Unrestricted Use SCOs or the NYSDEC TAGM. The results of the soil sample analysis are included on Figures 4A through 4D.

SVOCs – Numerous SVOCs were detected in the soils within the Study Area. The compounds that exceeded the Part 375 Unrestricted Use SCOs and/or NYSDEC TAGM were benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene.

Metals – Several metals were detected in the subsurface soils within the Study Area. Of these occurrences, the detections of barium, cadmium, calcium, copper, magnesium, lead, mercury, silver, and zinc in the soils within the Study Area exceeded the Part 375 Unrestricted Use SCOs and/or NYSDEC TAGM.

Pesticides – Several pesticides were detected in the soils within the Study Area. These included dieldrin, endrin, endosulan sulfate, DDE, DDD, and DDT. Of these, dieldrin exceeded the Part 375 Unrestricted Use SCOs and TAGM in the shallow, 0 to 1 foot deep samples only. The pesticides dieldrin, 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT exceeded Part 375 Unrestricted Use SCOs throughout the Study Area.

PCBs – There were two detections of PCBs, Aroclors 1242 and 1254 within the Study Area. Neither of these exceeded the NYSDEC TAGM; however, the detection of Aroclor 1242 exceeded the Part 375 Unrestricted Use SCOs.

Soil vapor

The results of the RI confirm that the soil vapor within the Study Area has been impacted with VOCs. PCE was detected in all seven of the sub-slab soil vapor points below the existing building at concentrations exceeding 1.3 ug/m^3 , the mean value of

VOCs in air of fuel oil heated homes. Numerous other VOCs including acetone, MEK, trichloroethylene, toluene and xylene were detected at concentrations in excess of the NYSDOH's mean values for indoor air. The results of the soil vapor sample analysis are included on Figures 7, 8 and Tables 7, 8, and 16.

o Groundwater

VOCs – Two VOCs, PCE and chloroform, were detected above NYSDEC TOGS groundwater standards in the monitoring wells installed and sampled in the Study Area.

Metals – There were five metals that exceeded NYSDEC TOGS groundwater standards in the Study Area; iron, magnesium, manganese, selenium, sodium, and thallium. The results of the groundwater sample analysis are included on Figure 10.

Qualitative Human Health Exposure Assessment

Based upon this analysis, there are currently no existing exposure pathways from contaminated surface and subsurface soil, fill and groundwater to on-Site receptors under existing conditions. However, there is an existing potential exposure pathway from soil vapor emanating from contaminated groundwater and soil to the indoor air of nearby structures. The potential for this exposure pathway will be decreased in the future as the contaminated on-Site soils are removed during redevelopment of the Site.

As a result of future on-Site construction activities, there is a potential pathway for exposure to on-Site construction workers. However, this can be controlled by employing proper health and safety procedures during construction.

There are also future potential exposure pathways to future adult and child residents of the proposed new building. Implementation of a NYSDEC-approved RAWP including the incorporation of a vapor barrier, sub-slab depressurization system and/or ventilated parking structure into the proposed new building would eliminate the pathway of soil vapor intrusion. By properly employing remedial measures and engineering and/or institutional controls, the occupants of the completed structure will not be subject to the accumulation of vapors within the planned structures. In addition, by employing engineering and institutional controls such as the vapor barrier, sub-slab depressurization system, and/or ventilated parking garage, dermal contact or inhalation of vapors associated with subsurface soils and/or groundwater underneath the building are eliminated.

Summary of the Remedy

Based on the Evaluation of Remedial Alternatives presented in this document, Alternative 2 (which will achieve Track 4 SCOs with a Track 2 contingency) is the selected remedy for this Site. Details of this Alternative are presented below:.

- Collection of additional soil waste characterization samples as needed to profile the soil/fill for disposal purposes. A waste disposal facility will be selected based on the data that has been collected to date. Based on the requirements of the selected facility, additional soil/fill samples will be collected and analyzed as needed to obtain soil disposal facility approval.
- 2. Excavation of soil/fill to 12.5 feet below grade Site-wide to install the foundation of the proposed structure. The excavation for the proposed new building's foundation is expected to remove all soil/fill exceeding the Track 4 Site Specific Soil Action Levels established for this Site (or Track 2) and soil vapor source areas at the Site. In the event the soil at 12.5 feet below grade does not meet the Site Specific Soil Action Levels, the soil excavation will continue past 12.5 feet

below grade until the Site Specific Soil Action Levels are achieved or bedrock is encountered;

- 3. Screening for indications of contamination (by visual means, odor, and monitoring with a PID) of all excavated soil during any intrusive Site work;
- Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of the Track 4 Site Specific Soil Action Levels developed for this Site (or Track 2);
- Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
- 6. Removal of three ASTs in accordance with applicable regulations;
- 7. A Pre-Design Groundwater Investigation (Ref. 10) will be performed at the Site after the building has been demolished. A Pre-Design Investigation Work Plan will be submitted to the NYSDEC as a separate document. If the groundwater quality below the Site exceeds the NYS groundwater standard for PCE, a separate Groundwater Investigation and Remediation Design Report will be submitted to the NYSDEC. Construction of the new building above grade that would impede implementation of a potential groundwater remedy will not commence until the Pre-Design Investigation is completed and the design for the groundwater remedy (if needed) is approved. If the analytical results from the groundwater interface samples comply with New York State drinking water standards, then no further action with respect to the groundwater interface will be required. In addition, if no water bearing rock fractures are encountered during the installation of the proposed new well MW-2A (see Figure 1 in Ref. 10), then no further action will be required with respect to groundwater located within bedrock. If any VOC

detection from the on-Site groundwater interface sampling analytical results exceeds the groundwater standards, then the VOC will be added to the list of Site Specific Soil Action Levels (if not already on the list), using the protection of groundwater value in Table 375-6.8b of 6 NYCRR.

- 8. It is noted that during redevelopment, any wells approved for abandonment will be abandoned per NYSDEC guidance using imported sand and bentonite. In addition, during abandonment, two to three well volumes of water from the respective monitoring well will be removed.
- 9. Construction and maintenance of an engineered composite cover consisting of concrete sidewalks, new building foundations, vapor barrier, and/or a ventilated parking garage, to prevent human exposure to residual contaminated soil/fill remaining under the Site. This cover will encompass the entire footprint of the Site. No exposed soils will remain.
- 10. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site (a copy of the Environmental Easement will be provided in the Site Management Plan);
- 11. As a contingency, a vapor barrier and a Sub-Slab Depressurization (SSD) system will be incorporated below the foundation of the building in addition to a ventilated parking garage as illustrated on Figures 16 and 17. The SSD system will consist of horizontal trenches filled with perforated pipe. The horizontal pipes will be connected to vertical risers that extend above the roof of the building. Any pipe penetrations through the vapor barrier will be sealed in accordance with the manufacturer's recommendations. The SSD fans will be mounted above the roof. The vapor barrier specifications are enclosed as

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Appendix G. It is noted that there will be no residential units in the subsurface portion of the building.

- 12. Collection and analysis of post-remedial groundwater samples from the wells that are to be installed as part of the Pre-Design Investigation as well as off-Site wells MW-3 and MW-4 to evaluate the performance of the remedy.
- 13. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for:(1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;
- 14. If required, import of materials to be used for backfill and cover in compliance with: (1) 375-6.7(d) of 6NYCRR and (2) all Federal, State and local rules and regulations for handling and transport of material;
- 15. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. Any deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the Final Engineering Report (FER).

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

CS Melrose Site B, LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC), in December 2008, to remediate an approximately 7,613 square foot lot located at 3100 Third Avenue in the Bronx New York. The approximately 7,613 square foot lot is currently improved with a vacant building. CS Melrose Site B LLC is a Volunteer in the Brownfield Cleanup Program. Residential and commercial use is proposed for the Site. When completed, the Site will contain a 107-unit affordable housing building with retail shops and community facilities that will span the Site as well as two adjacent lots. Refer to the Brownfield Cleanup Program (BCP) application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between June and October 2007, and April 2009. It provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have determined that this Site does pose a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

A formal Remedial Design document will be prepared. The Pre-Design Investigation Work Plan was submitted to NYSDEC on May 1, 2009 (Ref. 10). The Draft Remedial Design Report will be submitted on or about July 15, 2009.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located in the County of the Bronx, New York and is identified as Block: 2364, Lots: 45 on the Borough of the Bronx Tax Map. A United States Geological Survey (USGS) topographical quadrangle Site Location Map (Figure 1A) shows the Site location. In addition, Figure 1B shows the Site location on an Aerial photograph. The Site is situated on an approximately 7,613 square foot area bounded by a vacant lot to the north, East 158th Street to the south, a vacant lot to the east, and Third Avenue to the west (see Figure 2 – Site Plan). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 7,613 square foot Site is fully described in Appendix A – Metes and Bounds. A global positioning system coordinate for the starting point was not yet available.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan.

The proposed project, "La Terraza", will transform the Site as well as two adjacent lots into one new 8-story affordable residential building. The gross square footage of the proposed project is approximately 138,556 square feet. The proposed project will create a total of 106 units of low-income rental housing in the Melrose section of the Bronx plus one unit for a superintendent. The project will provide ground level retail, community space and a shared private courtyard for residents. There will be approximately 41 spaces of below grade ventilated parking available to rent. A Site Plan of the proposed redevelopment is enclosed as Figures 3A-3C.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is currently zoned residential (R8) with a C1-4 overlay that is immediately surrounded by residential (R7-2 and R-8), commercial (C4-4), and manufacturing (M1-1) zones. A 2008 Zoning change included removing the C1 overlay along Brook Avenue, changing the zoning to R8 with a C1 overlay to a depth of 100 feet from Third Avenue, and R8 on the remainder of the lot.

Specific neighboring property usage is outlined below:

North: Vacant Lot followed by Commercial Stores

South: E. 158th Street and a NYC Parks and Recreation Playground (Across E. 158th Street)

East: Vacant Lot followed by Brook Avenue

West: Third Avenue, La Puerta De Vitalidad Apartment Building (Across Third Avenue)

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with NYSDEC's DER-10. The investigation was conducted between June and October 2007, and in April 2009. The RI Report was submitted to NYSDEC in November 2007 and revised in April 2009 (Ref. 2).

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

The RI was conducted at the Site (Lot 45) as well as at its adjacent lots (Lot 49 and 70). All three lots (45, 49, and 70) are referred to as the "Study Area". The goals of this Investigation were: characterization of the surface and subsurface; identification of the sources of contamination, migration pathways, and actual or potential receptors; evaluation of the actual and potential threats to public health and the environment; and production of data of sufficient quantity and quality to support the evaluation of proposed remedial alternatives.

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The field activities were focused to determine the nature and extent of soil, soil vapor and groundwater contamination at the Site as well as at two adjacent lots to obtain the necessary information needed to prepare a RAWP that addresses the soil, soil vapor, and groundwater issues in a manner compatible with Site redevelopment.

The initial rounds of sampling at the Study Area were performed with the intention of completing a Phase II Environmental Site Assessment for property transfer purposes. As the results of the initial samples were received, the Volunteer decided to pursue an application for acceptance into the NYSDEC's BCP. The RI was prepared as part of the BCP process.

The Scope of Work of the RI included:

- Sub-slab and Exterior Soil Sampling and Analysis;
- Sub-slab and Exterior Soil Vapor Sampling and Analysis;
- Monitoring Well Installation, Surveying, Sampling and Analysis; and
- Report Preparation.

2.1.1 Soil Sampling

Soil samples were collected on three occasions as part of this RI. Soil boring logs are enclosed in Reference 2.

June 7, 2007 – On this date, four soil samples were collected for the analysis of VOCs via EPA method 8260. The location of the samples was focused to determine if PCE from the former dry cleaning operation at the Site had been released to the underlying soils. Three samples of the soil underlying the concrete floors of the basement were collected using a hammer drill and hand auger. One soil sample was also collected from the rear yard of the dry cleaner (Lot 70). The locations of these samples, identified as SB-1, SB-2, SB-3 and SB-4, are illustrated on Figure 3 of Ref. 2. The soil samples were immediately placed on ice and submitted to Ecotest Laboratories of North Bablyon, New York. PCE was detected in the soil samples at

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concentrations ranging from no detection to 11 ug/kg. The results are summarized on Table 1 of this Report.

September 7, 2007 – A sampling crew returned to the Study Area on this date and collected additional soil and soil vapor samples (The soil vapor samples are discussed in the next section). Two interior samples and one exterior sample were collected and identified as SVB-06, SVB-09 and SVB-11. The soil samples were immediately placed on ice and submitted to Ecotest Laboratories of North Bablyon, New York. The analysis of these samples, which included VOCs via EPA method 8260, revealed PCE at concentrations ranging from no detection to 49 ug/kg. These results are summarized on Figures 7 and 8 and Table 1.

October 10, 2007 – A total of two interior and 14 exterior soil samples were collected on this date via a Geoprobe[™] 6610DT direct push drilling machine. During this sampling round, the following samples were also collected for QA/QC purposes: 1 trip blank, 1 field blank, 1 duplicate sample, 1 matrix spike and 1 matrix spike duplicate. The two interior samples and 10 of the 14 exterior samples were submitted to Mitkem Laboratories (a CLP laboratory) of Rhode Island for analysis for of the full parameter list included in the CEQR Technical Manual which includes (VOCs) via EPA method 8260, (SVOCs) via EPA method 8270, pesticides via EPA method 8081, PCBs via EPA method 8082, and 23 TAL metals. Four of the 14 exterior samples, collected from the upper one foot of soil in the rear yard (Lot 70), were analyzed for pesticides only. The results of these analyses indicated that the VOCs PCE, methyl ethyl ketone and acetone were detected. In addition, elevated levels of the SVOCs benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene were also detected. The metals barium, cadmium, calcium, copper, magnesium, lead, mercury, silver, and zinc were also detected in elevated concentrations as were the PCB Aroclor 1242 and the pesticides 4,4'-DDE, 4,4'-DDD, 4,4'-DDT. The locations of these samples are illustrated on Figures 4A - 4D and the results are summarized on Tables 2-6. A qualified third-party Data Validator reviewed the soil laboratory data and a Data Usability Summary Report (DUSR) was prepared. A complete copy of the validated soil data package is enclosed as Appendix C of Ref. 2.

2.1.2 Soil Vapor Probe Installation and Sampling

Soil vapor samples were collected on three occasions as part of this RI. Construction details for the points are included in Reference 2.

September 7, 2007 – Two sub-slab soil vapor samples were collected from the southern portion of the basement. The temporary points, identified as SS-01 and SS-02, were constructed of stainless steel screens connected to new, 1/8-inch diameter polyethylene tubing in accordance with the NYSDOH 2006 Guidance for Evaluating Soil Vapor Intrusion (Ref. 3). The points were installed using a hammer drill and set in the ground with new, number 2 washed sand and a bentonite seal. The samples were collected using laboratory-issued SUMMA canisters set to collect a sample at a rate of less than 0.2 liters per minute and were submitted to Ecotest Laboratories of North Babylon, New York. The samples were analyzed for VOCs using EPA method TO-15. The location of the soil vapor points are displayed on Figures 7 and 8 and the results are presented on Table 7. Both of the September 2007 soil vapor samples detected elevated levels of PCE ranging from 3,528 to 5,903 ug/m3. Lower level detections of acetone, toluene and xylene were also detected in these samples.

October 11, 2007 – An additional 12 soil vapor samples were collected on this date. Two additional points -- identified as RIBAS-SV01 and SV02 -- were installed below the basement floor in the northern portion of the building. These points were also constructed of stainless steel screens connected to new, 1/8-inch diameter polyethylene tubing and completed with number 2 sand and a bentonite seal. Five soil vapor couplets, each consisting of a 5 foot and 15 foot deep sample point, were installed in the rear of the Study Area for a total of 10 points. The identification numbers for these samples are RI-SV-1S and 1D through RI-SV-5S and 5D. These were installed using a Geoprobe[™] direct push sampling device and constructed of six-inch stainless steel screens connected to new, 1/8-inch diameter polyethylene tubing and completed with number 2 sand and a bentonite seal. The 12 points were then sampled using laboratory-issued SUMMA canisters set to collect a sample at a rate of less than 0.2 liters per minute and were submitted to Mitken Laboratories of Rhode Island. The samples were analyzed

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for VOCs using EPA method TO-15. A qualified third-party Data Validator reviewed the soil vapor laboratory data and a DUSR was prepared. A complete copy of the validated soil vapor data package is included in Appendix C of Ref. 2. The location of the soil vapor points are displayed on Figures 7 and 8 and the results are presented on Table 8 of this Report.

The two interior soil samples contained PCE at 100 to 680 ug/m3. The trichloroethylene values ranged from 4.5 to 26 ug/m3. Acetone, MEK, toluene and xylene were detected at concentrations in excess of the NYSDOH's mean values for indoor air (Ref. 3).

April 15, 2009 – A final set of sub-slab vapor samples were collected along the perimeter of the building to represent the concentration of VOCs expected to migrate off-Site. The temporary points, identified as BCPSV-01 through 03 were constructed of stainless steel screens connected to new, 1/8-inch diameter stainless steel tubing in accordance with the NYSDOH 2006 Guidance document (Ref. 3). The points were installed using a hammer drill and set in the ground with new, number 2 washed sand and a bentonite seal. The samples were collected using laboratory-issued SUMMA canisters set to collect a sample at a rate of less than 0.2 liters per minute and were submitted to Ecotest Laboratories of North Babylon, New York. The samples were analyzed for VOCs using EPA method TO-15. The location of the soil vapor points are displayed on Figure 8 and the results are presented on Table 16. All of the April 2009 soil vapor samples detected elevated levels of PCE ranging from 26.46 to 882.05 ug/m3. The highest levels were recorded around the location of the former dry cleaner. Lower level detections of acetone, chloroform, ethyl benzene, methyl ethyl ketone, trichloroethene, toluene and xylene were also detected in these samples.

2.1.3 Monitoring Wells Installation and Sampling

A total of five monitoring wells were installed within the Study Area as part of the RI. Boring logs and construction details for the wells are included in Appendix_B of Ref. 2 and a well location map is included as Figure 5.

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June 26 through August 9, 2007 – Three monitoring wells -- identified as MW-1, 2 and 3 -- were installed during this time period using an air rotary drill rig equipped with an Odex drilling system. The geology of the Study Area presented difficult drilling conditions. A surface casing was advanced using the Odex system to the top of the bedrock surface. This varied across the Study Area from 14 feet to 34 feet below grade. Once the bedrock was encountered, which consisted of the Inwood Marble, a rotary, down-the-hole hammer bit was used to advance the boring. In some of the borings, groundwater was encountered in the soil above the bedrock surface. However, in others, the water table surface exists below the soil/bedrock interface. The wells were completed using new, four-inch diameter Schedule 40 PVC pipe and factory slotted well screens. The wells were constructed such that the well screens intersected both the water table interface and the soil/bedrock interface. The wells were completed with number 2 sand, a bentonite seal, and a locking, watertight plug. MW-2 and MW-3 were completed with locking manholes, while MW-1 was left above grade and covered with a metal standpipe.

October 10 through 12, 2007 – Monitoring wells MW-4 and 5 were installed during this time period. These boreholes were advanced using hollow stem augers from the ground surface to the top of the bedrock. From that point onward, a tri-cone roller bit attached to an air rotary drill rig was used to advance the borehole. The wells were again completed using new, four-inch diameter Schedule 40 PVC pipe and factory slotted well screens. The wells were constructed such that the well screens intersected both the water table interface and the soil/bedrock interface. The wells were completed with number 2 sand, a bentonite seal, and a locking, watertight plug. MW-5 was completed with a locking manhole, while the casing of MW-4 was left above grade and covered with a metal standpipe.

The Inwood Marble encountered during both well installation periods was massive and did not contain noticeable water producing fractures. Well MW-3 encountered the water table in the soil above the bedrock surface. This well yielded water readily upon completion. Well MW-2, however, encountered the bedrock surface above the water table. MW-1, MW-2, MW-4 and MW-5 are all low yielding and recover very slowly after pumping. These four wells (MW-1, MW-2 and MW-4 and MW-5) were initially dry, but fill with groundwater after rainfall events.

The wells were developed after completion using a submersible pump. Approximately one to two weeks after development, the wells were sampled using a pre-cleaned submersible pump and new polyethylene tubing.

The elevations of the tops of the well casings were surveyed by Montrose Surveying Co. upon completion. As shown on Figure 6, wells MW-1 and 3 have nearly similar water table elevations and display a southerly flow direction as would be expected based on regional information. The regional direction of groundwater flow is believed to be to the south and towards the confluence of the Harlem and East Rivers. The water level elevations in wells MW-2, MW-4 and MW-5 are more erratic and are believed to reflect the accumulation of rainfall infiltration into the well after storm events. As such, these water level measurements do not lend themselves to the creation of a water table map.

CA RICH collected depth-to-water measurements and groundwater samples from wells MW-1, MW-2 and MW-3 on August 24, 2007 and the complete network of five monitoring wells were sampled on October 25, 2007. Prior to sampling, at least three times the volume of water was removed from each well using new polyethylene tubing and a submersible pump. The submersible pump was decontaminated between sample collections by passing a laboratory grade detergent through the pump, followed by a fresh water scrub and a fresh water rinse. Gloves worn for sample handling were discarded between each sampling point.

After purging was complete, the samples were collected using pre-cleaned polyethylene disposal bailers. All groundwater samples were placed into laboratory-issued 40 mil glass vials, placed in a cooler on ice and delivered to the laboratory. The August 24, 2007 samples were submitted to American Analytical Laboratories of Farmingdale, New York for analysis of VOCs via EPA method 8260. The October 25, 2007 samples were submitted to Mitkem Laboratories of Rhode Island and were analyzed for VOCs using USEPA Method 8260, SVOCs using EPA Method 8270, pesticides, PCBs, and filtered and unfiltered TAL metals. The second round used NYSDEC ASP Category B deliverables. During the October 2007 sampling round, the following samples were also collected for QA/QC purposes: 1 trip blank, 1 field blank, 1

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duplicate sample, 1 matrix spike and 1 matrix spike duplicate. A qualified third-party Data Validator reviewed the groundwater laboratory data and a DUSR was prepared. A complete copy of the validated groundwater data package is included in Appendix C of Ref. 2.

The results from the August 2007 sampling revealed a PCE concentration of 2,300 ug/l in well MW-2, the well closest to the former dry cleaning facility. The results are summarized on Table 9 of this Report. The results of the October 2007 analyses again revealed an elevated concentration of PCE in well MW-2 of 7,900 ug/l. The metals iron, magnesium, manganese, selenium and sodium also exceeded NYSDEC TOGS groundwater standards (Ref. 4). There were no detections of pesticides, SVOCs or PCBs in the samples from the monitoring that exceeded groundwater standards. The results are summarized on Tables 10-15.

2.1.4 Summary of RI Findings

• The contaminants of concern at the Cornerstone B-1 Study Area include VOCs, SVOCs, the PCB Aroclor 1242, metals, and pesticides.

• The VOCs of concern were detected in soil, soil vapor and groundwater samples collected at the Site. These include: perchloroethylene (a.k.a. dry cleaning fluid) and its degradation products; other industrial solvents including, acetone, chloroform, trichloroethene, and methyl ethyl ketone; and a variety of petroleum related compounds such as benzene, toluene, ethylbenzene and xylene.

• Several SVOCs commonly referred to as polynuclear aromatic hydrocarbons or "PAHs" were detected throughout the Site at varying depths above NYSDEC TAGM and/or Part 375 Unrestricted Use SCOs. These compounds, however, were not detected above standards in the groundwater samples.

• Dieldrin exceeded the NYSDEC TAGM and Part 375 Unrestricted Use SCOs in the shallow, 0 to 1 foot deep samples only, and dieldrin, DDE, DDD, and DDT exceeded Part 375

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Unrestricted Use SCOs only in the 0-5 feet samples and the 10-15 feet samples; but were not detected in the groundwater samples.

• Select metals were detected in the soil samples above the NYSDEC TAGM and/or Part 375 Unrestricted Use SCOs. Lead and mercury were the most elevated of these detections. Manganese was the only one of these metals detected in the groundwater above NYSDEC TOGS standards.

• There were two detections of PCBs, Aroclors 1242 and 1254. Neither of these exceeded the NYSDEC TAGM; however, Aroclor 1242 exceeded the Part 375 SCOs. In addition, PCBs were not detected in the groundwater.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYSDOH has determined that this Site does pose a significant threat to human health and the environment.

2.3 SITE HISTORY

The history of the Site is described in the following sections.

2.3.1 Past Uses and Ownership

Although the Site is currently unoccupied, historical records indicate that Lot 45 was originally developed circa 1951 with a single story building with a basement. According to the Phase I Environmental Site Assessment (ESA), the building was occupied as a store, upholstery business and an undertaker. Circa 1969, the building was also developed as a Dry Cleaners and in 1989, the building operated as a Medical Center and a Dry Cleaners. Although the Site is currently unoccupied, the one-story building still exists.

2.3.2 Phase I and Phase II Reports

A Phase I ESA dated March 5, 2004 was prepared by Pressly and Associates, Inc. for the Site (Lot 45) as well as additional lots (Ref. 5). The Phase I ESA noted that past uses of the Site included a Dry Cleaner and an undertaker. The Phase I ESA concluded the following:

- A dry cleaner operated on the Site in and around the period between 1969 and 1989. The dry-cleaner was not identified in the RCRA database or spill files and probably pre-dated those databases. However, due to past experience with the poor housekeeping operations of these facilities, it was recommended that a groundwater investigation be conducted to evaluate the potential presence of dry cleaning solvents in the subsurface on the southern side of the building.
- All reported spills within 1/8 mile of the Site were of small volume and on land, therefore, not likely to impact the Site.
- Although medium radon levels were reported for Bronx County basements, the basement area is currently not occupied.

Based on the findings of the Phase I ESA, a RI was conducted for the Site (Ref. 2).

2.3.3 Sanborn Maps

All Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP. In addition, Sanborn Maps were reviewed and analyzed in Section 5.0 of the Phase I ESA dated March 5, 2004 (Ref. 5) prior to preparation of the RAWP. The Sanborn Maps are also attached to this RAWP as Appendix B. The following is the text from Section 5.0 of the Phase I ESA.

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Property maps and descriptions were obtained from Sanborn Insurance maps for the target site. The Site was depicted on a total of 6 maps from the period between 1909 and 1989. In 1909, the entire Site consisted of vacant land.

In 1951[,] ... Lot 45 was improved by a single story building divided into sections with a basement with addresses 3100 and 3104 Third Ave, and 481, 501, and 503 158th Street. The building included descriptions of a store, upholstery business, and an undertaker.

Between 1969 and 1979, the former upholstery space in the building on the [Property] was described as a Dry-Cleaners. The dry cleaner space could be under the addresses of 481 and 501 158th Street or 3100 Third Ave. In 1989, the building on the Property includes a Medical Center and a Dry-Cleaners.

2.4 GEOLOGICAL CONDITIONS

According to recent survey measurements, the Site is approximately 27 to 30 feet above mean sea level based on the Borough of the Bronx Datum. The on-site topography slopes gently toward the northwest.

The Site is located in the New England Upland Physiographic Region. Based on field observations and the New York State Museum and Science Service (Ref. 6) the bedrock underlying the Site is comprised of the Inwood Marble, a member of the Ordovician-Cambrian Wappinger and Stockbridge Groups. During the monitoring well drilling program, the bedrock was observed to be a massive, creamy white marble formation. Very few fractures were noted during the drilling program and the rock was observed to have very low water transmitting properties.

Surficial geologic materials are characterized as ground moraine and/or urban fill consisting of sand, silt, clay and gravel. Where encountered, underlying groundwater exists primarily in the overburden material as the Inwood Marble is massive and contains very few fractures.

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Groundwater in this area of the Bronx is not used for potable supply purposes. No potable groundwater resources appear to be threatened by local groundwater quality. A groundwater well location and water table elevation map is included as Figure 6. As shown on Figure 6, wells MW-1 and 3 have nearly similar water table elevations and display a southerly flow direction as would be expected based on regional information. The regional direction of groundwater flow is believed to be to the south and towards the confluence of the Harlem and East Rivers. The water level elevations in wells MW-2, MW-4 and MW-5 are more erratic and are believed to reflect the accumulation of rainfall infiltration into the well after storm events. A geologic section is shown in Figure 9.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

On-Site

The data indicates that there has been a release of PCE to the subsurface soils at the Site. This is demonstrated by the detections of PCE in the soil as well as in the soil vapor. The data also indicates that PCE soil exists below all portions of the existing building foundation that were tested, but is most concentrated below southern portion of the building which was formerly used as a dry cleaning facility. In addition, elevated levels of soil vapor acetone, MEK, toluene and xylene were measured throughout the Site. The levels of acetone and toluene may have been related to the Site once being occupied by an undertaker.

As rainwater infiltrates into the soils at the Site, some of the PCE has migrated into the groundwater. This condition is most evident in the down-gradient monitoring well MW-2, which is located adjacent to the former dry cleaner and the elevated PCE soil vapor readings.

Off-Site

The applicant for this project entered into the BCP as a Volunteer. As such, the Volunteer was only responsible for investigating on-Site issues. However, as the planned redevelopment for this Site also includes the two adjoining lots (49 and 70), the RI Study Area extended to these two lots as well.

Elevated levels of several SVOCs commonly referred to as polynuclear aromatic hydrocarbons or "PAHs" and select metals were detected throughout the Lots 49 and 70 at varying depths. There were also four pesticide detections above Part 375 Unrestricted Use SCOs. In addition, one Aroclor (1242) exceeded the Part 375 Unrestricted Use SCOs.

All monitoring wells installed during the RI are technically "off-Site". Two of the monitoring wells, MW-2 and MW-5, are located in the sidewalk of East 158th Street. These wells indicate that the PCE contamination of the local groundwater has migrated off-Site. In addition, four of the five monitoring wells had PCE concentrations exceeding NYSDEC TOGS groundwater standards. Chloroform was also detected above NYSDEC TOGS in three wells. The detections of Chloroform may be related to the Site's former usage as an undertaker. Select metals were also detected in the groundwater above drinking water standards.

2.5.2 Description of Areas of Concern

• Unrecorded historic spills

Based on the soil and soil vapor samples collected, there appears to have been releases of PCE (a.k.a.dry cleaning fluid) to the basement of the former dry cleaner located on the Site. PCE releases at dry cleaners typically occur as either separator water, bulk product or distillation sludge. The visual observations during the RI did not reveal which of these types of PCE releases occurred at the Site. A Field Technician will be on-Site during the excavation phase of this project and, if possible, will determine which of these types of releases occurred.

Above-Ground Storage Tanks

Three 275-gallon above-ground storage tanks (ASTs) were observed within the basement of the existing building. It appears that one of the ASTs contains liquid, one is empty, and the third is filled with sand. The approximate AST locations are shown on Figure 2. In addition, a fill port and vent pipe probably associated with the ASTs were observed on Third Avenue next to the Site building.

2.5.2.1 Contaminated Media

o Soil

VOCs – Several VOCs were detected in the soils below the Site as well as off-Site. PCE was detected in the soil samples collected below the basement floor at concentrations ranging from 3.6 to 49 ug/kg. Detections of methyl ethyl ketone (a.k.a. 2-butanone and MEK) and acetone were also recorded. None of these detections exceeded Part 375 Unrestricted Use SCOs (Ref. 1).

SVOCs – Numerous SVOCs were detected in the soils below the Site. None of these detections exceeded Part 375 Unrestricted Use SCOs (Ref. 1). Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene exceeded Part 375 Unrestricted Use SCOs in the off-Site soils.

Metals – Several metals were detected in the subsurface soils throughout the Site. Of these occurrences, the detections of lead, silver, and mercury in the soils underneath the building exceeded the Part 375 Unrestricted Use SCOs. Detections of barium, copper, lead, mercury, selenium, and zinc in the off-Site soils exceeded Part 375 Unrestricted Use SCOs.

Pesticides – Several pesticides were detected in the soils underlying the Site. None of these were detected above Part 375 Unrestricted Use SCOs. Detections of dieldrin, in the shallow, 0 to 1 foot off-Site soil samples only and 4,4'-DDD, 4,4'-DDE, 4,4'-DDT collected from the off-Site soil samples exceeded the Part 375 SCOs.

PCBs –No detections of PCBs on-Site. One detection of the PCB Aroclor 1242 exceeded the Part 375 Unrestricted Use SCOs in the off-Site soils.

• Soil vapor

The results of the RI confirm that the soil vapor below the Site has been impacted with VOCs. PCE was detected in all seven of the sub-slab soil vapor points below the existing building. Numerous other VOCs including acetone, trichloroethylene, MEK, toluene and xylene were detected at concentrations in excess of the NYSDOH's mean values for indoor air (Ref. 3).

Groundwater

VOCs – Two VOCs, PCE and chloroform, were detected above NYSDEC TOGS groundwater standards (Ref. 4) in the off-Site wells MW-1, MW-3 and MW-4.

SVOCs – There were no detections of SVOCs in the samples from the monitoring wells that exceeded NYSDEC TOGS groundwater standards.

Metals – There were six metals that exceeded NYSDEC TOGS groundwater standards in one or more the off-Site wells; iron, magnesium, manganese, selenium, sodium, and thallium.

Pesticides – No Pesticides were detected.

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PCBs – No PCBs were detected.

2.5.3 Identification of Standards, Criteria and Guidance

The concentrations of the media and contaminants of concern found at the Site were compared to the following standards or guidance values:

Soil Vapor – NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in NYS (Ref. 3);

Soil –6 NYCRR Part 375, Track 1 Unrestricted Use SCOs (Ref. 1).

Groundwater – Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, NYSDEC (Ref. 4).

2.5.4 Soil/Fill Contamination

In the on and off-Site areas that were tested, the soil displayed characteristics of historic fill. However, only the off-Site soil samples contained elevated levels of several SVOCs commonly referred to as polynuclear aromatic hydrocarbons or "PAHs" and select metals at varying depths. In addition, there were four pesticide detections in the off-Site soil samples above Part 375 Unrestricted Use SCOs. One PCB Aroclor (1242) also exceeded the Part 375 Unrestricted Use SCOs in the off-Site soils.

2.5.4.1 Summary of Soil/Fill Data

Based on the sampling data obtained to date, the on-Site soils at the Site are classified as nonhazardous regulated waste. Since the Site includes a former dry cleaner, "hot spots" of soil
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contaminated with elevated levels of PCE may be encountered as the excavation of the building foundation progress. The fill consists of brown medium grain sand to silty sand and gravel with pieces of brick. A summary of the chemical analysis of the fill is included in Section 2.5.2.1 and Tables 1-6 of this document.

2.5.4.2 Comparison of Soil/Fill with SCGs

The results of our evaluation of the laboratory data presented in the RI indicate that soil is a media of concern. The following compounds of concern were detected above the 6 NYCRR Part 375 Unrestricted Use SCOs in the on-Site soils.

	Highest	6NYCRR Part 375
Compounds	Detection	Track 1 – Unrestricted Use
Metals		
lead	219 mg/kg	63 mg/kg
mercury	0.26 mg/kg	0.18 mg/kg
silver	2.1 mg/kg	2 mg/kg

Based on this comparison to regulatory criteria, three metals exceed the SCOs for unrestricted use under 6 NYCRR Part 375 – Track 1. The metals appear to be linked to the historic fill conditions at the Site.

Tables 1-6 show exceedances from Track 1 Unrestricted SCOs for all soil/fill at the Site. Figures 4A-4D contain box plot maps that show the locations and summarize exceedances from Track 1 Unrestricted SCOs for all soil/fill.

2.5.5 On-Site and Off-Site Groundwater Contamination

On-Site

As rainwater infiltrates into the soils at the Site, some of the PCE has migrated into the groundwater. This condition is most evident in monitoring well MW-2, which is technically off-Site, but is located adjacent to the location of the former dry cleaner and the elevated PCE soil vapor readings.

Off-Site

All of the monitoring wells installed during the RI are technically "off-Site". Two of the monitoring wells, MW-2 and MW-5, are located in the sidewalk of East 158th Street. These wells indicate that the PCE contamination of the local groundwater has migrated off-Site. In addition, four of the five monitoring wells had PCE concentrations exceeding NYSDEC TOGS groundwater standards. Chloroform was also detected above NYSDEC TOGS in three wells. Select metals were also detected in the groundwater above drinking water standards.

2.5.5.1 Summary of Groundwater Data

Five off-Site monitoring wells were installed for this project. However, for the purpose of this RAWP, MW-2 is being considered an on-Site well. Therefore, the following compounds were detected in the groundwater at MW-2 during the October 2007 sampling round and compared to the regulatory guideline.

	Cornerstone E	Cornerstone B-1 RAWP December 2007; Revised April 2009		
	Highest	Groundwater standards		
<u>Compounds</u>	Detection	(TOGS)		
VOCs				
perchloroethylene	7,900 ug/l	5 ug/l		
Metals				
iron	1,210 ug/l	300 ug/l		
magnesium	112,000 ug/l	35,000 ug/l		
selenium	45.3 ug/l	10 ug/l		
sodium	340,000 ug/l	20,000 ug/l		
thallium	8.1 ug/l	4 ug/l		

The results of the groundwater samples indicate that elevated levels of PCE and select metals exist in the groundwater below the Site.

2.5.5.2 Comparison of Groundwater with SCGs

Five off-Site monitoring wells were installed for this project. However, for the purpose of this RAWP, MW-2 is being considered an on-Site well. Therefore, the following compounds were detected in the groundwater at MW-2 during the October 2007 sampling round and compared to the regulatory guideline.

	Highest	Groundwater standards
Compounds	Detection	(TOGS)
VOCs		
perchloroethylene	7,900 ug/l	5 ug/l

Metals

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iron	1,210 ug/l	300 ug/l
magnesium	112,000 ug/l	35,000 ug/l
selenium	45.3 ug/l	10 ug/l
sodium	340,000 ug/l	20,000 ug/l
thallium	8.1 ug/l	4 ug/l

The results of the groundwater samples indicate that elevated levels of PCE and select metals exist in the groundwater below the Site. A table that indicates exceedances from GA groundwater standards in monitor wells prior to the remedy is shown in Tables 9-15. A box plot map that indicates the location(s) of and summarizes exceedances from GA groundwater standards prior to the remedy is shown in Figure 10. The exceedances of PCE are linked to the Site's former use as a dry cleaning establishment. The metals are believed to be naturally occurring or a ramification of the historic fill conditions at the Site.

2.5.6 On-Site and Off-Site Soil Vapor Contamination

On-Site

The results indicate that perchloroethylene (a.k.a. dry cleaning fluid) and its degradation products exist in the subsurface soil vapor and are linked to the Site's former use as a dry cleaning establishment. Several other industrial solvents including, acetone, chloroform, trichloroethylene, and methyl ethyl ketone were also detected. A variety of petroleum related compounds such as benzene, toluene, ethylbenzene and xylene were detected as well. The levels of acetone and toluene may have been related to the Site once being occupied by an undertaker. The other compounds believed to be a ramification of the Site's historic fill condition.

Off-Site

The applicant for this project entered into the BCP as a Volunteer. As such, the RI and RAWP were both focused to address on-Site issues. However, as the redevelopment plans for the Site also include the adjacent two lots (49 and 70), soil vapor testing was conducted on these lots as well. The soil vapor results indicate that perchloroethylene and its degradation products exist in the subsurface soil vapor. In addition, several other industrial solvents including, acetone, chloroform, trichloroethylene, and methyl ethyl ketone were also detected. A variety of petroleum related compounds such as benzene, toluene, ethylbenzene and xylene were detected as well.

2.5.6.1 Comparison of Soil Vapor with SCGs

The following compounds of concern were analyzed in the on-Site soil vapor and the results compared to regulatory guidelines. The results were compared to the Mean VOCs in Air of Fuel Oil Heated Homes value as these vapors could potentially migrate into a new structure placed over the Site.

		Mean VOCs in
	Highest	Air of Fuel Oil
	Detection	Heated Homes
<u>Compounds</u>	Units: <u>ug/m³</u>	ug/m^3
VOCs		
perchloroethylene	5,903	1.3
trichloroethylene	46.21	0.4
1,2,4 Trimethylbenzene	20.17	4.8
1,2 Dichloroethane	0.78	0.1
1,3,5 Trimethylbenzene	6.39	3.7
1,4 Dichlorobenzene	26	3.7

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1,3 Dichlorobenzene	1.80	0.3
acetone	84	42
benzene	26.49	8.3
carbon tetrachloride	0.77	0.4
carbon disulfide	43.54	4.2
chloroform	876.60	0.9
cis-1,2-Dichloroethylene	9.92	0.3
cyclohexane	6.4	6.0
ethyl acetate	7.4	No Given Value
ethyl alcohol	39.54	610
ethylbenzene	268.96	3.7
freon 11	32	No Given Value
freon 12	4.2	No Given Value
heptane	15	No Given Value
hexane	17	No Given Value
m&p xylene	434.60	5.9
methylene chloride	12.51	17
methyl isobutyl ketone	15.58	8.4
methyl ethyl ketone	44.19	8.4
MTBE	56	13
o-xylene	43.03	3.8
p-ethyltoluene	18.66	No Given Value
styrene	7.0	No Given Value
tert. Butyl Alcohol	13.93	No Given Value
tetrahydrofuran	4.3	2.1
toluene	160	26
1,1,1-Trichloroethane	20.20	2
2,2,4-Trimethylpentane	20.17	No Given Value

22 compounds exceeded the Mean VOCs in Air of Fuel Oil Heated Homes. A table of soil vapor data collected prior to the remedy is shown in Tables 7 and 8. Box plot maps indicating the location(s) of and summarizes soil vapor data prior to the remedy is shown in Figures 7 and 8.

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

2.6.1.1 Introduction

As part of the BCP process, a Qualitative Exposure Assessment (EA) was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. For this EA, all available sampling data for the environmental media within the Study Area was reviewed to determine whether there is any health risk by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This EA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 7).

The five elements of an exposure pathway are: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future.

Land Use of the Cornerstone B-1 and Neighboring Properties - Current and Future Exposure Setting - The area immediately surrounding the Cornerstone B-1 Site is residential/commercial.

There are several housing developments, a church with a school, a police precinct, and retail units to the north, east and west of the Site. The property directly to the south is a public park/playground.

It is expected that the future use of the Cornerstone B-1 Site and adjoining properties would remain residential/commercial because the surrounding land use is currently residential/commercial and the area is zoned residential/commercial. The land use in the surrounding area is anticipated to remain residential/commercial since several new similar projects have recently been completed or are under construction in this neighborhood.

2.6.1.2 Contaminants of Concern

Based upon all of the background information and analytical detections in either soil, soil vapor or groundwater at the Study Area, the contaminants of concern are:

<u>VOCs</u> – These include PCE, (and its degradation products which are TCE, DCE and vinyl chloride), acetone, methyl ethyl ketone (MEK) and petroleum related compounds (benzene, toluene, ethylbenzene and xylene or "BTEX").

<u>SVOCs</u> – These include polynuclear aromatic hydrocarbons or "PAHs". The compounds that exceeded the NYSDEC TAGM and/or Part 375 Unrestricted Use SCOs include: benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene.

<u>Metals</u> – The metals barium, cadmium, calcium, copper, magnesium, lead, mercury, silver, and zinc exceeded NYSDEC TAGM and/or Eastern USA background levels and/or Part 375 Unrestricted Use SCOs.

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<u>Pesticides</u> – The pesticide dieldrin exceeded NYSDEC TAGM in shallow soils in the rear yard of the Site. The pesticides dieldrin, DDE, DDD, and DDT exceeded Part 375 Unrestricted Use SCOs throughout the Study Area.

<u>PCBs</u> – There were two detections of PCBs, Aroclors 1242 and 1254. Neither of these exceeded NYSDEC TAGM; however, Aroclor 1242 exceeded the Part 375 Unrestricted Use SCOs.

2.6.1.3 Regulatory Criteria

The concentrations of the media and contaminants of concern found at the Site were compared to the following standards or guidance values:

Soil Vapor - NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in NYS (Ref. 3);

Soil – The evaluation of data presented in sections 3 and 4 of this Report compared the soil results to the NYSDEC TAGM (Ref. 8) and 6 NYCRR Part 375 Unrestricted Use SCOs (Ref. 1). However, as part of the Study Area has been accepted into the BCP, the Qualitative Exposure Assessment will only use the 6 NYCRR Part 375, Unrestricted Use SCOs (Ref. 6) as the regulatory criteria.

Groundwater – Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, NYSDEC (Ref. 4).

2.6.1.4 Media of Concern

<u>Soil</u> – The results of our evaluation of the laboratory data presented in Section 2.5 indicates that soil is a media of concern. The following compounds of concern were detected above the Part 375 Unrestricted Use SCOs in the soils within the Study Area.

Highest	6NYCRR Part 375
Detection	<u>Track 1 – Unrestricted Use</u>
7,000ug/kg	1,000 ug/kg
7,300 ug/kg	1,000 ug/kg
8,500 ug/kg	1,000 ug/kg
4,100 ug/kg	800 ug/kg
6,900 ug/kg	1,000 ug/kg
4,600 ug/kg	500 ug/kg
1,200 ug/kg	330 ug/kg
	Highest <u>Detection</u> 7,000ug/kg 7,300 ug/kg 8,500 ug/kg 4,100 ug/kg 6,900 ug/kg 4,600 ug/kg 1,200 ug/kg

Metals

barium	802 mg/kg	350 mg/kg
copper	89.1 mg/kg	50 mg/kg
lead	2,700 mg/kg	63 mg/kg
mercury	1.1 mg/kg	0.18 mg/kg
silver	4.8 mg/kg	2 mg/kg
zinc	540 mg/kg	109 mg/kg

Pesticides

dieldrin	260 ug/kg	5 ug/kg
4,4'-DDE	370 ug/kg	3.3 ug/kg
4,4'-DDD	1,200 ug/kg	3.3 ug/kg
4,4'-DDT	78 ug/kg	3.3 ug/kg

PCBs

ug/kg 100 ug/kg

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Based on this comparison to regulatory criteria, seven SVOCs, six metals, one Aroclor, and four pesticides exceed the 6NYCRR Part 375 Unrestricted Use SCOs.

<u>Soil Vapor</u> – The results of the laboratory data indicate that soil vapor is a media of concern. The following compounds of concern were analyzed in the soil vapor below the Study Area and the results compared to the Mean VOCs in Air of Fuel Oil Heated Homes value as these vapors could potentially migrate into a new structure placed over the Site.

		Mean VOCs in
	Highest	Air of Fuel Oil
	Detection	Heated Homes
Compounds	Units: <u>ug/m³</u>	$\underline{ug/m^3}$
VOCs		
perchloroethylene	5,903	1.3
trichloroethylene	46.21	0.4
1,2,4 Trimethylbenzene	20.17	4.8
1,2 Dichloroethane	0.78	0.1
1,3,5 Trimethylbenzene	6.39	3.7
1,4 Dichlorobenzene	26	3.7
1,3 Dichlorobenzene	1.80	0.3
acetone	84	42
benzene	26.49	8.3
carbon tetrachloride	0.77	0.4
carbon disulfide	43.54	4.2
chloroform	876.60	0.9
cis-1,2-Dichloroethylene	9.92	0.3
cyclohexane	6.4	6.0
ethyl acetate	7.4	No Given Value

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ethyl alcohol	39.54	610
ethylbenzene	268.96	3.7
freon 11	32	No Given Value
freon 12	4.2	No Given Value
heptane	15	No Given Value
hexane	17	No Given Value
m&p xylene	434.60	5.9
methylene chloride	12.51	17
methyl isobutyl ketone	15.58	8.4
methyl ethyl ketone	44.19	8.4
MTBE	56	13
o-xylene	43.03	3.8
p-ethyltoluene	18.66	No Given Value
styrene	7.0	No Given Value
tert. Butyl Alcohol	13.93	No Given Value
tetrahydrofuran	4.3	2.1
toluene	160	26
1,1,1-Trichloroethane	20.20	2
2,2,4-Trimethylpentane	20.17	No Given Value

The results indicate that perchloroethylene (a.k.a. dry cleaning fluid) and its degradation products exist in the subsurface soils and vapor. Several other industrial solvents including, acetone, chloroform, and methyl ethyl ketone were also detected. A variety of petroleum related compounds such as benzene, toluene, ethylbenzene and xylene were detected as well. 22 compounds exceeded the Mean VOCs in Air of Fuel Oil Heated Homes.

<u>Ground Water</u> – Five monitoring wells were installed within the Study Area. The following compounds were detected in the groundwater during the October 2007 sampling round and compared to the regulatory guideline.

	Highest	Groundwater standards
Compounds	Detection	(TOGS)
VOCs		
perchloroethylene	7,900 ug/l	5 ug/l
chloroform	24 ug/l	5 ug/l
Metals		
iron	1,220 ug/l	300 ug/l
magnesium	112,000 ug/l	35,000 ug/l
manganese	1,170 ug/l	300 ug/l
selenium	49.8 ug/l	10 ug/l
sodium	340,000 ug/l	20,000 ug/l
thallium	8.7 ug/l	0.5 ug/l

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The results of the groundwater samples indicate that elevated levels of PCE exist in the groundwater below the Study Area. The PCE concentrations exceeded groundwater standards in four of the five wells installed. Chloroform, which was detected at much lower concentrations, exceeded the groundwater standards in three of the five wells that were sampled. Six naturally occurring metals also exceeded groundwater standards.

2.6.1.5 Potential Sensitive Receptors

<u>On-Site Receptors</u> - Since the Site is currently vacant, there are no on-Site potential sensitive receptors. However, the proposed redevelopment of the Site includes the construction of a mixed-use commercial and affordable housing building containing subsurface parking and ground floor commercial units followed by residential units on the floors above. During redevelopment of the Site, the on-Site potential sensitive receptors will include construction workers. Once the Site is redeveloped into a multi-story residence/commercial building, the on-Site potential sensitive receptors will include sensitive receptors.

The potential on-Site receptors include adult and child residents, and commercial and construction workers as summarized below:

- 1. Commercial Businesses future only
- 2. Residential Buildings future only
- 3. Building Construction/Renovation future only
- 4. Pedestrians, Trespassers, Cyclists future only

Visitors, pedestrians, trespassers, cyclists, and miscellaneous delivery persons would have significantly less exposure than building occupants; and therefore, were deleted from further consideration.

<u>Off-Site Receptors</u> - Potential off-site receptors within a 0.25-mile radius of the Site include adult and child residents, and commercial and construction workers based on the following:

- 1. Commercial Businesses (up to 0.25 mile) existing and future
- 2. Residential Buildings (up to 0.25 mile) existing and future
- 3. Building Construction/Renovation (up to 0.25 mile) existing and future
- 4. Pedestrians, Trespassers, Cyclists (up to .25 mile) existing and future

Visitors, pedestrians, trespassers, cyclists, and miscellaneous delivery persons would have significantly less exposure than building occupants; and therefore, were deleted from further consideration.

2.6.1.6 Exposure Route

An exposure route is the mechanism by which a receptor comes into contact with a chemical. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill, soil or building materials.

2.6.1.7 Identification and Evaluation of Exposure Pathways

This evaluation consists of the following components: contaminant source; contaminant release and transport mechanism; point of exposure; route of exposure; and receptor population.

Existing On-Site Pathway - The Site currently consists of a vacant building. Since the building is locked and includes a fenced enclosure, there are no on-Site inhalation, ingestion or dermal contact exposure pathways, and there are no on-Site potential receptors under existing conditions.

Future On-Site Pathways - Once on-Site construction activities begin, there will be potential exposure pathways as a result of the redevelopment and construction activities. There will be potential exposure pathways from contaminated surface and subsurface soil/fill to commercial workers as a result of on-Site construction/excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with any exposed impacted fill or soils.

There will also be a potential exposure pathway from the groundwater as a result of on-Site excavation and/or dewatering activities for construction purposes. On-Site construction workers could potentially inhale or have dermal contact with any soil/fill that is saturated with contaminated groundwater, vapors from off-gassing from the groundwater, and/or the contaminated groundwater itself.

Once the construction of the project is completed, there will be potential exposure pathways to residents of the building from inhalation of indoor VOC vapors from the soil and off-gassing from the groundwater.

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Existing Off-Site Pathway - There are existing potential exposure pathways for soil gas emanating from VOCs within the soil and groundwater to enter into the adjoining buildings as a result of any sub-basement floor or lower wall openings/cracks. The indoor air quality at the adjoining properties maybe susceptible to contamination from subsurface vapor intrusion attributable to VOCs emitted from the shallow contaminated groundwater beneath the Site. The potential receptors from such a migration pathway into the building would be to off-site construction and commercial workers, and adult and child residents. The primary route of exposure would be inhalation. Samples BCPSV-01 through 03 were collected from around the perimeter of the basement along 3rd Avenue and 158th Street to determine the concentrations of VOCs migrating from the Site as soil vapor. These results indicate that elevated levels of PCE exist at the property line and may be migrating off-Site.

Future Off-Site Pathway - **Future Off-Site Pathway** - There is a potential exposure pathway from soil gas emanating from contaminated groundwater to enter into the adjoining buildings as a result of any sub-basement floor or lower wall openings/cracks. The indoor air quality at the adjoining properties may be susceptible to contamination from subsurface vapor intrusion attributable to VOCs that would be emitted from the shallow groundwater beneath the Site. The potential receptors from such a migration pathway into the building would be to off-Site commercial workers, and adult and child residents. The primary route of exposure would be inhalation.

There is a potential exposure pathway for future on-Site construction workers conducting construction-related activities underneath the building if future construction activities require on-Site workers to come into direct dermal contact with contaminated groundwater and/or soil.

2.6.1.8 Exposure Assessment Conclusions and Recommendations

Based upon this analysis, there are currently no existing exposure pathways from contaminated surface and subsurface soil, fill and groundwater to on-Site receptors under existing conditions. However, there is an existing potential exposure pathway from soil vapor emanating from

contaminated groundwater and soil to the indoor air of nearby structures. The potential for this exposure pathway will be decreased in the future as the contaminated on-Site soils are removed during redevelopment of the Site.

As a result of future on-Site construction activities, there is a potential pathway for exposure to on-Site construction workers. However, this can be controlled by employing proper health and safety procedures during construction.

There are also future potential exposure pathways to future adult and child residents of the proposed new building. Implementation of a NYSDEC-approved RAWP including the incorporation of a vapor barrier, SSD system, and/or ventilated parking structure into the proposed new building would eliminate the pathway of soil vapor intrusion. By properly employing remedial measures and engineering and/or institutional controls, the occupants of the completed structure will not be subject to the acclamation of vapors within the planned structures. In addition, employing engineering and institutional controls such as the vapor barrier, SSD system and/or ventilated parking garage, dermal contact or inhalation of vapors associated with subsurface soils and/or groundwater underneath the building, are eliminated.

2.7 INTERIM REMEDIAL ACTION

There were no IRMs completed for this Site.

2.8 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.8.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

2.8.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.8.3 Surface Water

There are no surface water bodies in proximity to the Site.

2.8.4 Sediment

There are no areas of sediment in proximity to the Site.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

This section includes a description of the remedial alternatives considered for this Site, a comparison of the alternatives and the Remedial Action standards, criteria and guidance.

Alterative 1 (Track 1) - This alternative includes: removal of all contaminated soil to a depth where Track 1 SCOs are achieved; an investigation of on-Site groundwater quality; installation of a ventilated parking garage; post-remedial groundwater monitoring; and, removal of three ASTs in accordance with applicable regulations. A Pre-Design On-Site Groundwater Investigation will be performed after the existing structure is demolished. A Pre-Design Investigation Work Plan (Ref. 10) was prepared as a separate submittal. If the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible.

Based on the data included in the RI, this alternative was judged to not be feasible for the following reasons: 1) the detections of metals within the soil samples collected at 12.5 feet, the anticipated depth of the proposed building, exceeded the Track 1 SCOs; 2) excavation may have to extend to bedrock to achieve the Track 1 SCOs; and, 3) the presence of contaminated soil

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vapor and groundwater below the Site will require the incorporation of an engineering control as part of the remedy.

Alternative 2 (Track 4 with Track 2 contingency) - Alternative two includes: excavation of contaminated soils as part of the construction and redevelopment of this parcel; installation of a composite cover system consisting of building foundations, concrete sidewalks, and/or a vapor barrier; an investigation of on-Site groundwater quality; removal of three ASTs in accordance with applicable regulations; off-Site disposal of contaminated soil; installation of a ventilated parking garage and/or SSD system; and post-remedial groundwater monitoring. A Pre-Design On-Site Groundwater Investigation will be performed after the existing structure is demolished. A Pre-Design Investigation Work Plan (Ref. 10) was prepared as a separate submittal. If the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible.

Alternative 2 will both achieve the RAOs for soil, soil vapor and groundwater to Track 4 SCOs (with a Track 2 contingency) and allow for the redevelopment of the Site.

STANDARDS, CRITERIA AND GUIDANCE

The following Remedial Action standards, criteria and guidance were considered as part of the preparation of this Plan.

- 6 NYCRR Part 375-6 Soil Cleanup Objectives
- New York State Groundwater Quality Standards 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values TOGS 1.1.1;
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation
 December 2002 (or later version if available);

- NYSDEC Draft Brownfield Cleanup Program Guide May 2004;
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYS Waste Transporter Permits 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements 6 NYCRR Part 360 and Part 364;

Evaluation of Alterative 1 (Track 1) – this alternative was compared to the following criteria.

• Protection of human health and the environment;

This remedy will be protective of Public Health and the Environment. By employing health and safety procedures during construction, the workers will be protected from dermal contact and inhalation of vapors or dust. The source(s) of VOC contamination in the underlying groundwater are the PCE residues remaining in the soil. Removal of the impacted soils during construction will aid in reducing the VOC levels in the groundwater. In addition, if the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible.

• Compliance with standards, criteria, and guidelines (SCGs);

<u>Soil</u> – The results of our evaluation of the laboratory data presented in the RI indicate that soil is a media of concern. Based on this comparison to regulatory criteria, the metals lead, mercury, and silver exceed the soil cleanup objectives for unrestricted use under 6NYCRR Part 375 – Track 1. Therefore, to implement this remedy, the excavation may have to extend significantly beyond the anticipated depth of the proposed building foundation and possibly to bedrock to achieve the Track 1 SCOs.

<u>Soil Vapor</u> – The results of the laboratory data indicate that soil vapor is a media of concern. The following compounds of concern were analyzed in the on-Site soil vapor and the results compared to regulatory guidelines. When available, the results were compared to the Mean VOCs in Air of Fuel Oil Heated Homes value as these vapors could potentially migrate into a new structure placed over the Site.

		Mean VOCs in
	Highest	Air of Fuel Oil
	Detection	Heated Homes
<u>Compounds</u>	Units: <u>ug/m³</u>	ug/m^3
VOCs		
perchloroethylene	5,903	1.3
trichloroethylene	46.21	0.4
1,2,4 Trimethylbenzene	20.17	4.8
1,2 Dichloroethane	0.78	0.1
1,3,5 Trimethylbenzene	6.39	3.7
1,4 Dichlorobenzene	26	3.7
1,3 Dichlorobenzene	1.80	0.3
acetone	84	42
benzene	26.49	8.3
carbon tetrachloride	0.77	0.4
carbon disulfide	43.54	4.2
chloroform	876.60	0.9
cis-1,2-Dichloroethylene	9.92	0.3
cyclohexane	6.4	6.0
ethyl acetate	7.4	No Given Value
ethyl alcohol	39.54	610
ethylbenzene	268.96	3.7
freon 11	32	No Given Value

freon 12	4.2	No Given Value
heptane	15	No Given Value
hexane	17	No Given Value
m&p xylene	434.60	5.9
methylene chloride	12.51	17
methyl isobutyl ketone	15.58	8.4
methyl ethyl ketone	44.19	8.4
MTBE	56	13
o-xylene	43.03	3.8
p-ethyltoluene	18.66	No Given Value
styrene	7.0	No Given Value
tert. Butyl Alcohol	13.93	No Given Value
tetrahydrofuran	4.3	2.1
toluene	160	26
1,1,1-Trichloroethane	20.20	2
2,2,4-Trimethylpentane	20.17	No Given Value

The results indicate that perchloroethylene (a.k.a. dry cleaning fluid) and its degradation products exist in the subsurface soils. Several other industrial solvents including, acetone, chloroform, trichloroethylene, and methyl ethyl ketone were also detected. A variety of petroleum related compounds such as benzene, toluene, ethylbenzene and xylene were detected as well. These 22 compounds exceeded the Mean VOCs in Air of Fuel Oil Heated Homes. By removing the impacted soil, the source of VOCs in the soil vapor should be eliminated.

<u>Groundwater</u> – Five off-Site monitoring wells were installed within the Study Area for this project. However, for the purposes of this RAWP, MW-2 is considered an on-Site well as it was installed within the sidewalk close to the dry cleaner door. The following compounds were detected in the groundwater during the October 2007 sampling round and compared to the regulatory guideline.

		······································
	Highest	Groundwater Standards
Compounds	Detection	(TOGS)
VOCs		
perchloroethylene	7,900 ug/l	5 ug/l
Metals		
iron	1,210 ug/l	300 ug/l
magnesium	112,000 ug/l	35,000 ug/l
selenium	45.3 ug/l	10 ug/l
sodium	340,000 ug/l	20,000 ug/l
thallium	8.1 ug/l	4 ug/l

The results of the groundwater samples indicate that elevated levels of PCE exist in the groundwater below the Site. Five naturally occurring metals also exceeded groundwater standards. By removing the impacted soil, the source of VOCs in the groundwater should be eliminated. In addition, if the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible. Post-remedial groundwater monitoring will be included in the remedy to track the degradation of these VOCs over time.

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• Short-term effectiveness and impacts;

The proposed remedy will be very effective in reducing soil contaminant levels in the short term as the impacted soil will be removed from the Site. There is, however, a risk of short-term impacts to the site workers and the community as the process of excavating impacted soil may cause the release of dust and volatile organic vapors. This will be controlled by employing engineering controls. A trained technician will be at the Site during the excavation program to measure VOC readings with a PID meter and airborne dust readings with a particulate meter around the work perimeter. If the measured levels exceed a predetermined threshold level, engineering controls such as applying a potable water mist in the work area, will be implemented to reduce these levels.

• Long-term effectiveness and permanence;

The remedy will achieve long-term effectiveness for all three media of concern in accordance with the RAOs.

Soil – All of soil at the Site exceeding 6NYCRR Part 375 Track 1 standards will be removed.

Soil Gas – As all of the contaminated soils will be removed, the soil gas within the fill material used to replace excavated soil is not expected to contain contaminant vapors.

Groundwater – By removing the impacted soil, the source of VOCs in the groundwater should be eliminated. In addition, if the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible. Post-remedial groundwater monitoring will be included in the remedy to track the degradation of these

VOCs over time. Development of a Site Management Plan will assure the long term effectiveness of this control.

• Reduction of toxicity, mobility, or volume of contaminated material;

Soil – As all of the impacted soil at the Site will be removed, the volume of contaminants will be greatly reduced.

Soil Gas – As all of the contaminated soils will be removed, the soil gas within the fill material used to replace excavated soil is not expected to contain contaminant vapors. Therefore the toxicity, mobility, and volume will be reduced.

Groundwater – By removing all of the impacted soil, the water quality at the Site boundary will improve and the concentration of VOCs in the groundwater will be reduced. Over time, this should reduce the mobility and toxicity of the VOCs in the groundwater. In addition, if the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible. Post-remedial groundwater monitoring will be included in the remedy to track the degradation of these VOCs over time as specified in the Site Management Plan.

• Implementability;

The proposed remedy is not implementable. This remedy will require extensive excavation, most likely significantly beyond the anticipated depth of the proposed structures and down to the water table or bedrock surface.

• Cost effectiveness;

The 7,613 square foot Site consists of an existing building with a basement floor approximately 10 feet below sidewalk grade. For this alternative, the soil would have to be removed to the water table surface or bedrock surface, approximately 25 feet below grade. As there is an existing basement, approximately 15 additional feet of soil would need to be removed from this area. Based on these measurements, approximately 4,230 cubic yards of soil would have to be excavated from the Site. Using a conversion factor of 1.5, this equates to approximately 6,345 tons of material.

The market rate for the transportation and disposal of non-hazardous, regulated soil is approximately \$55 per ton. Using this as an average rate, the soil disposal for this project would be approximately \$348,975. It is noted that this cost does not include dewatering, which may be needed to excavate to 25 feet. As the proposed depth of the foundation is 15 feet, approximately 10 feet of clean fill will be required. Using a market rate of \$12.50 per cubic yard, this equals approximately \$2,833.

The market rate for removing three ASTs is approximately \$15,000. The market rate for the Pre-Desgin investigation is approximately \$51,000. The market rate for one round of post-remedial monitoring is approximately \$10,000. The market rate for installation of a ventilated parking garage/foundation/waterproofing membrane (prorated for Lot 45 only) is approximately \$550,000. Inspection, testing and reporting associated with this work was estimated at a rate of 10% of total costs or approximately \$97,781.

In order to perform an excavation to 25 feet, excessive shoring, sheeting, and underpinning would have to be performed as this underpinning would be nearly 15 feet deep and would recreate foundations for existing roadways and adjacent properties, the costs – and especially the unknown liabilities – would be prohibitive. Instead, we would mitigate these with secant walls, which would shore surrounding properties and provide foundation support. At a depth of 15 feet, these walls are quoted at approximately \$6,750/linear feet. With a perimeter of 174 feet, the estimated fee for this is \$1,174,500.

The cost for this Alternative was estimated by combining these figures for an approximate total of \$2,152,308.

This assumes the work will be performed concurrent with the planned redevelopment of the Site and a groundwater treatment system will not need to be developed.

• Community Acceptance

We expect that this project will achieve community acceptance. In fact, community review of the development is complete, and the development has been approved: as part of NYC's ULURP process, the local Community Board and the Borough President have reviewed and recommended the project for approval; likewise, the City Planning commission and the City Council have reviewed and approved the project, and on November 21, 2007, the NYC Mayor's Office approved the project.

The Site is currently vacant and does not contribute to the neighborhood. The proposed project will provide the community with retail stores, residences and parking. It will provide local jobs both during and after construction. The proposed affordable housing development is in context with other recent developments in the area, and it supports the goals and guidelines of the 1994 Melrose Commons Urban Renewal Plan.

• Land use

Currently, the land is vacant. The future land use intended for this Site is a combination of ventilated sub-grade parking, ground level retail stores and upper level residential units. The proposed redevelopment plan matches well with other recent developments in the area which include residential and commercial properties. In addition, the Site is part of an Urban Renewal Area. The population of the City of New York is expected to increase in the future. This project will provide necessary housing units to meet that need. The Site is serviced by public transportation in the form of both buses and trains. The area is sewered, municipal water and utilities are available. Cultural resources are

available both locally in Bronx and in nearby Manhattan. There are no known natural resources, such as fish and wild life, or floodplains in close proximity to the Site. To the best of our knowledge, there are no current institutional controls related to this Site.

Evaluation of Alterative 2 (Soil removal using Track 4 SCOs plus EC/IC with a Track 2 contingency) – this alternative was compared to the following criteria.

• Protection of human health and the environment;

This remedy will be protective of Public Health and the Environment. By employing health and safety procedures during construction, the workers will be protected from dermal contact and inhalation of vapors or dust. Incorporation of a ventilated parking garage, a vapor barrier, and/or SSD system into the structure will prevent volatile vapors from entering the new structure. The sources of VOC contamination in the underlying groundwater are the PCE residues remaining in the soil. Removal of the impacted soils during construction will aid in reducing the VOC levels in the groundwater.

• Compliance with standards, criteria, and guidelines (SCGs);

<u>Soil</u> – The results of our evaluation of the laboratory data presented in RI indicate that soil is a media of concern. The detections of lead, mercury, and silver that exceeded 6 NYCRR Part 375 Unrestricted Residential SCOs during the RI were compared to the Site-specific Track 4 SCOs established for this Site (see Table 20) even though the soil testing completed to date shows that the soil at the bottom of the proposed excavation complies with the 6 NYCRR Part 375 Restricted Residential SCOs (Track 2). Based on this comparison to regulatory criteria, these three metals will meet the Track 4 and 2 SCOs.

<u>Soil Vapor</u> – The following compounds of concern were analyzed in the on-Site soil vapor and the results compared to regulatory guidelines. When available, the results were compared to the Mean VOCs in Air of Fuel Oil Heated Homes value as these vapors could potentially migrate into a new structure placed over the Site.

		Mean VOCs in
	Highest	Air of Fuel Oil
	Detection	Heated Homes
<u>Compounds</u>	Units: <u>ug/m³</u>	ug/m^3
VOCs		
perchloroethylene	5,903	1.3
trichloroethylene	46.21	0.4
1,2,4 Trimethylbenzene	20.17	4.8
1,2 Dichloroethane	0.78	0.1
1,3,5 Trimethylbenzene	6.39	3.7
1,4 Dichlorobenzene	26	3.7
1,3 Dichlorobenzene	1.80	0.3
acetone	84	42
benzene	26.49	8.3
carbon tetrachloride	0.77	0.4
carbon disulfide	43.54	4.2
chloroform	876.60	0.9
cis-1,2-Dichloroethylene	9.92	0.3
cyclohexane	6.4	6.0
ethyl acetate	7.4	No Given Value
ethyl alcohol	39.54	610
ethylbenzene	268.96	3.7
freon 11	32	No Given Value
freon 12	4.2	No Given Value
heptane	15	No Given Value
hexane	17	No Given Value
m&p xylene	434.60	5.9

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methylene chloride	12.51	17
methyl isobutyl ketone	15.58	8.4
methyl ethyl ketone	44.19	8.4
MTBE	56	13
o-xylene	43.03	3.8
p-ethyltoluene	18.66	No Given Value
styrene	7.0	No Given Value
tert. Butyl Alcohol	13.93	No Given Value
tetrahydrofuran	4.3	2.1
toluene	160	26
1,1,1-Trichloroethane	20.20	2
2,2,4-Trimethylpentane	20.17	No Given Value

The results indicate that perchloroethylene (a.k.a. dry cleaning fluid) and its degradation products exist in the subsurface soils. Several other industrial solvents including, acetone, chloroform, trichloroethylene, and methyl ethyl ketone were also detected. A variety of petroleum related compounds such as benzene, toluene, ethylbenzene and xylene were detected as well. These 22 compounds exceeded the Mean VOCs in Air of Fuel Oil Heated Homes. Installation of a vapor barrier, SSD system, and/or ventilated parking garage will prevent these vapors from entering into the proposed new building.

<u>Groundwater</u> – Five off-Site monitoring wells were installed within the Study Area for this project. However, for the purposes of this RAWP, MW-2 is considered an on-Site well as it was installed within the sidewalk close to the dry cleaner door. The following compounds were detected in the groundwater during the October 2007 sampling round and compared to the regulatory guideline.

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	Highest	Groundwater standards
<u>Compounds</u>	Detection	(TOGS)
VOCs		
perchloroethylene	7,900 ug/l	5 ug/l
Metals		
iron	1,210 ug/l	300 ug/l
magnesium	112,000 ug/l	35,000 ug/l
selenium	45.3 ug/l	10 ug/l
sodium	340,000 ug/l	20,000 ug/l
thallium	8.1 ug/l	4 ug/l

The results of the groundwater samples indicate that elevated levels of PCE exist in the groundwater below the Site. Five naturally occurring metals also exceeded groundwater standards. By removing the impacted soil, the source of VOCs in the groundwater should be eliminated. In addition, if the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible. Post-remedial groundwater monitoring will be included in the remedy to track the degradation of these VOCs over time.

• Short-term effectiveness and impacts;

The proposed remedy will be very effective in reducing soil contaminant levels in the short term as the impacted soil will be removed from the Site. There is, however, a risk of short-term impacts to the site workers and the community as the process of excavating

impacted soil may cause the release of dust and volatile organic vapors. This will be controlled by employing engineering controls. A trained technician will be at the Site during the excavation program to measure VOC readings with a PID meter and airborne dust readings with a particulate meter around the work perimeter. If the measured levels exceed a predetermined threshold level, engineering controls such as applying a potable water mist in the work area, will be implemented to reduce these levels.

• Long-term effectiveness and permanence;

The remedy will achieve long-term effectives for all three media of concern in accordance with the RAOs.

Soil – The upper 12.5 feet of soil at the Site will be removed. The soils that will remain are not expected to achieve the SCGs for unrestricted residential use under the NYSDECs 6NYCRR Part 375 Track 1 standards for SVOCs and selected heavy metals. However, it is anticipated that these soils will comply with the SCGs for restricted residential (Track 2) or the Site-specific Track 4 SCOs established for this Site. In addition, these soils will be covered by a composite cover system consisting of the new building's foundation, concrete sidewalks, and/or vapor barrier, which will effectively serve as a long term barrier between the soil and the local residents. In the event soil below a depth of 12.5 feet contains elevated levels of PCE, additional soil will be removed until Track 4 SCOs are achieved or bedrock is encountered. A ranking of the three metals that exceed Track 1 SCOs below the current basement are illustrated on Tables 17-19.

Soil Gas – Incorporation of a vapor barrier, SSD system and a ventilated parking garage into the structure will prevent volatile vapors from entering the new structure. Development of a Site Management Plan will assure the long term effectiveness of this control.

Groundwater – The water table occurs at 20 to 25 feet below grade and should not come in contact with the proposed new structure. By removing the impacted soil in the upper

12.5 feet of the Site, the source of VOCs in the groundwater should be eliminated. In addition, if the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible. Post-remedial groundwater monitoring will be included in the remedy to track the degradation of these VOCs over time. Development of a Site Management Plan will assure the long term effectiveness of this control.

• Reduction of toxicity, mobility, or volume of contaminated material;

Soil – As the upper 12.5 feet of soil at the Site will be removed, the volume of contaminants will be greatly reduced. The foundation, sidewalk, and/or vapor barrier will act as a composite cover system and reduce the mobility of the contaminants in the soil.

Soil Gas – Excavating the upper 12.5 feet of soil should greatly reduce the volume of contaminated soil vapor at the Site. In the event soil below a depth of 12.5 feet contains elevated levels of PCE, additional soil will be removed until Track 4 SCOs are achieved or bedrock is encountered. Incorporation of a vapor barrier, SSD system, and/or ventilated parking garage into the structure will reduce its mobility with respect to migrating into the structure.

Groundwater – By removing the impacted soil at the Site, the suspected source of PCE will be removed and the water quality below the Site will improve. In addition, a Pre-Design On-Site Groundwater Investigation will be performed after the existing structure is demolished. If the on-Site investigation determines that groundwater below the Site is contaminated above NYSDEC Class GA standards, then an On-Site Groundwater

Investigation and Remediation System Design Report will be prepared and construction of the remediation system will be incorporated into the Site redevelopment plans. Based on the results of the Pre-Design Investigation, the Design Report will address source removal and control and groundwater quality restoration (if needed) and plume contaminant stabilization to the extent feasible. Post-remedial groundwater monitoring will be included in the remedy to track the degradation of these VOCs over time as specified in the Site Management Plan.

• Implementability;

The proposed remedy is highly implementable. The building's foundation and ventilated parking garage will be constructed using standard excavation techniques. The equipment and personnel needed to perform this work are readily available. The on-Site soil was tested during the site investigation and characterized for waste disposal. The majority of the soil from the Site is expected to be classified as non-hazardous, regulated soil. Should isolated pockets of soil containing higher concentrations of PCE be uncovered during the excavation phase of work, selected portions of the excavated soil can be characterized and shipped to an alternative disposal facility. Landfill space for these types of materials is readily available.

Five groundwater monitoring wells were installed during the RI and additional wells will be installed during the Pre-Design Investigation. The new wells as well as existing wells MW-3 and MW-4 should serve as appropriate points for post-remediation monitoring of the underlying groundwater.

• Cost effectiveness;

The 7,613 square foot Site consists of an existing building with a basement floor approximately 10 feet below sidewalk grade. The existing soil at the Site will be excavated to a depth of 12.5 feet below grade. As there is an existing basement, approximately 2.5 additional feet of soil needs to be removed from this area. Based on these measurements, approximately 705 cubic yards of soil will have to be excavated

from the Site. Using a conversion factor of 1.5, this equates to approximately 1,058 tons of material.

The market rate for the transportation and disposal of non-hazardous, regulated soil is approximately \$55 per ton. Using this as an average rate, the soil disposal for this project would be approximately \$58,190. The market rate for removing three ASTs is approximately \$15,000. The market rate for the Pre-Design investigation is approximately \$51,000. The market rate for one round of post-remedial monitoring is approximately \$10,000. The market rate for the purchase and installation of a vapor barrier (if needed) is approximately \$4.60 per square foot. In order for the vapor barrier to be effective it needs to be installed underneath the entire building (Lots 45, 49, and 70), not just on Lot 45. As the vapor barrier will need to be installed underneath the entire new building foundation (Lots 45, 49, and 70), using the entire new building foot print plus the wall portions that will be below grade, the area of vapor barrier is estimated to be of 26,960 square feet. The estimated cost of the vapor barrier is therefore \$124,825. Installation of a ventilated parking garage, foundation, and SSD system (prorated for Lot 45 only) is approximately \$550,000. Inspection, testing and reporting associated with this work was estimated at a rate of 10% of total costs or approximately \$80,902.

Soldier piles and tiebacks will be required to shore the excavation. At a market rate of \$100 per linear foot and a perimeter of 174 feet, the estimate for shoring is \$17,400. The cost for this Alternative was estimated by combining these figures for an approximate total of \$907,317.

For planning purposes, no imported top soil is assumed for the Site. The existing soil/fill is not expected to be reused/relocated on Site. This assumes the work will be performed concurrent with the planned redevelopment of the Site and that groundwater treatment won't be necessary.
• Community Acceptance

We expect that this project will achieve community acceptance. In fact, community review of the development is complete, and the development has been approved: as part of NYC's ULURP process, the local Community Board and the Borough President have reviewed and recommended the project for approval; likewise, the City Planning commission and the City Council have reviewed and approved the project, and on November 21, 2007, the NYC Mayor's Office approved the project.

The Site is currently vacant and does not contribute to the neighborhood. The proposed project will provide the community with retail stores, residences and parking. It will provide local jobs both during and after construction. The proposed affordable housing development is in context with other recent developments in the area, and it supports the goals and guidelines of the 1994 Melrose Commons Urban Renewal Plan.

• Land use

Currently, the land is vacant. The future land use intended for this Site is a combination of ventilated sub-grade parking, ground level retail stores and upper level residential units. The proposed redevelopment plan matches well with other recent developments in the area which include residential and commercial properties. In addition, the Site is part of an Urban Renewal Area. The population of the City of New York is expected to increase in the future. This project will provide necessary housing units to meet that need. The Site is serviced by public transportation in the form of both buses and trains. The area is sewered, municipal water and utilities are available. Cultural resources are available both locally in Bronx and in nearby Manhattan. There are no known natural resources, such as fish and wild life, or floodplains in close proximity to the Site. To the best of our knowledge, there are no current institutional controls related to this Site.

3.2 SELECTION OF THE PREFERRED REMEDY

Both Alterative 1 (cleanup to Track 1 SCOs) and Alterative 2 (cleanup to Track 4 SCOs with a Track 2 contingency) achieve the RAOs presented in Section 2.7 of this document. Alternative 1 (Track 1 SCOs) is not viewed to be implementable from a construction stand point as it will require extremely deep excavations which will likely extend to the water table. The estimated total for Alternative 1 (Track 1 SCOs) is \$2,152,308 including the disposal of additional soil beyond 15 feet below grade. The excavation cost to achieve Track 1 would make the project economically unfeasible. Alternative 2 (Track 4 SCOs) is believed to be implementable. The estimated to the impacted soil is incorporated into the planned development of the Site. The estimated cost of Alternative 2 (Track 4) is \$907,317 which is both cost effective and achieves the RAOs through the incorporation of institutional and engineering controls.

3.2.1 Zoning

The proposed land use development complies with the current zoning for this property.

3.2.2 Applicable comprehensive community master plans or land use plans

The Site is part of the Melrose Commons Urban Renewal Area. The proposed project complies with the development goals outlined for this renewal area.

3.2.3 Surrounding property uses

The proposed redevelopment matches well with other recent developments in the area which include residential and commercial properties. Other land uses in the area include a public park, a church and a private school.

3.2.4 Citizen participation

A Citizens Participation Plan has been developed as Appendix E of this document and will be incorporated into the implementation of this project.

3.2.5 Environmental justice concerns

The local Community Board, City Council Members, State Senators, and the Borough President have reviewed and recommended the project for approval. Redevelopment of the Site in accordance with the approved plan will eliminate the current concerns in connection with the Site's current blighted condition, while providing affordable housing, community resources, local retail and open space. Therefore, there are no known environmental justice concerns at the Site.

3.2.6 Land use designations

The Site is currently zoned residential (R8) with a C1-4 overlay that is immediately surrounded by residential (R7-2 and R-8), commercial (C4-4), and manufacturing (M1-1) zones. A 2008 Zoning change included removing the C1 overlay along Brook Avenue, changing the zoning to R8 with a C1 overlay to a depth of 100 feet from Third Avenue, and R8 on the remainder of the lot.

3.2.7 Population growth patterns

The population of the City of New York is expected to increase in the future. This project will provide necessary housing units to meet that need.

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3.2.8 Accessibility to existing infrastructure

The Property is in close proximity to bus and subway lines. The area is also serviced by public water, sewers, electric power and telephone service.

3.2.9 Proximity to cultural resources

The Site is in close proximity to many cultural resources including Yankee Stadium and the Bronx Botanical Gardens locally as well as many museums, theaters and Madison Square Garden in nearby Manhattan.

3.2.10 Proximity to natural resources

As this area is fully developed, the Site is not a significant source of natural resources. However, natural resources such as parks and the waterfront are easily accessible from the Site via public transportation.

3.2.11 Off-Site groundwater impacts

The results of groundwater samples collected in downgradient monitoring wells MW- 2 and MW-5 indicates that there have been impacts to the off-Site groundwater in the form of VOCs. The selected remedy will prevent the migration of contaminants within the groundwater from further migrating off-Site, to the extent feasible.

3.2.12 Proximity to floodplains

There are no floodplains in proximity to the Site.

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3.2.13 Geography and geology of the Site;

The on-Site topography slopes gently toward the northwest. The Site is located in the New England Upland Physiographic Region. Bedrock underlying the Site is comprised of the Inwood Marble, a member of the Ordovician-Cambrian, Wappinger, and Stockbridge Groups.

Surficial geologic materials are characterized as ground moraine and/or urban fill consisting of sand, silt, clay and gravel. Underlying groundwater exists primarily in the overburden material as the Inwood Marble is massive and contains very few fractures. Groundwater in this area of the Bronx is not used for potable supply purposes.

3.2.14 Current Institutional Controls

There are currently no known institutional controls on the Site.

3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS

Based on the Evaluation of Remedial Alternatives presented in this document, Alternative 2 (which will achieve Track 4 SCOs with a Track 2 contingency) is the selected remedy for this Site. Details of this Alternative are presented below:

- Collection of additional soil waste characterization samples as needed to profile the soil/fill for disposal purposes. A waste disposal facility will be selected based on the data that has been collected to date. Based on the requirements of the selected facility, additional soil/fill samples will be collected and analyzed as needed to obtain soil disposal facility approval.
- 2. Excavation of soil/fill to 12.5 feet below grade as needed Site-wide to facilitate construction of the foundation of the proposed new structure (see Figure 14). The

excavation for the proposed new building's foundation is expected to remove all soil/fill exceeding the Track 4 Site Specific Soil Action Levels established for this Site (or Track 2) and soil vapor source areas at the Site. In the event the soil at 12.5 feet below grade does not meet the Site Specific Soil Action Levels, the soil excavation will continue past 12.5 feet below grade until the Site Specific Soil Action Levels are achieved, or bedrock is encountered;

- 3. Screening for indications of contamination (by visual means, odor, and monitoring with a PID) of all excavated soil during any intrusive Site work;
- Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of the Track 4 Site Specific Soil Action Levels developed for this Site (or Track 2). See Figure 14.;
- 5. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
- Removal of three ASTs in accordance with applicable regulations. AST locations are shown on Figure 2;
- 7. A Pre-Design Groundwater Investigation will be performed at the Site after the building has been demolished. A Pre-Design Investigation Work Plan (Ref. 10) was submitted to the NYSDEC in a separate document. If the groundwater quality below the Site exceeds the NYS groundwater standard for PCE, a separate Groundwater Investigation and Remediation Design Report will be submitted to the NYSDEC. Construction of the new building above grade that would impede implementation of a potential groundwater remedy will not commence until the Pre-Design Investigation is completed and the design for the groundwater remedy (if needed) is approved. If the analytical results from the groundwater interface

samples comply with New York State drinking water standards, then no further action with respect to the groundwater interface will be required. In addition, if no water bearing rock fractures are encountered during the installation of the proposed new well MW-2A (see Figure 1 in Ref. 10), then no further action will be required with respect to groundwater located within bedrock. If any VOC detection from the on-Site groundwater interface sampling analytical results exceeds the groundwater standards, then the VOC will be added to the list of Site Specific Soil Action Levels (if not already on the list), using the protection of groundwater value in Table 375-6.8b of 6 NYCRR;

- It is noted that during redevelopment, any wells approved for abandonment will be abandoned per NYSDEC guidance using imported sand and bentonite. In addition, during abandonment, two to three well volumes of water from the respective monitoring well will be removed;
- 9. Construction and maintenance of an engineered composite cover consisting of concrete sidewalks, new building foundations, vapor barrier, and/or a ventilated parking garage to prevent human exposure to residual contaminated soil/fill remaining under the Site. This cover will encompass the entire footprint of the Site. No exposed soils will remain;
- 10. Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining at the Site (a copy of the Environmental Easement will be provided in the Site Management Plan);
- 11. As a contingency, a vapor barrier and SSD system will be incorporated below the foundation of the building in addition to the ventilated parking garage as illustrated on Figures 16 and 17. The SSD system will consist of horizontal trenches filled with perforated pipe. The horizontal pipes will be connected to vertical risers that extend above the roof of the building. Any pipe penetrations through the vapor

barrier will be sealed in accordance with the manufacturer's recommendations. The SSD fans will be mounted above the roof. The vapor barrier specifications are enclosed as Appendix G. It is noted that there will be no residential units in the subsurface portion of the building.

- 12. Collection and analysis of post-remedial groundwater samples from the wells that are to be installed as part of the Pre-Design Investigation as well as off-Site wells MW-3 and MW-4 to evaluate the performance of the remedy. The post-remedial monitoring well network is illustrated on Figure 16.
- Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;
- 14. If required, import of materials to be used for backfill and cover in compliance with: (1) 375-6.7(d) of 6NYCRR and (2) all Federal, State and local rules and regulations for handling and transport of material;

All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations. Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. Any deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the Final Engineering Report (FER).

4.0 **REMEDIAL ACTION PROGRAM**

4.1 GOVERNING DOCUMENTS

4.1.1 Site-Specific Health & Safety Plan (HASP)

The Health and Safety Plan (HASP) is included as Appendix F.

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The HASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

The Site Safety Coordinator will be Victoria Whelan. Her resume as well as the resumes of key personnel involved in this project are attached as Appendix C.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.2 Quality Assurance Project Plan (QAPP)

This document describes sampling and analytical methods for end-point sampling.

4.1.2.1 Introduction - The following Quality Assurance Plan (QAPP) has been prepared specifically for the Cornerstone Site B-1 RAWP. This Plan was prepared and approved as stated below:

Prepared by:

Eie Weinstel

Date: 5/1/09_____

Eric Weinstock, Vice President

O Dhapio

Date: 5/1/09

Approved by:___

Deborah Shapiro, Project Manager

The following elements are included in this QAPP: Table of Contents **Title Page and Introduction Project Description Project Organization** Quality Assurance Objectives for Data Measurements **Sampling Procedure** Sample and Document Custody Procedures Calibration Procedures and Frequency **Analytical Procedures** Data Reduction, Validation and Reporting Internal Quality Control Checks Performance and System Audits **Preventive Maintenance** Data Measurement Assessment Procedures **Corrective Action** Quality Assurance Reports and Management

4.1.2.2 Project Description – The Cornerstone Site B-1 RAWP subject to this QAPP has been prepared for implementation of Alternative Two of the RAWP. Alternative Two includes:

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excavation of contaminated soils Site-wide down to 12.5 feet below grade or until compliance with Track 4 SCOs or bedrock is encountered; off-Site disposal of contaminated soil; installation of a composite cover system including concrete sidewalks, building foundation, vapor barrier and/or a ventilated parking garage; installation of an SSD system below the vapor barrier (if needed), an on-Site groundwater investigation and (if needed) design of a groundwater treatment system; and, post-remedial groundwater monitoring.

4.1.2.3 Project Organization - Ms. Deborah Shapiro will serve as the Project Director/Manager (PM) and will be responsible for the overall scheduling and performance of all the RAWP activities.

Mr. Stephen Malinowski will serve as the Quality Assurance Officer (QAO) for this project. His duties will include:

- Review of laboratory data packages
- Interface with laboratory
- Performance of Field Audits

Experienced CA RICH staff will complete the field activities described in the Work Plan.

4.1.2.4 Quality Assurance Objectives and Data Measurement – There are two sources of data collection methodology that will provide data information during this RAWP.

Field Screening - Organic vapor readings will be recorded from the head space of soil samples as well as the ambient air during excavation activities. This data is intended to be used only as a screening tool. To meet these goals, clean sampling tools will be used and the PID will be calibrated at the beginning of each screening day on-site.

Laboratory Analysis – All environmental samples will be delivered to a New York State-Certified laboratory contracted to CA RICH for chemical analysis. The five soil samples from the Pre-Design Investigation will be analyzed for volatile organic compounds (VOCs) via EPA

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Method 8260, semi-volatile organic compounds (SVOCs) via EPA Method 8270, PCBs, Pesticides and TAL metals using EPA Method 6000/7000 series. The 14 sidewall and 6 bottom excavation endpoint soil samples will be analyzed for VOCs via EPA method 8260, SVOCs via EPA method 8270, PCBs, pesticides, and TAL Metals. The five groundwater samples from the Pre-Design Investigation will be analyzed for VOCs via EPA Method 8260, SVOCs via EPA Method 8270, and total and dissolved TAL metals. The five groundwater samples collected as part of the post-remedial monitoring will be analyzed for VOCs via EPA Method 8260, and total and dissolved TAL metals. The five groundwater samples collected as not dissolved TAL metals. The excavation endpoint sampling and post-remedial monitoring data is intended to determine that the remedial measures have mitigated the risk from any contaminants in the soil and groundwater at the Site. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 1995. All samples will be analyzed using NYSDEC ASP Category B deliverables. All samples will be collected in pre-cleaned laboratory supplied containers, placed in iced-filled coolers, and delivered to the laboratory by CA RICH within 48 hours of collection.

Quality assurance objectives are generally defined in terms of five parameters:

• **Representativeness** - Representativeness is the degree to which sampling data accurately and precisely represents Site conditions, and is dependent on sampling and analytical variability. The Work Plan has been designed to assess the presence of the constituents at the time of sampling. The Plan presents the rationale for sample quantities and location. The Work Plan presents field sampling methodologies and laboratory analytical methodologies, respectively.

The use of the prescribed field and laboratory analytical methods with associated holding times and preservation requirements are intended to provide representative data. Further discussion of QC checks is presented in Section 4.1.2.6 of this document.

• **Comparability** - Comparability is the degree of confidence with which one data set can be compared to another. Comparability between the remedial activities and to the extent possible, with existing data will be maintained through consistent sampling and analytical

methodology set forth in the QAPP, the NYSDEC ASP analytical methods with NYSDEC ASP QA/QC requirements (1995), and through use of QA/QC procedures and appropriately trained personnel.

- **Completeness** Completeness is defined as a measure of the amount of valid data obtained from an event and/or investigation compared to the amount that was expected to be obtained under normal conditions. This will be determined upon assessment of the analytical results, as discussed in Section 4.1.2.13 of this document.
- **Precision** Precision is the measure of reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the Pre-Design Investigation and Remedial Action. To maximize precision, sampling and analytical procedures will be followed. All work for the Pre-Design Investigation and remediation phases of this project will adhere to established protocols presented in the QAPP. Checks for analytical precision will include the analysis of field duplicates. Checks for field measurement precision will include obtaining duplicate field measurements. Further discussion of precision QC checks is provided in Section 4.1.2.13 of this document.
- Accuracy Accuracy is the deviation of a measurement from the true value of a known standard. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, internal standards, matrix spikes, blank spikes, and surrogates (system monitoring compounds) will be used to assess the accuracy of the laboratory analytical data. Further discussion of these QC samples is provided in Section 4.1.2.13 of this document.

4.1.2.5 Sampling Procedures - The sampling procedures that will be employed are discussed in detail in Section 5.2 of this document.

4.1.2.6 Sample and Document Custody Procedures

- **General** The Chain-of-Custody program allows for the tracing of possession and handling of the sample from the time of collection through laboratory analysis. The chain-of-custody program at this Site will include:
 - Sample labels
 - Chain-of-Custody records
 - Field records
- **Sample Labels** To prevent misidentification of samples, a label will be affixed to the sample container and will contain the following information:
 - -Site Name
 - -Sample identification number
 - -Date and time of collection
 - -Name of Sampler
 - -Preservation (if any)
 - -Type of analysis to be conducted.
- Chain-of-Custody Records To establish the documentation that is necessary to trace sample possession from the time of collection, a chain-of-custody record (sample attached as Appendix D) will be filled out and will accompany samples at all times. The record will contain the following information:
 - -Project name:
 - -Printed name and signature of samplers
 - -Sample number
 - -Date and time of collection
 - -Sampling location
 - -Number of containers for each sample
 - -Signature of individuals involved in sample transfer
 - (when relinquishing and accepting samples)
 - -Inclusive dates and times of possession.

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• **Field Records** - Field records will be maintained during each sampling effort in a logbook. All aspects of sample collection, handling and visual observations will be recorded. All sample collection equipment, field analytical equipment and equipment utilized to make physical measurements will be identified in the field logbook.

All calculations, results and calibration data for field sampling, field analytical and field physical measurement equipment will also be recorded in the field logbook. Entries will be dated and initialed. Entries will be made in ink, and will be legible. The bottom of each page will be signed.

4.1.2.7 Calibration Procedures and Frequency - The contracted laboratory will follow the NYSDEC Category-B requirements for equipment calibration procedures and frequency.

The QA Officer and/or PM will be responsible for ensuring that the Field PID is calibrated at the beginning of each day of field sampling using calibration gas supplied by the manufacturer. A log of the meter calibration will be kept in the filed logbook.

4.1.2.8 Analytical Procedures - The laboratory analysis includes VOCs using EPA method 8260, SVOCs using USEPA Method 8270, PCBs, Pesticides, and TAL metals using EPA Method 6000/7000 series and will follow NYSDEC ASP (1995) protocols with Category B deliverables. The following samples will be collected for QA/QC purposes for both the soil and groundwater sampling: 1 trip blank, 1 field blank, 1 duplicate sample, 1 matrix spike, and 1 matrix spike duplicate. A qualified data validator will review the laboratory data and a Data Usability Summary Report (DUSR) will be prepared.

4.1.2.9 Data Reduction, Validation and Reporting

CA RICH will prepare summary tables of the analytical data using computer spread sheet software. The data entries will be reviewed using the red check-green check method. All entries will be reviewed and entry errors will be marked in red ink. Once these entries are corrected, the printouts will be marked with green ink and placed in the project file.

4.1.2.10 Internal Quality Control Checks

Both field and laboratory quality control checks are proposed for this project. In the event that there are any deviations from these checks, the Project Manager and Quality Assurance Officer will be notified. The proposed field and laboratory control checks are discussed below.

Field Quality Control Checks

- **Sample Containers** Certified-clean sample containers in accordance with NYSDEC ASP (1995) will be supplied by the contracted laboratory.
- **Field Duplicates** Field duplicates will be collected to check reproducibility of the sampling methods. In general, field duplicates will be analyzed at a five percent frequency (every 20 samples).

4.1.2.11 Performance and Systems Audits

Performance and systems audits will be completed in the field and the laboratory during implementation of the RAWP as described below.

- Field Audits The PM and QAO will monitor field performance. Field performance audit summaries will contain an evaluation of field measurements and field meter calibrations to verify that measurements are taken according to established protocols. The PM will review all field logs. In addition, the PM and the QAO will review the duplicate sample data to identify potential deficiencies in field sampling procedures.
- Laboratory Audits The contracted laboratory will perform internal audits consistent with NYSDEC ASP (1995).

4.1.2.12 Preventive Maintenance

Preventive maintenance schedules have been developed for both field and laboratory instruments. A summary of the maintenance activities to be performed is presented below.

- Field Instruments and Equipment Prior to any field sampling, each piece of field equipment will be inspected to assure it is operational. If the equipment is not operational, it must be serviced prior to use. All meters which require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, it is the responsibility of the field personnel to follow the maintenance schedule and arrange for prompt service.
- Laboratory Instruments and Equipment Laboratory instrument and equipment procedures will be documented by the laboratory. Documentation includes details of any observed problems, corrective measure(s), routine maintenance, and instrument repair (which will include information regarding the repair and the individual who performed the repair). Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call from the manufacturer.

4.1.2.13 Data Assessment Procedures

The analytical data generated during the RAWP will be evaluated with respect to precision, accuracy, and completeness. The procedures utilized when assessing data precision, accuracy, and completeness are presented below.

• Data Precision Assessment Procedures - Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess precision for the entire measurement system including sampling, handling, shipping, storage, preparation and analysis.

Laboratory data precision for organic analyses will be monitored through the use of duplicate sample analyses. For other parameters, laboratory data precision will be monitored through the use of field duplicates and/or laboratory duplicates.

The precision of data will be measured by calculation of the standard deviation (SD) and the coefficient of variation (CV) of duplicate sample sets. The SD and CV are calculated for duplicate sample sets by:

Where:

A = Analytical result from one of two duplicate measurements

B = Analytical result from the second measurement.

Where appropriate, A and B may be either the raw measurement or an appropriate mathematical transformation of the raw measurement (e.g., the logarithm of the concentration of a substance).

Alternately, the relative percent difference (RPD) can be calculated by the following equation:

RPD = (A-B) x 100(A+B)/2 RPD = 1.414 (CV)(100)

• Data Accuracy Assessment Procedures - The accuracy of field measurements will be controlled by experienced field personnel, properly calibrated field meters, and adherence to established protocols. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

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Laboratory accuracy will be assessed via the use of matrix spikes, surrogate spikes, and internal standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy. Accuracy will be calculated as a percent recovery as follows:

Accuracy =
$$(\underline{A}-\underline{X})/\underline{B} \times 100$$

Where:

A = Value measured in spiked sample or standard

X = Value measured in original sample

B = True value of amount added to sample or true value of standard

This formula is derived under the assumption of constant accuracy over the original and spiked measurements. If any accuracy calculated by this formula is outside of the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but acceptable accuracy. Accuracy objectives for matrix spike recoveries and surrogate recovery objectives are identified in the NYSDEC ASP (1995).

• Data Completeness Assessment Procedures - Completeness of a field or laboratory data set will be calculated by comparing the number of samples collected or analyzed to the proposed number.

Completeness = <u>No. Valid Samples Collected or Analyzed</u> X 100 No. Proposed Samples Collected or Analyzed

As general guidelines, overall project completeness is expected to be at least 90 percent. The assessment of completeness will require professional judgment to determine data useability for intended purposes.

4.1.2.14 Corrective Action

Corrective actions are required when field or analytical data are not within the objectives specified in this QAPP. Corrective actions include procedures to promptly investigate,

document, evaluate, and correct data collection and/or analytical procedures. Field and laboratory corrective action procedures for this project are described below.

• **Field Procedures** - When conducting the field work, if a condition is noted that would have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action implemented will be documented as a memo to the project file and reported to the PM.

Examples of situations which would require corrective actions are provided below:

- Protocols as defined by the QAPP and the RAWP have not been followed;
- Equipment is not in proper working order or properly calibrated;
- QC requirements have not been met; and
- Issues resulting from performance or systems audits.

Project field personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

• Laboratory Procedures - In the laboratory, when a condition is noted to have an adverse effect on data quality, corrective action will be taken as not to repeat this condition. Condition identification, cause and corrective action to be taken will be documented, and reported to the QAO.

Corrective action may be initiated, at a minimum, under the following conditions:

- Specific laboratory analytical protocols have not been followed;
- Predetermined data acceptance standards are not obtained;
- Equipment is not in proper working order or calibrated;
- Sample and test results are not completely traceable;
- QC requirements have not been met; and
- Issues resulting from performance or systems audits.

Laboratory personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

4.1.2.15 Quality Assurance Reports to Management

- Internal Reporting -The analytical laboratory will submit analytical reports using NYSDEC ASP (1995), Category B requirements. The analytical reports will be submitted to the data validator for review. Supporting data (i.e., historic data, related field or laboratory data) will also be reviewed to evaluate data quality, as appropriate. The QAO will incorporate results of data validation reports (if any) and assessments of data usability into a summary report. This report will be filed in the project file and will include the following:
 - Assessment of data accuracy, precision, and completeness for field & laboratory data;
 - Results of the performance and systems audits;
 - Significant QA/AC problems, solutions, corrections, and potential consequences;
 - Analytical data validation report; and
 - Data usability report.
- **Reporting** The Groundwater Investigation and Design Report and FER will contain a separate QA/QC section summarizing the quality of data collected and/or used as appropriate to the project DQOs. The QAO will prepare the QA/QC summaries using reports and memoranda documenting the data assessment and validation.

4.1.3 Construction Quality Assurance Plan (CQAP)

The following procedures will be employed to assure that QA/QC protocols are implemented during this remedial action.

• One of the Field Technicians identified on the organization chart (ie: environmental scientists and geologists) will be present on-Site during the soil removal program to monitor particulates and VOC vapor at the Site boundary in accordance with the

CAMP. If there are exceedances, these will be reported to the Field Coordinator. The Field Coordinator will then relay this information to the Remedial Engineer and the Project Director.

- During excavation, the Field Technician will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. This information will be forwarded to the Field Coordinator on a daily and the Project Director & Remedial Engineer on a weekly basis.
- The Field Technicians will screen the bottom of the excavation with a PID to determine if there are any PCE "Hot Spots".
- The Field Coordinator will be ensure that the Field Technicians have read the QAPP and are prepared to collect these samples in accordance with the Plan.
- The Remedial Engineer or his designee will be on-site during the installation of the vapor barrier.

4.1.4 Soil/Materials Management Plan (SoMP)

The Soil/Materials Management Plan is included as Section 5.4 of this document.

4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

4.1.6 Community Air Monitoring Plan (CAMP)

A Community Air Monitoring Plan (CAMP) is included in the HASP, which is enclosed as Appendix F.

4.1.7 Contractors Site Operations Plan (SOP);

The Remediation Engineer or his designee has reviewed all plans and submittals for this remedial project and confirms that they are in compliance with this RAWP. The Remediation Engineer or his designee is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 Community Participation Plan

The BCP Volunteer is committed to informing and involving the public concerning the Investigation and Remediation of the Site under the BCP. As such, a Citizen's Participation (CP) Plan was developed for use (Ref. 9).

The CPP identified information needs that relate to the Site. In addition, it identified information that NYSDEC needs from the community. The CP Plan also describes CP activities conducted to date and expected in the future during the remediation. The CP activities are design to achieve the following objectives:

• Help the interested and affected public to understand the contamination problems at the Site, and the nature and progress of NYSDEC's program to investigate and clean up the Site;

- Ensure open communication between the public and project staff throughout the remedial process;
- Create opportunities for the public to contribute information, opinions and perspectives that have the potential to influence decisions about the Site's investigation and cleanup.

Copies of the CP Plan are available for review at the document repository established for this Site:

Mr. Gene Shaw, Branch Librarian New York Public Library Woodstock Branch 761 East 160th Street Bronx, NY 10456-7816 (718) 665-6255 Hours: Mon. & Thurs. 12 Noon To 8 PM Tues., Wed. & Fri. 10 AM To 6 PM Sat. 10 AM To 5 PM Sun. Closed

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 **Project Organization**

A list of people who will be responsible for the Remedial Action work is included on the organization chart, which is enclosed as Figure 13. Resumes of key personnel involved in the Remedial Action are included in Appendix C.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Stephen J. Osmundsen. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Cornerstone Site B-1 (NYSDEC BCA Index No. W2-1126-08-10). The Remedial Engineer will certify in the FER that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer or his designee will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal. The Remedial Engineer or his designee will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the Final Remediation Report.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the FER.

4.2.3 Remedial Action Construction Schedule

A proposed Remedial Action/Construction Schedule is included in Section 11.0

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. NYDEC will be notified by the Applicant of any complaints regarding work hours issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

The area around the Site will be fully fenced, and a security guard will be on-Site from 3pm to 7am on weekdays, and 24-hours a day on weekends. Construction staff will be on-Site during normal working hours on weekdays.

4.2.6 Traffic Control

A traffic control plan has been developed and is enclosed as Figure 15.

4.2.7 Contingency Plan

It is anticipated at this time that only three ASTs are present within the basement of the building and will be removed in accordance with applicable regulations. If any additional ASTs or underground storage tanks (UST) are encountered, they will also be exhumed and remomved in accordance with applicable regulations and the following scope of work.

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All remaining liquids inside the tank will first be pumped out of the tank via a vacuum truck for proper off-Site disposal. Once emptied, the tank will be excavated, inspected, cut, cleaned, and then disposed of off-Site at an approved off-Site disposal facility according to applicable regulations. If the total storage capacity of any tank(s) found at the Site is greater than 1,100 gallons, it will be registered with NYSDEC. In addition, CA RICH will visually inspect the tank excavation and monitor the soil surrounding the tank with a portable photoionization detector (PID) for any signs of petroleum-related contaminated soils that may have been attributable to the tank and/or any appurtenant piping, CA RICH will collect representative soil sediment samples from all four sides and the bottom of the excavation. The samples will be placed into (lab-issued) containers, stored in a cooler on ice, and transported to a State-Certified Laboratory contracted to CA RICH under chain-of-custody documentation.

These samples will be analyzed for the NYSDEC STARS list of volatile and semi-volatile organic compounds via EPA Method 8260 and 8270, respectively. The results for the tested parameters will then be compared to the Track 1 Unrestricted Use SCOs in Table 375-6.8 of 6 NYCRR. This is for comparison purposes only. If visual inspection and soil screening identify evidence of a petroleum release, the owner will be contacted, and as required by law, a fuel spill will be reported to the NYSDEC Spill Hotline. Under such circumstances, the excavation will continue until all of the visually-impaired soil is removed or until underlying bedrock is encountered. CA RICH will stockpile all of the excavated soils, and arrange for their proper off-Site handling, transport and disposal. All stockpiled soils will be covered with polyethylene sheeting until they are loaded into trucks and transported off-Site to an acceptable waste disposal facility. Additional excavation 'endpoint' soil samples will be collected following the removal of all visibly contaminated soils. All on-Site tank removal activities will be documented and a Tank Closure Report will be submitted to the owner/developer, and NYSDEC if required, and will be included as part of the FER.

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4.2.8 Worker Training and Monitoring

As discussed in the HASP, the environmental personal at the Site, such as Field Technicians and Site Health and Safety Officer will have completed HAZWOPER, site safety training and medical monitoring.

4.2.9 Agency Approvals

The Applicant has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the property as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work is attached in Table 21. This list includes the originating agency, and a contact name and phone number in that agency. This list will be updated in the FER.

All planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

4.2.10 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the "New York State Brownfield Cleanup Program". The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

4.2.11 Pre-Construction Meeting with NYSDEC

A pre-construction meeting with NYSDEC will be scheduled and will take place prior to the start of major construction activities.

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the HASP (Appendix F). The document defines the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.3 SITE PREPARATION

4.3.1 Mobilization

Equipment and materials will be mobilized to the Site via NYC streets and stored within the fenced area.

4.3.2 Erosion and Sedimentation Controls

The Site is surrounded by NYC streets that are serviced with storm water catch basins. As such, precipitation to the ground surface adjoining the Site will not result in a soil erosion issue.

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Precipitation falling on the Site may flow off the Site at the northwest corner along Third Avenue. To address this potential issue, temporary silt fencing will be placed along the low elevation Site boundaries. Once excavation for soil removal and foundation begins, storm water runoff will be captured and will percolate into the on-Site soils.

Should excessive quantities of storm water accumulate on-Site, a need to discharge this water to the local sewer connect may arise. Should this occur, a NYCDEP wastewater discharge permit will be obtained.

4.3.3 Stabilized Construction Entrance(s)

A 2 to 2-1/2 diameter crushed stone path will be constructed at all truck entrances for the Site. All trucks will drive over this path prior to leaving so that they do not get recontaminated prior to departure from the Site. A laborer with a hose connected to a NYC fire hydrant will check the trucks as they leave. If necessary, the hose will be used to wash off soil from the truck tires and body as it leaves the Site.

4.3.4 Utility Marker and Easements Layout

The Applicant and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Applicant and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

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The presence of utilities and easements on the Site will be investigated by the Remedial Engineer prior to start of construction. At that time, it will be determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

4.3.5 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities include excavation is the sole responsibility of the Applicant and its contractors. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Applicant and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the Applicant and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.6 Equipment and Material Staging

The "load and go" approach is intended, when possible for soil removal whereby the soil is excavated and then placed directly into trucks for disposal. This eliminates the need for staging excavated soil on-site. Should excavated soil have to be staged, it will be placed covered with plastic sheeting to prevent erosion by precipitation. In addition, all construction equipment and materials will be stored within the fenced area of the Site.

4.3.7 Decontamination Area

The crushed stone paths described in Section 4.3.3 will serve as decontamination areas for the trucks leaving the Site. The only other equipment that will require decontamination is the soil sampling tools. These will be decontaminated using Alconox soap and a fresh water rinse in plastic buckets that will be brought to the Site on an as needed basis. The area to be used for the

decontamination of soil and groundwater sampling tools will be decided on a day by day basis so as not to interfere with construction activities.

4.3.8 Site Fencing

A description of the Site fencing is included in Section 4.2.5 of this document.

4.3.9 Demobilization

The proposed redevelopment project will include development of the entire Site up to the existing sidewalks. As such, the Site will be restored through the redevelopment of the property. Demobilization will consist of removing equipment, sediment and erosion control measures, debris, refuse, and unused construction materials from the Site.

4.4 **REPORTING**

All daily and monthly Reports will be included in the FER.

4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers via e-mail by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions;
- An explanation of notable Site conditions.

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Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alpha-numeric grid for use in identifying locations described in reports submitted to NYSDEC is attached in Figure 11.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

A log of all complaints from the public regarding nuisance or other Site conditions will be compiled by the Project Director. This information will be forwarded to the NYSDEC Site Manager and the BCP Volunteer.

4.4.5 Deviations from the Remedial Action Work Plan

Any deviations from the RAWP will be recorded in both the monthly progress reports and in the FER. At a minimum, the report of the deviation will include the following:

- Reasons for deviating from the approved RAWP;
- Approval process to be followed for changes/editions to the RAWP;
- Effect of the deviations on overall remedy.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

The removal of materials from the Site will include: 1) the demolition of the existing structure and associated building materials such as brick and concrete; 2) the excavation and removal of subsurface soils; and, 3) removal of ASTs. The demolished building materials are not known to be contaminated and will be disposed of as construction & demolition (C&D) debris. Location of ASTs are illustrated on Figure 2.

5.1 SOIL CLEANUP OBJECTIVES

The remedy selected for this Site includes a Track 4 cleanup with Site Specific Soil Action Levels with a Track 2 contingency and implementation of certain engineering and institutional controls. The Site Specific Soil Action Levels were developed based upon 6 NYCRR Part 375 and data from the RI report. It is anticipated that all excavation end-point soil samples will meet or exceed the Track 4 Site Specific Soil Action Levels or the Track 2 Restricted Residential SCOs. The Track 4 Site Specific Soil Action Levels are listed in Table 20. A ranking of the three compounds that exceeded the Part 375 Track 1 Unrestricted Use SCOs during the RI are illustrated on Tables 17-19.

Soil and materials management on-Site and off-Site will be conducted in accordance with the Soil Management Plan as described below. UST closures will, at a minimum, conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

Excavation end-point samples will be obtained as shown on Figure 14.

5.2.1 End-Point Sampling Frequency

Based on the sampling frequency discussed in Section 5.4 of DER-10 (Ref. 7), a total of 20 endpoint samples consisting of 12 sidewalls and six bottom samples will be obtained from the Site-wide excavation.

5.2.2 Methodology

The excavation endpoint samples will be collected using a decontaminated stainless steel sampling trowel, hand auger or an unused wooden tongue depressor and placed directly into a laboratory issued bottle. The sample containers will be properly labeled and immediately placed on ice within a cooler. Sample time and location will be recorded on a Chain of Custody. The samples will be submitted to an ELAP-Certified laboratory for analysis of VOCs via EPA Method 8260, SVOCs via EPA Method 8260, PCBs, pesticides, and the TAL list of metals using the EPA Method 6000/7000 series. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 1995. The laboratory will compile and submit the data package using NYSDEC ASP Category B deliverables.

5.2.3 Reporting of Results

The analytical results of the end-point samples will be tabulated and compared to the Track 1 SCOs, per Table 375-6.8(a) of 6 NYCRR; Track 2 Restricted Residential SCOs for the protection of public health per Table 375-6.8b of 6 NYCRR or the Site Specific Soil Action Level, whichever is lower; and, the Track 4 Site Specific Soil Action Levels. The tabulated data as well as the laboratory reports will be included in the FER.
5.2.4 QA/QC

One trip blank and one field blank will be collected during the end-point sampling event. The field blank will include all of the parameters included in the sample analysis while the trip blank will be limited to VOCs. One matrix spike and one matrix spike duplicate will also be collected. One duplicate field sample will be submitted as well.

5.2.5 DUSR

A qualified data validator will review the laboratory submission and prepare a DUSR for the sampling event.

5.2.6 Reporting of End-Point Data in FER

The FER will include a detailed description of endpoint sampling activities, data summary tables, box plot map showing endpoint sample locations and concentrations, DUSR, and laboratory reports. Chemical laboratories used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified.

Endpoint sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements. Side-wall samples will be collected a minimum of every 30 linear feet. Bottom samples will be collected at a rate of one for every 900 square feet. The FER will provide a tabular and illustrated summary of all end-point sample results and exceedances of SCOs.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

The Site consists of an existing building with a basement floor approximately 10 feet below sidewalk grade with the remaining area consisting of vacant, unimproved land. The existing soil

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at the Site will be excavated to a depth of 12.5 feet below grade. The foot print of the existing building comprises approximately 7,613 square feet. As there is an existing basement, approximately five additional feet of soil needs to be removed from this area. Based on these measurements, approximately 705 cubic yards of soil will have to be excavated from the Site. Using a conversion factor of 1.5, this equates to approximately 1,058 tons of material.

The estimated quantity of soil/fill to be removed from the Site is 705 cubic yards. The estimated quantity of soil to be imported into the Site for backfill and cover soil is not anticipated as the building foundations themselves will be used as part of the composite cover system. The existing soil/fill is not expected to be reused/relocated on Site.

The existing building is approximately 100 feet by 77 feet. Assuming the walls extend from the basement to the roof for a total height of 25 feet; the walls are approximately 1-1/2 feet thick; and the floor & roof are approximately 1/2 foot thick, the estimate volume of construction and demolition debris will be approxiately 750 cubic yards.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

The Soil/Materials Management Plan describes the procedures to be performed during the handling of soil/fill materials on-Site during the remedial activities.

5.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER.

Screening will be performed by qualified environmental professionals. Resumes for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work are enclosed as Appendix C.

5.4.2 Stockpile Methods

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

A hose connected to a NYS fire hydrant will be available on-Site for dust control.

5.4.3 Materials Excavation and Load Out

The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and

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load-out of all excavated material and will keep a record of the load out of all excavated materials.

The presence of utilities and easements on the Site will be investigated by the Remedial Engineer prior to the start of remedial activities. The BCP Volunteer has been determined that no risk or impediment to the planned work under this RAWP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site. The Remedial Engineer will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remedial Engineer will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Applicant and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

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Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-Site will be prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the FER.

5.4.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Truck transport routes will be determined after the disposal facilities for this project are selected. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. Proposed in-bound and out-bound truck routes to the Site are shown in Figure 12. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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Trucks will be encouraged not to stop and idle in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-Site to the extent possible in order to minimize off-Site disturbance. Off-Site queuing will be used only when necessary.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loosefitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

5.4.5 Materials Disposal Off-Site

Approximately 1,410 cubic yards of soil/fill are expected to be disposed of off-Site. Based on the results of the RI, the material to be disposed of off-Site is best described as non-hazardous regulated material.

Waste characterization samples will be collected from the Site prior to commencing with Site construction activities. Based on the waste characterization results, a properly permitted waste disposal facility will be selected for off-Site disposal. The disposal facility information including location will be reported to the NYSDEC Project Manager prior to commencing with the disposal activities.

Since the Site includes a former dry cleaner, "hot spots" of soil contaminated with elevated levels of PCE may be encountered as the excavation of the building foundation progress. Should PID readings indicate that such a "hot spot" has been encountered, that material will be

segregated and stored in a separate, plastic-covered pile. The material will be sampled and analyzed to determine if it can be disposed of at the facility selected for the project or if an alternate disposal facility and waste disposal classification must be selected.

A demolition contractor will be retained to demolish the existing structure. The demolition contractor will be required to provide the name of the facility that will be used for disposal of the demolished building materials. This information will, in turn be forwarded to the NYSDEC and be included in the FER.

All soil/fill excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Solid waste, such as the building maeterials from demolition and buried debris within the fill will be disposed of in accordance with Part 360. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer or his/her designee for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or BCP Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter

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from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a NYSDEC DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

There are currently no plans to reuse the soil on-Site.

5.4.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

5.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to placement of the foundation slab, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of the vapor barrier described in Section 7 will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the Site Management Plan. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute the physical and written record of the upper surface of the 'Residuals Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Final Remediation Report and the Site Management Plan.

5.4.9 Backfill from Off-Site Sources

At this time, there are no plans to import soil to the Site. However, if this changes the following procedures will be employed.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site.

Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The FER will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site, which is the lower of the protection of groundwater or the protection of public health, restricted residential clean up objectives per Table 375-6.8b of 6 NYCRR. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this RAWP should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

5.4.10 Stormwater Pollution Prevention

The BCP Volunteer has established that construction activities at this Site will minimize soil erosion, sedimentation of surrounding storm drains, pollution of storm-water runoff leaving the Site, and the migration of dust and dirt from the Site to surrounding streets and buildings. To achieve this requirement, Contractors will employ the measures in this plan to satisfy the following objectives:

- 1. Minimize unnecessary soil disturbance and dust generation on Site.
- 2. Minimize storm-water contamination from on-Site activities.
- 3. Inhibit or slow the flow of runoff across the Site.
- 4. Remove sediment from on-Site runoff before it leaves the Site.
- 5. Remove soil from vehicles leaving the Site.

6. Inhibit dust migration from the Site to surrounding streets and buildings without excessive use of water.

- 7. Prevent concrete washout from filling catch basins.
- 8. Minimize on-Site pollution due to construction activity.

5.4.10.1 Minimize Unnecessary Soil Disturbance and Dust Generation

Construction-related Site soil excavation activities for this project generally include removing the soil underneath the building until 12.5 feet below grade or until Track 4 Site Specific Soil Action Levels (if any) are achieved or bedrock is encountered. The excavation aerial limits are the Site boundary lines.

Soil excavation and removal/re-use (if needed) for environmental purposes is covered by the RAWP. The RAWP includes a HASP and CAMP that outline the requirements for dust monitoring and dust control during construction activities and record keeping requirements.

Perimeter fencing at the Site will also provide protection from the wind thus reducing the potential for wind blown dust from leaving the Site.

5.4.10.2 Minimize Storm-Water Contamination

During the first phases of construction, storm-water will be managed on Site. Run-off from the Site is not anticipated after the excavation starts. On-Site soils/fill are permeable and storm-water is expected to freely leach into the ground. If ponding does occur, pumping of storm-water to a New York City storm sewer may be required. Storm-water discharge permits will be obtained as required from NYCDEP before storm-water may be pumped to the sewer. As a precautionary measure, sediment control measures such as silt fencing and/or hay bales may be put in place along the northwestern perimeter of the Site to minimize any sediment carried by storm-water leaving the Site.

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On-site soils/fill that are stockpiled for transportation will be positioned such that all storm-water and any soil erosion will be prevented from leaving the Site by the proper grading around the pile. This will cause run-off to flow to the on-Site low point or a retention area.

Stockpiled materials for off-Site disposal will be properly enveloped in plastic sheeting to prevent storm-water contamination, on-Site migration of sediments during rain events, and to minimize dust generation from these materials.

5.4.10.3 Inhibit or Slow the Flow of Run-off Across the Site

On-Site control of flow across the Site should only become a problem if the excavation of the Site does not proceed uniformly. Areas in the excavation where steep slopes occur should be bermed at the top of the slope to prevent run-off from the upper bench from flowing over the open fence of the excavation.

Due to the size and depth of the excavation and permeability of the soils on Site, storm-water control should not be a difficult task and normal prudent excavating procedures should be capable of controlling the storm-water flow.

5.4.10.4 Remove Sediment from Storm-Water before Leaving the Site

NYCDEP has established standards for storm-water discharged to the city's sewer system. The standards for suspended solids usually require that storm-water be settled and sometimes filtered before it can be discharge to the sewer. Any storm-water pumped from the Site would have to meet the requirement.

5.4.10.5 Remove Soil from Vehicles Leaving the Site

A tracking control pad is proposed for the Site's entrance gate. This is a crushed stone pad to prevent tracking of Site soils and mud from the Site to the nearby roadways. Each truck leaving

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the Site will be inspected for soil/fill or mud on its tires. If found, the soil/fill or mud will be washed off by a laborer, with a hose before the truck leaves the Site.

Additional stone may have to be added to the tracking control pad from time to time as it becomes fouled with on-site soils.

In the event sediment from the trucks leaving the Site does begin to flow down the street, such as on rainy days, the following procedures will be employed.

• Disposalable absorbent socks will be laid on the ground in front of the downgradient stormdrains to catch the sediment. The sediment will then be pushed up the street and back onto the Site with brooms.

• In extreme cases when even the use of absorbent socks will not prevent all of the sediment from flowing toward the storm drain, a drain insert filter will be placed in the storm drain to catch the sediment that flows into the drain.

5.4.10.6 Prevent Concrete Washout from Filling Catch Basins

A specific area will be designated on-Site for concrete truck wash down. No wash down water will be allowed to flow off the Site. Excess concrete delivered to the Site, but not used, shall remain on the truck and be returned to the supplier. If minor amounts of excess concrete are discharged at the Site, it shall be collected by the contractor after it has hardened and placed in a roll-off container for recycling.

During construction, wash water generated from the delivery trucks will be discharged to the ground and allowed to percolate into the soil.

5.4.10.7 Minimize Site Pollution Due to Construction Activities

Construction waste management practices are described in Section 5 of the RAWP. These include fluids management, construction & demolition debris management, soil materials management and re-use, and Site clearing waste management. Additional preventative measures are described below in Section 5.4.10.10.

5.4.10.8 Permit Requirements

The only permit that may be required for storm-water and erosion control is a Storm-water Discharge permit from the NYCDEP. However, discharge of storm-water to the public sewer is not anticipated at this time.

5.4.10.9 Control Measures for SWPPP

- Construction fencing with wind screen shall be erected.
- Dust control during Site excavation by Site Contractor monitored by CA RICH
- Limited trucking of excavated materials to recycle or disposal in covered trucks monitored by CA RICH.
- Controlled sprinkling of the Site by Site Contractor as need to suppress dust monitored by CA RICH
- Use of a ready mix company that can washout concrete trucks off-Site and limit on-Site washouts to concrete chutes only. Use on-Site washout tanks only if necessary.
- Soil and dust shall be rinsed from trucks before leaving Site at gravel covered Tracking Control Station.
- The construction manager shall designate storage areas for construction materials and areas for staging equipment at the Site.
- Waste materials from the Site will be handled according to Section 5 of the RAWP.

• On rainy days, disposable absorbent socks will be laid on the ground in front of the downgradient storm drain to catch the sediment. The trapped sediments will then be pushed up the street and back onto the site with brooms.

• In extreme cases when even the use of absorbent socks will not prevent all of the sediment from flowing toward the storm drain, a drain insert filter will be placed in the storm drain to catch the sediment that flows into the drain.

5.4.10.10 Other Related Items

• Good housekeeping efforts shall be employed during vehicle refueling. A contracted vendor supplies a delivery truck that is used to fuel construction vehicles. The operator shall be careful to prevent overfill or spillage of fuel.

• If any minor spills occur, they shall be quickly and completely cleaned up and the impacted soil shall be disposed of off-Site. All major releases of fuel shall be reported to the NYSDEC in accordance with regulations.

• Waste chemicals, such as used motor oil or used oil filters, shall be disposed of off-Site in accordance with NYSDEC regulations.

5.4.10.11 Recommendations

- Line up ready mix and concrete pump trucks that can do off-Site wash-out and/or can supply portable wash-out tanks.
- Set-up a Site inspection log documenting the SWPP Practices, noting any deficiencies or improvements that can be made. This should be done on a weekly basis at a minimum.
- Site Contractor should hold monthly SWPPP meetings to coordinate all contractors and subcontractor efforts.

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- Barriers will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.
- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.
- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.
- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.
- Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.
- Silt fencing will be installed at the low point of the remedial construction area.

5.4.11 Contingency Plan

Three ASTs will be removed from the Site in accordance with applicable regulations. If USTs, additional ASTs, or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, it will be removed according to applicable regulations and sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

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5.4.12 Community Air Monitoring Plan

The Community Air Monitoring Plan is included in the HASP which is enclosed as Appendix F. A map showing the location of fixed and mobile sampling stations will be developed by the Site Health & Safety Office prior to beginning the excavation program.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.4.13 Odor, Dust and Nuisance Control Plan

The FER will include the following certification by the Remedial Engineer: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include use of a PID meter to screen for VOCs and olfactory observations by Field Technicians. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Applicant's Remedial Engineer, who is responsible for certifying the FER.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open

excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.4.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work, will include, at a minimum, the items listed below:

- Dust suppression will be achieved though the use of a dedicated on-Site hose connected to a fire hydrant. The hose will be equipped with a nozzle capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel apron will be provided at truck entry/exit points to the Site to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

5.4.13.3 Other Nuisances

A plan for rodent control was developed and will be utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work. The rodent plan includes the following.

Within the construction Site, tamper resistant rodent bait stations will be installed in appropriate locations and active rodent burrows will be baited.

Upon installation, each bait station will be baited, labeled, and secured to the ground. Bait will be replenished and bait stations relocated as necessary to control rodent populations. A baiting program will be initiated prior to mobilization by the contractor in the construction area. Regular inspections and rebaiting of bait stations will be performed to ensure rodents will not be dispersed by construction activities and that rodents will not infest work areas.

Safety signs will be posted onsite, which will include a copy of the product label and MSDS for the rodenticide in used. Signs will also list practical medical treatment, first aid procedures, and antidote. Caution signs in English and Spanish will be posted when bait stations are placed in areas accessible to the general public, domestic animals, and pets.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil, groundwater and soil vapor will exist beneath the Site after the remedy is complete, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a Site specific Site Management Plan (SMP) that will be developed and included in the FER.

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ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have two primary EC systems. These are: (1) a composite cover system consisting of a concrete covered sidewalks, concrete building slabs/foundations; (2) a vapor barrier; and/or, (3) a ventilated parking garage.

The FER will report residual contamination on the Site in tabular and graphic form. This will include presentation of exceedances of Track 1 and Track 4 Site Specific Soil Action Levels (if any).

7.0 ENGINEERING CONTROLS: COMPOSITE COVER SYSTEM

7.1 COMPOSITE COVER SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the Site. This composite cover system will be comprised of a composite system consisting of concrete sidewalks, concrete building slabs/foundations, vapor barrier, and/or a ventilated parking garage. The proposed new building and ventilated parking garage are shown on Figures 3A, 3B, and 3C.

Maintenance of this composite cover system will be described in the Site Management Plan in the FER. In addition, a Soil and Underground Structure Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

8.0 ENGINEERING CONTROLS: TREATMENT SYSTEMS

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER.

8.1 ENGINEERING CONTROL SYSTEMS

8.1.1 Criteria for Completion of Remediation/Termination of Remedial Systems

8.1.1.1 Composite Cover System

The composite cover system described in Section 7 is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in perpetuity.

8.1.1.2 Sub-Slab Depressurization (SSD) System

To prevent off-gassing of residual VOCs dissolved in underlying uppermost groundwater and/or in the soil/fill from entering the new building's interior, installation of an active SSD system will be included in the construction of the new buildings' foundation as a contingency. The SSD system will maintain a negative pressure underneath the slab while allowing the vapors below the concrete slab to vent without intruding into the building. The SSD system will consist of horizontal trenches filled with perforated pipe. The horizontal pipes will be connected to vertical risers that extend above the roof of the building. Any pipe penetrations through the vapor barrier will be sealed in accordance with the manufacturer's recommendations. The SSD fans will be mounted above the roof. The proposed SSD layout is illustrated on Figure 16. The Typical Vent Detail is illustrated on Figure 17. The SSD system will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSD system may be submitted by the property owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

8.1.1.3 Monitored Natural Attenuation

Groundwater monitoring of wells installed during the Pre-Design Investigation as well as off-Site wells MW-3 and MW-4 will be performed (see Figure 18) to assess natural attenuation and the effectiveness of the groundwater treatment system (if one is required). The monitoring frequency will be submitted to the NYSDEC in Groundwater Remediation System Design Report. Groundwater samples will be collected from the wells, submitted to an ELAP-Certified Laboratory and analyzed for VOCs via EPA Method 8260 and total and dissolved TAL metals. The results of the first round of post-remedial groundwater monitoring will be included in the FER. The monitoring will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities outlined in Groundwater Remediation System Design Report will also be incorporated into the Monitoring Plan of the SMP.

9.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and a Site Management Plan. These elements are described in this Section. A Site -specific Environmental Easement will be recorded with Bronx County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and

Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

9.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions than an Environmental Easement is required. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Bronx County Clerk. The Environmental Easement will be submitted as part of the Final Remediation Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the Bronx County Clerk before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to residential and commercial use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of concrete sidewalks, concrete building slabs/foundation, vapor barrier, and/or ventilated parking garage must be inspected, certified and maintained as required in the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and remediation wells (if needed), must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Subsurface vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;

- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan;
- The Controlled Property may be used for restricted-residential and commercial use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The Controlled Property may not be used for a higher level of use, such as unrestricted residential use without an amendment or extinguishment of this Environmental Easement;
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC finds acceptable.

9.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002 (Ref. 7) and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The Site Management Plan in the FER will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy. Existing well MW-5 and proposed well MW-2A are downgradient wells located in the sidewalk along East 158th Street.

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No exclusions for handling of residual contaminated soils will be provided in the Site Management Plan (SMP). All handling of residual contaminated material will be subject to provisions contained in the SMP.

10.0 FINAL ENGINEERING REPORT

An FER and SMP will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the FER review.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

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The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCOs in 6 NYCRR Part 375-6, but meets the Track 4 Site Specific Soil Action Levels established for this Site. A table that shows exceedances from Track 1 SCOs and compliance with Track 4 Site Specific Soil Action Levels for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes the data for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site, if any, in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs, if any, and a map that shows residual contamination in excess of Site SCOs, if any, will be included in the FER.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

10.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the Remedial Engineer Stephen Osmundsen who is a Professional

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Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Stephen Osmundsen, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Cornerstone Site B-1 (NYSDEC BCA Index No. W2-1126-08-10 Site No. C203044).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the BCA for Cornerstone Site B-1 and related amendments.

I certify that the Remedial Action Work Plan dated December 2007; revised May 2009 and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan will be submitted by the Applicant along with the FER for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan will be approved by the NYSDEC.

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I certify that the export of all contaminated soil, fill, water or other material from the Site was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

11.0 SCHEDULE

A schedule of remedial action activities is presented below.

Activity	Calendar Date
Submission of Pre-Design Investigation Work Plan	May 1, 2009
Submission of Final RAWP and Fact Sheet	May 11, 2009
Removal of ASTs and Demolition of Building	May 2009
NYSDEC approval of Pre-Design Investigation Work Plan	June 1, 2009
Pre-Design Investigation	June 1, 2009
Selection of waste disposal facilitie(s) and collection & analysis of waste characterization samples	June 2009
Start of Construction Fact Sheet	June 15, 2009
Excavation of Site Begins	July 1, 2009
Collection of Excavation Endpoint Samples	July 15, 2009
Groundwater Investigation and Design Report	July 22, 2009
Comments from NYSDEC on Groundwater Investigation and Design Report	August 8, 2009

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Construction of below grade portions of groundwater		
treatment system (if needed)		September 1, 2009
Completion of above ground portion of gro	oundwater	
treatment system (if needed)		November 2009
First Round of Post-Remedial Monitoring		December 2009
Recording of an Environmental Easement		December 2009
Preparation of FER, SMP, and Fact Sheet		JanFebruary 2010
Certificate of Completion and IC/EC Fact	Sheet	Feb March 2010

REFERENCES

NYSDEC. 6 NYCRR Part 375 Environmental Remediation Programs, Subparts 375-1 to 375-4 & 375-6. New York: Author, December 2006.

2. CA Rich Consultants, Inc. Remedial Investigation Report, Cornerstone Site B-1, 3100 Third Avenue, Bronx, N.Y. New York: Author, November 2007; Revised April 2009.

3. NYSDOH. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. New York: Author, October 2006.

4. NYSDEC. Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. New York: Author, June 1998.

5. Pressly & Associates, Inc. Phase I Environmental Site Assessment For Site B, Block 2364; Lots 45, 49. 55, 56, 58, Third Avenue/E.160th Street/Brook Avenue, Bronx, NY. (also includes Lot 70). New York: Author, March 2004.

6. New York State Museum and Science Service. Geologic Map of New York, Lower Hudson Sheet, Map and Chart Series Number 15. New York: Author, 1995.

7. NYSDEC, (December 2002), Draft DER-10 Technical Guidance for Site Investigation and Remediation.

8. NYSDEC. Technical And Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels. New York: Author, January 24, 1994.

9. CA Rich Consultants, Inc. Citizen Participation Plan. New York: Author, April 2007.

10. CA Rich Consultants, Inc. Pre-Design Investigaiton Work Plan. New York: Author, May 2009.

ATTACHMENT 1

1.0 SCG'S FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 Water Quality Standards (June 1998)
- 6 NYCRR Part 182 Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 Use and Protection of Waters
- 6 NYCRR Part 661 Tidal Wetlands Land Use Regulations
- 6 NYCRR Part 663 Freshwater Wetlands Maps and Classification
- 6 NYCRR Parts 700-706 Water Quality Standards (June 1998)
- 6 NYCRR Part 257 Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 175 Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- TAGM 4046 Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- STARS #1 Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 Site Assessments at Bulk Storage Facilities (August 1994)
- TOGS 1.1.1 Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)

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- Technical Guidance for Screening Contaminated Sediments (January 1999)
- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorus Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

2.0 SCGS FOR REMEDY SELECTION

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Part 376 Land Disposal Restrictions
- 6 NYCRR Part 608 Use and Protection of Waters
- 6 NYCRR Part 661 Tidal Wetlands Land Use Regulations
- 6 NYCRR Part 663 Freshwater Wetlands Permit Requirements
- 6 NYCRR Parts 700-706 Water Quality Standards (June 1998)
- 19 NYCRR Part 600 Waterfront Revitalization and Coastal Resources
The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 Early Design Strategy (August 1993)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TAGM 3028 "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:
- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

3.0 SCGS FOR UNDERGROUND STORAGE TANK CLOSURE

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)

- 6 NYCRR Part 371 Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 Standards for the Management of Used Oil (November 1998)
- 6 NYCRR Parts 700-706 Water Quality Standards (June 1998)
- 40 CFR Part 280 Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 Petroleum-Contaminated Soil Guidance Policy
- STARS #2 Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks (July 1988)
- TAGM 3028 "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Air Guide 1 Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 "Individual Water Supplies -Activated Carbon Treatment Systems"

4.0 SCGS FOR REMEDIAL ACTION

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 Underground Injection Control Program
- 10 NYCRR Part 67 Lead

- 12 NYCRR Part 56 Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 Land Disposal Restrictions
- 19 NYCRR Part 600 Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 Use and Protection of Waters
- 6 NYCRR Part 661 Tidal Wetlands Land Use Regulations
- 6 NYCRR Part 663 Freshwater Wetlands Permit Requirements
- 6 NYCRR Parts 700-706 Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 Implementation of NPDES Program in NYS ("SPDES Regulations")
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 Making Changes To Selected Remedies (May 1998)
- STARS #1 Petroleum-Contaminated Soil Guidance Policy
- STARS #2 Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies
- OSWER Directive 9200.4-17 Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)
- NYSDOH Environmental Health Manual CSFP-530 "Individual Water Supplies -Activated Carbon Treatment Systems"

5.0 SCGS FOR SITE MANAGEMENT

The following standards and criteria typically apply to Site Management activities conducted in New York State:

Ca RICH Environmental Specialists

Cornerstone B-1 RAWP December 2007; Revised April 2009

• 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)
- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.
- NYSDOH Environmental Health Manual CSFP-530 "Individual Water Supplies Activated Carbon Treatment Systems"

FIGURES









Figure 3A



Cornerstone B-1

A New 107 Unit Mixed-Use Residential Building w/ Commercial Space

Comensione B-1 Biock 2364 Lot 45,PAO 58, 59 & 70 Bronx, NY 10458 Ctents:

CS Meirose Site B Associates, LLC Nos Guadamos L + M Equity Participants Natives Associates

1805 Palmer Avenue Larchmont, NY 19538 Tal: 914-833-3000 Fax: 914-833-3082



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Landspace Architect

Drawing Titlas

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CELLAR PLAN

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Data 03.15.09	Drawing #
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FIGURE 3 B



Pagest Tilar Cornerstone **B-1**

A New 107 Unit Mixed-Use Residential Building w/ Commercial Space

Comensione B-1 Block 2364 Lot 45,P/O 58, 59 & 70 Bronx, NY 10458 Clorits

CS Melrose Sits B Associates, LLC Not Guedence L + M Equity Participants Marrise Associations

1805 Palmer Avenue Larchmont, NY 19538 Teb 914-833-3009 Fax: 914-833-3082



Key Plan: INVITE: DATE DESCRIPTION MARKER DATE DESCRIPTION 13.1127 KIN RICHAR BET 11.027 KIN RICHAR BET 11.027 KIN RICHAR BET 11.027 KIN RICHAR BET 11.02 DOB RUMARISON II 11.02 _____ ____ ____ ____ ____ Revisions Ard Mart Magnusson Architecture & Planning PC 833 Broadwry, Bula 800 New York, NY 1003 Tel (212) 283-7830 Fex (212) 283-1278 www.magarchitecta.com Stutumi Engineer Goldstein Associates, PLLC Structural Engineer 31 Weet Zrh Street New York, NY 15001 Tel: 212-545-7878 Fee: 212-545-822 MEP Engineer: Rodkin-Cardinale Cons. Engineers PC

Consulting Engineer 214 West 20th Street New York, NY 1001 Teb (212) 230-1882 Fest (212) 230-6412 Expeditor:

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Drawing Tile: SITE PLAN + BUILDING DATA

Project Number: 03008 Data 03.15.09 Drawing # Deart by: 80 A=0.7 Checked by:

90% CONSTRUCTION SET: 03-15-09

FIGURE 3C

















<u>Geologic</u> Section









TRUCK ROUTE MAP

Figure 12













TABLES

•

				Т	ABLE 1				· · · · · · · · · · · · · · · · · · ·						
			Sum	mary of VOC	Analytical De	etections for									
			Soil Borin	g Samples fro	om June and	September 20	007								
				Corner	stone Site B-	1									
				Bron	x, New York										
Sample ID	SB-1 (18")	SB-2 (18")	SB-3 (18")	SB-4 (6")	SVB-06	SVB-09	SVB-X*	SB-11	NYSDEC	Part 375***					
Lot	45	45	45	45	45	45	45	70							
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	TAGM**	Track 1					
Date Sampled	6/7/2007	6/7/2007	6/7/2007	6/7/2007	9/7/2007	9/7/2007	9/7/2007	9/7/2007		Unrestricted Use					
Volatile Organics															
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg					
Methylene Chloride	25 B	20 B	25 B	30 B	ND	ND	ND	ND	100	50					
Tetrachloroethene	11	3.6 J	ND	ND	28	49	15	ND	1,400	1,300					
Notes:							···· · · · ·	· · · · · · · · · ·							
All concentrations are report	ed in microgram	ns per kilogram (µg/kg) or parts p	er billion.		***6 NYCRR Pa	nt 375, Table 37	5-6.8(a): Unresti	ricted Use Soil (Cleanup Objectives,					
ND= Indicates the compound	d was analyzed	for but not detec	ted.			December 2006	5.								
B = Analyte detected in the a	associated meth	od blank.													
J - Estimated Value															

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* SVB-X is a duplicate of SVB-06.

** NYSDEC Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup

Objectives and Cleanup Levels; January 24, 1994.

	IABLE 2 VALIDATED ANALYTICAL DETECTIONS FOR VOLATILE ORGANIC COMPOUNDS IN SOIL BORING SAMPLES - OCT. 2007 Cornerstone Site B-1 3100 Third Avenue Bronx, New York																				
SAMPLE ID: DEPTH: Lot: MATRIX: SAMPLING DATE: UNITS:	RI-1 0-5 ft. 70 Soli 10/10/2007 ug/kg C	RI-1 10-15 ft. 70 Soil 10/10/2007 Qug/kg C	RI-2 0-5 ft. 70 Soli 10/10/2007 Q ug/kg 0	RI-2 10-15 ft. 70 Soil 10/10/2007 Q ug/kg C	RI-3 0-5 ft. 70 Soil 10/10/2007 Ug/kg C	RI-3 10-15 ft. 70 Soll 10/10/2007 ug/kg	RI-4 0-5 ft. 49 Soil 10/10/2007 Q ug/kg	RI-4 10-15 ft, 49 Soll 10/10/2007 Q ug/kg C	RI-XX* 10-16 ft. 49 Soil 10/10/2007 ug/kg	RI-5 0-5 ft. 70 Soil 10/10/2007 Q ug/kg	RI-5 10-15 ft. 70 Soli 10/10/2007 Q ug/kg (RIBAS-01 10" below bsmt. 45 Soli 10/10/2007 Q ug/kg	RIBAS-02 10" below bsmt. 45 10-15 ft. 10/10/2007 Q ug/kg C	RIPS-01 0-1 ft. 70 Soil 10/10/2007 Q ug/kg	RIPS-02 0-1 ft. 70 Soli 10/10/2007 Q ug/kg 0	RIPS-03 0-1 ft. 70 Soil 10/10/2007 1 ug/kg	RIPS-04 0-1 ft. 70 Soli 10/10/2007 Q ug/kg	FIELD BLANK Liquid 10/10/2007 Q ug/L (TRIP BLANK Liquid 10/10/2007 ug/L	NYSDEC TAGM'' ug/Kg	Part 375*** Unrestricted Use ug/Kg
Volatife Organic Compounds Dichlorodifiuoromethane Vinyl Chloride 1,1-Dichloroethane 2-Butanone Bromomethane Chloroform Carbon Tetrachloride Chloroform Carbon Tetrachloride Chloroethane 1,2-Dichloroethane Trichloroethane 1,2-Dichloroethane Benzene Acetone Trichloroethane Carbon Disulfide Chlorobenzene Methylene Chloride trans-1,2-Dichloroethane Tithekoroethene Carbon Disulfide Chlorobenzene Methylene Chloride trans-1,2-Dichloroethane 3,2-Dichloroethane Chloroform 1,1-1-Trichloroethane 1,1-Dichloroethane Chloroform 1,1-1-Trichloroethane Chloroform 1,1-1-Trichloroethane Chloroform 1,1-2-Trichloropropane Bromochloromethane Cis-1,3-Dichloropropane Bromochloromethane Chloroform 1,1,2-Trichloroethane 1,1,2-Trichloropropane Erans-1,3-Dichloropropane Toluene Chloroform 1,1,2-Trichloroethane 1,1,2-Trichloroethane 1,1,2-Trichloroethane 1,1,2-Trichloroethane 1,1,2-Tetrachloroethane 1,1,2-Tetrachloroethane 1,1,2-Tetrachloroethane 1,3-Dichloropropane Dibromochloromethane Chloroform 1,2-Dichloropropane Dibromochloromethane 1,1,2-Tetrachloroethane 1,2-Dichloropropane 2-Chloroblenzene 1,3-Trichloroptopane 1,3-Trichloroptopane 1,3-Trichloroptopane 1,3-Trichloroptopane 1,2-Dichlorobenzene 1,2-Dichlorobenz	5 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		6 U 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 U U U U U U U U U U U U U U U U U U U	66662666666666666666666666666666666666			66666666666666666666666666666666666666	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	5 U 5 U 5 U 5 U 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 5 0 0 0 <td>J NA NA NA NA NA NA NA NA NA NA NA NA NA N</td> <td>NA NA N</td> <td>NA NA N</td> <td>NA NA NA NA NA NA NA NA NA NA NA NA NA N</td> <td>5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5</td> <td>しいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしい</td> <td>NVG 200 400 NVG 600 NVG 300 NVG 1,900 NVG 60 200 NVG 1,400 1,200 1,400 1,200 1,400 1,200 1,700 300 200 NVG NVG NVG NVG NVG NVG NVG NVG NVG NVG</td> <td>NVG 20 330 NVG NVG 370 760 NVG 20 NVG 60 50 470 NVG 1,300 NVG 1,100 50 1,300 NVG 250 NVG 250 NVG 250 NVG 250 NVG 370 830 NVG 250 NVG NVG NVG NVG NVG NVG NVG NVG NVG NVG</td>	J NA NA NA NA NA NA NA NA NA NA NA NA NA N	NA N	NA N	NA NA NA NA NA NA NA NA NA NA NA NA NA N	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	しいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしいしい	NVG 200 400 NVG 600 NVG 300 NVG 1,900 NVG 60 200 NVG 1,400 1,200 1,400 1,200 1,400 1,200 1,700 300 200 NVG NVG NVG NVG NVG NVG NVG NVG NVG NVG	NVG 20 330 NVG NVG 370 760 NVG 20 NVG 60 50 470 NVG 1,300 NVG 1,100 50 1,300 NVG 250 NVG 250 NVG 250 NVG 250 NVG 370 830 NVG 250 NVG NVG NVG NVG NVG NVG NVG NVG NVG NVG
NVG - No Value Given. D - results after cilution Q - Qualifier				***6 NYCRR Part BOLD AND BOX ITALICS INDICAT	375 Table 375-6.8(INDICATES VALU ES VALUE IS ABC	a):Unrestricted Us E IS ABOVE NYS IVE PART 375 UN	se Soil Cleanup Obj DEC TAGM GUID RESTRICTED US	ectives: December 2 ANCE VALUES E SOIL CLEANUP 0	006. BJECTIVES												

| | VALIDATED ANALYTICAL DETECTIONS FOR SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL BORING SAMPLES - OCT. 2007
Correstone Site B-1
3100 Third Avenue
Bronx, New York | |
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DEPTH:
Lot:
MATRIX:
SAMPLING DATE: | RI-1
0-5 ft.
70
Soll
10/10/2007 | RI-1
10-15 ft.
70
Soll
10/10/2007 | Ri-2
0-5 ft.
70
Soil
10/10/2007
 | Ri-2
10-15 ft.
70
Soil
10/10/2007
 | RI-3
0-5 ft.
70
Soll
10/10/2007 | RI-3
10-15 ft.
70
Soll
10/10/2007 | RI-4
0-5 ft.
49
Soïl
10/10/2007 | RI-4
10-15 ft.
49
Soil
10/10/2007
 | RI-XX*
10-15 fL
49
Soil
10/10/2007
 | Ri-5
0-5 ft.
70
Soli
10/10/2007 | RI-5
10-15 ft.
70
Soll
10/10/2007 | RIBAS-01
10" below bsmt.
45
Soil
10/10/2007 | RIBAS-02
10" below bsmt.
45
Soli
10/10/2007 | RIPS-01
0-1 ft.
70
Soil
10/10/2007
 | RIPS-02
0-1 ft.
70
Soil
10/10/2007 | RIPS-03
0-1 ft.
70
Soli
10/10/2007 | RIPS-04
0-1 ft.
70
Soil
10/10/2007 | FIELD BLANK
Líquid
10/10/2007 | NYSDEC
TAGM** | Part 375
Unrestricted
Use SCOs
 |
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 | <u>d ug/kg C</u>
 | ug/kg (| ug/kg | Q ug/kg | Q ug/kg (
 | ug/kg C
 | ug/kg | Q ug/kg | Q ug/kg (| Q ug/kg C |) ug/kg C
 | t ug/kg | Q ug/kg | Q ug/kg | Q ug/L Q | ug/kg | ug/kg
 |
| SAMPLING DATE:
UNITS:
SEMIVOLATILE ORGANIC COMPOUNDS
Phenol
bis(2-Chlorobenzene
1,4-Dichlorobenzene
1,4-Dichlorobenzene
1,4-Dichlorobenzene
1,4-Dichlorobenzene
2Methylphenol
2,2-oxybis(1-Chloropropane)
4-Methylphenol
2,-Dichlorobenzene
Nitrobenzene
1,4-Dimethylphenol
2,4-Dichlorobenzene
2,4-Dichlorobenzene
Nitrobenzene
2,4-Dichlorobenzene
Naphthalene
4-Chloroaniline
Hexachloroethaxymethane
4-Chloroaniline
Hexachloroethaxymethane
4-Chloroaniline
Hexachloroethaxymethane
4-Chloroaniline
Hexachloroethaxymethane
4-Chloroaniline
Hexachloroethaxymethane
4-Chloroaniline
Hexachlorophenol
2,4,5-Trichlorophenol
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2,4,5-Trichlorophenol
2,4,5-Trichlorophenol
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2,4,5-Trichlorophenol
2,4-Dinitrotoluene
3-Nitroaniline
Accenaphthene
2,4-Dinitrotoluene
3-Nitroaniline
Accenaphthene
2,4-Dinitrotoluene
3-Nitroaniline
Accenaphthene
2,4-Dinitrotoluene
3-Nitroaniline
Accenaphthene
2,4-Dinitrotoluene
Biblenzoturan
2,4-Dinitrotoluene
Dietnylphthalate
4-Chlorophenyl-phenylether
Fluorene
4-Nitroaniline
Acconaphterylether
Hexachlorobezene
Pentachlorophenol
Dietnylphthalate
1-Ductylphthalate
Fluorantinene
Anthracene
Catbazole
Di-n-butylphthalate
S,3-Dichlorobenzidine
Benzo(k)fluoranthene
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| Dibenzo(a,h)anthracene
Benzo(g,h,i)perylene | 690 J
2,700 | 380 380 | ノ 360 L
J 91 L
 | 1 400 U
1 400 U
 | | 200 | J 45
J 200 | J 990 J
J 4,300
 | 5,100 J
 | 340
45 | 2,800 | 320 | J 98 J | I NA
 | NA
NA | NA | NA | 10 U | 50,000 | 100,000
 |
| Total TiCs | 7,090 J | 240 | J 1,170
 | 370
 | 510 | 880 | J 320 | J 9,420 .
 | I 470 J
 | 14,410 | J 14,520 | J 1,580 . | J 690 . | NA .
 | NA | NA | NA | ND | Not Applicable | Not Applicable
 |
| Notes:
J - Estimated Value, below the calibrated range
ug/Kg - micrograms per kilogram or parts per b
U - Not detected at or above laboratory detectiv
NVG - No Value Given
Q - Qualifier | es.
Mon
ion limits | | ND - Not Detecte
NA - Not Analyze
*RI-XX is a duplic
**NYSDEC TAGM
Bold and Box In
ITALICS INDICA
 | d
d
ale of RI-4 (10'-15')
<u>/ 4046: Determinati</u>
dlactes Value is A
TES VALUE IS ABC
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bove NYSDEC TA
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3M Guidance Vali
RESTRICTED USE | R - Unusable Da
anup Levels; Janu
ues]
SOIL CLEANUP (| ta
nry 24, 1994.
DBJECTIVES
 |
 | ***6 NYCRR Par
December 2006. | 1 375 Table 375-6.8 | i(a): Unrestricted Us | se Soil Cleanup Obje | ectives;
 | | | | | |
 |

	TABLE 4 VALIDATED ANALYTICAL DETECTIONS FOR PCBs IN SOIL BORING SAMPLES - OCT. 2007 Cornerstone Site B-1 3100 Third Avenue Bronx, New York																			
SAMPLE ID:	RI-1	RI-1	RI-2	RI-2	RI-3	RI-3	Ri-4	RI-4	RI-XX	RI-5	RI-5	RIBAS-01	RIBAS-02	RIPS-01	RIPS-02	RIPS-03	RIPS-04	FIELD BLANK		
DEPTH:	0-5 ft.	10-15 ft.	0-5 ft.	10-15 ft.	0-5 ft.	10-15 ft.	0-5 ft.	10-15 ft.	10-15 ft.	0-5 ft.	10-15 ft.	10" below bsmt.	10" below bsmt.	0-1 ft.	0-1 ft.	0-1 ft.	0-1 ft.	5 11.	NYSDEC	Рап 3/5
Lot:	70	70 Soll	70	70	70 Soil	UV Soli	49 Soil	49	49	Soil	Soil	40 Soil	40 10-15 ft	Soll	Soil	Soil	Soli	Soil	TAGM**	Unrestricted
SAMPLING DATE	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007	10/10/2007		SCOs
UNITS:	ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg	Q ug/kg C	tug/L	Q ug/Kg	ug/Kg
PCBs Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1254	37 37 37 37 37 37 37 37 37 37	U 38 U 38 U 38 U 38 U 38 U 38 U 38 U 38	U 36 U 36 U 36 U 440 U 36 U 36 U 36 U 36	U 39 U 39 U 39 V 39 V 39 U 39 U 39 U 39 U 39	U 37 U 37 U 37 U 37 U 37 U 37 U 58 U 37	U 38 U 38 U 38 U 38 U 38 U 38 U 38 U 38	U 38 U 38 U 38 U 38 U 38 U 38 U 38 U 38	U 39 U 39 U 39 U 39 U 39 U 39 U 39 U 39	U 38 U 38 U 38 U 38 U 38 U 38 U 38 U 38	U 35 U 35 U 35 U 35 U 35 U 35 U 35 U 35	U 36 U 36 U 36 U 36 U 36 U 36 U 36 U 36	U 36 U 36 U 36 U 36 U 36 U 36 U 36 U 36	U 35 U 35 U 35 U 35 U 35 U 35 U 35 U 35	U NA U NA U NA U NA U NA U NA U NA	NA NA NA NA NA NA	NA NA NA NA NA	NA NA NA NA NA NA NA	1.0 1.0 1.0 1.0 1.0 1.0 1.0	U 10,000 U 10,000 U 10,000 U 10,000 U 10,000 U 10,000 U 10,000 U 10,000	100 100 100 100 100 100 100
Notes: ug/Kg - m/crograms per kä P - This flag is used for Pe U- Not detected at or abov NVG - No Value Given. J - Estimated Value	Thes: // Rg - micrograms or parts per billion // Rg - micrograms per kilogram or parts per billion - This flag is used for Pesticides/PCB/Herbicide compound when there is a greater than 40% difference for delected concentration between the two GC columns used for Primary and Confirmation analyses. The lower of the two values is reported. - Not detected at or above baloratory detection limits. NA - Nol Analyzed																			

J - Estimated Value	BOLD AND BOX INDICATES VALUE IS ABOVE NYSDEC TAG	M GUIDANCE VALUES **/	NYSDEC TAGM 4046: Determination of Soil Cleanup Objectives and Cleanup Levels; Janua
	ITALICS INDICATES VALUE IS ABOVE PART 375 UNRESTRIC	TED USE SOIL CLEANUP OBJECTIVES ***	*6 NYCRR Part 375 Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives; December :

	VALIDATED ANALYTICAL DETECTIONS FOR PESTICIDES IN SOIL BORING SAMPLES - OCT. 2007																																
													Co	ornerstone Sit	e B-1																		
													3	100 Third Ave	nue																		
														Bronx, New 1	ork																		
SAMPLE ID:	RI-1	Ri-1	R	-2	RI-2	RI-	3	RI-3	RI-3	RE	RI-4	RI-	4	RI-XX	R	1-5	RI-5		RIBAS-01	RIBAS-02	RIPS-0	/ 1	RIPS-02	RIPS-03	RIPS-	34	FIELD BLANK						
DEPTH:	0-5 ft.	10-15 ft.	0-5	ft.	10-15 ft.	0-5	ft.	10-15 ft.	10-1	5 ft.	0-5 ft.	10-16	5 ft.	10-15 ft.	0-4	5 ft.	10-15 ft.	10	0" below bsmt.	10" below bsmt.	0-1 ft.	.	0-1 ft.	0-1 ft.	0-1 ft	-	5 ft.	NYSDEC	Part 375***				
Lot:	70	70	7	0	70	70		70	70		49	49)	49	7	70	70		45	45	70		70	70	70			1					
MATRIX:	Soll	Soil	Se	lic	Soll	So	11	Soil	So	11	Soil	So	11	Soil	S	oil	Soll	.	Soil	10-15 ft.	Soil		Soli	Soll	Soil	007	Soil	TAGM**	Unrestricted				
SAMPLING DATE:	10/10/2007	10/10/2007	10/10	/2007	10/10/2007	10/10/	2007	10/10/2007	10/10/	2007	10/10/2007	10/10/2	2007	10/10/2007	10/10)/2007	10/10/2007		10/10/2007	10/10/2007	10/10/20	."	10/10/2007	10/10/2007	10/10/20	107	10/10/2007		Jug/kg				
UNITS:	ug/kg	Q ug/kg	ն ուն	rkg C	a ng/kg	u ugn	g L	al ug/kg		<u>kg lu</u>	ug/kg	գ ացո			u ug	UKG I	ug/kg	<u> </u>	ug/kg	u uy/xy				- ug/ng	G Ug/K			a aging	- uging				
PESTICIDES																																	
alpha-BHC	1.9	u 1.9	U 1	6	2.0	U 1.9	. L	1 2.0	U 2.	o luu	2.0	U 80	ν lu	78	U 1	.8 1	J 1.9	U	1.9	U 1.8	U 1.8	υ	1.9	J 38	U 1.9	υ	0.050	U 110	20				
beta-BHC	1.9	U 1.9	U 1.	.9 U	1 2.0	U 1.9	i ŭ	J 2.6	PJ 2.	o juu	2.0	U 80) ւ	78	U 1	.8 I	U 1.9	U	1.9	U 1.8	U 1.8	U	1.9	J 38	U 1.9	U	0.050	U 200	36				
delta-BHC	1.9	U 1.9	U 1.	.9 U	J 2.0	U 1.) L	リ 2.1	2.) (U	2.0	U 80) լ	78	1 ปี	i.8 l	U 1.9	U	1.9	U 1.8	U 1.8	U I	1.9 1	J 38	U 1.9	U	0.050	U 300	40				
gamma-BHC (Lindane)	1.9	U 1.9	U 1.	.9 L	ノ 2.0	U 1.9) L	J 2.2	2.0	o (ui	2.0	U 80) (լ	78	U 1	.8 1	J 1.9	U	1.9	U 1.8	U 1.8	U	1.9	J 38	U 1.9	U	0.050	U 60	NVG				
Heptachlor	1.9	U 1.9	U 1.	.9 U	J 2.0	U 1.9) L	J 2.0	U 2.	5 U.	2.0	U 80) [L	78	U 1	.8 [U 1.9	U	1.9	U 1.8	U 1.8	U.	1.9	J 38	U 1.9	u	0.050	U 100	42				
Aldrin	1.9	U 1.9	U 1.	.9 U	1 2.0	0 1.9	} [2.3	2.0	0.0.	2,0	U 80	1	78		.8 1	U 1.9		1.9	U 1.8	1.8	19	1.9	J 38	1.9	0	0,050	41	NU/G				
Heptachlor epoxide	1.9	U 1.9	0 1	9 10	2.0			2.2	2.0		2.0	08 0		/ /8		.8 1	U 1.9		1.9	U 1.8	10 1.8		1.9	1 30	1.9	0	0.050		2400				
Endosultan I	1.9	0 1.9	1.	.9 [L	2.0	U 3.8					2.0	0 00		150		.o u	0 1.9		1.9	0 1.0	1.0	5	6.2	2 260	12	D.	0.000		5				
	3.7	0 3.8	0 3	.0 1.	1 3.9		, l'	, <u>5.2</u>			0.0	0 10		270		25 1	1 20	1	3.0	0 3.5	11 77	ſ	50	73	11 12	10	0.10	11 2 100	33				
4,4-DDE	0.2	3.8		.0 U	1 3.9		; L		4.1		3.0	15	ñ li	150	и з	15 1	0 0.7	°	36	-0 0.5 II 35	U 36	10	3.7	u 73	U 3.7	u	0.10	U 100	14				
Endocuitan II	37	11 38		.0 C	1 30		, li	1 36	.19 3.1		38	15	ດ ໄປ	150	u 3	15 1	3.6	u	3.6	Ú 3.5	U 3.6	Ŭ	3.7	ú 73	U 3.7	Ū	0,10	U 900	2,400				
4 4'-DDD	17	B/ 38	Ŭ 3	6 1	3.9	U 3.1	, 1	5.1	3.	3 0.	3.8	U 1.10	ño	1,200	3	1.5 L	7.2	Ĵ	3.6	U 3.5	U 5.5	PJ	3,7	J 73	U 4.5	P.	0.10	U 2,900	3.3				
Endosulfan sulfate	3.7	U 3.8	U 3	.6 1	3.9	U 3.	, lī	3.6	JP 3.	3 01	3.8	U 150	ο Ιι	150	υ 3	1.5 L	J 18		3.6	U 3.5	U 3.6	U	3.7	J 73	U 3.7	U	0.10	U 1,000	2,400				
4 4'-DDT	34	3.8	U 7.	0	3.9	U 23		12	19	J	6.0	PJ 150	o lu	150	U 3	1.5 L	U 41		37	PJ 3.5	U 26	J	21 F	'J 78	PJ 31	P.	0.10	U 2,100	3.3				
Methoxychlor	19	U 19	Ŭ 1	9 ປ	20	U 19	. lu	1 23	J 20) U.	20	U 800	0 u	780	U 1	18	U 19	u	19	U 18	U 18	U	19 1	J 380	U 19	U	0.50	U NVG	NVG				
Endrin ketone	3.7	U 3.8	U 3.	.6 L	J 3.9	0 3.1	, ı	J 5.2	PJ 3.4	3 03	3.8	U 150	o u	150	บ 3	3.5 l	U 3.6	U	3.6	U 3.5	U 3.6	U	3.7	J 73	ປ 3.7	U	0.10	U NVG	NVG				
Endrin aldehyde	6.0	PJ 3.8	U 3.	.6 L	J 3.9	U 3.7	' ı	2.6	J 3.	3 U.	3.8	U 15	o u	150	U 3	3.5 L	U 3.6	U	3.6	U 3.5	U] 3.6	U	3.7	J 73	U 3.7	U	0.10	U NVG	NVG				
alpha-Chlordane	1.9	U 1.9	U 1.	.9 U	2.0	U 1.9	, լլ	J 2.0	U 2.0) UJ	2.0	U 80) (L	/ 89	PJ 1	.8 l	J 1.9	U	1.9	U 1.8	U 5.7		1.9	니 38	U 4.2		0.050		NVG				
gamma-Chlordane	2.4	PJ 1.9	U 1.	.9 L	J 2.0	0 1.) L	1 2.0	2.0	0 01	2.0	U 80		78	U 1	.8 I	U 2.4	PJ	1.9	U 1.8	U 3.7		1.9	J 38	0 2.2	TI	0.050	UI 540	NVG NVG				
Toxaphene	190	U 190	U 19	€0 [Ľ	200	U 19) [L	200	U 20	0 U.	200	U 8,00	50 JU	7,800		80 1	U 190	U	190	0 180	0 180	101	190 [1	J 3,800		10	5.0		INVG				
Notes:						Easts of DI	(110) 1=1	'n																									
J - Estimated value, below the call	orateo ranĝes. r parte per billion				**MYSDEC TA	4036: DI RI-4 SM 4036: De	terminat	/ ion of Soil Clea.	nun Ohiective	s and Cle	anun Levels: Ja	nuary 24, 19	94																				
U- Not detected at or above laboral	torv detection limit:	s.			***6 NYCRR P	art 375 Table	375-6.8	(a);Unrestricted	Use Soil Cle	anup Obje	ectives; Decemb	er 2006.																					
NVG - No Value Given.	,				Q - Qualifier			,,,		, .,																							
E-Estimated value that exceeds ins	struments calibratio	on range			BOLD AND BO	X INDICATE	S VALU	E IS ABOVE N	YSDEC TAG	n guidai	NCE VALUES																						
D - results after dilution					ITALICS INDIC	ATES VALU	E IS ABO	OVE PART 375	UNRESTRIC	TED USE	SOIL CLEANU	P OBJECTIVI	ES																				
P - This flag is used for Pesticides/	PCB/Herbicide con	npound when then) is a greater	r than 40%	6 difference for d	stected conc	entration	between the tw	vo GC colums	used for	Primary and Col	nhrmation an	aiyses. T	ne lower of the h	vo values is	s reported.																	
												.,			VTICA			TABLE 6	C IN	0011 0001			007										
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												ν.	ALIUAT	EU ANAL	.1 1107	AUDETECT	Com	FOR METAL	-,⊙ii¥i IoR-1	SUL BURI	NG SAN	VIPLES - 001. 2	007										
																	310	0 Third Ave	enue	•													
																	Bre	onx, New Y	ork														
SAMPLE ID:	RI-1	RJ-1		RI-2		RI-2		RI-3		RI-3		RI-4		RI-4		RI-XX		R1-5		RI-5		RIBAS-01		RIBAS-02		RIPS-01	RIPS-02	RIPS-03	RIPS-04	FIELD BLANK			
DEPTH:	0-5 ft.	10-15 ft.		0-5 ft.		10-16 ft.		0-5 ft.		10-15 ft.		0-5 ft.		10-15 ft.		10-15 ft.		0-5 ft.		10-16 ft.		10" below bsmt.	•	10" below bsmt.		0-1 ft.	0-1 ft.	0-1 ft.	0-1 ft.		EASTERN	NYSDEC	Part 375***
LOT:	70	70		70		70		70		70		49		49		49		70		70		45		45		70	70	70	70 Sall	Linuted	110 4	TACHIN	Unrectricted
MATRIX:	Soil	Soil		Soil		Soli	L	Soll		SOIL		5011		5011 V4012007		SOIL	.	5011		5011		5011		3011		10/10/2007	40/10/2007	10/10/2007	10/10/2007	10/10/2007	BACKGROUND	TAGM	
SAMPLING DATE:	10/10/2007	10/10/200	(`	0/10/2007		10/10/2007	1,11	0/10/2007	' <u>,</u> '	0/10/2007		10/2007 malka	۰ ا م ا	mo/ka		10/10/2007		10/10/2007		10/10/2007		ma/ka	0	malka	ا م ا	ma/ka	0 malka	0 ma/ka		0 ma/l		ma/ka	malka
	mg/kg u	пд/кд		myrky		myrxy		шуку	<u> 4</u>	nig/ng		myiny	<u> </u>	nigrky	┝┷┼	ngrig	- u	niging	<u> </u>	nığıng	*	Inging	4	mgreg	┼╩┼	mgrkg	a mgang r				u ingrig		
TAL METALS																																	
Alumínum	7 360 E	19 900	E.I	7 880	E.I	11 100	E.I	11,500	EJ	11.300	EJ	8.370	EJ	4.510	EJ	5.190	EJ	8,110	EJ	4.440	EJ	9.820	εJ	8,560	ΕJ	NA	NA	NA	NA	37.0	U 33,000	SB	NVG
Antimony	1.1 NF	1.7	NR	0.086	UNR	1.1	NR	1.4	NR	0.50	BNR	0.10	UNR	0.11	UNR	0.088	UNJ	0.085	UNR	0.086	UNR	0.35	BNR	0.77	NR	NA	NA	NA	NA	4.4	U NVG	SB	NVG
Arsenic	6.6	4.5		4.1		2.6		3.1		3.3		4.3		6.3		6.1		2.5		3.8	EJ	4.2	ΕJ	2.7	ΕJ	NA	NA	NA	NA	2.5	U 3.0 - 12 (NYS)	7.5 OR SB	13
Barium	802 E	236	EJ	200	EJ	100	EJ	228	EJ	127	EJ	180	EJ	354	EJ	778	EJ	88.2	EJ	293	*EJ	103	*EJ	68,6	*EJ	NA	NA	NA	NA	11.0	UI 15 - 600	300 OR SB	350
Bervilium	0.00094 UN	0.00090	UNJ	0.00081	LINU	0.00093	UNJ	0.00089	UNJ	0.00088	UNJ C	0.00093	UNJ	0.0010	UNJ	0.00082	UNJ	0.00079	UNJ	0.00081	UNJ	0.00082	UNJ	0,00075	UNJ	NA	NA	NA	NA	0.051	U 0-1.75	0.16 OR SB	7.2
Cadmium	1.0 EU	J 0.31	EJ	0.48	EJ	0.16	BEJ	0.42	εJ	0.48	EJ	0.32	EJ	0.22	EJ	0.43	EJ	0.16	EJ	0.24	N'EJ	0.23	N*EJ	0.20	N*EJ	NA	NA	NA	NA	0.11	U 0.1-1	1 OR SB	2.5
Calcium	20,200 *J	6,340		35,600	1 ±	3,990	+	5,600		14,400	*	19,400	*	111,000	*	84,700	*	25,300	I * [56,500		23,500		20,900		NA	NA	NA	NA	99.0	U 130 - 35,000	SB	NVG
Chromium	20.3 E	28.3	EJ	15.8	EJ	24.2	EJ	24.2	EJ	20.4	EJ	24.9	EJ	7.5	EJ	10.8	EJ	14.5	EJ	11.3	N*EJ	21.3	N⁺EJ	24.7	N*EJ	NA	NA	NA	NA	0.22	U 1.5 - 40	10 OR SB	30
Cobalt	8.2 NE	J 13.0	NEJ	7.7	NEJ	11.3	NEJ	8.1	NEJ	10.8	NEJ	8.8	NEJ	5.2	NEJ	5.1	NEJ	7.8	NEJ	4.8	NEJ	9.3	NEJ	8.5	NEJ	NA	NA	NA	NA	0.089	U 2.5 - 60	30 OR SB	NVG
Copper	89.1 J	31.6		69.5		31.5		30.3		27.6		49.6		9.3	J	18.8	J	14.0		11.8	EJ	32.4	EJ	29.9	EJ	NA	NA	NA	NA	1.7	U 1-50	25 OR SB	50
Iron	18,800 E	26,800	EJ	16,800	EJ	20,900	EJ	17,900	EJ	22,000	EJ	20,200	£J	6,670	EJ	6,930	El	16,500	EJ	6,870	EJ	18,700	EJ	16,500	EJ	NA	NA	NA	NA	89.0	U 2,000 - 550,000	2,000 OR SB	NVG
Lead	2,700 NE	J 72.7	NEA	180	NEA	17.7	NEJ	79.4	NEJ	67.8	NEJ	236	NEJ	125	NEJ	407	NEJ	14.1	NEJ	414	1	57.8	*J	219	*J	NA	NA	NA	NA	1.2	U 200 - 500	SB	63
Magnesium	6,650 E.	J 7,960	EJ	4,860	EJ	5,820	EJ	4,850	EJ	8,950	EJ	9,050	EJ	33,500	EJ	20,800	EJ	15,700	EJ	18,200	•	6,130	*	8,990	*	NA	NA	NA	NA	7.9	B 100 - 5,000	SB	NVG
Manganese	261 E.	499	EJ	188	EJ	317	EJ	201	EJ	336	EJ	322	EJ	224	ΕJ	167	EJ	545	EJ	186	EJ	252	EJ	237	EJ	NA	NA	NA	NA	2.6	B 50 ~ 5,000	SB	1,600
Mercury	0.71 J	0.18		0.13		0.067		0.20		0.21		1.1		0.12	1	0.24	J	0.023	BJ	0.25	NJ	0.21	N	0,26	NJ	NA	NA	NA	NA	0.11	U .001 ~ .02	0.1	0.18
Nickel	15.9 NE	21.2	NEJ	11.3	NEJ	17.8	NEJ	15.8	NEJ	16.1	NEJ	14.6	NEJ	9.8	NEJ	23.5	NEJ	12.4	NEJ	7.4	NEJ	16.9	NE	14.7	NEJ	NA	NA	NA	NA	0.22	U 0.5 - 25	13 OR SB	30
Potassium	2,580 J	4,070		3,700		3,680		2,360		3,700	T	3,750		1,150		1,380		5,200		1,210		2,860		2,540		NA	NA	NA	NA	64.5	B 8,500 - 43,000 (NYS)	SB	NVG
Selenium	0.10 UN	J 0.096	UNJ	0.086	UNJ	0.099	UNJ	0.096	UNJ	0.094	UNJ	0.10	UNJ	5.0	NJ	3.9	NJ	0.085	UNJ	1.7		0.088	U	0.081	υ	NA	NA	NA	NA	6.1	B 0.1 - 3.9	2 OR SB	3.9
Silver	3.2	4.8		0.80	в	4.2		3.6		3.3		3.0		0.034	U	0.027	U	1.4		0.027	U	2.1		1.9		NA	NA	NA	NA	1.2	U NVG	SB	2
Sodium	191 E	200	E	118	E	92.6	E E	108	E	183	E	254	ε	351	E	426	E	195	E	136	EJ	219	EJ	242	EJ	NA	NA	NA	NA	64.0	0 6,000 - 8,000	SB	NVG
Thallium	0.074 UN	0.071	UNJ	0.063	UNJ	0.073	UNJ	0.070	UNJ	0.069	UNJ	0.073	UNJ	4.5	NJ	3.1	NJ	0.062	UNJ	1.4	NJ	0.064	UNJ	0.059	UNJ	NA	NA	NA	NA	2.8	U NVG	SB	NVG
Vanadium	29.8 E.	1 35.2	EJ	19.4	EJ	26.4	EJ	32.9	EJ.	26.3	EJ	27.9	EJ	15,1	EJ	18.1	<u>EJ</u>	20.0	EJ	11.4	EJ	26.0	E.J	23.6	ŁJ	NA	NA	NA	NA	0,40	0 1-300	150 UR 58	100
Zinc	540 NE	J 83.7	NE.	467	WEA	56.1	NEJ	102	NEJ	70.2	NEJ	129	NEJ	201	NEJ.	391	NEA	34.0	NEJ	162	Y*EJA	63.5	NER	66.9	NEH	NA	NA	NA	NA I	13.2	B 8-20	20 OR 58	109
NOTES:																																	
MG/KG - Milligrams per kild	grams or parts per million	_	N/4 400	ч • NOt Anal) u VV io o du	vzeci nitooto n	F EX / / / / / /	50		51	5 • S/(8 Dack	grouna																						
I - Not detected at of above	laooratory detection limit	\$	~~~ ••/	WYSDEC TA	picate c chnical	n 51-4 (10-7 and Adminis	∨) trative G	uidance																									
NVG - No value oiven			Me	emorandum:	Delem	unation of Se	oil Clean	10													П	TALICS INDICATE	S VALU	E IS ABOVE PART 3	75 UNR	RESTRICTED I	USE SOIL CLEANU	IP OBJECTIVES					
N - Matrix spike recovery fal	is outside of the control lin	nit	0	jectives and	d Cleanu	up Levels; Ja	nuary 24	, 1, 1994													B	IOX INDICATES V/	ALUE IS	SABOVE NYSDEC T	AGM G	UIDANCE VAL	UES						
E - Estimated concentration				6 NYCRR P	Part 375	Table 375-6	.8(a):Unr	estricted Us	se Soil Cl	eanup Obje	ctives; Dec	ember 200	6.								В	SOLD INDICATES	VALUE	IS ABOVE EASTER	N U.S.A	A. BACKGROU	IND						
R. Confirms Presence of Ma	trix Interference on this el	ement																															

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Table 7

Summary of VOC Analytical Detections in Soil Gas - Sept. 2007 Cornerstone Site B-1 3100 Third Avenue Bronx, New York

Sample ID	SS-01	SS-02	*NYSDOH 2003
Matrix	Soil Gas	Soil Gas	Mean VOCs in Air of
Lot	45	45	
Date Sampled	9/7/2007	9/7/2007	Fuel Oil Heated Homes
EPA Method TO-15			
Parameters	<u>ug/m3</u>	<u>ug/m3</u>	<u>ug/m3</u>
1,3 Dichlorobenzene	ND	1.80	0.3
1,4 Dichlorobenzene	ND	16.24	3.7
1,1,1-Trichloroethane	20.20	ND	2
1,2,4-Trimethylbenzene	20.17	12.79	4.8
1,3,5-Trimethylbenzene	6.39	5.41	3.7
2,2,4-Trimethylpentane	10.26	ND	NGV
Acetone	52.32	26.16	42
Benzene	26.49	9.58	8.3
Carbon Disulfide	43.54	14.62	4.2
Chloroform	92.53	5.36	0.9
Ethyl alcohol	17.51	22.60	610
Ethyl Benzene	15.18	9.11	3.7
Heptane	9.82	ND	NGV
Hexane	12.00	ND	NGV
m+p Xylene	52.15	31.29	5.9
Methylene Chloride	12.51	4.17	17
Methylisobutylketone	15.58	14.76	8.4
o Xylene	18.69	12.17	3.8
p-Ethyltoluene	18.66	13.75	NGV
MTBE	19.00	17.60	13
tert. Butyl Alcohol	13.93	12.11	NGV
Tetrachloroethene	5,903.00	3,528.20	1.3
Toluene	86.60	90.36	26
Trichloroethene	17.19	4.84	0.4
Notes:			
All concentrations are shown in	ug/m3-micrograms	s per cubic meter.	

ND - Analyte was not detected

NGV = No Given Value

Boxed value exceeds NYSDOH Mean VOCs in air of homes heated with fuel oil *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Appendix C

1

					•		Table 8		·				
					Validat	ed Soli Vapor	Analytical R	esulis - Oot.	2007				
					,	Co	merstone B-	5					
						310 Bro	na sta Avenu Sox, New Yor	e K					
					DIRYAN		DIRVER	PL.97.40	PLOYAR	81.81/-00	RIBAS-SVO4	RIBAS-81/02	*NYSDOH 2003
Sample ID:	RI-SV-18 70	RI-SV-10	RI-5V-28	RI-SV-2D 70	RI-SV-38 70	70	49	49	70	70	45	45	111025112000
Sample Date:	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	10/11/2007	Mean VOCs In Air of
Sample Matrix:	Air	Aa	Air	Art	Air	Air	Air	Air	Aa	Air 15 Fair	Air 1 Fact	Air 1 East	Fuel Oil Heated Homes
Depth:	6 Feet	15 Feet	5 Fest	15 Feet	5 Feet	15 Feet	5 Feet	15 Feet	16510	15 Feat	1 Post	Troot	
Volable Organacs Units	ugim ^a	יהיבע	ug/m²	upini	<u>uq:m³</u>	<u>ugini</u>	<u>uq/m²</u>	ugʻm ^a	ugʻm ^a	ugʻm ^a	uq/m³	'm'ou	<u>uami</u>
1,1,1-Trichiorosthana	19	18	19	17	12	19	17	15	29	40	26	24	2
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND ND	ND	ND	ND ND	ND	ND DA	ND	02
1.1.2- (richloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	01
1,1-Dichloroethene	ND	NÐ	ND	NÐ	ND	NÐ	ND	ND	ND	ND	ND	ND	14
1,2,4-Trichlorobenzene	ND	ND	ND		NO	ND 4.0	ND	<u>D</u> 81		5.8	ND 47	4B	48
1,2,4-Trimethylbenzene 1,2-Ditromosthage	85 ND	<u>5.8</u>	<u>1 6.4</u> ND	1 38 ND	ND	19 ND	NO	ND	ND ND	ND	ND	ND	01
1.2-Dichlorobenzene	ND	ND	ND	ND	ND	NÐ	ND	NÐ	ND	ND	ND	ND	03
1,2-Dichlorosthane	1.5	0.82	0.99	ND	ND	ND	ND	ND	ND	ND ND	0.62	0.78	01
1.2-Dichloropropane	ND 5.5	ND 3.9	ND 39	ND 38	<u>. ND</u>	33	3.2	39	3.3	33	3.7	45	2
1.3.5-11metryperizeria 1.3-butaciene	ND	ND	ND	ND	ND ND	NO	ND	ND	ND	ND	ND	ND	NGV
1,3-Dichlorobenzena	ND	NÐ	ND	ND	ND	N9	ND	ND		ND	<u>DN</u>	ND	03
1.4-Dichlorobenzena	15 J	21	23	26	28	28	26	<u>21</u>	<u>1 21</u> ND	<u>1 30</u> ND	1 <u>23</u> NO	ND	37 NG∀
1.4-Dioxane 2.2.4-trimethyloantane	ND 40	ND 30	10	10	NU 047 J	0.65	ND	ND	0.90	ND	39	34	NGV
4-ethyltoluena	26	1.4	20	1.4	16	15	17	19	13	1.8		15	NGV
Acetone	540	230	200	500	100	220	57	250	260	190	62 ND	L <u>. 84</u> . №0	42 NGV
Altyl chloride	ND 8.9	ND 85	ND 40	<u>NP</u>	55	4.8	78	71	43	ND	11	66	83
Benzyl chlaride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NÐ	ND	ND	NGV
Bromodichioromethane	ND	ND	ND	ND	NÐ	NÐ	ND	ND	ND	ND	ND	ND	NGV
Bromofluorobenzene	ND	ND	NO NO	ND	NÐ	ND ND	ND Na⊓	ND ND	NÐ	NU ND	NU	ND	NGV
Bromotorm	ND	ND	ND	ND	ND	ND	ND	ND	NÐ	ND	ND	ND	0.3
Carbon disulfide	4.3	7.0	25	17	37	67	71	ND	74	43	2.5	42	NGV
Carbon tetrachloride	ND	ND	ND	ND	ND	NÐ	ND	ND	ND ND	ND	<u>077</u> J	טא <u>ן</u> אס	0.4
Chiorobenzene	ND	ND ND	ND	ND	ND	NO	ND	ND	ND	NO	<u>ND</u>	ND	0.2
Chloroform	0.79	0.69	0 65 J	1.2	26	0.55 J	3.3	פא [37	ND	39	ND	09
Chloromathana	ND	ND	ND	סא ן	ND	ND	ND	NÐ	ND DA21	ND	<u>ND</u>	<u>ND</u>	2
cis-1,2-Dichloreethene	. <u>1.4</u>) ND ND	<u>1 0.62 J</u> ND	נא ן נא	ND	ND	ND	ND	ND	NO	ND	ND	0.2
Cyclohexane	ND	7.0] ND	77J	37	63	65) ND	ND	ND	64	63	6
Dibromochloremethane	ND	NÐ	NÐ	NÐ	ND	NO	ND	ND	ND	ND	ND	ND	NGV
Ethyl acetate	21	15J_	15 J	18 J	<u>53</u>	64	57	19	15 5.1	6.0	48	5.5	37
Ethyloenzana Freon 11	22	17	1.7	23	2.5	29	33	54	54	35	32	21	NGV
Freon 113	1.2	NÐ	27	44	10	14	ND	ND	ND	NO	ND	ND	NGV
Freon 114	ND	ND	ND	ND	ND	ND	ND	ND	ND 2.6	ND ND	ND 42	NU 24	NGV
Freen 12 Heatana	23	27	12	12	17	27	16	ND	ND	ND	15	9.2 J	NGV
Haxachloro-1,3-butadiana	ND	ND	ND	ND	ND	ND	NQ	ND	ND	ND	ND	ND	18
Нехале	43	32	14	22	45	25	17	38	82	24	17	15	NGV
isopropyl alcohol	NO	ND 18		<u>ND</u>	17	17	18	23	15	18	15	17	59
Map-Aylene Methyl Butyl Ketone	ND	<u>ND</u>	ND	ND	<u>אס</u>	ND	ND .	ND	ND	ND	ND	NÐ	NGV
Methyl Ethyl Katone	70	32	29	43	20	23	12	34	24	25	13 J	14	84
Methyl Isobutyl Ketone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND พก	<u>N0</u>	56	12
Methyl tert-butyl other Methylana chlorida	97	44	48	4.6	24	42	37	ND	54	ND	34	41	17
o-Xylana	6.5	45	41] NO	38	3.8	4.1	53	34	42	34	38	38
Propylene	NO	ND	ND	ND	ND		NO	ND 7.0	<u>ND</u>		ND es	<u>80</u>	NGV 08
Styrana Tamaabaraataraana	87	19	95	40	93	4.5	46	59	42	87	680	100	13
Tetrahydrofuran	ND	ND	ND	ND	ND	35	NO	5.6	ND	ND ND	43	ND	21
Toluena	120	160	230	320	170	160	190	200	190	100	150	160	26
trans-1,2-Dichlorcethena	ND	ND	ND	ND	ND NO	ND 1:0	ND	NÐ ND	U73 N∩	ND ND	NU ND	ND	D 1
Trichlerosthene	7.8	54	5.5	84	4.5	58	5.0	7.5	55	62	26	55	0.4
Vinyl acetata	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Vinyl Bromide	ND	ND	ND	ND	ND	ND	ND	NÐ	ND ND	ND ND	ND ND	ND ND	NGV 01
Vinyl chłorida	I ND	ND	NO	NO	NU	<u>60</u>	- 10	<u>au</u>	- 190	<u></u>			·
NOTES													
NGV = NO GARA Value													
J = Analyte detected at or below q	นสาชัยวิธง มีการีช				1								
In a start start to a part of	teres a la sistema de sele		where the start										

Eared value exceeds NrSDOH Mean VOCs in air of bornes heated with files of NVSDOH Guidance for Evaluating Soil Vapor Initiation in the State of New York, Appendix C

	٦	TABLE 9										
Validated G	Summary of roundwater S Corner 3100 ⁻ Bron	VOC Analytic Samples - Aug stone Site B- Third Avenue ax, New York	cal Detections gust 2007 1	for								
Sample ID	MW-1	MW-2	MW-3	NYSDEC								
Lot	70	Sidewalk	49									
Matrix Groundwater Groundwater Groundwater TOGS*												
Matrix Groundwater Groundwater Groundwater TOGS* Date Sampled 8/24/2007 8/24/2007 8/24/2007												
Volatile Organics	a a a gran se de dir de la											
Units	ug/L	ug/L	ug/L	ug/L								
Methylene Chloride	7.8 B	9.1 B	6.9 B	5								
Tetrachloroethene	35	2,300	ND	5								
Notes: All concentrations are report ND= Indicates the compoun B = Analyte detected in the * NYSDEC Technical and Q	ted in microgram d was analyzed associated meth perational Guida	ns per liter (µg/L) for but not detec ood blank. ance Series (1.1.) or parts per billio sted. 1) Ambient Water	n.								
Quality Standards and Guid	' ance Values, Ju	ne 1998.										

Box indicates value exceeds NYSDEC TOGS standard or guidance value.

Adjuication of cyantie Cognitie Cognitie Cognitie Cognitie Control Color Control Co				TAB	LE 10					
Image: browner	Validated A	alytical R	esuits for	Volatile Or Cornersto 3100 Thii Bronx, 1	ganic Con ne Site B d Avenue tew York	1 1	Groundwa	ster - Oct 2	200	
Data control Data control Description Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>	Sample 12 Lot	1. 8 M	Sidewalk	?₩¥ ·	70 70	Sidewalk	MAY-0 Sidewalk	Field Blark	Trip Blank	NISOEC
Main Main <th< th=""><th>Date Satisfied</th><th>100252007</th><th>50 10/2/2/007</th><th>10/25/007</th><th>10/2/01</th><th>20 10/25/2007</th><th>10/2/2/00/2</th><th>100502001</th><th>10/20/2017</th><th>85</th></th<>	Date Satisfied	100252007	50 10/2/2/007	10/25/007	10/2/01	20 10/25/2007	10/2/2/00/2	100502001	10/20/2017	85
Obstrokention 5/4 3/4 <	Volatile Organic Compounds Units	ug/L	νĝι	ug/L	ugL	401	ny l	ugl	ηζη	Ъ,
Witching State	Orthlerodifuctomethone Orthoromethone	N15	25010	32	500	302	510	33	3	ŝ
Enconnentine 5/1 26/0 5/1 26/0 5/1	Viry Chlorde	33		50	33	200	20	55	50	'n
The interference 0.0 500	Bromomethane	25	282	25	5	202	25	5	23	in i
1.125/10/interentioninane 10 20 <th>Chloroetheno</th> <th>33</th> <th></th> <th>25</th> <th>33</th> <th></th> <th>25</th> <th>22</th> <th>22</th> <th>n v</th>	Chloroetheno	33		25	33		25	22	22	n v
1. Cubiometera 50	1,1,2. Ynchlorotrifucioethane	23		50	50	1052	5	5 • •	50	NNC
Construction F/I SS01 F/I	- 1, t-Dictrionorethene	25	200	33	3 ç	5 - 52 52 52 52 52 52 52 52 52 52 52 52 52 5	3	5	38	wξ
Metric Instantion SU	Certan Disutide	55	2	22	¥ 73		202	202	55	NG NG
Million (Action 20 200 20 200 <	Methyl tertubudyl Ether	33	25015	50	50	250	50	50	ទ	₽
Tech Tech <th< th=""><th>Methyl Acetate</th><th>22</th><th>200</th><th>2 2</th><th>22</th><th></th><th>2.3</th><th>25</th><th>2 2</th><th>222</th></th<>	Methyl Acetate	22	200	2 2	22		2.3	25	2 2	222
Chronicomente SU SSO SU SSO SU SO SU	trans-1.2.Duchicrosthene	202	202	50	5.3	250 U	33	3.3	20	n 40
Contranter 50	1.1-Dichloroethane	3	1052	5	Ç	0.052	50	50	50	ŝ
Zelence 50 <t< th=""><th>Cyclonearte</th><th>50</th><th>260 (</th><th>50</th><th>⊇5</th><th>∩052</th><th>50</th><th>51</th><th>50</th><th>NVG</th></t<>	Cyclonearte	50	260 (50	⊇ 5	∩052	50	51	50	NVG
Constraints Col Col <th< th=""><th>2-Butanone</th><th>33</th><th>200</th><th>33</th><th>33</th><th>∩ 052 2007</th><th>33</th><th>5</th><th>33</th><th>NNC</th></th<>	2-Butanone	33	200	33	33	∩ 052 2007	33	5	33	NNC
1.1.1.7.0100000000000000000000000000000	Carbon Lerrochonde cre-1.2-Dichtorechene	25		25	⊒ = 0 = 0 =		23	23	22	a va
M1: Trip:Reservence SV SSU SU SU <th>Chloresterm</th> <th>÷</th> <th>192</th> <th>X</th> <th></th> <th>N 052</th> <th>δU</th> <th>5U</th> <th>5∪</th> <th>2</th>	Chloresterm	÷	192	X		N 052	δU	5U	5∪	2
Mathematical State	1,1,1.Trichicroathane	33	250 U	23	20	នុ	5	33	2	5
Technisoretiene 51 280 50	Benzone	5		23	23	1.052	23	2.5	2.2	- 2
1.2.Definition 3.0	1.2-Dehisroethene	15	1957	33	33	⊃ 952 572	οŝ.	33	30	- 1
Ameliny Science SU	1 1.2-Dichloroscoare	55		200	500		3	33	23	n ⊷
Taken SU SOU SU SOU SU SU </th <th>Gromodictivoromethane</th> <th>5U</th> <th>2500</th> <th>2.1</th> <th>50</th> <th>250 5</th> <th>5 U</th> <th>0.9 2</th> <th>50</th> <th>ទ</th>	Gromodictivoromethane	5U	2500	2.1	50	250 5	5 U	0.9 2	50	ទ
Construction Str. Solution	4-MethyL2-Pentanone	33		23	0.5		0.5	250	33	Š.
1.1.2.Printrostronente 5.0	t.1.3.Dichloropropene	33		22	S\$		5,5	33	33	64
Tubertonic Tubertonic <thtubertonic< th=""> Tubertonic Tuberton</thtubertonic<>	cts-1,3-Dichloropropeno	3	2501	ន	33	2501	1 2 2	7 G	33	-0
Dispension Str. Str. St	 Havenooe Havenooe 			25	25	ŝ	22	25		NNC
Tubershore A(1) 2(0) 2(1) 5(1) 2(1) 5(1)	Dromochloromethane	3	250.0	2	2	1057	50	50	5	\$
Chronomentanie Distribution Distributio	1,2-Dthomosthene		Ξ.	15	22	1 056	5	22	5	Š Š
Figure 51 2501 51 501 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50	Chevoberzene	ו קו	25010	105	33	1092	30	200	5	n un
Profession SU SOU SU	Ethyl Henzene	n 5	250 1	50	50	082	2	3	0,9	so i
Application SU	m/p.Xytenen	2		50	22		25	0 2 2 2	55	<i>.</i>
Bigrondermen 50 2001 51 501 51 501 50	Strete	3	12	200	33		33	50	55	n vo
1:10.20 (resonance) 51 3201 51 3201 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51 50 51	Bromotorm	50	202	2 2	∩ 3	105	∩ 3	5	50	8
Scholl Scholl Scholl Scholl Scho	Isopropyben2eite 4.1.2.3.Tetra-electerhaneiten	37	192	- - -	25	22	25	25	32	is ir
Advision 51 200 51 50 50 51 51 31 2.DeDrivervance 51 200 51 51 51 51 31 2.DeDrivervance 51 200 51 51 51 30 3.DeDrivervancement 51 200 51 51 51 50 3.DeDrivervancement 51 200 51 51 51 50 Nets. 7 51 501 51 51 50 5 Nets. 7 50 51 50 5 5 5 Nets. 7 50 51 50 5	1.5-Dichexobenzene	3	100	55	3	1952	33	3	20	• ••
Distribution 51 2301 51	1.4-Dichlorobenzene	50	1022	5∪	03	∩ 997	50	50	50	63
1/2 Encouncementary and the second	1,2-Dichiorobenzene	5		23	33		23	25		-
Note: We concepture per her or pertain metric Concernes and Granimona Continence Some (1.1) (1 Not instructed at above according detection innets and County Strateforms and Counters Values (1 Note and Concernes) (2 Note and Concernes) (3 Note and Concernes) (3 Note and Concernes) (3 Note and Concernes) (3 N	1,2,4,7nctiticrobenzenn	33		3	25		5	25	50	55
(1) - Incrigingent part for owning part paleon (1) - Not calculated and subvision deviced innets and concerned and concerned acculations of source (1 in (1) - Not calculated and a subvision deviced innets and concerned accession deviced accession deviced and Concerned accession deviced accession of subvision device accession deviced accession deviced - Elementary Calculation accession of subvision deviced accession accession deviced acce	Notes									
1. Elements Viewa Green 1. Elements Viewa Branch Children 1. Elements Viewa Branch Children 1. De	ug/L - mucrograms per taar or parte per bit 11 - Mit retarted at or above lebrication de	tion liaction limite		Amhiani wa	Fechnical and ar Oueby Nu	Oparational C antiards and C	kudanca Serv rudanca Valu	ыс(111) ыс		
), Estemator Vase 1. Publication Equipment on 11/58 Par. pris/2016 superview, 11/21	NYO - No Valua Gwen			and Oround	vatar Entern	Umitalions Jr	9661 au			
<u>[45m: 1] n du cycleses valation energin (2004).</u>	L- Damated Vaste R. "Ununable bared on Fil XSR			r ar XXXAAAA	a duplicate of	NWV-2				
	How in drugtes within excends 10445.									

Prepared by CA Rich Consultants, Inc

			TABLE 1	1				
						r.m.al	Oat 0007	
Validated Analytic	al Results:	for Semivo	iatile Orgai	nic Compou	inds in Gro	undwater -	Uct. 2007	
		-		tito P 4				
1		C01	Merstone S	venije				
		31 B	Fonx. New	York				
		-						
Sample ID	MW-1	MW-2	MW-3	MW-4	MW-XX**	MW-5	Field Blank	NYSDEC
Lot	70	Sidawalk 1	49	70	Sidewalk 1	Sidewaix 1	1	TOGS
Date Sampled	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	
Semivolatile Organic Compounds								
Units	ug/L	មg/L 10 L	ug/L 1011	ug/L 10.13	ug/L 10 II	ug/L tou	ug/L 10 U	NGV
Benzalosnyoe Phenol	100	10 U	10 U	10 U	10 U	10 U	10 U	1
bis(2-Chloroethyl)ether	10 V	10 U	10 V	10 U	10 U	10 U	10 U	1
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NGV
2-Methylphenol	100	10 U	10 U	10 U 10 U	10 U 10 U	10 0	100	NGV
2,2-oxybis(1-Chioropropane)	100	10 U	10 U	10 U	10 U	10 U	10 0	NGV
3+4-Methylphenols	10 U	10 U	10 Ų	10 Ų	10 U	10 U	10 U	1
N-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NGV
Hexachloroethane	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	10 U 10 U	5 04
NRIODENZENE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	50
2-Nitrophenol	10 UJ	10 00	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	NGV
2,4-Dimethylphenol	10 UJ	10 UJ	10 ŲJ	10 UJ	10 UJ	10 UJ	10 UJ	50
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U 10 11	10 U 10 U	10 U 10 U	р 5
2,4-Dichlorophenol Naphthalene	100	10 U	10 U	10 0	10 U	10 U	10 0	10
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	5
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	1 NGV
4-Chloro-3-methylphenol	100	10 U	10 U	10 U	10 U	10 U	10 U	NGV
2-Methylnaphthalene	10 Ų	10 Ų	10 V	10 U	10 U	10 U	10 U	NGV
Hexachlorocyclopentadiene	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U	10 U	NGV
2,4,5-Trichlorophenol	20 U	20 U	20 U	20 U	20 U	20 U	20 U	NGV
11,1-Biphenyl 2-Chloronaphthalene	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U	10 U	10 U	10
2-NitroanBine	20 U	20 U	20 U	20 U	20 U	20 U	20 U	NGV
Dimethylphthalate	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U	10 U	NGV
2,6-Dinitrotoluene	10 Ú	10 U	10 U	10 U	10 U	10 U	10 U	5 Nev
3-Nitroaniline Acenaphthene	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20
2,4-Dinitrophenol	20 U	20 V	20 U	20 U	20 U	20 U	20 U	10 NGV
4-Nitrophenol Dibenzofi kan	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	NGV
2,4-Dinitrotoluene	10 V	10 Ú	10 0	10 U	10 U	10 U	10 U	5
Diethylphthalate 4-Chiorophenyl-phenylether	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U	NGV
Fluorene	10 V	10 U	10 Ü	10 U	10 Ų	10 U	10 U	50 NCV/
4-Nitroaniline 4 6-Dinitro-2-methylohenol	20 U	20 U 20 U I	20 U 20 U J	20 U 20 UJ	20 U 20 UJ	20 U 20 UJ	20 U 20 UJ	NGV
N-Nitrosodiphenylamine	10 Ų	10 U	10 U	10 U	10 U	10 U	10 U	50
4-Bromophenyl-phenylether	10 U	10 Ų 10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 Ų 10 U	10 U 10 U	NGV 0.04
Atrazine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	7.50
Pentachlorophenol	20 U	20 U	20 Ų 10 U	20 U 10 U	20 U 10 U	20 U 10 U	20 U 10 U	NGV 50
Anthracene	10 U	10 V	10 Ų	10 0	10 U	10 U	10 U	50
Carbazole	10 U	10 U	10 U	10 U 10 U	10 U 10 U	10 U 10 U	10 U 10 U	NGV 50
Fluoranthene	10 U	10 U	10 U	10 Ų	10 U	10 U	10 U	50
Pyrene	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	10 U 10 U	50 50
3,3-Dichlorobenzidine	10 U	10 Ų	10 U	10 U	10 U	10 Ŭ	10 U	5
Benzo(a)anthracene	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	10 U 10 U	0.002 0.002
bis(2-Ethylinexyl)phthalate	1J	2 J	10 0	10 U	2J	10 0	10 U	5
Di-n-octyl phthalate	10 U	10 U	10 U	10 U	10 U	10 U 10 U	10 U 10 U	50 0.002
Benzo(b)fluoranthene	10 U	10 U	10 U	10 U	10 U	10 0	10 U	0.002
Benzo(a)pyrene	10 U	10 U	10 U	10 Ų 10 U	10 U 10 U	10 U 10 U	10 U 10 U	NGV 0.002
Dibenz(a,h)anthracene	100	10 U	10 U	10 Ų	10 U	10 U	10 U	NGV
Benzo(g,h,i)perviene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	NGV NA
Notes:		ENJ	UN U	NU				11/3
J - Estimated Value, below the calibr	ation range			•NYSDEC T	echnical and (Operational G	uldance Series	s (1.1.1)
ug/L - micrograms per liter or parts p U - Not detected at or above laboration	er billion ry detection li	mits.		and Groundy	er quainy Stai vater Effluent	Limitations Ju	ne 1998	
NGV - No Given Value				ARXAGAZ MM 1-	a dualicata at	MIALO		
ND - Not Detected B- Analyte found in associated blank	i			-WAA-YX 18	a onbicate of	m¥¥+2		
NA - Not applicable	•							
Box indicates value exceeds TOGS	J							

....

			TAE	3LE 12				
	Validated	Analytical	Results for	· PCBs In G	roundwate	r - Oct. 200	7	
			Cornersto 3100 Thi Bronx,	one Site B-' ird Avenue New York	_			
Sample ID	1WM	MW-2	MW-3	MW-4	**XX-WM	MW-5	Field Blank	NYSDEC
Lot	70	Sidewalk	49	70	Sidewalk	Sidewalk		
Dilution	-	~	τ-	free	~	~	₹	TOGS*
Date Sampled	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	
PCBs								
	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Aroclor-1016	1.0 U	1.0 U	1.0 U	1.0 U	1:0 U	1.0 U	1.0 U	0.09
Aroclor-1221	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.09
Aroclor-1232	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.09
Aroclor-1242	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.09
Aroclor-1248	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.09
Aroclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.09
Aroclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.09
Notes: V- not detected at or a ug/L = parts per billion NVG - No value Given	above laborato	ory detection li	*N imits. An an **	YSDEC Tech nbient water C d Groundwatt MW-XX is a d	nical and Ope Nuality Standa ar Effluent Lim uplicate of MV	rational Guide rds and Guide ifations June N-2	ance Series (1. ance Values 1998	1.1)

-			TAB	LE 13				
>	alidated An	ialytical Res	ults for Pe	sticides In	Groundwat	er - Oct. 20	07	
			Cornersto 3100 Thi Bronx, I	ne Site B-1 rd Avenue New York				
Sample ID	1-WM	MW-2	MW-3	MW-4	**XX-WW	NW-5	Field Blank	NYSDEC
Lot	70	Sidewalk	49	70	Sidewalk	Sidewalk		
Dilution	-	¥			-	-	+	TOGS*
Date Sampled	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	
Lesucides	1/on	tra/	na/L	ua/t	ua/L	na/L	ua/L	·ua/L
alpha-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.01
beta-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.04
delta-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.04
gamma-BHC(Lindane)	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.05
Heptachlor	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.04
Aldrìn	0:050 U	0.050 U	0:050 U	0.050 U	0.050 U	0.050 U	0.050 U	DVVG
Heptachior epoxide	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.03
Endosulfan I	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	9 NVG
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.004
4,4'-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.20
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	DVG NVG
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0,10 U	NVG
4,4'-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.30
Endosulfan sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	DVN
4,4'-DDT	0,10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.20
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	35.00
Endrin ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	5.00
Endrin aldehyde	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	5.00
alpha-Chlordane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	NVG
gamma-Chlordane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	NVG
Toxaphene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	0.06
Notes:		dined and a state	<i>2</i> 2	IYSDEC Tech	nical and Ope	rational Guida	ance Series (1.1 and Valuer	(-1)
U- not detected at or apt ug/L = parts per billion	ove laboratory	delection minut	2 2	nbient water u Id Groundwate	quality startua er Effluent Lim	itations June	1998	
			\$		الا المحمد المرامية	c /v		
NVUS - IND VAILUE GIVERI				n e ci vv-nnini	upinate of Min	7-4		
Box indicates value exor	eeds TOGS							

:			11	ABLE 14				
	Validate	d Analytical	Results fo Corners 3100 T Bron	rr Metals In stone Site E 'hird Avenu ¢, New Yor l	Groundwat 3-1 ie	ter - Oct. 20	20	
Sample ID	1-WM	MW-2	MW-3	MW-4	*XX-WM	MW-5	Field Blank	NYSDEC
Lot Dilution	20	Sidewalk	4 ,	20 -	Sidewalk	Sidewalk	¥	10004
Date Sampled	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	S S S
Metals								
Units	ng/L	ug/L	ug/L	ug/L	ng/L	ug/L	ng/L	ng/L
Aluminum	1,580	13,600	230	45,900	12,400	13,200	41.1 B	100
Antimony	4.4 U	4.4 U	4.4 U	5.4 B	4.4 U	4.4 U	4.4 Ú	ოკ
Arsenic		3.7 B		13.4 B	2.0 B	4.7 B		ç, ç,
Banum	56.6 B	239	11. U	2999 0 054 11	232	239		, 1,000
Dedmium	0.1001		0.10010		0 100.0			วน
Calcium		0.13 D	41 000		316 000	360,000	0 0 740 B	-UVN
Chromium	201.2	26.4	с. С. с. с.	146	25.5	49.1	0.60.8	S.
Cobalt	4 0 B	12.9 B	0.67 B	47.6 B	12.4 B	25.6 B	0.19 B	NVG
Copper	8.3 B	21.8 B	3.7 B	137	21.8 B	54.3	1.7 U	200
Iron	3,230	18,100	445	63,900	17,100	27,300	138 B	300
Lead	5.2 B	49.9	1.9 B	634	47.5	18.4	1.5 B	25
Magnesium	14,500	148,000	5,830	103,000	148,000	186,000	195 B	35,000
Manganese	87.2	251	16.4 B	2,560	247	832	4,1 B	300
Mercury	0.110 U	0.43	0.11 U	0.46	0.29	0.11 U	0.11 U	0.7
Nickel	8.6 B 2 250	32.5 B 15 200	1.5 B	110	32.0 B	55.4 12 200	0./4 t5 06 6 D	
Potassium	3,85U	10,300	0/Z'I		14,600			٩ ٢
Selenium	32.0	9.0¢		20.7 B	48.4	8.20 F		0
Silver		0.2.1	0 2.1		0 7.1	0.2.1	0 7 I	
Thallium	Z1,400	004,000	2, 10U	00,400	337,000	103 B	0 000 1 8 0	20,000
Vanadium	4 7 7 7 7 7	314B	2 7 C	104	297 B	43.9 B	0.40 U	NNG
Zinc	21.9 B	84.7	12.9 B	582	81.1	174	20.4 B	2,000
Notes:	-							
ug/L - parts per mil.	lion r ahoua lahor	atory datactics	n limite					
N - Spike recovery I	not within con	trol limits	· 67111111 1					
B-Trace concentrati	on below repo	orting limit/equ	al to or above	e detection lin	nit			
**NYSDEC Technic	al and Operat	tional Guidanc	e Series (1.1.	. 1)				
Ambient water Qual	lity Standards	and Guidance	e Values					
and Groundwater E. * MM-XX is a dunlic	tfluent Limitat ate of MW-2	ions June 199	20					
Box Indicates that V	/alue Exceed	s NYSDEC TC	GS.					

TABLE 15

Validated Analytical Results for Dissolved Metals In Groundwater - Oct. 2007

Cornerstone Site B-1 3100 Third Avenue Bronx, New York

Sample ID	MW-1	MW-2	MW-3	MW-4	MW-XX*	MW-5	Field Blank	NYSDEC
Lot	70	Sidewalk	49	70	Sidewalk	Sidewalk		
Dilution	1	1	1	1	1	1	1	TOGS**
Date Sampled	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	10/25/2007	
Dissolved Metals								
Units	ug/L	ug/L						
Aluminum	37.0 U	37.0 U	37.0 U	80.6 B	37.0 Ų	37.0 U	37.0 U	100
Antimony	4.4 U	4.4 U	4.4 U	4.4 U	4.4 Ų	4.4 U	4.4 U	3
Arsenic	2.5 U	2.5 U	2.5 Ų	2.5 U	2.5 U	2.5 U	2.5 U	25
Barium	48.6 B	151 B	11. Ų	94.7 B	150 B	148 B	11.0 U	1,000
Beryllium	0.14 B	0.051 Ų	0.051 U	3				
Cadmium	0.11 U	0.110 U	0.110 U	5				
Calcium	74,800	239,000	10,600	161,000	238,000	177,000	1,040	NVG
Chromium	2.6 B	0.22 U	0.44 B	0.22 Ų	0.22 U	Q.32 B	0.22 U	50
Cobalt	3.2 B	5.5 B	0.47 B	6.50 B	5.5 B	5.2 B	0.068 U	NVG
Copper	1.7 U	1.7 U	2.8 B	1.7 U	1.7 U	1.7 U	1.7 U	200
Iron	365	1,210	95.5 B	960	1,220	922	89.0 U	300
Lead	3.7 B	6.7 B	1.6 B	7.8 B	4.20 B	4.4 B	1.2 U	25
Magnesium	12,200	112,000	5,150	48,600	112,000	76,500	496 B	35,000
Manganese	11.9 B	60.3	8.9 B	1,170	61.4	226	1.8 U	300
Mercury	0.110 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 1 U	0.7
Nickel	5.6 B	11.8 B	1.2 B	16.4 B	12.0 B	12.7 B	0.22 U	NVG
Potassium	3,220	12,600	1,110	9,120	12,500	8,060	104 B	NVG
Selenium	26.4 B	45.3	6.2 B	35.6	42.4	49.8	5.2 U	10
Silver	1.2 U	1.2 U	1.2 U	1.2 Ų	1.20 U	1.2 U	1.2 U	50
Sodium	26,700	340,000	54,100	64,100	337,000	297,000	1,930	20,000
Thallium	2.9 B	8.1 B	2.8 U	8.7 B	7.4 B	5.5 B	2.8 U	4
Vanadium	3.5 B	5.2 B	1.4 B	3.3 B	5.6 B	3.8 B	0.40 U	NVG
Zinc	9,2 B	8.4 B	77 B	14.3 B	6.2 B	6.9 B	5.4 B	2,000

Notes:

ug/L - parts per million

U- not detected at or above laboratory detection limits.

N - Spike recovery not within control limits

B - Trace concentration below reporting limit/equal to or above detection limit

* MW-XX is a duplicate of MW-2 **NYSDEC Technical and Operational Guidance Series (1.1.1) Ambient water Quality Standards and Guidance Values and Groundwater Effluent Limitations June 1998

Box Indicates that Value Exceeds NYSDEC TOGS.

	_	AII C	UII	annanons in Oo	1110		
							445 B (00 01 (0000
Sample ID		BCP/SV-01		BCP/SV-02		BCP/SV-03	**NYSDOH 2003
Date Collected		4/15/2009		4/15/2009		4/15/2009	Mean VOCs in Air of
		Sub-Slab Vapor		Sub-Slab Vapor		Sub-Slab Vapor	Fuel Oil Heated Homes
Acabda	-						
Analyte		0.91		0.81	<	0.81	NA
1,1 Dichloroethane	È	0.40	2	0.01	2	0.40	NA
1,1 Dichloroethene		0.40	2	1.54	2	1.54	NΔ
1,2 Dibromoetnane	٢.	1.04	2	1.04	2	3.01	NA
1,2 Dichlorobenzene (V)	5	3.01	2	3.01	2	3.01	NA
1,2 Dichloroetriane	2	2,03	2	2.00	2	2.00	NA
1,2 Dichloropropane	2	2,31	2	1.40	2	1.40	NA
1,2-Dichlorotetranuoroetriane	2	1,4Ų 1,01	2	2.90	2	2.21	NA
1,3 Butadiene	2	2.21	2	2.21	0	1 20	NA
1,3 Dichlorobenzene (v)	<	1.20		2.01	0	1.20	NA
1,4 Dichlorobenzene (V)	5	3.01	2	3.01	0	3.60	NA
1,4-Dioxane	\$	3.00]	1.00	0	1.09	NA
	5	1.09		1.09	2	1.00	NA
112 Inchloroethane	5	1.09		1.03	2	1.00	NA
1122 etrachioroethane	5	1.97	2	1.07	2	2.46	NA
124-Inmelnyipenzene	Č.	2.40	2	2.40		2.40	2
135-Inmethylbenzene	<	2.40	2	2,40		12.60	NVG
2,2,4-Trimethylpentane	<	2.00	2	2,33		12.00	NA
2-Hexanone	<	2.05	~	2.00		2.00	NA
3-Chloropropene	<	1.57	<	1.97	`	01 02	NA NA
Acetone		18.79		17.84		01.00	
Acrylonitrile	<	2.17	<	2.17	<pre></pre>	2.17	83
Benzene	ł.	2.17		2.20		3.01	0,0 NA
Benzyl Chloride	<	1.04	<	1.04	5	1.04	NMA NMG
Bromodichloromethane		23.21	<	1.33	5	1.33	NVG
Bromoform	<	2.07	<	2.07	<	2.07	NA NA
Bromomethane	<	Q.78	<	0.78	<	Ų.78	NA I
c-1,2-Dichloroethene	<	0.79		9.92	<	0.79	0.3
c-1,3Dichloropropene	<	2.27	<	2.27	<	2.27	NA
Carbon disulfide	<	1.58	<	1.56	<	1,56	NA
Carbon Tetrachloride	<	0.50	<	0.50	<	0,50	NA
Chlorobenzene	<	Q.0Q	<	0.92	<	0.92	NA NA
Chlorodibromomethane	<	1.69	<	1.69	<	1.69	NA
Chloroethane	<	2.64	<	2.64	<	2.64	NA 0.0
Chloroform		876.60		185.06	<	0.97	U.9
Chloromethane	<	2.07	<	2.07	<	2.07	NA
Cyclohexane	<	0.69	<	0.69	<	0.69	NA NA
Dichlordifluoromethane	<	0.99	<	0.99	<	0.99	NA 1
Ethyl Acetate	<	18.01	<	18.01	<	18.01	NA
Ethyl alcohol		12.62		26,36	[39.54	NVG
Ethyl Benzene		3.60		3.43		268.96	3.7
Freon 113	<	Q.77	<	Q.77	<	0.77	NA
Heptane	<	2.05	<	2.05	<	2.05	NA
Hexachlorobutadiene	<	5.34	<	5.34	<	5.34	NA NA
Hexane		4.23		9.53	<	1.76	NVG
Isopropyl Alcohol	<	12.28	<	12.28	<	12,28	
m + p Xylene		13.04		12.60		434.60	5.8
Methyl Ethyl Ketone	<	2.95	<	2.95		44.19	8.4
Methylene Chloride		2.54		8.69	<	0.69	
Methylisobutylketone	<	4.10	<	4.10	<	4.10	
o Xylene	1	4.00		4.35	ł	43.03	3.8
p-Ethyltoluene	<	2.46	<	2.46		2.55	INVG
Propylene	<	Q.86	<	0.86	<	0.86	NA
Styrene	<	0.85	<	0.85	^ ا	0.85	NA NA
t-1,2-Dichloroethene	<	0.79	<	0.79	<	0.79	NA
t-1.3Dichloropropene	<	0.91	<	0.91	<	0.91	NA I
ter.ButylMethylEther	<	Q.70	<	0.70	<	0.70	NA NA
tert. Butyl Alcohol	<	6.06	<	6.06	<	6.06	NA I
Tetrachloroethene	Ì	26.46	Į	882.05		454.60	1.3
Tetrahydrofuran	<	1.47	<	1.47	<	1.47	NA NA
Toluene	1	31.63	1	33.13		12,05	26
Trichloroethene	1	4.19		46.21		2.47	0.4
Trichlorofluoromethane	<	1.12	<	1.12	<	1.12	NA
Vinyl Acetate	<	1.76	<	1.76	<	1.76	NA
Vinyl Bromide	<	0.88	<	0.88	<	0.88	NA
Vinvl Chloride	<	0.26	<	0.26	<	0.26	NA

Table 16 Summary of Soil Vapor Analyses - 2009 Cornerstone Site B1, 3100 Third Avenue, Bronx All Concentrations in UG/M3

NA = Not Applicable NVG = No Value Given **NYSDOH Guidance for Evaluating Soil Vapor Intrusion In the State of New York, Appendix C Boxed value exceeds NYSDOH Mean VOCs in air of homes healed with fuel oil

•••••	TABLE	17										
Ran	king of Elevated In Soil/Fill S Cornerstone 3100 Third Bronx, New	Lead Detections Samples Site B-1 Avenue w York										
Rank	1	2										
Sample ID	RIBAS-02	RIBAS-01	Part 375*									
Sample Depth 10" below bsmt. 10" below bsmt. Track 1												
Sample Depth 10" below bsmt. 10" below bsmt. Track 1 Matrix Soil Soil Unrestricted Use												
Date Sampled	Oct. 07	Oct. 07	SCOs									
Compound												
Units	mg/Kg	mg/Kg	mg/Kg									
Lead	219 J	57.8 J	63									
Notes: All concentrations are reporte (mg/kg) or parts per million. J = Estimated Value *6 NYCRR Part 375, Table 37 Use Soil Cleanup Objectives,	d in millograms per i 75-6.8(a): Unrestricte December 2006. -	kilogram ad										

	TABLI	∃ 18	
Rankir	ng of Elevated I In Soil/Fill Cornerston 3100 Third Bronx, Ne	Mercury Detectio Samples e Site B-1 Avenue w York	ons
Rank	1	2	
Sample ID	RIBAS-02	RIBAS-01	Part 375*
Sample Depth	10" below bsmt.	10" below bsmt.	Track 1
Matrix	Soil	Soil	Unrestricted Use
Date Sampled	Oct. 07	Oct. 07	SCOs
Compound			
Units	mg/Kg	mg/Kg	mg/Kg
Mercury	0.26 J	0.21	0.18
Notes: All concentrations are report (mg/kg) or parts per million. J = Estimated Value *6 NYCRR Part 375, Table 3 Use Soil Cleanup Objectives	ed in millograms po 75-6.8(a): Unrestri , December 2006.	ər kilogram İcted	

	TABLE 19	
Ranking of E In S Corr 310 Br	Ievated Silver De Soil/Fill Samples nerstone Site B-1 0 Third Avenue ronx, New York	etections
Rank	1	
Sample ID	RIBAS-01	Part 375*
Sample Depth	10" below bsmt.	Track 1
Matrix	Soil	Unrestricted Use
Date Sampled	Oct. 07	SCOs
Compound		
Units	mg/Kg	mg/Kg
Silver	2.1	2
Notes: All concentrations are reporte (mg/kg) or parts per million. *6 NYCRR Part 375, Table 3 Use Soil Cleanup Objectives,	əd in millograms per 75-6.8(a): Unrestricte , December 2006.	kilogram əd

.

Table 20Track 4 Site Specific Soil Action Levels (SSALs)Cornerstone Site B-13100 Third AvenueBronx, New York

Compound/Constituent	Track 4 SSALs	Units
Tetrachloroethene	1.3	mg/kg

Notes:

mg/kg = milligrams per kilogram

If any VOC detection from the on-Site groundwater interface sampling analytical results exceeds the groundwater standards, then the VOC will be added to the list of Site Specific Soil Action Levels (if not already on the list), using the protection of groundwater value in Table 375-6.8b of 6 NYCRR

Permit	Tabl s and Certificatio one Site B-1 Rem	e 21 ons Summary Table edial Action Work Plan	
Permits/Authorizations/Connections New Building Permit Fencing/Sidewalk Closure Permit Asbestos/Demo Permit Asbestos/Demo Permit Site Connections DOT signoff FDNY signoff FDNY signoff Certificate of Occupancy	Agency NYCDOB NYCDOB NYCDOB NYCDEP FDNY NYCDOB	Agency Contact Permit Unit Victor Viloria Permit Unit Davids Sakly CofO Unit Barry Brown William Hinkley	Agency Phone Number (718) 579-6906 (212) 442-6770 (718) 579-6906 (718) 579-6988 (212) 442-2772 (718) 999-1955 (718) 579-6923
Prepared by CA RICH CONSULTANTS, INC.			

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APPENDIX A

Metes and Bounds

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ALL NEW YORK TITLE AGENCY, INC.

Title No. ANY2007-4854C

SCHEDULE A

PARCEL A - SECTION 9, BLOCK 2364, LOT 45

ALL that certain plot, piece or parcel of land situate, lying and being in the Borough and County of Bronx, City and State of New York, bounded and described as follows:

BEGINNING at the corner formed by the intersection of the easterly side of Third Avenue and the northerly side of East 158th Street;

THENCE easterly along the said northerly side of East 158th Street, 84 feet;

THENCE northerly at right angles to said northerly side of East 158th Street 98.54 feet;

THENCE westerly 70.51 feet to the easterly side of Third Avenue, at a point therein distant 99.53 feet northerly from the northeasterly corner of Third Avenue and East 158th Street;

THENCE southerly along the easterly side of Third Avenue 99.53 feet to the point or place of BEGINNING.

APPENDIX B

Sanborn Maps from Phase I ESA











APPENDIX C

Resumes of Key Personnel

STEPHEN J. OSMUNDSEN, P.E.

■ TITLE

Senior Engineer

EDUCATION

Master of Engineering, Cornell University, 1975 Bachelor of Science, Clarkson College of Technology, 1974

CERTIFICATIONS AND REGISTRATIONS

Licensed Professional Engineer in the State of New York, State of Georgia, State of Kansas, State of Wisconsin, State of Michigan

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers N.Y. Water Pollution Control Federation Technical Association for the Pulp and Paper Industry Water Environment Federation Consulting Engineers Council Empire State TAPPI

PROFESSIONAL EXPERIENCE

Senior Engineer, CA Rich Consultants, Inc., 1993-Present

Mr. Osmundsen serves CA Rich Consultants, Inc. as both a Senior Engineer and Engineering Supervisor. He directs and advises the environmental engineering staff at CA RICH, providing detailed inspection and oversight services relative to the Firm's compliance auditing workload. Stephen works closely with CA RICH staff on projects ranging from environmental auditing and compliance services, violations searches, costing detail for remediation, as well as conceptual, pilot and full-scale remedial design and permits for treatment systems to correct hazardous waste contamination problems.

American Chemical Company

Evaluated the use of brackish water in American Chemical Company's cooling tower systems at their Searles Valley Facilities. The study included development of operating scenarios that considered the desert operating conditions at the site, the impacts of the arsenic emissions in the drift from the towers and California's Proposition 65 and Air Toxic Emissions Modeling for California AB 2588. Variables considered in the study were alternate water sources, tower configuration, blowdown frequency, reverse osmosis and other water treatment options, and tower materials of construction.

Bay West

Developed the design and supervised the detailed engineering and construction of a \$6 million wastewater treatment facility for the Bay West 400 ton deinked towel and tissue mill in Middletown, Ohio.

General Electric

Supervised the design of the \$2.5 million expansion of the General Electric Schenectady Works industrial wastewater treatment plant from a 40 million gallon a day capacity to 60 million gallons per day. The design included the up-grading of the industrial based control system to an online computer system with interactive control and data acquisition.

Fairchild Industries

Supervised and prepared designs and specifications for the closure, clean-up and remediation activities at Fairchild Industries, Farmingdale, New York Facility. Activities at the site included hazardous waste treatment unit closure, underground tank removal, soil removal, asbestos removal, building demolition and soil vapor extraction.

Fort Orange Paper Company

Developed the process design for the cooling water treatment for the condensing water at Fort Orange Paper Company's 60 megawatt LM 5000 combined cycle cogeneration plant. The process evaluation included surface water and stand-by well water treatment, cooling tower materials of construction, and cooling tower blowdown treatment.

Pentec Paper

The process design for cooling tower to temper the wastewater from Pentec Papers 600 ton per day pulp mill as the preparatory step for biological treatment. The design had to consider some unusual conditions including the relatively high temperature of the six million gallon a day, the extremely corrosive nature of the pulp mill effluent, and the high fiber content of the wastewater. The design of the distribution system and tower configuration were especially important due to the plugging potential and the materials of construction critical because of the high temperature and corrosivity of the waste stream.

ERIC ANDREW WEINSTOCK, CPG, CGWP

TITLE

Vice President

EDUCATION

Master of Science, Engineering Geology, Georgia Tech, 1980 Bachelor of Science, Geology, State University of New York at Oneonta, 1978

CERTIFICATIONS AND REGISTRATIONS

Certified Ground Water Professional, No. 278 Certified Professional Geologist, No. 7391 Health & Safety Operations at Hazardous Material Sites; 29 CRF 1910.120 Registered Professional Geologist in Delaware (No.379), South Carolina (No. 544), and Pennsylvania (No. 925-G)

PROFESSIONAL AFFILIATIONS

National Ground Water Association American Institute of Professional Geologists

PROFESSIONAL EXPERIENCE

Vice President and Senior Hydrogeologist, CA Rich Consultants, Inc., 1988 - Present

Mr. Weinstock serves as both a Project Manager and a Technical Supervisor. Since 1988, he has served as the Project Manager for numerous ground water, regulatory compliance, and real estate related projects.

Eric's responsibilities at the Firm include: Management of the following Federal and/or State Superfund investigations and cleanups:

- Tronic Plating Co., Farmingdale, NY
- Tishcon Corporation, Westbury, NY
- Stewart Hall Chemical Corp., Mt. Vernon, NY
- Spring Creek Gardens, Brooklyn, NY
- Munsey Cleaners, Port Washington, NY
- Ranco Wiping Cloth, Freeport, NY
- Jim Jam Cleaners, Merrick, NY
- Utility Manufacturing Co., Westbury, NY
- Coral Graphics Site, Hicksville, NY
- Bon Ton Cleaners Site, Brooklyn, NY

Mr. Weinstock also serves as the firm's Technical Supervisor at the following NYSDEC oil spill investigations and cleanup projects:

- 875 5th Avenue, New York Multi-phase extraction of subsurface No. 6 heating oil
- Best Metropolitan Towel & Linen Supply Co., Brooklyn, NY Total fluids recovery of subsurface No. 6 heating oil.
- 669 Atlantic Avenue, Brooklyn, NY

Senior Hydrogeologist, Camp Dresser & McKee, NY, 1984 - 1988

Mr. Weinstock was the Project Geologist for the Port Washington Landfill RI/FS, a U. S. EPA Superfund site. He was in charge of a drilling program including 400 foot-deep monitoring wells and landfill gas wells. He assisted in the use of CDM's Dynflow/Dyntrack computer model to assess remedial alternatives.

Eric developed a simulation of the regional stratigraphy of Nassau County for NCDPW's regional groundwater model. This information, along with hydrologic data, is being used by the County in Dynflow/Dyntrack to model the effects of pumping.

At the Metaltec/Aerosystems U.S. EPA Superfund site in Franklin, N.J., Mr. Weinstock was in charge of a remedial investigation of a metals plating site. The project included monitoring well installation; soil, surface water and groundwater sampling; and aquifer pump testing. This information was used to assess remedial alternatives in the Feasibility Study.

Hydrogeologist, Leeds Hill & Jewett, San Francisco, CA, 1982 - 1984

Eric served as a field geologist for the drilling and installation of 1,000 gpm production water wells for a power plant in Nevada. His duties included supervision of drillers, interpretation of geophysical logs, inspection of well construction and pump testing.

Mr. Weinstock was in charge of a drilling and well installation program to determine the extent of a 50,000-gallon plume of jet fuel at this U.S. Navy Base in Southern California.

Hydrogeologist, Dames & Moore, San Francisco, CA, 1980 - 1982

Mr. Weinstock supervised the installation, sampling and testing of a RCRA monitoring well network at a Chevron refinery and chemical plant in Richmond, Calif. Duties included drilling supervision, geophysical logging, mapping, pump testing and sampling.

SELECTED PUBLICATIONS

Rao, S.G. and Weinstock, E.A., 1981, "Numerical Modeling of Solute Transport in Groundwater; An Application to a Landfill Site in Florida." Paper presented at the 17th Am. Water Resources Assoc., National Conference, October 4-8, 1981, Atlanta, Georgia.

Weinstock, Eric A., 1988, "A Sensible Alternative for the Installation of Monitoring Wells," Water Well Journal, December 1988.

Weinstock, Eric A., 1991, "Phase II Environmental Assessments, Water Well Journal," April 1991

Weinstock, Eric A., 1992, "Cost-Effective Options for the Collection of Subsurface Soil, Soil Gas and Groundwater Samples," The National Environmental Journal, Nov/Dec 1992.

Weinstock, Eric A., 1996, "Methods for the Collection of Subsurface Samples during Environmental Site Assessments", in <u>Sampling Environmental Media</u>, <u>ASTM STP 1282</u>.

Weinstock, Eric A., 2001, "Dry Cleaners, Perchloroethene and Glacial Aquifers – Lessons Learned on Long Island, New York", The Professional Geologist, September/October, 2001

Weinstock, Eric A. and Sobstyl, Steven, 2003, "Comparison of Site Remediation Costs for Cleanups Performed Under Federal, State and County Oversight", NGWA Conference on Remediation: Site Closure and the Total Cost of Cleanup, November 13-14, 2003, New Orleans, LA.

Weinstock, Eric A., 2004, "Dual-Treatment Approach to Perc Cleanup", Drycleaner News

Weinstock, Eric A. and Shapiro, Deborah, 2006, *Redeveloping "E-Sites" in New York City*, in The Real Estate Journal, January 3-9, 2006.

Weinstock, Eric A., Osmundsen, Steven, and Shapiro, Deborah, 2008, "Subsurface Evaluation Through Sub-Slab Depressurization, The Investigation and Remediation of a Dry Cleaning Facility in Brooklyn, NY", NGWA Conference on Eastern Regional Ground Water Issues, June 23-24, 2008, Ronkonkoma, NYH.

Weinstock, Eric A. "Sub-Slab Depressurization – A Necessary Part of the Final Remedy", The Professional Geologist, November/December, 2008

SELECTED LECTURES

Guest Hydrogeology lecturer, Manhattan College & Cooper Union, 1988.

Guest Hydrogeology lecturer, Adelphi University, 1991.

Guest lecturer, NYC Mayor's Office of Environmental Remediation, Big Apple Brownfields Work Shop, 2008

EXPERT TESTIMONY

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Commerce Holding Co. Inc. v. the Board of Assessors of the Town of Babylon Suffolk County Supreme Court, 1991

State of New York v. AMN Oil Corp and Alvin Petroleum, et. al New York State Court, 2006

F.C. Properties v. the County of Nassau New York State Court, 2009

DEBORAH SHAPIRO, M.S.

TITLE

Project Manager/Environmental Scientist

EDUCATION

Master of Science, Environmental Science, American University (2001) Bachelor of Arts, Environmental Studies, American University (1998)

CERTIFICATIONS

40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120)
8-hour OSHA Hazardous Waste Operations and Emergency Response Refresher Training
8-hour OSHA Site Supervisor Training
Standard First Aid Training - American Red Cross
CPR Training – American Red Cross

PROFESSIONAL AFFILIATIONS

Long Island Association of Professional Geologists (LIAPG)

PROFESSIONAL EXPERIENCE

Project Manager, CA Rich Consultants, Inc., 2004 - Present

Ms. Shapiro serves as a Project Manager/Environmental Scientist for the Firm and has successfully performed field investigations and remedial activities at numerous sites. She is currently managing the testing and remediation of several E-Designated and restricted/negative delcaration Sites in New York City under the auspices of NYCDEP for redevelopment of industrial properties for residential and commercial usage.

Ms. Shapiro assisted in the design and construction of an air sparge/soil vapor extraction system at Bon Ton Cleaners in Brooklyn, New York. She also oversaw the installation of multiple permanganate injection wells and the injection of permanganate into these wells at Bon Ton Cleaners.

In addition, Ms. Shapiro conducts Phase I and Phase II Environmental Site Assessments of commercial and industrial properties, as well as other nonindustrial properties to facilitate real property transfers, loan workouts, and refinances. The Phase I Environmental Site Assessment Reports are prepared for lending institutions and/or attorneys and are used in assessing the environmental integrity and liability associated with the property.

Ms. Shapiro is competent in conducting all aspects of environmental investigations and cleanups including monitoring well design/installation, groundwater, indoor air, soil gas, subslab vapor, and soil sampling, UST removals, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation. She also assists with the Firm's drafting requirements using AutoCad.

Staff Environmental Scientist, Groundwater and Environmental Services, Inc., 2002 - 2004

Ms. Shapiro was responsible for managing numerous accounts for major petroleum clients and the NYSDEC. Her portfolio included retail service stations, trucking facilities, a commercial building, and an overnight delivery company. Ms. Shapiro performed all tasks associated with environmental site assessments (Phase I and Phase II), exposure assessments, on-going remedial action (especially AS/SVE), and permitting. In addition, she oversaw field activities including UST removals, soil excavation, pilot testing, soil borings, and the installation of groundwater and soil vapor extraction monitoring wells, and permanganate and gas injection wells. Before being promoted to Staff Environmental Scientist, Ms. Shapiro was an Associate Environmental Scientist for Groundwater and Environmental Services, Inc.

Junior/Associate Environmental Scientist, Groundwater and Environmental Services, Inc., 2001 - 2002

Ms. Shapiro was responsible for groundwater monitoring and sampling, gauging and product bailing, High Intensity Targeting (HIT) or Effluent Fluid Recovery (EFR) events, sensitive receptor surveys, soil borings, monitoring well installations, surveying, and permitting.

Researcher, Department of Biology, American University, 2000 - 2001

Ms. Shapiro was responsible for mapping data using Geographical Information Systems (GIS) for a subterranean biodiversity study of the United States. Ms. Shapiro also sampled springs (water chemistry, structure and Baits sampling) for a water guality study of Rock Creek Park, Washington, DC.

Litigation Assistant/Paralegal, Earthjustice Legal Defense Fund, 1998 - 2000

Ms. Shapiro was responsible for managing all casework, including research, editing, and assisting with the preparation of legal documents for numerous environmental legal proceedings.

FELLOWSHIP

Ms. Shapiro was a "Woman in Science Fellow" at the United States Senate Environmental Protection Agency, Office of Policy, Planning, and Evaluation in 1997.

SELECTED PUBLICATIONS

Weinstock, Eric A. and **Shapiro, Deborah**, 2006, Redeveloping "E-Sites" in New York City, in The Real Estate Journal, January 3-9, 2006.

Weinstock, Eric A., Osmundsen, Steven, and **Shapiro, Deborah**, 2008, "Subsurface Evaluation Through Sub-Slab Depressurization, The Investigation and Remediation of a Dry Cleaning Facility in Brooklyn, NY", NGWA Conference on Eastern Regional Ground Water Issues, June 23-24, 2008, Ronkonkoma, NYH.

MICHAEL T. YAGER

• TITLE

Project Manager/Environmental Scientist

EDUCATION

Biology and Environmental Science SUNY Cortland, 1988

CERTIFICATIONS AND REGISTRATIONS

Hazardous Waste Operations and Emergency Response-Supervisor OSHA Part 1910.120

Health & Safety Operations at Hazardous Materials Sites 29 CFR1910.120 (E) (2) - 40 hours

NÝS Department of Labor (NYSDOL) Asbestos Air Sampling Technician USEPA AHERA, NYSDOL Approved Asbestos Inspector

PROFESSIONAL EXPERIENCE

Project Manager/Environmental Scientist, CA Rich Consultants Inc., 1988 – Present

As a Project Manager/Environmental Scientist for CA RICH, Mr. Yager conducts all aspects of the asbestos abatement industry including asbestos inspections for residential, commercial, and industrial properties; Large and small scale asbestos abatement supervision including third party air monitoring for asbestos fiber control. In addition, Mr. Yager conducts Phase I ESAs and all aspects of hazardous waste site investigations and remediation including hazardous waste characterization, consolidation and disposal; regulatory compliance - RCRA, CERCLA (Superfund), ECRA, AHERA, large and small quantity generator reporting; SARA Title III Community Right-to-Know Reporting, discharge permits for air and groundwater.

Mr. Yager has also designed, implemented and supervised investigatory and/or remedial activities conducted on-site. Investigatory activities include: sub-surface soil sampling, soil vapor/gas sampling; installation, development and sampling of groundwater monitoring wells, Hydropunch groundwater sampling; air sampling and/or monitoring; etc., to determine and/or delineate the extent and degree of existing contamination at the site. Corrective actions include: asbestos abatement activities; underground storage tank removal or abandonment; excavation of contaminated soils and/or materials; consolidation and proper disposal of hazardous waste; etc., to remediate hazardous materials and/or on-site conditions.

RENEE G. COHEN

• TITLE

Data Validation Specialist

EDUCATION

Bachelor of Science, Environmental Science, Old Dominion University, 1984 Bachelor of Science, Biology, Old Dominion University, 1984 16 hours of Chemistry coursework Graduate Coursework - Rutgers University, New Brunswick, New Jersey Long Island University at C.W. Post, Glen Cove, New York

PROFESSIONAL EXPERIENCE

Data Validation Specialist, CA Rich Consultants, Inc. 1993 - Present

Perform organic and inorganic data validation according to the various protocols from the USEPA EPA CLP, NYS ASP and USEPA Test Methods for the Evaluation of Solid Waste, Methods for the Chemical Analysis of Water and Waste and the Federal Register. Use the USEPA National Functional Guidelines for Organic and Inorganic Data Validation (where applicable) as well as State (NYS DEC ASP/DUSR) and EPA Region requirements to report on laboratory data quality and data usability. Review and write Quality Assurance Project Plans using Regional and State guidelines for Remedial Investigations, Ground Water Monitoring programs and Superfund Programs. Review data and work plans as they relate to project data quality objectives. Conducts seminars on client specific topics. Perform on-site laboratory QA/QC audits as required by the client and site-specific work plans. Perform ASTM Phase 1 Assessments for engineering firms.

QA Specialist, Environmental Testing Laboratories, 2002 - 2003

Performed the data review and report compilation of organic and inorganic data for report preparation. Performed departmental audits in compliance with NELAC and internal Helped to revise laboratory logbooks for bench chemists. Revised/updated laboratory SOP's for method compliance. Participated in onsite audit by both state representatives and commercial clients.

Keyspan Laboratory Services, 1999 - 2002

Developed laboratory QAPP (in accordance with NELAC) and Chemical Hygiene Plan. Modified and updated laboratory SOP's. Perform audits in the different work areas. Maintained the NYS DOH proficiency program for analytes of interest. Review data for completeness and QC criteria. Implemented client inquiry system. Performed QC training and method training for bench and field chemists. Developed protocols and documentation for field PCB wipe sampling. Responsible for update/maintenance of laboratory state certifications.

Quality Assurance Officer, Nytest Environmental Inc., 1994 - 1998

Responsible for the overall quality program at the laboratory. This included the auditing test methods, systems and data reporting. Performed the review of 10% of all data reports prior to submission to client. Oversaw the training program of new employees. Maintain the documentation of the training records. Review and maintain state certification paperwork and SOP files. Update and file annual MDL datum. Worked with sales and customer service to insure that client needs are met. Respond to client data inquires. Work with state and federal auditors for review of laboratory to receive certification. Successfully lead the laboratory to an Army Corp of Engineer validation.

QA/QC Scientist, Enseco East, 1989 - 1993

Performed organic and inorganic audits of the laboratory. Performed and coordinated corrections and revisions to data reports. Wrote and reviewed laboratory Quality Assurance Project plans (QAPjP's) for client specific projects. Developed and led seminars for both client and employees on a number of topics including; data quality objectives, data review vs. data validation and laboratory QC. Interacted with clients, project managers and state personnel for regulatory concerns and data/lab issues. Performed lab audits for method compliance and project specific requirements. Acted as the Technical Representative for Ensecos EPA 3/90 Organic CLP Contract.

QA/QC Manager, Intech Biolabs, 1988 - 1989

QA/QC Manager - Responsible for the review of all organic and inorganic data. Performed general laboratory and safety audits. Recorded and charted all QA/QC data. Reviewed and assembled all CLP organic data reports.

Central Laboratory, Chemist, International Technologies Corporation, 1986 - 1988

REAC and EERU Contract for the Emergency Response Branch (ERB) of the USEPA. Responsible for the organic and inorganic extraction of environmental samples according to EPA Methods. This included both metals digestion as well as organic extraction's for semivolatiles, pesticides and PCB's. Performed Volatile Organic analyses using Gas Chromatography, Total Petroleum Hydrocarbon Analysis by IR, Metal Analyses by both Graphite Furnace AA and ICP. Field experience included s on site analyses for both metals and GC volatiles.

Chemist, U.S. Testing Company, 1985 - 1986

Responsible for the digestion and analysis of both soil and aqueous samples for metals according to USEPA CLP and SW 846 protocols. Responsible for the analysis of sample digestates using the Varian Graphite Furnace Atomic Absorption Spectrophotometer and a Jerall Ash ICP-61.

JASON T. COOPER, B.S.

TITLE

Project Environmental Scientist

EDUCATION

Bachelor of Science, Geology, State University of New York at Buffalo, 1999

CERTIFICATIONS

40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120) 8-hour OSHA Hazardous Waste Operations and Emergency Response Refresher Training Standard First Aid Training - American Red Cross CPR Training – American Red Cross

PROFESSIONAL AFFILIATIONS

Long Island Association of Professional Geologists (LIAPG)

PROFESSIONAL EXPERIENCE

Project Environmental Scientist, C A Rich Consultants, Inc., 2005 - Present

As a Project Environmental Scientist with CA RICH, Mr. Cooper's responsibilities include the conductance of Phase I and Phase II Environmental Site Assessments (ESAs). Jason's Phase I and Phase II ESA experience includes coordinating historical and regulatory database searches, conducting Property inspections, collecting soil, groundwater, and sediment samples and authoring Phase I and Phase II reports.

Mr. Cooper has also assisted with the construction and start-up tests for an air sparge/soil vapor extraction (AS/SVE) system for the remediation of PCE contamination. In addition, he has conducted quarterly monitoring and troubleshooting for the AS/SVE system.

Mr. Cooper also conducts annual property inspections for the highly successful Tenant Environmental Compliance Program, which helps to ensure that the tenants are not contaminating a landlord's properties. This Program now covers almost two million square feet of multi-tenanted buildings on Long Island, NY.

Geologist, Geologic Services Corporation, 2001 - 2005

As a Geologist with Geologic Services Corporation, Mr. Cooper's responsibilities included the authoring of quarterly monitoring reports, sub-surface investigation reports, and sensitive receptor survey reports. In addition he has conducted monitoring well installation oversight with logging and sampling, remediation system maintenance, well surveying, groundwater sampling, 24-hour pump tests, equipment maintenance and peer mentoring.

Mr. Cooper developed and implemented a program for the management and oversight for the collection of over 1,000 groundwater samples for a retail gasoline station in Smithtown, New York. His duties included the training of
personnel, management and QA/QC of samples, and meeting monthly deadlines. In addition, he conducted monthly mass flux calculations, MTBE vertical cross-section contour maps, vertical cross-section groundwater flow maps (flow nets), and aerial groundwater flow maps.

Jason has also assisted with the construction of a groundwater pump and treat remediation system and determined the most affective locations for the submersible pumps for maximum contamination recovery.

Jason has completed the ExxonMobil Loss Prevention Safety (LPS) program and participated in monthly Health and Safety meetings. Jason conducted health and safety oversight of drilling activities, tank cleanings and removals and soil removal. The LPS and health and safety programs were implemented in the field by Jason as a health and safety officer with zero incidences.

Field Technician, Environmental Assessment and Remediation (EAR) 2000 - 2001

As a field technician with EAR, Mr. Cooper's responsibilities included the construction of remediation systems, operations and maintenance along with troubleshooting of remediation systems, groundwater sampling, air sampling and well abandonment.

VICTORIA D. WHELAN, B.S.

TITLE

Project Hydrogeologist

EDUCATION

Bachelor of Science, Geology, State University of New York at Oswego, 2005

CERTIFICATIONS

40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120) Standard First Aid Training - American Red Cross- Bohemia Fire Department CPR Training – American Red Cross -Bohemia Fire Department

PROFESSIONAL EXPERIENCE

Project Hydrogeologist, C A Rich Consultants, Inc., 2006 - Present

As a Project Hydrogeologist with CA RICH, Ms. Whelan's responsibilities include the conductance of Phase I and Phase II Environmental Site Assessments (ESAs). Ms. Whelan has also conducted all aspects of environmental investigations including monitoring well design/installation, groundwater, indoor air, soil gas, subslab vapor, and soil sampling, UST removals, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation.

Ms. Whelan conducts annual property inspections for the highly successful Tenant Environmental Compliance Program, which helps to ensure that the tenants are not contaminating a landlord's properties. This Program now covers almost two million square feet of multi-tenanted buildings on Long Island, NY.

Project Hydrogeologist, Walden Associates, P.L.L.C, 2005 - 2006

As a Hydrogeologist with Walden Associates, Ms. Whelan's responsibilities included the quarterly monitoring report write ups, sub-surface investigation reports, monitoring well installation oversight with logging and sampling, remediation system maintenance, well surveying, groundwater sampling, and free product recovery.

Ms. Whelan assisted with the start-up tests and monitoring for an air sparge/soil vapor extraction (AS/SVE) system for the remediation of PCE contamination on a Federal Superfund site.

PROFESSIONAL AFFILIATIONS

Long Island Association of Professional Geologists (LIAPG) National Ground Water Association, member *Sigma Xi*, member

PUBLICATIONS

Andrews, J., and **Whelan, V.,** Department of Earth Sciences, State University Of New York at Oswego NY 13126, <u>Ordovician Carbonates in Northwest Lewis and parts of Southeastern Jefferson counties, New York</u> Northeastern Section and Southeastern Section joint Meeting

FIELD RESEARCH FOR PAPER CONTRIBUTIONS

Bauer, M., Valentino, D., Chiarenzelli, J., Solar, G., Department of Earth Sciences, State University of New York at Oswego, NY 13126, <u>Metamorphic</u> <u>Petrology and Unit Distribution in The Oliver hill Dome, Eastern Adirondack</u> <u>Mountains, New York</u>, Northeastern Section and Southeastern Section joint Meeting

Smith, N., Valentino, D., Chiarenzelli, J., Solar, G., Department of Earth Sciences, State University of New York at Oswego, NY 13126, <u>Distribution of L-and L-S Tectonite in the Oliver Hill Dome, Eastern Adirondack Mountains, New</u> York, Northeastern Section and Southeastern Section joint Meeting

Stilwell, S., Garwron, J., Andrews, J., Bauer, M., Crocetti, A., Meneilly, N., Piaschyk, D., Smith, N., and **Whelan, V.,** Earth Sciences, SUNY Oswego, Oswego, NY 13126, <u>Fracture analysis along the southern shore of Lake Ontario</u> <u>in the Oswego Formation, Oswego County, New York,</u> Northeastern Section and Southeastern Section joint Meeting

JESSICA E. PROSCIA, B.S.

• TITLE

Project Environmental Scientist

EDUCATION

Bachelor of Science, Health Science, Environmental Health and Safety, State University of New York at Stony Brook, 2007

CERTIFICATIONS

40-hour OSHA Hazardous Waste Operations and Emergency Response Training (OSHA 29 CFR 1910.120) 8-hour OSHA Hazardous Waste Operations and Emergency Response Refresher Training Standard First Aid Training - American Red Cross CPR Training – American Red Cross

PROFESSIONAL EXPERIENCE

Project Environmental Scientist, C A Rich Consultants, Inc., Oct. 2008 - Present

As a Project Environmental Scientist with CA RICH, Ms. Proscia's responsibilities include the conductance of Phase I and Phase II Environmental Site Assessments (ESAs). Ms. Proscia has also conducted all aspects of environmental investigations including UST removals, supervision of drilling and well installation, sanitary system or dry well clean-outs, groundwater, and soil sampling, soil delineation, excavation, petroleum and hazardous waste disposal, analytical interpretation, groundwater contouring, and report preparation.

Environmental Scientist/Health and Safety Officer, Hydro Tech Environmental, Corp., 2007 - 2008

As an Environmental Scientist with Hydro Tech Environmental, Ms. Proscia's responsibilities included Phase I ESA's through Subsurface Investigations. Ms. Proscia was also involved in site supervision on several properties in New York State.

Ms. Proscia performed on site safety inspections for the company's field crew as well as trained staff for the OSHA 40-hour and 8-hour refresher course.

PROFESSIONAL AFFILIATIONS

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Long Island Association of Professional Geologists (LIAPG)

APPENDIX D

Sample Chain of Custody

175 Metro Center Boulevard Warwick, Rhode Island 02886-1755 (401) 732-3400 • Fax (401) 732-3499 email: mitkem@mitken.com

> MITKEM Corporation

CHAIN-OF-CUSTODY RECORD

TURNAROUND TIME: COOLER TEMP: CAB PROJECT #: COMMENTS ADDITIONAL REMARKS: **REQUESTED ANALYSES** PHONE FAX DATTE/TIME ~ -~ CITY/ST/ZIP COMPANY ADDRESS NAME ACCEPTED BY # OF CONTAINERS CURNT P.O.#: LAB ID ABHTO PHONE FAX SOIL CLIENT PROJECT #: DATE/TIME WATER ~ ~ ~ екув COMPOSITE DATE/TIME SAMPLED ~ ~ ~ ~ ~ ~ ~ ~ ~ **RELINQUISHED BY** CLIENT PROJECT NAME: SAMPLE IDENTIFICATION CITY/ST/ZIP COMPANY ADDRESS NAME TSF#

PINK: CLIENT'S COPY

YELLOW: REPORT COPY

WHITE: LABORATORY COPY

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APPENDIX E

Citizen Participation Plan

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan for Cornerstone Site B-1

3100 Third Avenue The Bronx, New York

Prepared by: CA Rich Consultants, Inc. 17 Dupont Street Plainview, NY 11803 (516) 576-8844

January 2009; Revised April 2009

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Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the brownfield site's remedial process.

Applicant: CS Melrose Site B LLC ("Applicant") Site Name: Cornerstone Site B-1 ("site") Site Address: 3100 Third Avenue Site County: The Bronx Site Number: C203044

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site remedial activities.¹ An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: www.dec.state.ny.us/website/der/bcp.

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the site.

¹ "Remedial activities", "remedial action", and "remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Project Contacts

Appendix B identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's remedial program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Document Repositories

The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List

Appendix C contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield site contact list includes, at a minimum:

- X chief executive officer and official(s) principally involved with relevant zoning and planning matters of each county, city, town and village in which the site is located;
- X residents, owners, and occupants of the site and properties adjacent to the site;
- X the public water supplier which services the area in which the site is located;
- X any person who has requested to be placed on the site contact list;
- X the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- X document repositories.

Where the site or adjacent real property contains multiple dwelling units, the Applicant will work with NYSDEC to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The brownfield site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the brownfield site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the site remedial process. The public is informed about these CP activities through fact sheets and notices developed at significant points in the site's remedial process.

- X Notices and fact sheets help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.
- X **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation.

The public is encouraged to contact project staff at any time during the site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 6 or in the nature and scope of remedial activities. Modifications may include additions to the brownfield site contact list and changes in planned citizen participation activities.

3. Site Information

Site Description

The Site is improved with a single story building with a basement totaling 7,613 square feet. The Site is located on the northeast corner of the intersection of East 158th Street with Third Avenue and spans westward. Legally, the Site is designated as Block: 2364, Lot: 45. The current corresponding address to Block: 2364; Lot 45 is 3100 Third Avenue, Bronx, New York New York City Department of Housing Preservation and Development (NYCDHPD) has owned the Property since January 1999 when it was acquired through condemnation as part of the Melrose Commons Urban Renewal Plan. As part of the redevelopment plans for the Property, CS Melrose Site B LLC plans to purchase Block: 2364; Lot 45 from NYCHPD. A Site Map is included in Appendix A.

The Site is located in an urban setting and is currently zoned residential (R8) with a C1-4 overlay. According to the Notice to Proceed issued on November 2, 2006 regarding Cornerstone Site B, identified as Block: 2364, Lots: 45, 49, 55, 56, 58, 60, and 70 (07DEPTECH075X), the Site was 'E' designated for Noise as part of the 1994 Melrose Commons Final Environmental Impact Statement (CEQR No. 88-087X).

Specific neighboring property usage is outlined below:

North:	Commercial Stores and Vacant Land
South:	E. 158 th Street and a NYC Parks and Recreation Playground (Across E. 158 th
	Street)
East:	Vacant Land followed by Brook Avenue
West:	Third Avenue, La Puerta De Vitalidad Apartment Building (Across Third
	Avenue)

Site History

The site is currently improved with a single story building with a basement totaling 7,613 square feet. Although the site is currently unoccupied, historical records indicate that the site was originally developed circa 1951 with a single story building with a basement and was occupied as a store, upholstery business and an undertaker. Circa 1969, the building was also developed as a Dry Cleaner and in 1989, the building operated as a Medical Center and a Dry Cleaner.

According to the Remedial Investigation Report dated November 2007 prepared by CA Rich Consultants, Inc. (CA RICH), the contaminants of concern at the site include the following: volatile organic compounds (VOCs) – perchloroethylene (PCE) (a.k.a. dry cleaning fluid) and its degradation products; semi-volatile organic compounds (SVOCs) – polynuclear aromatic hydrocarbons or "PAHs"; metals – chromium, copper, magnesium, iron, lead, mercury, nickel, selenium, sodium, thallium and zinc; and, the pesticides 4,4'-DDE, and 4,4'-DDT. The VOCs of concern were detected in the soil, soil vapor and groundwater. The SVOCs of concern were detected in the soil and groundwater, but not above standards in the groundwater. The pesticides were detected in the soil; but were not detected in the groundwater samples. The metals were detected in the soil and groundwater.

Environmental History

A Phase I Environmental Site Assessment (ESA) was conducted by Pressly and Associates, Inc. in March 2004 for the site as well as Block 2364; Lots 49, 55, 56, 58, and 70. The Phase I ESA identified the following Recognized Environmental Condition (REC):

• A drycleaner operated on Lot 45 [the site] in and around the period between 1969 and 1989. The dry-cleaner was not identified in the RCRA database or spill files and probably pre-dated those databases. However, due to past experience with the poor housekeeping operations of these facilities, it is recommended that a groundwater investigation be conducted to evaluate the potential presence of dry cleaning solvents in the subsurface on the southern side of the building.

Based on this REC, a Phase II ESA was initiated by CA RICH. As the results of the initial samples were received, the Applicant decided to pursue an application for acceptance into the NYSDEC's Brownfield Cleanup Program (BCP) as well as conduct a Remedial Investigation. The scope of work of the Remedial Investigation included: interior and exterior soil sampling

and analysis; interior and exterior soil vapor sampling and analysis; monitoring well installation, surveying, sampling and analysis; and report preparation.

The data indicated that there has been a release of PCE to the subsurface soils at the site. This is demonstrated by the detections of PCE in the soil as well as in the soil vapor. The data indicates that PCE soil vapors exceeding New York State Department of Health Services (DOH) guidance values exist below all portions of the existing building foundation that were tested, but is most concentrated below the southern portion of the building, which was formerly used as a dry cleaning facility. In addition, elevated levels of soil vapor containing acetone, MEK, toluene and xylene were measured underneath the building and to the north and east of the building.

Elevated levels of several SVOCs commonly referred to as polynuclear aromatic hydrocarbons or "PAHs" and eight metals were detected throughout the site and on the adjacent lots to the north and east at varying depths. Pesticides were also detected above NYSDEC Part 375 Soil Cleanup Objectives (SCOs) underneath the building and on the northern and eastern adjacent lots. No PCBs were detected on the site; however, one Aroclor (1242) exceeded the Part 375 SCOs on the lot immediately adjacent to the site to the east.

The groundwater data conducted during the Remedial Investigation suggests that the underlying groundwater exists primarily in the overburden material above bedrock, classified as the Inwood Marble. However, groundwater was not encountered above bedrock towards the southern and western portions of the property. The Inwood Marble is massive and contains very few fractures. New York City currently utilizes upstate reservoirs for its municipal water supply. As the underlying groundwater is not used for potable supply purposes, no potable resources appear to be threatened by local groundwater contamination.

As rainwater infiltrates into the soils at the Site, some of the PCE migrates into the groundwater. This condition is most evident in monitoring well MW-2, which is located adjacent to the location of the former dry cleaner and the elevated PCE soil vapor readings. In addition, three of the monitoring wells installed on the adjacent lots had PCE concentrations exceeding NYSDEC TOGS groundwater standards. Magnesium, which was detected in the soil above NYSDEC TAGM levels, was also detected in the groundwater above drinking water standards in three of the five wells. These three wells are MW-2, MW-4 and MW-5, the wells that fill with water in response to rainfall.

In response to the findings of the Remedial Investigation Report, a Draft Remedial Action Work Plan was prepared by CA RICH and submitted to NYSDEC. As of the date of this plan, the Remedial Action Work Plan has not been approved by NYSDEC.

It is noted that the Phase I ESA conducted by Pressly and Associates, Inc., Remedial Investigation Report prepared by CA RICH, and Draft Remedial Action Work Plan prepared by CA RICH were included in the BCP application, which is on file at the document repository.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting a remedial program at the site.

Investigation

A Remedial Investigation (RI) was conducted in 2007 and a RI Report was submitted to NYSDEC along with the BCP Application. The goals of the investigation were as follows:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other impacted media;

2) Identify the source(s) of the contamination;

3) Assess the impact of the contamination on public health and/or the environment; and

4) Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

The Applicant completed a RI Report after it completed the RI field activities. This Report summarized the results of the RI and included the Applicant's recommendation of whether remediation is needed to address site-related contamination. The RI Report was initially submitted to NYSDEC as part of the BCP Application and a Revised RI Report was submitted to NYSDEC in April 2009. As the RI Report was submitted as part of the BCP Application, it was included in the BCP Application public comment period which ended in February 2008.

NYSDEC will determine if the site poses a significant threat to public health and/or the environment. If NYSDEC determines that the site is a "significant threat," a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is

to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the eligible site.

For more information about the TAG Program and the availability of TAGs, go online at: www.dec.state.ny.us/website/der/guidance/tag/.

Remedy Selection

After NYSDEC approves the RI Report, the Applicant will be able to develop a Remedial Work Plan if remediation is required. The Remedial Work Plan describes how the Applicant would address the contamination related to the site. For this site, a DRAFT Remedial Action Work Plan was prepared and submitted along with the BCP application. The remedy selected in DRAFT Remedial Action Work Plan includes excavation of contaminated soils as part of the construction and redevelopment of the site; removal of three ASTs in accordance with applicable regulations; off-site disposal of contaminated soil; installation of a vapor barrier and sub-slab depressurization system; and post-remediation groundwater monitoring.

The public had the opportunity to review and comment on the Draft Remedial Work Plan. The site contact list was sent a fact sheet that described the Draft Remedial Work Plan and announced a 45-day public comment period, which ended in February 2008. Any comments received by NYSDEC will be factored into its decision to approve, reject or modify the draft Remedial Work Plan.

A public meeting may be held by NYSDEC about the proposed Remedial Work Plan if requested by the affected community and if significant substantive issues are raised about the draft Remedial Work Plan. Please note that, in order to request a public meeting, the health, economic well-being or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the site. In addition, the request for the public meeting should be made within the first 30 days of the 45-day public comment period for the draft Remedial Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Remedial Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the site. The site contact list will receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a final engineering report that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the

report to be certain that the remediation is protective of public health and the environment for the intended use of the site. The site contact list will receive a fact sheet that announces the completion of remedial activities and the review of the final engineering report.

Certificate of Completion and Site Management

Once NYSDEC approves the final engineering report, it will issue the Applicant a Certificate of Completion. This Certificate states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The Certificate also includes a description of any institutional and engineering controls or monitoring required by the approved remedial work plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the site contact list will receive a fact sheet that discusses such controls.

An institutional control is a non-physical restriction on use of the brownfield site, such as a deed restriction that would prevent or restrict certain uses of the remediated property. An institutional control may be used when the remedial action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the brownfield site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Remedial Work Plan.

All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval of, NYSDEC.

6. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern, if any, that relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

Current Issues

The Site is comprised of the approximately southern one-half of Site 17 in the Melrose Commons Urban Renewal Area, which is designated for residential use. The northern approximate one-half of Site 17 will be the site of another proposed project, designated as Cornerstone RFP Site B2. The remaining portion of this block, on Third Avenue, is occupied by one-to-two story commercial buildings, which are not part of the urban renewal or the project sites. The Melrose Commons Urban Renewal Plan has the following objectives:

- Eliminate blight and maximize appropriate land use;
- Remove substandard and insanitary structures;
- Remove impediments to land assemblage and orderly development;
- Strengthen the tax base of the City by encouraging development;
- Provide new and/or rehabilitated low, moderate, and/or middle income housing exhibiting good design in terms of privacy, light, air, and open space;
- Provide convenient community facilities, parks, and recreational uses, local commercial activities, parking;
- Redevelop the Area in a comprehensive manner, removing blight and restoring the residential character of the Area, with appropriate support facilities;
- Encourage the upgrading of housing quality in the immediate vicinity.

The proposed development will meet all of the aforementioned goals of the Melrose Commons Urban Renewal Plan. According to the Department of City Planning's District Needs Assessment, housing affordability problems in the Bronx have been a persistent problem, with 29.1% of Bronx residents spending more than 50% of their incomes on housing, the highest rate of any borough. The proposed development will help to alleviate this problem by providing rental housing with all units targeted to households earning less than 80% of HUD's Income Limits.

The project site, currently zoned R8 with a C1-4 overlay, is located on East 158th Street between Third and Brook Avenues. Lot 58 is an open trench which was occupied by a now legally abandoned railroad line. As a result of the Urban Renewal Plan, the City took title to the air rights starting at 15'10" above the tracks in the trench. The tax lot itself, and the trench up to 15'10" above the former rails, are privately owned. The community garden formerly located on part of this site voluntarily relocated to a nearby site. A Zoning Map Amendment was approved for this project, which will enable the building design to match the neighborhood context and will improve the street frontages on both Third and Brook Avenues. The C1-4 overlay will remain on the majority of the block, enabling commercial development on the Third Avenue and part of the East 158th Street sides of the project.

The immediate area surrounding the project site has seen large amounts of City investment. Within a one-block radius of the site are the completed La Casa de Felicidad (85 units, HUD 202) and La Puerta de Vitalidad (60 units, Permanent Housing for Homeless Families), the 91-unit Aurora (a Cornerstone Program condominium), and Melrose Court, 265 occupied low-rise condominium units built through the Partnership New Homes Program. All of these are on formerly City-owned urban renewal sites. Immediately south of this project site, across East 158th Street, is a NYC Parks Department playground. Across Brook Avenue to the east on the north side of East 159th Street is the Church of Saint Peter and Paul and a parochial school and on the south side of East 159th Street are condominiums.

The Site contains City-owned vacant land and a vacant commercial building to be demolished. There are no issues related to odor or noise. The Site is not impacting the use and enjoyment of any local amenities or nearby projects, however, the Site is considered to be an unattractive blight on the community in its undeveloped condition.

The proposed project, "La Terraza", will transform the blighted lots into a one new 8-story affordable residential building. The gross square footage of the proposed project is approximately 138,556 square feet. The proposed project will create a total of 106 units of low-income rental housing in the Melrose section of the Bronx plus one unit for a superintendent. The project will provide ground level retail, community space and a shared private courtyard for residents. There will be approximately 41 spaces of below grade parking available to rent. The proposed development will be participating in the New York State Energy Research and Development Authority's Multifamily Performance Program. NYSERDA's residential programs help multifamily building owners provide energy-efficient apartments for their tenants through the implementation of energy conservation measures and practices. The project will be constructed under HPD's Cornerstone Program and will be built under the Quality Housing guidelines. Redevelopment of this Site in accordance the Melrose Commons Urban Renewal Plan will eliminate the current concerns in connection with the Site's blighted condition, while providing affordable housing, community resources, local retail and open space.

Potential Remediation/Construction-Related Issues

Issues of concern during the on-Site remediation phase will likely include those related to the on-Site handling and off-Site disposal of impacted fill materials. Of particular concern to the surrounding community will likely be the possibility of the generation of vapors or dust from the Site during remediation. On-Site air quality and dust levels will be monitored during any soil excavation and removal activity in accordance with a Site-specific Health and Safety Plan (HASP). The HASP will be prepared as part of the Remedial Action Work Plan. Dust suppression techniques will also be employed to prevent the generation of dust. All air and dust monitoring will be performed in accordance with NYSDOH's Community Air Monitoring Program.

An additional remediation/construction concern will likely be the potential presence of large trucks traveling through the community and parked or idling at or near the project Site during soil excavation and disposal. The RAWP will include provision for on-Site soil handling

techniques that minimize the number of trucks and duration of time within or near the Site. In addition, provision will be included to restrict truck traffic (to the extent possible) to designated routes along main roads while minimizing traffic within the community.

The concern over construction-related noise is a common one for communities in which redevelopment is occurring. Construction plans will minimize noise to the extent possible and the operation of heavy equipment will be restricted to normal working hours as will be set forth in the required NY City-issued permits.

Other Issues

The Citizen Participation process as outlined in Section 4.0 will be used to communicate to the public any issues and milestones that may arise. If additional major issues of public concern are identified in the future, this plan will be revised accordingly.



Appendix A – Site Location Map

Appendix B – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Sadique Ahmed Project Manager NYSDEC Division of Environmental Remediation 625 Broadway Albany, New York 12233-7016 518-402-9775

Arturo Garcia-Costas

Regional Citizen Participation Specialist NYSDEC Region 2 1 Hunters Point Plaza 47 40 21st Street, Long Island City NY 11101-5407 718-482-7287

New York State Department of Health (NYSDOH):

Christopher M. Doroski Public Health Specialist 2 NYSDOH Bureau of Environmental Exposure Investigation 547 River Street Troy, NY 12180 1-800-458-1158 x27860

Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

New York Public Library – Woodstock Branch	NYSDEC
761 East 160th Street,	Division of Environmental Remediation
Bronx, NY	625 Broadway
Attn: Mr. Gene Shaw, Branch Librarian	Albany, New York 12233-7020
Phone: (718) 665-6255	Attn: Mr. Sadique Ahmed
Hours: Mon Tue Wed Thu Fri Sat Sun	Phone: 518-402-9775
10-8 10-6 10-6 10-8 10-5 10-5 Closed	Hours: Monday through Friday 9am to 5pm
	(call for appointment)

Appendix C – Brownfield Site Contact List

1. Government Contacts

Hon. Charles E. Schumer U.S. Senator 757 Third Avenue, Room 1702 New York, NY 10017

Hon. Kirsten E. Gillebrand 531 Dirksen Senate Office Building Washington D.C. 20510

Hon. Jose E. Serrano US House of Representatives 788 Southern Boulevard Bronx, NY 10455

City of New York

Chief Executive Officer and Zoning Board Chairperson:

The Honorable Michael R. Bloomberg, Mayor, City of New York c/o The Mayor's Office of Environmental Coordination 253 Broadway, 14th Floor, New York, NY 10007 ATTN: Robert Kulikowski, Director

Amanda M. Burden, Director, Department of City Planning and Chair, City Planning Commission Department of City Planning 22 Reade Street, New York, NY 10007-1216

Department of City Planning, Bronx Office One Fordham Plaza, 5th Fl., Bronx, NY 10458 ATTN: Carol Samol, Deputy Director

City Councilperson:

The Honorable Maria del Carmen Arroyo, New York City Council, District 17 384 E. 149th St., Suite 300, Bronx, NY 10455

Borough of The Bronx, Bronx County:

The Honorable Adolfo Carrion, Jr., Bronx Borough President Bronx County Building, 851 Grand Concourse, Bronx, NY 10451 ATTN: Wilhelm Ronda, Director, Program, Policy & Planning

Bronx Community Board 1:

3024 Third Avenue, Bronx, NY 10455 ATTN: Mr. Cedric Lofton, District Manager

3024 Third Avenue, Bronx, NY 10455 ATTN: Mr. George Rodriquez, Chairperson

Bronx Community Board 3:

1426 Boston Road, Bronx, NY 10456 ATTN: Gloria Alston, Chairperson

1426 Boston Road, Bronx, NY 10456 ATTN: John Dudley, District Manager

State of New York

State Assembly:

The Honorable Carmen E. Arroyo, New York State Assembly, District 84 384 East 149th Street, Suite 608, Bronx, NY 10455

Hon. Michael Benjamin New York State Assemblymember 540 E. 169th Street, Bronx, NY 10456

State Senate:

The Honorable Ruben Diaz, Sr., New York State Senate, District 32 1750 Westchester Avenue, Bronx, NY 10472

2. Residents, owners, and occupants of site and properties immediately adjacent

Owner of Site:

City of New York Department of Housing Preservation and Development 100 Gold Street, New York, NY 10038

Property Occupants Currently Vacant

Adjacent to North: Block 2364 Lot 51: F.K.B. Realty LLC 3286 White Plains Road, Bronx, NY 10467

Lot 56:

City of New York Department of Housing Preservation and Development 100 Gold Street, New York, NY 10038

p/o Lot 58: Midtown Trackage Ventures LLC 551 5th Avenue, 34th Floor, New York, NY 10176

Adjacent to East:

Block 2360 Lot 80: Michelle Mckeon, Principal, St. Peter and St. Paul Church and School 838 Brook Ave., Bronx, NY 10451

Lionel Farrington, Director, Melrose Community School 838 Brook Ave., Bronx, NY 10451

Lot 6: Resident 512 E 159th St, Apt A Bronx, NY 10451-4667

Wheeler, Alphonso W & Annie R 512 E 159th St, Apt B Bronx, NY 10451-4667

Resident 512 E 159th St, Apt C Bronx, NY 10451-4667

Chemical Community Development Inc. 277 Park Avenue, New York, New York

Adjacent to South: Block 2364 Lot 25: New York City Department of Parks and Recreation The Arsenal, Central Park 830 5th Avenue, New York, NY 10021

Adjacent to West: Block 2380 Lot 55: La Puerta De Vitalidad Housing Development Fund Corp. 43 West 23rd Street, New York, NY 10010

3. Local news media

The Bronx Press & Riverdale Review 6050 Riverdale Ave Bronx, NY, 10471-1604 Phone: 718-543-5200

Hoy *(in Spanish)* 330 West 34th Street, 17th Floor New York, New York 10001 917-339-0800

Bronx Times Reporter 1111 Calhoun Avenue Bronx, NY 10456

Inner City Press P.O. Box 580188 Mt. Carmel Station Bronx, NY 10458

New York Daily News 450 West 33rd Street New York, NY 10001

NY 1 News 75 Ninth Avenue New York, NY 10011

4. Public water supplier

The New York City Department of Environmental Protection (DEP), Bureau of Water Supply

59-17 Junction Boulevard Flushing, New York 11373

DEP manages the water supply and distribution and a copy of the New York City 2005 Drinking Water Supply and Quality report is available by calling 311 or from outside

New York City by calling (212) New-York. To view the 2005 Statement, you may also visit DEP's web site at: www.nyc.gov/dep

5. Any person who has requested to be on the SCL

Nos Quedamos 754 Melrose Avenue Bronx, New York 10451 Attn: Yolanda Gonzalez

6. Administrator of Any School or Day Care facility located on or near the Site

City of New York, Department of Education, c/o Peter Heaney, Jr., Regional Superintendent 333 7th Avenue, New York, NY 10001

Director, Five Star Day Care 3261 3rd Ave, Bronx, NY

Director, Embassy Day Care Center 421 E 161st St, Bronx, NY

Director, Salvation Army Bronx Day Care Center 425 E 159th St, Bronx, NY

Director, Ola Jordan Day Care Center 421 East 161 Street, Bronx, 10451

Denise Simone, Principal, New Explorer's High School 701 St. Ann's Avenue, Bronx, NY 10455

Felice Lepore, Principal, The Urban Assembly School for Careers in Sports 701 St. Ann's Avenue, Bronx, NY 10455

Michelle McKeon, Principal, St Peter and St. Paul School 838 Brook Avenue, Bronx, NY 10451

Lionel Farrington, Director, Melrose Community School 838 Brook Avenue, Bronx, NY 10451

St. Peter's & Paul's Elem School 838 Brook Avenue, Bronx, NY 10451

Melrose Community School 838 Brook Avenue #1, Bronx, NY 10451

Middle School #301 890 Cauldwell Avenue, Bronx, NY 10456 ATTN: Benjamin Basile, Principal

Bronx Elementary School #29 758 Courtlandt Avenue, Bronx, NY 10451 ATTN: Meredith Gotlin, Principal

7. Document Repository

New York Public Library – Woodstock Branch 761 East 160th Street, Bronx, NY, (718) 665-6255

8. Community, Civic, Religious and other Educational Institutions

Bronxchester Resident Association Jannie Smith Sheppard, President c/o St. Mary's Park 649 Westchester Avenue Bronx, NY 10455

Zionic Ministries 3114 3rd Avenue Bronx, NY 10451

Christian Federation 3065 3rd Avenue Bronx, NY 10451

Greater Eternal Baptist Church 746 Elton Avenue Bronx, NY 10451

Centor Cultural Rincon Criolla Inc. 499 East 158th Street Bronx, NY 10451

Salvation Army Citadel Corps Community Center 425 East 159th Street Bronx, NY 10451

Bronxchester (NYC Housing Authority) c/o St. Mary's Park 649 Westchester Avenue Bronx, NY 10455

9. Community Impact Zone

Resident/Business Owner 530 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 824 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 3146 3 AVENUE BRONX NY 10451

Resident/Business Owner 3154 3 AVENUE BRONX NY 10451

Resident/Business Owner 3172 3 AVENUE BRONX NY 10451

Resident/Business Owner 833 ST ANN'S AVENUE BRONX NY 10456

Resident/Business Owner 526A EAST 159 STREET BRONX NY 10451

Resident/Business Owner 3046 3 AVENUE BRONX NY 10451

Resident/Business Owner 3050 3 AVENUE BRONX NY 10451

Resident/Business Owner 3052 3 AVENUE BRONX NY 10451

Resident/Business Owner 3054 3 AVENUE BRONX NY 10451

Resident/Business Owner 3056 3 AVENUE BRONX NY 10451

Resident/Business Owner 3058 3 AVENUE BRONX NY 10451

Resident/Business Owner 3060 3 AVENUE BRONX NY 10451

Resident/Business Owner 755 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 749 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 745 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 741 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 499 EAST 156 STREET BRONX NY 10455

Resident/Business Owner 497 EAST 156 STREET BRONX NY 10455

Resident/Business Owner 493 EAST 156 STREET BRONX NY 10455

Resident/Business Owner 3080 3 AVENUE BRONX NY 10451

Resident/Business Owner 3100 3 AVENUE BRONX NY 10451

Resident/Business Owner 3106 3 AVENUE BRONX NY 10451

Resident/Business Owner 3108 3 AVENUE BRONX NY 10451

Resident/Business Owner 3110 3 AVENUE BRONX NY 10451

Resident/Business Owner 3116 3 AVENUE BRONX NY 10451

Resident/Business Owner 3118 3 AVENUE BRONX NY 10451

Resident/Business Owner 3140 BROOK AVENUE BRONX NY 00000

Resident/Business Owner 850 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 868 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 872 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 883 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 881 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 879 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 877 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 873 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 871 BROOK AVENUE BRONX NY 10451

Resident/Business Owner 767 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 3063 3 AVENUE BRONX NY 10451

Resident/Business Owner 3061 3 AVENUE BRONX NY 10451

Resident/Business Owner 3053 3 AVENUE BRONX NY 10451

Resident/Business Owner 3051 3 AVENUE BRONX NY 10451

Resident/Business Owner 754 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 756 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 758 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 760 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 762 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 764 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 766 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 3065 3 AVENUE BRONX NY 10451

Resident/Business Owner 430 EAST 158 STREET BRONX NY 10451

Resident/Business Owner 791 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 789 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 787 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 785 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 777 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 776 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 450 EAST 158 STREET BRONX NY 10451

Resident/Business Owner 456 EAST 158 STREET BRONX NY 10451

Resident/Business Owner 462 EAST 158 STREET BRONX NY 10451

Resident/Business Owner 3097 3 AVENUE BRONX NY 10451

Resident/Business Owner 3089 3 AVENUE BRONX NY 10451

Resident/Business Owner 3087 3 AVENUE BRONX NY 10451

Resident/Business Owner 3085 3 AVENUE BRONX NY 10451

Resident/Business Owner 3079 3 AVENUE BRONX NY 10451

Resident/Business Owner 3075 3 AVENUE BRONX NY 10451

Resident/Business Owner 459 EAST 157 STREET BRONX NY 10451

Resident/Business Owner 783 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 781 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 778 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 780 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 782 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 784 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 804 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 464 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 3103 3 AVENUE BRONX NY 10451

Resident/Business Owner 428 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 821 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 819 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 817 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 815 ELTON AVENUE BRONX NY 10451
CA RICH Environmental Specialists

Resident/Business Owner 813 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 811 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 809 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 807 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 805 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 425 EAST 158 STREET BRONX NY 10451

Resident/Business Owner 806 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 808 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 810 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 812 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 814 ELTON AVENUE BRONX NY 10451

Ca RICH Environmental Specialists

Resident/Business Owner 816 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 818 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 820 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 843 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 833 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 831 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 829 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 827 ELTON AVENUE BRONX NY 10451 Resident/Business Owner 437 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 425 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 451 EAST 159 STREET BRONX NY 10451

CA RICH Environmental Specialists

Resident/Business Owner 830 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 838 ELTON AVENUE BRONX NY 10451

Resident/Business Owner 454 EAST 160 STREET BRONX NY 10451

Resident/Business Owner 462 EAST 160 STREET BRONX NY 10451

Resident/Business Owner 841 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 837 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 833 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 831 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 825 WASHINGTON AVENUE BRONX NY 10451

Resident/Business Owner 467 EAST 159 STREET BRONX NY 10451

Ca RICH Environmental Specialists

Resident/Business Owner 465 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 463 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 461 EAST 159 STREET BRONX NY 10451

Resident/Business Owner 453 EAST 160 STREET BRONX NY 10451

Resident/Business Owner 470 EAST 161 STREET BRONX NY 10451

Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities	CP Activities) Occur at this Point
Application Process:	
• Prepare brownfield site contact list (BSCL)	At time of preparation of application to participate in BCP.
Establish document repositories	
Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period	When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreemen	.t:
• Prepare citizen participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution.
After Remedial Investigation (RI) Work Plan Received	l:
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.
After RI Completion:	
Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report.
After Remedial Work Plan (RWP) Received:	
 Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period 	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day
• Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	comment period.
After Approval of RWP:	
 Mail fact sheet to BSCL summarizing upcoming remedial construction 	Before the start of remedial construction.
After Remedial Action Completed:	
Mail fact sheet to BSCL announcing that remedial construction has been completed	At the time NYSDEC approves Final Engineering Report. These two fact sheets should be combined when possible if there is not a delay in issuance of the COC.
• Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)	







APPENDIX F

Health and Safety Plan & Community Air Monitoring Plan



HEALTH AND SAFETY PLAN & COMMUNITY AIR MONITORING PLAN

FOR THE REMEDIAL ACTION WORK PLAN

> Cornerstone B1 3100 Avenue Bronx, New York

BCP Site #C203044

May 2009

Prepared For:

CS Melrose Site B, LLC 1865 Palmer Avenue Suite 203 Larchmont, New York 10538

Prepared by:

CA RICH CONSULTANTS, INC. 17 Dupont Street Plainview, New York 11803 (516) 576-8844

HEALTH AND SAFETY PLAN & COMMUNITY AIR MONITORING PLAN

FOR THE REMEDIAL ACTION WORK PLAN AT Cornerstone Site B-1 3100 Third Avenue Bronx, New York BCP #C203044

1.0 INTRODUCTION

This Health and Safety Plan (HASP) is developed for utilization during implementation of the Remedial Action Work Plan (RAWP) at Cornerstone Site B-1, 3100 Third Avenue, Bronx, New York (the Site). The HASP is to be enforced by the Project Health and Safety Manager and onsite Health & Safety Coordinator (HSC). The on-site HSC will interface with the Project Manager and is vested with the authority to make field decisions including the termination of on-site activities if an imminent health and safety hazard, condition or related concern arises. Information and protocol in the HASP is applicable to all on-site personnel who will be entering the work zone.

2.0 POTENTIAL HAZARDS

2.1 Chemical Hazards

On-site testing performed to date indicates the primary class of compounds detected in soils and groundwater underlying the Site to be volatile organic compounds (VOCs), and Metals – specifically lead, mercury, and silver.

Some of the chemicals listed above are described as "sweet" or "aromatic" smelling and are narcotic in high concentrations. Acute exposure to significant concentrations of these chemicals can cause irritation of the skin, eyes and mucus membrane, headache, dizziness, nausea, and in high enough concentrations, loss of consciousness and death (*Sax, 1984*). These compounds are suspected to be carcinogenic with chronic exposure.

There is also potential that additional VOCs, semi-volatile organic compounds (SVOCs), pesticides, PCBs and heavy metals may be present in the on-site soils and/or groundwater due the urban environment. During the on-site investigation activities, CA RICH will operate as if there is a potential hazard from the above-listed compounds. Physical properties and toxicological information is included in Appendix A.

2.2 Other Health and Safety Risks

The HASP addresses the environmentally-related chemical hazards identified on the Site. Normal physical hazards associated with using drilling equipment and hand tools as well as hazards associated with adverse climatic conditions (heat and cold) also exist and represent a certain degree of risk to be assumed by on-site personnel.

Certain provisions in this Plan, specifically the use of personnel protective equipment, may tend to increase the risk of physical injury, as well as susceptibility to cold or heat stress. This is primarily due to restrictions in dexterity, hearing, sight, and normal body heat transfer inherent in the use of protective gear.

3.0 RISK MANAGEMENT

3.1 Work / Exclusion Zones

For each proposed activity (e.g., soil excavation, soil and groundwater sampling, etc.), a work/exclusion zone will be established. Access to this area will be limited to properly trained, properly protected personnel directly involved with the on-site activities. Enforcement of the work/exclusion zone boundaries is the responsibility of the on-site Health & Safety Coordinator.

3.2 Personnel Protection

Health & Safety regulatory personnel have developed different levels of personnel protection to deal with differing degrees of potential risks of exposure to chemical constituents. The levels are designated as **A**, **B**, **C**, and **D** and ranked according to the amount of personnel protection afforded by each level. Level **A** is the highest level of protection, and Level **D** is the lowest level of protection as described below.

A – Fully encapsulating suit, SCBA, hard hat, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.

B – One-piece, hooded chemical-resistant splash suit, SCBA, hard hat, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.

C – One-piece, hooded chemical-resistant splash suit, hard hat, canister equipped face mask, chemical-resistant steel-toed boots, boot covers, inner and outer gloves.

D – Work clothes, hard hat (optional), work boots/shoes, gloves (as needed).

The different levels are primarily dependent upon the degree of respiratory protection necessary, in conjunction with appropriate protective clothing. Levels of protection mandate a degree of respiratory protection. However, flexibility exists within the lower levels (B, C, and D) concerning proper protective clothing.

The four levels of protection were developed for utilization in situations which involve suspected or known atmospheric and/or environmental hazards including airborne contamination and skin-affecting substances.

It is anticipated that all of the on-site work will be performed using Level D protection (no respiratory protection with protective clothing requirements limited to long sleeved shirts, long pants or coveralls, work gloves and steel-toe leather work boots).

Level D may be modified by the HSC to include protective clothing or equipment (Saran-coated disposable coveralls or PVC splash suits, safety glasses, hard hat with face shield, and chemically resistant boots) based upon physical hazards, skin contact concerns, and real-time monitoring.

Real-time air monitoring for total airborne organics using either an OVA or an HNU will determine if and when an upgrade from Level D to a higher level of respiratory protection is warranted. Decisions for an upgrade from Level D to higher levels of protection, mitigative actions, and/or suspension of work are the responsibility of the Project Manager and/or the designated on-site Health & Safety Coordinator.

3.3 Air Monitoring

The Health & Safety Coordinator or his properly trained assignee will conduct "Real Time" air monitoring for total organic vapor and total particulates. "Real-time" monitoring refers to the utilization of instrumentation, which yields immediate measurements. The utilization of real time monitoring helps determine immediate or long-term risks to on-site personnel and the general public, the appropriate level of personnel respiratory protection necessary, and actions to mitigate the recognized hazard. Air monitoring will be conducted in accordance with NYSDOH's Community Air Monitoring Program.

3.3.1. Particulate Monitoring

a. Instrumentation

Dust particulates in air will be monitored using a light scattering technique MINIRAM Model PDM-3 Miniature Real-time Aerosol Monitor (MINIRAM) or equivalent. The MINIRAM is capable of measuring airborne dust particles within the range of 10 to 100,000 micrograms per cubic meter ($\mu g/m^3$).

b. Application

Dust monitoring will occur at regular intervals of excavation work activities. Monitoring will be conducted in upgradient and downgradient locations, relative to prevailing wind direction along the perimeter of the work zone. The HSC or his designee will perform monitoring. As outlined in the NYSDOH Community Air Monitoring Plan, if particulate levels in the downwind location are 150 mg/m³ greater than those measured in the upwind location, dust suppression techniques shall be employed.

3.3.2 Organic Vapor

a. Instrumentation

Real-time monitoring for total organic vapor (TOV) utilizes either a photoionization detector (PID) or flame ionization detector (FID). The appropriate PID is an intrinsically safe HNU Systems Model PI-101 photoionization detector (HNU) or MiniRAE[™] photoionization detector or equivalent, which is factory calibrated to benzene. The appropriate FID is a Foxboro model 128 Organic Vapor Analyzer (OVA) or equivalent, which is factory calibrated to methane.

b. Application

Organic vapor monitoring is performed as outlined in the NYSDOH Community Air Monitoring Plan. Specifically, monitoring shall be conducted at the downwind perimeter of the work zone periodically during work activities. If TOV levels exceed 5 parts per million (ppm) above established pre-work background levels, work activities will be halted and monitoring will be continued under the provision of a Vapor Emission Response Plan (as outlined in the Community Air Monitoring Plan).

3.4 Worker Training

Personnel overseeing the remedial activities will be trained, fit-tested, and medically certified (OSHA 29 CFR 1910.134). This includes the Health & Safety Coordinator or his/her properly trained assignee.

Prior to any work, all workers involved with the project should be aware of the potential chemical, physical and biological hazards discussed in this document, as well as the general safety practices outlined below. A safety briefing by the on-site HSC and/or assistant designee shall take place at the outset of work activities.

The HSC will be available to address project-related health and safety issues a site worker (such as an equipment operator or laborer) may have regarding the site conditions. Once an issue is brought to the HSC's attention, he or she will evaluate the issue and apply the procedures outlined in this Health & Safety Plan.

3.5 General Safety Practices

All project personnel shall follow the following safety practices:

- 1. Avoid unnecessary skin exposure to subsurface materials. Long-sleeved shirts tucked into long pants (or coveralls), work gloves, and steel-toe leather work boots are required unless modified gear is approved by the HSC. Remove any excess residual soil from clothes prior to leaving the site.
- 2. No eating, drinking, gum or tobacco chewing, or smoking allowed in designated work areas. Thoroughly wash hands prior to these activities outside the work area. Avoid sitting on the ground during breaks or while eating and drinking. Thoroughly wash all exposed body areas at the end of the workday.
- 3. Some symptoms of acute exposure include: nausea, dizziness, light-headedness, impaired coordination, headache, blurred vision, and nose/throat/eye irritation. If these symptoms are experienced or strong odor is detected, leave the work area and immediately report the incident to the on-site HSC.

3.6 Enforcement

Enforcement of the Site Safety Plan will be the responsibility of the HSC. The Coordinator should be on-site on a full-time basis and perform or directly oversee all aspects of Project Health & Safety operations including: air monitoring; environmental mitigation; personnel respiratory and skin protection; general safety practices; documentation; emergency procedures and protocol; and reporting and recordkeeping as described below.

3.7 Reporting and Recordkeeping

Incidents involving injury, symptoms of exposure, discovery of contained (potentially hazardous) materials, or unsafe work practices and/or conditions should be immediately reported to the HSC.

A log book must be maintained on-site to document all aspects of HASP enforcement. The log is paginated and dated with entries made on a daily basis in waterproof ink, initialed by the HSC or designee. Log entries should include date and time of instrument monitoring, instrument type, measurement method, test results, calibration and maintenance information, as well as appropriate mitigative actions responding to detections. Miscellaneous information to be logged may include weather conditions, reported complaints or symptoms, regulatory inspections, and reasons to upgrade personnel protection above the normal specification (Level D).

4.0 EMERGENCIES

4.1 EMERGENCY RESPONSE SERVICES

(1)	HOSPITAL Bronx-Lebanon Hospital 1650 Grand Concourse Bronx, New York 10457 (See Figure 1 for Map Route)	(718) 590-1800
(2)	AMBULANCE	911
(3)	FIRE DEPARTMENT HAZARDOUS MATERIAL	911
(4)	POLICE DEPARTMENT	911
(5)	POISON CONTROL CENTER	(800) 222-1222

The preceding list and associated attached map (Figure 1) illustrating the fastest route to the nearest hospital must be conspicuously posted in areas of worker congregation and adjacent to all on-site telephones (if any).

4.2 EMERGENCY PROCEDURES

4.2.1 Contact or Exposure to Suspected Hazardous Materials

In the event of a fire, chemical discharge, or medical emergency, workers are instructed to immediately notify the HSC and proper emergency services (posted). Should physical contact with unknown or questionable materials occur, immediately wash the affected body areas with clean water and notify the HSC. Anyone experiencing symptoms of exposure should exit the work area, notify the HSC, and seek medical attention.

4.2.2 Personnel Decontamination, First Aid, and Fire Protection

The first step in the treatment of skin exposure to most chemicals is to rinse the affected area with water. For this reason, adequate amounts of potable water and soap are maintained on-site in a clearly designated and readily-accessible location. Portable emergency eyewash stations and a first aid kit must be made available and maintained in the same locations as the potable water. Fire extinguishers are also to be maintained on-site in designated locations. All on-site personnel are to be made aware of the locations of the above-mentioned on-site Health & Safety accommodations during the initial Health and Safety briefing.

4.2.3 Ingress/egress

Clear paths of ingress/egress to work zones and site entrances/exits must be maintained at all times. Unauthorized personnel are restricted from accessing the site.

5.0 COMMUNITY AIR MONITORING PLAN

Real-time air monitoring for volatile compounds and particulate levels at the perimeter of the work area is necessary. This plan includes the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (NYDSDEC and NYSDOH) personnel to review.
- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations during excavation activities. If the downwind particulate level is 150 µg/m³ greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

5.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the 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:

The organic vapor level 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 the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

5.2 Major Vapor Emission

If any organic 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, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic 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 must 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 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 into effect if organic vapor levels are greater than 10 ppm above background.

5.3 Major Vapor Emission Response Plan

Upon activation of the plan, the following activities will be undertaken:

- 1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Remedial Action Plan will go into effect.
- 2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
- 3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

6.0 HEALTH AND SAFETY PLAN REFERENCES

- 1. American Conference Governmental Industrial Hygienists, 1989; Threshold Limit Values And Biological Exposure Indices, 111 Pp.
- 2. Geoenvironmental Consultants, Inc., 1987; Safety & Operations At Hazardous Materials Sites
- 3. NIOSH Guide To Chemical Hazards, 1985; US Department Of Health And Human Services, Centers For Disease Control
- 4. US Department Of Labor Occupational Safety & Health Administration, 1989; Hazardous Waste Operations And Emergency Response Interim Final Rule, 29 CFR Part 1910
- 5. Sax, N. I., Dangerous Properties Of Industrial Materials; © 1984

Projects/Cornerstone Site B/Rem Action Plan/HASP and CAMP/H&S and Comm Air Monitoring Plan for RAP

FIGURE

7

3100 3rd Ave, Bronx, NY 10451 to Bronx Lebanon Hospital Center Dental - Google Maps Page 1 of 2



Ŷ	310 1.	Head northeast on 3rd Ave toward E 159th St	go 236 ft total 236 ft
¢	2.	Turn left at E 159th St About 1 min	go 0.2 mi total 0.2 mi
þ	3.	Turn right at Melrose Ave	go 486 ft total 0.3 mi
÷	4.	Turn left at E 161st St About 1 min	go 0.4 mi total 0.7 mi
7	5.	Slight right to stay on E 161st St	go 413 ft total 0.8 mi
P	6.	Turn right at Grand Concourse	go 384 ft total 0.9 mi
7	7.	Slight right to stay on Grand Concourse About 3 mins	go 1.4 mi total 2.3 mi
₽	Bro 177	nx Lebanon Hospital Center Dental ⁄0 Grand Concourse # 2B, Bronx, NY 10457 - (718) 960-2018	

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2009, Tele Atlas

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APPENDIX A

Physical Properties and Toxicological Information

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Material Name: Benzene

MSDS ID: NOVA-0011

Section 1 - Product and Company Identification

Synonyms: Benzene, benzol Chemical Name: Benzene Chemical Family: Aromatic hydrocarbons Material Use: Petrochemical industry: Solvent, raw material for petrochemicals Chemical Formula: (C_6H_6)

NOVA Chemicals

P.O. Box 2518, Station M Calgary, Alberta, Canada T2P 5C6

EMERGENCY Telephone Numbers:

North America (Canada and US): 1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours) 1-800-424-9300 (CHEMTREC-USA) (24 hours) 1-613-996-6666 (Canutec-Canada) (24 hours) Mexico and South America: +44 208 762 8322 (NCEC) (24 hours)

Product Information: 1-412-490-4063 MSDS Information Email: msdsemail@novachem.com

Section 2 - Hazards Identification

HMIS Ratings: Health: 2* Fire: 3 Physical Hazard: 0 Personal Protection: chemical goggles, gloves, respirator, coveralls

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

NFPA Ratings: Health: 2 Fire: 3 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Emergency Overview

DANGER! TOXICI FLAMMABLE! CANCER HAZARD! Product is a clear liquid at room temperature with a sweet, solvent-like odor. Vapor is heavier than air and may spread long distances. Distant ignition and flashback are possible. Flammable liquid and vapor can accumulate static charge. Product will float on water and may travel to distant locations and/or spread fire. This product is considered harmful by inhalation, by skin contact, and if it is swallowed. This product is irritating to the eyes and skin. Excessive inhalation may result in heartbeat irregularities and adverse central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, tremors, and in extreme conditions, coma and death. Systemic absorption effects may include long-term damage to the blood-forming system, kidney and liver damage, and/or cancer (leukemia). Ingestion may also cause adverse central nervous system effects, blood disorders, kidney and/or liver damage. Small amounts, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Potential Health Effects: Eye

Contact with liquid and high concentrations of this product's vapors are irritating to the eyes.

Potential Health Effects: Skin

Product may be rapidly absorbed through the skin. Prolonged and/or repeated skin contact may cause mild to severe irritation/dermatitis and chemical blistering. Prolonged contact may also cause skin sensitization and secondary skin infections.

Potential Health Effects: Ingestion

This product may be harmful if swallowed. Ingestion of this product may result in adverse central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions coma and/or death. Ingestion may also cause kidney and liver damage and blood disorders. Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Potential Health Effects: Inhalation

This product may be harmful if inhaled. Excessive inhalation may result in heartbeat irregularities and adverse central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions, coma and death. Additional adverse inhalation effects may also include long-term damage to blood-forming system, kidney and liver damage, and/or cancer (leukemia). Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Material Name: Benzene

MSDS ID: NOVA-0011

Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent by Wt.
71-43-2	Benzene	99.87-99.99
Not Available	Other hydrocarbons	0.01-0.10
Not Available	Other hydrocarbons	0.10-0.13

Additional Information

* May include cyclohexane (CAS # 110-82-7), cyclohexene (CAS # 110-83-8) and/or toluene (CAS # 108-88-3) as impurities.

The actual components and weight % concentrations vary based on operating conditions.

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication). This material is a controlled product under Canadian WHMIS regulations.

This material is regulated as a hazardous material / dangerous goods for transportation.

See Section 8 for applicable exposure limits. See Section 11 for applicable toxicity data.

Section 4 - First Aid Measures

First Aid: Eyes

Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical if symptoms develop or persist.

First Aid: Skin

Remove contaminated clothing and shoes. Wash immediately with soap and water. Seek medical attention if symptoms develop or persist. Completely decontaminate clothing, shoes and other protective equipment before reuse or discard.

First Aid: Inhalation

Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. WARNING: Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention.

First Aid: Notes to Physician

For more detailed medical emergency support information call 1-800-561-6682 or 1-403-314-8767 (24 hours, NOVA Chemicals Emergency Response). Ensure thorough eye and skin decontamination. Treat unconsciousness, nausea, hypotension, seizures and cardiac arrhythmias in the conventional manner. Aspiration of this product during induced emesis can result in lung injury. If evacuation of stomach contents is considered necessary use the method least likely to cause aspiration, such as gastric lavage after protecting the airway. Observe hospitalized patients for delayed chemical pneumonia, acute tubular necrosis, encephalopathy and dysrhythmias. Monitor for urinary phenol within 72 hours of acute exposure.

Section 5 - Fire Fighting Measures

See Section 9: Physical Properties for flammability limits, flash point and auto-ignition information.

General Fire Hazards

Fire and container explosion hazards are serious when this product is exposed to heat or flame. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Consider need for immediate emergency isolation and evacuation for at least 300 meters (984 feet). If tank is involved in a fire, ISOLATE for 800 meters (1/2 miles) in all directions.

Explosion Hazards

Vapors may form explosive mixture with air. Keep containers away from source of heat or fire. Containers may explode when involved in a fire. Evacuate personnel to a distance of at least 0.8 to 1.6 kilometers (1/2 mile) if a fire or rail car, tank car, or major vessel rupture is possible.

Material Name: Benzene

Hazardous Combustion Products

Upon combustion, this product emits carbon monoxide, carbon dioxide, and/or low molecular weight hydrocarbons.

Extinguishing Media

Dry chemical, foam, carbon dioxide, and water spray or fog. Use water to cool fire-exposed containers and to protect personnel. Water may be an ineffective extinguishing medium. Use of an inert foam extinguishing material may also assist in short term flammable vapor suppression. Monitor water run-off for flammability, and prevent entry into ditches, sewers, drains and, waterways, or other confined or underground spaces.

Fire Fighting Equipment/Instructions

Reference 2004 Emergency Response Guidebook, Guide # 130. Position upwind. Keep unnecessary personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Immediately withdraw in case of fire and container venting or heat discoloration of a container. Fire fighters should wear full-face, self-contained breathing apparatus and thermal protective clothing. Avoid inhaling any smoke and combustion materials. Remove and clean or destroy any contaminated clothing. Cool containers with flooding quantities of water until well after the fire is out. Control runoff waters to prevent entry into ditches, sewers, drains, underground or confined spaces and waterways.

Section 6 - Accidental Release Measures

Evacuation Procedures

Isolate area. Keep unnecessary personnel away. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for build-up of flammable concentrations in air.

Small Spills

Eliminate ignition sources. Spill or leak area should be isolated immediately for 25 to 50 meters (82 to 164 feet) in all directions. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain discharge by booming on water or diking on ground. Spills on water will volatilize rapidly, making containment or recovery difficult. Remove liquid material with non-sparking approved pumps, skimmers or vacuum equipment. Absorb/adsorb residual materials and clean up with non-sparking tools. Prevent entry into ditches, sewers, drains, underground or confined spaces, water intakes and waterways. Shovel material with non-sparking tools into appropriate container for disposal.

Large Spills

Consider downwind evacuation for 300 meters (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain liquids by booming on water or by diking on land to prevent entry into ditches, sewers, drains or waterways. Spills on water will volatilize rapidly, making containment or recovery difficult. Recover any pooled liquid material with approved, non-sparking pumps, skimmers or vacuum equipment. An inert foam cover material may assist in short term vapor suppression. Absorb with DRY earth, sand or other non-combustible material and clean up with non-sparking tools. Soil remediation may be required.

Special Procedures

Contact local police/emergency services and appropriate emergency telephone numbers provided in Section 1. Ensure that statutory and regulatory reporting requirements in the applicable jurisdiction are met. Wear appropriate protective equipment and clothing during cleanup. Individuals without appropriate protective equipment should be excluded from area of spill until cleanup has been completed.

See Section 8 for recommended Personal Protective Equipment and see Section 13 for waste disposal considerations.

Section 7 - Handling and Storage

Handling Procedures

Keep locked up or secured. Handle in fully grounded, properly designed and approved equipment systems that are suitable for flammable liquids. Use with adequate ventilation. Do not ingest or inhale. Keep away from heat and ignition sources. No smoking or open flames permitted in storage, use, or handling areas. Dissipate static electricity during transfer by grounding and bonding containers and equipment. Avoid draining or venting to atmosphere if possible. Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Do not breathe product gas, fumes, vapor, or spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately. Avoid contact with skin and eyes. Keep away from incompatible materials such as oxidizing agents and acids. After handling,

Material Name: Benzene

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always wash hands thoroughly with soap and water.

Storage Procedures

Storage area should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Adequate security must be provided so that unauthorized personnel do not have access to material. Store in grounded, properly designed vessels and away from incompatible materials. Store and use away from heat, sparks, open flame, or any other ignition source. Store according to applicable regulations for flammable materials for storage tanks, containers, piping, buildings, rooms, cabinets, allowable quantities and minimum storage distances. Use non-sparking ventilation systems, approved explosion-proof equipment, and intrinsically safe electrical systems. Have appropriate extinguishing capability in storage area (e.g. portable fire extinguishers (dry chemical, foam or carbon dioxide)) and flammable gas detectors. Keep absorbents for leaks and spills readily available. Consider use of internal floating roof tanks or flame arrestors. Inspect vents during winter conditions for vapor ice build-up. Storage tanks should be above ground and diked to hold entire contents. A refrigerated room is generally recommended for warehouse storage of materials with a flash point lower than 37.8°C (100°F).

See Section 8: Exposure Controls/Personal Protection for appropriate Personal Protective Equipment. See Section 10 for information on Incompatibilities.

Section 8 - Exposure Controls / Personal Protection

Exposure Guidelines

A: General Product Information

Refer to published exposure limits - use effective control measures and PPE to maintain worker exposure to concentrations that are below these limits. Ensure that eyewash stations and safety showers are in close proximity to work locations.

B: Component Exposure Limits

ACGIH, OSHA, NIOSH, EPA, Alberta, and Ontario exposure limit lists have been checked for major components listed with CAS registry numbers. Other exposure limits may apply, check with proper authorities.

*Note: The Vacated OSHA Permissible Exposure Limits (PELs) are those provided in the 1989 update to OSHA's Air Contaminants Standard 29 CFR 1910.1000. These limits were vacated by the U.S. Court of Appeals, Eleventh Circuit but may be enforceable in some states. Benzene (71-43-2)

20117010 (11-40-2)	
ACGIH:	0.5 ppm TWA; 1.6 mg/m3 TWA; 2.5 ppm STEL; 8 mg/m3 STEL; BEI
	Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA (Vacated)*:	0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 CFR
	1910.1028)
OSHA Final:	0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable - see 29 CFR
	1910,1028); 1 ppm TWA; 10 ppm TWA (applies to industry segments exempt from the benzene
	standard at 29 CFR 1910, 1028); 5 ppm STEL (see 29 CFR 1910, 1028); 25 ppm Ceiling (applies
	to industry segments exempt from the 1 ppm TWA and 5 ppm STEL of the benzene standard)
NIOSH:	0,1 ppm TWA; 0.32 mg/m3 TWA; 1 ppm STEL; 3.2 mg/m3 STEL
	500 ppm IDLH
Alberta:	1 ppm TWA: 3.2 ma/m3 TWA: 5 ppm STEL; 16 mg/m3 STEL
	Substance may be readily absorbed through intact skin
Ontario:	0.5 ppm TWAEV (applies to workplaces to which the designated substance regulation does not
•••••••	apply): 0.5 ppm TWAEV (designated substance regulation)
	2.5 ppm STEV (applies to workplaces to which the designated substance regulation does not
	apply): 2.5 ppm STEV (designated substances regulation)

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Cyclohexane (110-8	2-7)
ACGIH:	100 ppm TWA; 344 mg/m3 TWA
OSHA (Vacated)*:	300 ppm TWA; 1050 mg/m3 TWA
OSHA Final:	300 ppm TWA; 1050 mg/m3 TWA
NIOSH:	300 ppm TWA; 1050 mg/m3 TWA
	1300 ppm IDLH
Alberta:	300 ppm TWA; 1030 mg/m3 TWA
Ontario:	100 ppm TWAEV
Cyclohexene (110-8	3-8)
ACGIH:	300 ppm TWA; 1010 mg/m3 TWA
OSHA (Vacated)*:	300 ppm TWA; 1015 mg/m3 TWA
	200 mm TIALA: 4045 mg/m2 TIALA

Cyclohexene (110-8	3-8)
ACGIH:	300 ppm TWA; 1010 mg/m3 TWA
OSHA (Vacated)*:	300 ppm TWA; 1015 mg/m3 TWA
OSHA Final:	300 ppm TWA; 1015 mg/m3 TWA
NIOSH:	300 ppm TWA; 1015 mg/m3 TWA
	2000 ppm IDLH
Alberta:	300 ppm TWA: 1010 mg/m3 TWA
Ontario:	300 ppm TWAEV; 1010 mg/m3 TWAEV
Toluene (108-88-3)	
ACGIH:	20 ppm TWA; 75 mg/m3 TWA; BEI
OSHA (Vacated)*:	100 ppm TWA; 375 mg/m3 TWA; 150 ppm ST
OSHA Final:	200 ppm TWA; 300 ppm Ceiling
NIOSH:	100 ppm TWA: 375 mg/m3 TWA: 150 ppm ST

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ACGIH:	20 ppm TWA; 75 mg/m3 TWA; BEI
Vacated)*:	100 ppm TWA; 375 mg/m3 TWA; 150 ppm STEL; 560 mg/m3 STEL
SHA Final:	200 ppm TWA; 300 ppm Ceiling
NIOSH:	100 ppm TWA; 375 mg/m3 TWA; 150 ppm STEL; 560 mg/m3 STEL
	500 ppm IDLH
Alberta:	50 ppm TWA; 188 mg/m3 TWA
	Substance may be readily absorbed through intact skin
Ontario:	20 ppm TWAEV (also known as methylbenzene)

ENGINEERING CONTROLS

Engineering methods to reduce hazardous exposure are preferred controls. Methods include mechanical ventilation (dilution and local exhaust) process or personal enclosure, remote and automated operation, control of process conditions, leak detection and repair systems, and other process modifications. Ensure all exhaust ventilation systems are discharged to outdoors, away from air intakes and ignition sources. Supply sufficient replacement air to make up for air removed by exhaust systems. Administrative (procedure) controls and use of personal protective equipment may also be required.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses; chemical goggles are recommended to prevent eye irritation or injury from splashing or vapors.

Personal Protective Equipment: Skin/Hands/Feet

Use chemically resistant gloves when handling product. Wear chemical-resistant safety footwear with good traction to prevent slipping. Work clothing that sufficiently prevents skin contact should be worn, such as coveralls and/or long sleeves and pants. If splashing or contact with liquid material is possible, consider the need for an impervious overcoat. Fire resistant (i.e., Nomex) or natural fiber clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where a flammable vapor release may occur.

Personal Protective Equipment: Respiratory

If engineering controls and ventilation is not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator or self-contained breathing apparatus (SCBA) should be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

Personal Protective Equipment: General

Personal protective equipment (PPE) should not be considered a long-term solution to exposure control. Employer programs to properly select, fit, maintain, and train employees to use equipment must accompany PPE. Consult a competent industrial hygiene resource, the PPE manufacturer's recommendation, and/or applicable regulations to determine hazard potential and ensure adequate protection.

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Section 9 - Physical & Chemical Properties

Physical State and Appearance:	Liquid	Color:	Coloriess
Odor:	Sweet, solvent-like	Odor Threshold:	Detectable at 2-5 ppm, but not reliable as warning
pH:	Not applicable	Vapor Pressure:	75 mm Hg at 20°C (68°F)
Vapor Density @ 0°C (Air=1):	2.8	Dispersion Properties:	Is not dispersed in cold or hot water.
Bolling Point:	80°C (176°F)	Melting Point:	5.5°C (41.9°F)
Solubility (H2O):	Slightly soluble (0.1- 0.3%), rapidly volatilizes	Specific Gravity (Water=1):	0.88 at 15°C (59°F)
lonicity (in water):	Not applicable	Evaporation Rate (n-Butyl Acetate=1):	Not available
Octanol/H2O Coeff.:	Kow = 2.13	Percent Volatile:	100%
Auto Ignition:	498°C (928°F) (benzene)	Flash Point:	-11°C (12°F) (benzene)
Flash Point Method:	Closed cup	Upper Flammable Limit (UFL):	7.8% (volume/volume) (benzene)
Lower Flammable Limit (LFL):	1.2 % (volume/volume) (benzene)	Flammability Classification:	Flammable

Section 10 - Stability & Reactivity Information

Chemical Stability

This product is stable under normal use conditions for shock, vibration, pressure, or temperature.

Chemical Stability: Conditions to Avoid

Keep away from heat, sparks, or open flame.

Incompatibility

Reactive with oxidizing agents, acids and halogens. May attack some forms of plastics, rubbers and coatings. Vapors may form explosive mixture with air.

Hazardous Polymerization

Not likely to occur.

Corrosivity

Not considered to be corrosive.

Hazardous Decomposition

Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.

Section 11 - Toxicological Information

A: Acute Toxicity - General Product Information

Benzene may cause corneal injury to the eye. It is also a skin irritant that may be absorbed through the skin in harmful amounts. Inhalation of benzene can irritate the respiratory tract and may result in central nervous system (CNS) depression and possible death due to respiratory failure. Ingestion and subsequent aspiration into the lungs may cause chemical pneumonitis.

B: Component Analysis - LD50/LC50

Benzene (71-43-2) Inhalation LC50 Rat: 13,050-14,380 ppm/4H; Oral LD50 Rat: 1800 mg/kg Cyclohexane (110-82-7) Inhalation LC50 Rat: 13.9 mg/L/4H; Oral LD50 Rat: >5000 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg Cyclohexene (110-83-8) Oral LD50 Rat: 2400 μL/kg Toluene (108-88-3) Inhalation LC50 Rat: 12.5 mg/L/4H; Inhalation LC50 Rat: >26,700 ppm/1H; Oral LD50 Rat: 636 mg/kg; Dermal LD50 Rabbit: 8390 mg/kg; Dermal LD50 Rat: 12,124 mg/kg

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C: Chronic Toxicity - General Product Information

Prolonged and/or repeated exposure can cause drying and scaling of the skin. Long-term exposure has been associated with certain types of leukemia in humans. IARC and OSHA consider benzene to be a human carcinogen. EPA has classified benzene as a Group A, known human carcinogen. Chronic exposure to benzene has been reported to cause bone marrow abnormalities and adverse blood effects including anemia. Progressive deterioration of hematopoietic function expressed as a decrease in absolute lymphocyte count is the most sensitive indicator of benzene exposure. Benzene may cause fetotoxicity and teratogenicity. Chromosomal aberrations have been noted in animal tests.

D: Chronic Toxicity - Carcinogenic Effects

ACGIH, EPA, IARC, OSHA, and NTP carcinogen lists have been checked for selected similar materials or those components with CAS registry numbers.

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen

- OSHA: 0.5 ppm Action Level; 1 ppm TWA; 5 ppm STEL (Cancer hazard, Flammable see 29 CFR 1910.1028)
- EPA: Classification: known human carcinogen for all routes of exposure
- NTP: Known Human Carcinogen (Select Carcinogen)
- IARC: Supplement 7 [1987], Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Toluene (108-88-3)

- ACGIH: A4 Not Classifiable as a Human Carcinogen
 - EPA: Classification: under the Guidelines for Carcinogen Risk Assessment (U.S. EPA, 2005), there is inadequate information to assess the carcinogenic potential of toluene.
- IARC: Monograph 71 [1999], Monograph 47 [1989] (Group 3 (not classifiable))

E: Special Remarks on Chronic Effects

Benzene may pose a cancer hazard and may cause adverse birth and reproductive effects. Bone marrow abnormalities, leukemia, multiple myelomas, fetotoxicity, teratogenicity (ex. encephaly, angulated ribs and dilated brain ventricles) have been linked to benzene exposure.

Section 12 - Ecological Information

Ecotoxicity

A: General Product Information

Product is largely insoluble in water, and evaporates rapidly. Product has moderate absorption into soil and sediment. It is considered toxic to fish.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Benzene (71-43-2) Test & Species 96 Hr LC50 Pimephales promelas 96 Hr LC50 Oncorhynchus mykiss 96 Hr LC50 Lepomis macrochirus 96 Hr LC50 Poecilia reticulata 72 Hr EC50 Selenastrum capricornutum 48 Hr EC50 water flea 48 Hr EC50 Daphnia magna	12.6 mg/L 5.3 mg/L 22 mg/L 28.6 mg/L 29 mg/L 356 mg/L 10 mg/L	Conditions flow-through flow-through static static static
Cyclohexane (110-82-7) Test & Species 96 Hr LC50 Pimephales promelas 96 Hr LC50 Lepomis macrochirus 96 Hr LC50 Poecilia reticulata 72 Hr EC50 Scenedesmus subspicatus 5 min EC50 Photobacterium phosphoreum 10 min EC50 Photobacterium phosphoreum 48 Hr EC50 water flea	4.53 mg/L 34.72 mg/L 48.0 mg/L >500 mg/L 85.5 mg/L 93 mg/L 400.0 mg/L	Conditions flow-through

Material Name: Benzene

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Toluene (108-88-3)	
Test & Species	
96 Hr LC50 Pimephales promelas	25 mg/L
96 Hr LC50 Oncorhynchus mykiss	24.0 mg/L
96 Hr LC50 Lepomis macrochirus	24.0 mg/L
96 Hr LC50 Lepomis macrochirus	13 mg/L
96 Hr EC50 Selenastrum capricornutum	>433 mg/L
30 min EC50 Photobacterium phosphoreum	19.7 mg/L
48 Hr EC50 water flea	11.3 mg/L
48 Hr EC50 water flea	310 mg/L
48 Hr EC50 Daphnia magna	11.3 mg/L

Environmental Fate/Mobility

When released to soil or water, product will rapidly begin to volatilize. At 20°C (68°F) and moderate wind speeds, the evaporation rate for benzene is calculated to be over 2 g per m2 per sec. At 0°C (32°F) and moderate wind speeds, the evaporation rate is calculated to drop to below 0.1 g per m2 per sec. And at a warmer temperature of 30°C, the evaporation rate increases to over 3 g per m2 per sec. Benzene migrates in soils and in ground waters. Its airborne levels of benzene can be reduced by rain or water spray.

Conditions 1 day old flow-through static static

Persistence/Degradability

Benzene in air will photo-degrade with a calculated half-life of 13.4 days. This is accelerated in polluted atmospheres containing nitrogen or sulfur oxides. By-products include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrate. Benzene will biodegrade in soils and ground waters (half-life 16-28 days) under aerobic conditions. Limited degradation occurs under anaerobic conditions. Sewage treatment plants have been shown to remove 44-100%.

Bioaccumulation/Accumulation

Benzene has a reported Kow = 2.13. Metabolites may partially bioaccumulate in fatty fish tissues liver and brain. **Ecological Summary**

The high volatility and water solubility of benzene suggests that readily available benzene will partition to the atmosphere from the surface of water and soil within seven days. Estimated volatization half-life of benzene for soil was 7.2 to 38.4 days (Jury, WA et al., 1984). Benzene that does not evaporate will be highly to very highly mobile in the soil and may leach down into the ground water. Benzene may be subject to biodegradation based on reported biodegradation of 24% and 47% of the initial 20 ppm benzene in a base-rich, para-brownish soil within 1 to 10 weeks. Half-life of volatization from a model river 1m deep, was 2.7 hours at 20°C (68°F). In the atmosphere, benzene will exist predominantly in the vapor phase. It will react with oxygen photochemically to produce hydroxyl radicals with a half-life of 13.4 days. Products of photo-oxidation include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrate. Based on the reported and estimated BCF, benzene is not expected to bioconcentrate in aquatic organisms.

Section 13 - Disposal Considerations

U.S./Canadian Waste Number & Descriptions

A: General Product Information

This product is known to be a hazardous waste according to US RCRA and Canadian regulations. The use, mixing or processing of this product may alter this product. Contact federal, provincial/state and local authorities in order to generate or ship a waste material associated with this product to ensure materials are handled appropriately and meet all criteria for disposal of hazardous waste. DO NOT ATTEMPT TO DISPOSE OF BY UNCONTROLLED IGNITION. Since emptied containers retain product/material residue, follow safe handling/label warnings even after container is emptied.

See Section 7: Handling and Storage and Section 8: Exposure Controls/Personal Protection for additional handling information that may be applicable for safe handling and the protection of employees.

Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

Material Name: Benzene

MSDS ID: NOVA-0011

B: Component Waste Numbers Benzene (71-43-2) RCRA: waste number U019 (Ignitable waste, Toxic waste); 0.5 mg/L regulatory level Cyclohexane (110-82-7) RCRA: waste number U056 (Ignitable waste) Toluene (108-88-3) RCRA: waste number U220

Section 14 - Transportation Information

US DOT Information

Shipping Name: Benzene
UN/NA #: UN1114 Hazard Class: 3 Packing Group: II
Required Label(s): FLAMMABLE LIQUID
Additional Info.: NOTE: The Reportable Quantity for benzene is 10 lbs. (4.54). The Reportable quantity for
toluene is 1000 lbs. (454kg).
2004 Emergency Response Guidebook: Guide No. 130.
Canadian TDG Information
Shipping Name: Benzene
UN#: UN1114 Hazard Class: 3 Packing Group: II
Required Label(s): FLAMMABLE LIQUID
Additional Info.: 2004 Emergency Response Guidebook, Guide No. 130.
nternational Air Transport Association (IATA) Regulations
Shipping Name: Benzene
UN# 1114 Hazard Class: 3 Packing Group:
Required Label(s): FLAMMABLE LIQUID
nternational Maritime Dangerous Goods (IMDG) Code
Shipping Name: Benzene
UN# 1114 Hazard Class: 3 Packing Group: II
Required Label(s): FLAMMABLE LIQUID
Additional Info.: EmS No.: F-E, S-D
Section 15 - Regulatory Information

A: International Regulations Component Analysis – Inventorv

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Com	ponent	CAS #	US - TSCA	CANADA - DSL	EU - EINECS	
Benz	ene	71-43-2	Yes	Yes	Yes	

B: USA Federal & State Regulations

Ongoing occupational hygiene, medical surveillance programs, or site emission or spill reporting may be required by Federal or State regulations. Check for applicable regulations.

USA OSHA Hazard Communication Class

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication). HCS Classes: HCS CLASS: Flammable liquid IB having a flash point lower than 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F).

HCS CLASS: Highly Toxic

HCS CLASS: HUMAN CARCINOGEN

HCS CLASS: Irritating substance

HCS CLASS: Target organ effects

USA Right-to-Know - Federal

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Material Name: Benzene

MSDS ID: NOVA-0011

Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration

CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Cyclohexane (110-82-7)

SARA 313: 1.0 % de minimis concentration

CERCLA: 1000 lb final RQ; 454 kg final RQ

Toluene (108-88-3)

SARA 313: 1.0 % de minimis concentration

CERCLA: 1000 lb final RQ; 454 kg final RQ

USA Right-to-Know - State

The following components appear on one or more of the following state hazardous substances lists. Some components (including those present only in trace quantities, and therefore not listed in this document) may be included on the Right-To-Know lists of other U.S. states. The reader is therefore cautioned to contact his or her NOVA Chemicals' representative or NOVA Chemicals' Product Integrity group for further U.S. State Right-To-Know information.

Component	CAS	NJ	PA
Benzene	71-43-2	Yes	Yes
Cyclohexene	110-83-8	Yes	Yes
Toluene	108-88-3	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer. WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

C: Canadian Regulations - Federal and Provincial

WHMIS Ingredient Disclosure List (IDL)

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List (IDL):

Component	CAS #	Minimum Concentration	
Benzene	71-43-2	0.1 %	
Cyclohexane	110-82-7	1 %	
Cyclohexene	110-83-8	1 %	
Toluene	108-88-3	1 %	

WHMIS Classification

Workplace Hazardous Materials Information System (WHMIS): This product has been classified in accordance with the hazard criteria of the CPR (Canadian Controlled Products Regulations) and the MSDS contains all of the information required by the CPR.

WHMIS CLASS B2: Flammable liquid with a flash point lower than 37.8°C (100°F). WHMIS CLASS D2A: Carcinogen (Benzene)

WHMIS CLASS D2B: Toxic

Other Regulations

Ongoing occupational hygiene, medical surveillance programs, or site emission or spill reporting may be required by Federal or Provincial regulations. Check for applicable regulations.

Material Name: Benzene

Section 16 - Other Information

Label Information

DANGER! TOXIC! FLAMMABLE! CANCER HAZARD! Product is a clear liquid at room temperature with a sweet, solventlike odor. Vapor is heavier than air and may spread long distances. Distant ignition and flashback are possible. Flammable liquid and vapor can accumulate static charge. Product will float on water and may travel to distant locations and/or spread fire. This product is considered harmful by inhalation, by skin contact, and if it swallowed. This product is irritating to the eyes and skin. Excessive inhalation may result in heartbeat irregularities and adverse central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, tremors, and in extreme conditions, coma and death. Systemic absorption effects may include long-term damage to the blood-forming system, kidney and liver damage, and/or cancer (leukemia). Ingestion may also cause adverse central nervous system effects, blood disorders, kidney and/or liver damage. Small amounts, if aspirated into the lungs, may cause mild to severe pulmonary injury.

FIRST AID:

SKIN: Remove contaminated clothing and shoes. Wash immediately with soap and water. Seek medical attention if symptoms develop or persist. Completely decontaminate clothing, shoes and other protective equipment before reuse or discard.

EYES: Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical if symptoms develop or persist.

INHALATION: Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. WARNING: Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

INGESTION: DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention.

IN CASE OF A LARGE SPILL: Consider downwind evacuation for 300 meters (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain liquids by booming on water or by diking on land to prevent entry into ditches, sewers, drains or waterways. Spills on water will volatilize rapidly, making containment or recovery difficult. Recover any pooled liquid material with approved, non-sparking pumps, skimmers or vacuum equipment. An inert foam cover material may assist in short term vapor suppression. Absorb with DRY earth, sand or other non-combustible material and clean up with non-sparking tools. Soil remediation may be required.

References

Available on request.

Special Considerations

For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity".

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; BLEVE = Boiling Liquid Expanding Vapor Explosion; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CPR = Controlled Products Regulations; DOT = Department of Transportation; DSL = Domestic Substances List; EINECS = European Inventory of Existing Commercial Substances; EPA = Environmental Protection Agency; EU = European Union; FDA = Food and Drug Administration; IARC = International Agency for Research on Cancer; IDL = Ingredient Disclosure List; Kow = Octanol/water partition coefficient; LEL = Lower Explosive Limit; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; RCRA = Resource Conservation and Recovery Act; SARA = Superfund Amendments and Reauthorization Act; TDG = Transportation of Dangerous Goods; TSCA = Toxic Substances Control Act.

MSDS Prepared by: NOVA Chemicals MSDS Information Phone Number: 1-412-490-4063

Other Information

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Material Name: Benzene

UNLESS SPECIFICALLY AGREED OTHERWISE, NOVA CHEMICALS DOES NOT TAKE RESPONSIBILITY FOR USE, TRANSPORTATION, STORAGE, HANDLING OR DISPOSAL OF THE PRODUCTS DESCRIBED HEREIN.



This is the end of MSDS # NOVA-0011.

MSDS ID: NOVA-0011

Material Safety Data Sheet Toluene

MSDS Number: M1003 Effective Date: 9/07/2004

Section 1 -

Chemical Product and Company Identification

MSDS Name: Toluene

Synonyms: Methacide; Methylbenzene; Methylbenzol; Phenylmethane; Toluol

Company Identification: VEE GEE Scientific, Inc.

13600 NE 126th PI Ste A

Kirkland, WA 98034

For information in North America, call: 425-823-4518

Chemical Name

Section 2 -

Composition, Information on Ingredients

CAS# 108-88-3

Section 3 -

Toluene

Percent >99 EINECS/ELINCS 203-625-9

Hazard Symbols: XN F Risk Phrases: 11 20

Hazards Identification

Emergency Overview

Appearance: Colorless. Flash Point: 40°F, Warning! Flammable liquid and vapor. May cause central nervous system depression. May cause liver and kidney damage. This substance has caused adverse reproductive and fetal effects in animals. Causes digestive and respiratory tract irritation. May cause skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Danger! Harmful or fatal if swallowed. Causes eye irritation and possible transient injury. Poison! May be absorbed through intact skin. Vapor harmful. Call physician immediately.

Target Organs: Kidneys, central nervous system, liver.

Potential Health Effects

Eve Contact: Causes eye irritation. May result in corneal injury. Vapors may cause eye irritation.

Skin Contact: Causes moderate skin irritation. May cause cyanosis of the extremities.

Ingestion: Aspiration hazard. May cause irritation of the digestive tract. May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Inhalation of vapor may cause respiratory tract irritation. May cause liver and kidney damage. Vapors may cause dizziness or suffocation. Overexposure may cause dizziness, tremors, resilessness, rapid heart beat, increased blood pressure, hallucinations, acidosis, kidney failure.

Chronic Exposure: Prolonged or repeated skin contact may cause dermatitis. May cause cardiac sensitization and severe heart abnormalities. May cause liver and kidney damage.

Section 4 -

First Aid Measures

Eye Contact: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Skin Contact: Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Possible aspiration hazard. Get medical aid immediately.

inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult over exposure to fresh air immediately.

Notes to Physician: Causes cardiac sensitization to endogenous catelcholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine or pseudoepinephrine.

Section 5 -

Fire Fighting Measures

General Information: Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapors may be heavier than air. They can spread along the around and collect in low or confined areas. Containers may explode when heated.

Fire Extinguishing Media: Use water spray to cool fire-exposed containers. Water may be ineffective. Do NOT use straight streams of water. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out. For large fires, use water spray, fog or regular foam.

Section 5 -

Fire Fighting Measures

Autoignition Temperature: 422°C (792°F) Flash Point: 7°C (45°F) Explosion Limits, Iower: 1.2 vol%. Explosion Limits, upper: 7.1 vol% NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

Section 6 -

Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8. Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as saw dust. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 -

Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, wellventilated area away from incompatible substances.

Exposure Controls, Personal Protection Section 8 -**OSHA - Vacated Pels** NIOSH **OSHA - Final PELs** ACGIH **Chemical Name** 50 ppm TWA 200 ppm TWA 100 ppm TWA AWT mag 001 Toluene 375 mg/m3 TWA C 300 ppm 375 mg/m3 TWA 150 ppm STEL 500 ppm IDLH

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 -

Physical and Chemical Properties

Physical State: Clear liquid Appearance: Colorless Odor: Sweet, pleasant pH: Not available Vapor Pressure: 36.7 mm Hg @ 30° C Vapor Density: 3.1 Evaporation Rate: 2.4 Viscosity: 0.59 cP @ 20° C Boiling Point: 232° F Freezing/Melting Point: -139° F Decomposition Temperature: Not available Solubility: Insoluble Specific Gravity/Density: 0.9 Molecular Formula: C6H5CH3 Molecular Weight: 92.056

Section 10 -

Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Conditions to Avoid: Incompatible materials, ignition sources, excess heat. Incompatibilities with Other Materials: Ntrogen tetroxide, nitric acid plus sulfuric acid, silver perchlorate, strong oxidizers, sodium difluoride. Hazardous Decomposition Products: Carbon monoxide, carbon dioxide. Hazardous Polymerization: Has not been reported.

Section 11 -

Toxilogical Information

Carcinogenicity: CAS# 108-88-3: ACGIH: A4 - Not Classifiable as a Human Carcinogen IARC: Group 3 carcinogen

M1003

560 mg/m3 STEL

Section 11 -

Toxilogical Information (continued)

Epidemiology: No information available.

Teratogenicity: Specific developmental abnormalities included craniofacial effects involving the nose and tongue, musculoskeletal effects, urogenital and metabolic effects in studies on mice and rats by the inhalation and oral routes of exposure. Some evidence of fetotoxicity with reduced fetal weight and retarded skeletal development has been reported in mice and rats.

Reproductive Effects: Effects on fertility such as abortion were reported in rabbits by inhalation. Paternal effects were noted in rats by inhalation.

These effects involved the testes, sperm duct and epididymis.

Neurotoxicity: No information available.

Mutagenicity: No information available.

Ecological Information

Ecotoxicity: No data available. Bluegill LC50=17 mg/L/24H Shrimp LC50=4.3 ppm/96H Fathead minnow LC50=36.2 mg/L/96HSunfish (fresh water) TLm=1180 mg/L/96H

Environmental: From soil, substance evaporates and is microbially biodegraded. In water, substance volatilizes and biodegrades. Physical: Photochemically produced hydroxyl radicals degrade substance.

Other: None.

Section 12 -

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

Section 14 -

RCRA U-Series: CAS# 108-88-3: waste number U220.

Transport Information

	US DOT	Canada TDG
Shipping Name	Toluene	Toluene
Hazard Class	3	3 (9.2)
UN Number	UN1294	UN1294
Packing Group	H	ll FP 4C

Regulatory Information

US Federal

Section 15 -

TSCA: CAS# 108-88-3 is listed on the TSCA inventory.

Health & Safety Reporting List: None of the chemicals are on the Health & Safety Reporting List.

CAS# 108-88-3: Effective Date: October 4, 1982; Sunset Date: October 4, 1992

Chemical Test Rules: None of the chemicals in this product are under a Chemical Test Rule.

Section 12b: None of the chemicals are listed under TSCA Section 12b. TSCA Significant New Use Rule: None of the chemicals in this material have a SNUR under TSCA.

SARA:

Section 302 (RQ): CAS# 108-88-3: final RQ = 1000 pounds (454 kg)

Section 302 (TPQ): None of the chemicals in this product have a TPQ.

SARA Codes: CAS # 108-88-3: acute, flammable.

Section 313: This material contains Toluene (CAS# 108-88-3, 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act: CAS# 108-88-3 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act. CAS# 108-88-3 is listed as a Hazardous Substance under the CWA. CAS# 108-88-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 108-88-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

STATE: CAS# 108-88-3 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetta.

WARNING: This product contains Toluene, a chemical known to the state of California to cause birth defects or other reproductive harm. California No Significant Risk Level: CAS# 108-88-3: NOEL = 7000 ug/day

European/International Regulations

European Labeling in Accordance with EC Directives Hazard Symbols: XN F Risk Phrases: R 11 Highly flammable. R 20 Harmful by inhalation

Regulatory Information (continued)

Safety Phrases:

Section 15 -

- S 16 Keep away from sources of ignition No smoking.
- S 25 Avoid contact with eyes.
- S 29 Do not empty into drains.
- S 33 Take precautionary measures against static discharges.

WGK (Water Danger/Protection): CAS# 108-88-3: 2

Canada - DSL/NDSL: CAS# 108-88-3 is listed on Canada's DSL List.

Canada - WHMIS: This product has a WHMIS classification of B2, D2B.

Canadian Ingredient Disclosure List: CAS# 108-88-3 is listed on Canada's Ingredient Disclosure List.

Exposure Limits: CAS# 108-88-3: OEL-AUSTRALIA:TWA 100 ppm (375 mg/m3):STEL 150 ppm (560 mg/m3) OEL-BELGIUM:TWA 100 ppm (377 g/ m3);STEL 150 ppm (565 mg/m3) OEL-CZECHOSLOVAKIA:TWA 200 mg/m3;STEL 1000 mg/m3 OEL-DENMARK:TWA 50 ppm (190 mg/m3);Skin OEL-FINLAND:TWA 100 ppm (375 mg/m3);STEL 150 ppm;Skin OEL-FRANCE:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3) OEL-GERMANY:TWA 100 ppm (380 mg/m3) OEL-HUNGARY:TWA 100 mg/m3;STEL 300 mg/m3;Skin OEL-JAPAN:TWA 100 ppm (380 mg/m3) OEL-THE NETHERLANDS:TWA 100 ppm (375 mg/m3);Skin OEL-THE PHILIPPINES:TWA 100 ppm (375 mg/m3) OEL-POLAND:TWA 100 mg/m3 OEL-USSIA:TWA 100 ppm;STEL 50 mg/m3 OEL-SWEDEN:TWA 50 ppm (200 mg/m3);STEL 100 ppm (400 mg/m3);Skin OEL-SWITZERLAND:TWA 100 ppm (380 mg/m3);STEL 500 ppm OEL-THAILAND:TWA 200 ppm;STEL 300 ppm OEL-TURKEY:TWA 200 ppm (750 mg/m3) OEL-UNITED KINGDOM :TWA 100 ppm (375 mg/m3);STEL 150 ppm;Skin OEL IN BULGARIA, COLOMBIA,JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 09/07/2004

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall VEE GEE Scientific be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if VEE GEE Scientific has been advised of the possibility of such damages.

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Health2Fire3Reactivity0Personal
ProtectionH

Material Safety Data Sheet Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification	
Product Name: Ethylbenzene	Contact Information:
Catalog Codes: SLE2044	Sciencelab.com, Inc. 14025 Smith Rd.
CAS#: 100-41-4	Houston, Texas 77396
RTECS: DA0700000	US Sales: 1-800-901-7247 International Sales: 1-281-441-4400
TSCA: TSCA 8(b) inventory: Ethylbenzene	Order Online: ScienceLab.com
CI#: Not available.	CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300
Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane	
Chemical Name: Ethylhenzene	International CHEMTREC, call: 1-703-527-3887
Chemical Formula: C8H10	For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points: CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances: Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Slightly explosive in presence of heat.

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m3) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility: Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ingnition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:

Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Can cause mild skin irritation. It can be absorbed through intact skin.

Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm, it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS)

Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and conciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue,

insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987).

Ingestion: Do not drink, pipet or siphon by mouth. May cause gastroinestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through)]. 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey .: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethvibenzene Massachusetts RTK: Ethvlbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Manufacturer's Material Safety Data Sheet.

-Fire Protection Guide to Hazardous Materials, 13th ed., Nationial Fire Protection Association (NFPA)

-Registry of Toxic Effects of Chemical Substances (RTECS)

-Chemical Hazard Response Information System (CHRIS)

-Hazardous Substance Data Bank (HSDB)

-New Jersey Hazardous Substance Fact Sheet

-Ariel Global View

-Reprotext System

Other Special Considerations: Not available.

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Last Updated: 11/06/2008 12:00 PM

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MATERIAL SAFETY DATA SHEET

24 Hour Emergency Phone 316/524-5751

SECTION 1 PRODUCT IDENTIFICATION

CHEMICAL NAME 1,1,1 Trichloroethane CHEMICAL FORMULA C₂H₃Cl₃ MOLECULAR WEIGHT 133.4

PRODUCT NAME Solvent 111®, General Purpose Grade, Industrial Grade

SYNONYMS Methyl Chloroform DOT IDENTIFICATION NO. UN 2831

SECTION 2 COMPONENT DATA

CHEMICAL NAME	CAS NUMBER	% (wt.) Approx	OSHA PEL
* 1,1,1 Trichloroethane	71-55-6	96.5	350 ppm
* 1,4 Diethylene dioxide	123-91-1	< 3.0	
1,2 Butylene oxide	106-88-7	< 0.5	

The hazard information presented is based on tests conducted on this or similar mixtures.

* Denotes chemical subject to reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372

SECTION 3 PHYSICAL DATA

APPEARANCE AND ODOR Clear, colorless liquid, mildly sweet odor

BOILING POINT 165°F (74°C)

VAPOR PRESSURE 100 mm Hg @ 20°C

EVAPORATION RATE (ether = 1): 0.4

1.32 @ 25º/25ºC

SPECIFIC GRAVITY

VAPOR DENSITY IN AIR (Air = 1) 4.6

% VOLATILE BY VOLUME 100

SOLUBILITY IN WATER 0.07 gm/100 gm @ 25°C

SECTION 4 REACTIVITY INFORMATION

STABILITY Stable

CONDITIONS TO AVOID

Avoid contact with open flame, electric arcs, or other hot surfaces which can cause thermal decomposition.

INCOMPATIBLE MATERIALS

Strong alkalies, oxidizers, and reactive metals (i.e., aluminum, potassium, sodium, etc.). Refer to Section 8 for additional information on aluminum.

HAZARDOUS DECOMPOSITION PRODUCTS Hydrogen chloride, phosgene, chlorine.

HAZARDOUS POLYMERIZATION

Will not occur.

SECTION 5 FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT

None (TCC)

FLAMMABLE LIMITS IN AIR 7.5 - 15.0% (vol.) @ 25°C

Health 2; Flammability 1; Reactivity 0

NFPA RATINGS

EXTINGUISHING MEDIA Water, foam, dry chemical, carbon dioxide (CO2)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Concentrated vapors can be ignited by high intensity ignition source. Firefighters should wear self-contained, positive-pressure breathing apparatus, due to thermal decomposition products, and avoid skin contact.

SECTION 6 TOXICITY AND FIRST AID

EXPOSURE STANDARDS

1.1.1-trichloroethane:	ACGIH:	350 ppm TWA (8 hr),	450 ppm STEL
	OSHA:	350 ppm TWA (8 hr),	450 ppm STEL

(Odor threshold approximately 100 ppm; causes olfactory fatigue)

When exposure to this product and other chemicals is concurrent, the exposure limit must be defined in the workplace. Effects described in this section are believed not to occur if exposures are maintained at or below the appropriate TLV's, however because of the wide variation in individual susceptibility, these exposure limits may not be applicable to all persons and those with the medical conditions listed below.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Acute and chronic liver disease and rhythm disorders of the heart.

ACUTE TOXICITY

PRIMARY ROUTES OF EXPOSURE

Inhalation; Skin Absorption

INHALATION

Major potential route of exposure. Minimal effects observed below 1,000 ppm; dizziness, drowsiness, and throat irritation at levels above 1,000 ppm. Unconciousness and death possible at levels above 10,000 ppm. Blood pressure depression, cardiac sensitization, and ventricular arrhythmia can result from the exposure to near-anesthetic levels. Studies in laboratory animals have shown 1,1,1-trichloroethane in aerosol form to be more acutely toxic than 1,1,1-trichloroethane vapor.

SKIN

Prolonged or repeated skin contact can cause irritation, defatting of skin, and dermatitis. Absorption through intact skin is possible if contact with liquid is prolonged. 1,4 Diethylene dioxide as a pure substance is readily absorbed through intact skin.

EYE

Liquid can cause slight temporary irritation with slight temporary corneal injury. Vapors can irritate eyes.

INGESTION

Single dose toxicity is low to moderate. If vomiting occurs, 1,1,1 trichloroethane can be aspirated into the lungs, which can cause chemical pneumonia and systemic effects.

FIRST AID

INHALATION

Remove to fresh air. If breathing has stopped, administer artificial respiration. Call a physician.

SKIN

Remove contaminated clothing and shoes. Wash exposed area with soap and water. Wash contaminated clothing before reuse.

EYES

Flush eyes immediately with water for at least 15 minutes. If irritation persists, call a physician.

INGESTION

Do not induce vomiting. Contact physician or emergency medical facility immediately.

NOTE TO PHYSICIAN: Adrenalin should never be given to persons overexposed to 1,1,1 trichloroethane.

CHRONIC TOXICITY

The finding of chronic toxic effects in laboratory animals may indicate toxicity to humans. Overexposure should be avoided, failure to do so could result in injury, illness or even death.

Chronic overexposures to 1,1,1 trichloroethane and this mixture have caused liver toxic effects in experimental animals.

CARCINOGENICITY

The available data indicates that 1,1,1 trichloroethane and this mixture are not carcinogenic in laboratory animals. 1,1,1 trichloroethane is not listed on the OSHA, IARC, or NTP carcinogen lists.

REPRODUCTIVE TOXICITY

Three studies have been performed on laboratory animals to evaluate the effects of 1,1,1 trichloroethane on reproduction and fetal development. Two of the three studies indicate no reproductive toxicity. The third study noted delays in normal development, but these delays did not affect later life.

SECTION 7 PERSONAL PROTECTION AND CONTROLS

RESPIRATORY PROTECTION

Where vapor concentration exceeds or is likely to exceed 350 ppm, a NIOSH/MSHA approved organic vapor type respirator is acceptable. A NIOSH/MSHA approved self-contained breathing apparatus or air line respirator, with full face piece, is required for vapor concentrations above 1,000 ppm and for spills and/or emergencies. Follow any applicable respirator use standards or regulations.

VENTILATION

Do not use in closed or confined space. Open doors and/or windows. Use ventilation to maintain exposure levels below 350 ppm.

SKIN PROTECTION

Wear solvent-resistant gloves such as Viton, polyvinyl alcohol, or equivalent. Solvent-resistant boots, apron, headgear and/or faceshield should be worn where splashing is possible.

EYE PROTECTION

Wear safety glasses. Contact lenses should not be worn. Chemical goggles and/or face shields should be worn where splashing is possible.

HYGIENE

Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom.

OTHER CONTROL MEASURES

To determine exposure level(s), monitoring should be performed regularly. Safety shower and eyewash station should be available.

NOTE: Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations. For further information, contact the clothing or equipment manufacturer or the Vulcan Chemicals Technical Service department.

SECTION 8 HANDLING AND STORAGE

Follow protective controls set forth in Section 7 when handling this product. Store labeled and sealed containers in a cool, dry, well-ventilated area. Prevent water or moist air from entering storage tanks or containers. Do not cut or weld on empty or full drums. Aluminum equipment should not be used for storage and/or transfer. Vapors are heavier than air and will collect in low areas. Do not enter confined spaces such as tanks or pits without

following proper entry procedures as required by 29 CFR 1910.146.

Contact with aluminum parts in a pressurizable fluid system may cause violent reactions. Consult equipment supplier for further information. Do not remove or deface label. Do not reuse drum without recycling or reconditioning in accordance with any applicable federal, state or local laws.

SARA Title III Hazard Categories: Immediate Health, Delayed Health.

SECTION 9 SPILL, LEAK AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate the area, ventilate, and avoid breathing vapors. Dike area to contain spill. If spill occurs indoors, turn off air conditioning and/or heating system, to prevent vapors from contaminating entire building. Clean up area (wear protective equipment - refer to Section 7) by mopping or with absorbent material and place in closed containers for disposal. Avoid contamination of ground and surface waters. Do not flush to sewer. Reportable Quantity (RQ) is 1000 lbs. Notify National Response Center (800/424-8802) of uncontained releases to the environment in excess of the RQ.

WASTE DISPOSAL METHOD

Recovered liquids may be sent to a licensed reclaimer or incineration facility. Contaminated material must be disposed of in a permitted waste management facility. Consult federal, state, or local disposal authorities for approved procedures.

SECTION 10 TRANSPORTATION INFORMATION

DOT SHIPPING DESCRIPTION (49 CFR 172.101) 1,1,1-Trichloroethane, 6.1, UN 2831, PG III, RQ PLACARD REQUIRED KEEP AWAY FROM FOOD, 2831, Class 6

LABEL REQUIRED

KEEP AWAY FROM FOOD, Class 6

Label as required by OSHA Hazard Communication Standard, and any applicable state and local regulations.

Medical Emergencies: Call collect 24 hours a day

for emergency toxicological information 415/821-3182

Other Emergency information:

Call 316/524-5751 (24 Hours)

For any other information contact:

Vulcan Chemicals Technical and Environmental Services P O Box 530390 Birmingham, AL 35253-0390 800/873-4898 8 AM - 5 PM, Central Time Monday through Friday

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Date of Preparation: March 1, 1994 (Reformatted and Reprinted: January 15, 1996)

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology Standard Reference Materials Program 100 Bureau Drive, Stop 2300 Gaithersburg, Maryland 20899-2300 SRM Number: 3080 MSDS Number: 3080 SRM Name: Aroclor 1260 in Transformer Oil

Date of Issue: 05 February 2008

Emergency Telephone ChemTrec: 1-800-424-9300 (North America) +1-703-527-3887 (International)

Description: A unit of Standard Reference Material (SRM) 3080 consists of five 2 mL ampoules, each containing approximately 1.2 mL of transformer oil.

Substance: Aroclor 1260 in Transformer oil

MSDS Coordinator: Mario Cellarosi

Telephone: 301-975-6776

E-mail: SRMMSDS@nist.gov

FAX: 301-926-4751

Other Designations: Aroclor 1260 (Polychlorinated biphenyls, Chlorobiphenyl [60 % chlorine], PCBS) Transformer oil (Hydrotreated light naphthenic distillate, distillates [petroleum], hydraulic petroleum oil)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Components	CAS Number	EC Number (EINICS)	Nominal Concentration ^(a) (mass fraction)
Transformer oil	64742-53-6	265-156-6	99.9 %
Aroclor 1260	11096-82-5	not assigned	.1 %

(a) Hazardous components 1 % or greater; carcinogens 0.1 % or greater are listed in compliance with OSHA 29 CFR 1910.1200

Note: The health hazards provided in this MSDS are for the pure components. Health hazard data for this Transformer oil/Aroclor 1260 solution has not been determined.

EC Classification (assigned):

Transformer oil: Not determined.

Aroclor 1260: T Toxic.

EC Risk (R):

Transformer oil: Not determined

Aroclor 1260: R22, R36, R37, R38 and R45.

EC Safety (S):

Transformer oil: Not determined

Aroclor 1260: S2, S13, S24, S25, S26, S36 and S46.

EC Risk/Safety Phrases: See Section 15 "Regulatory Information"

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0-4): Health = 2 Fire = 1 Reactivity = 0

Major Health Hazards:

Transformer oil: Carcinogen.

Aroclor 1260: Polychlorinated biphenyls may be absorbed into the body through ingestion, eye or skin contact and accumulate in tissues and organs, especially those rich in lipids. This substance is toxic to the liver. Polychlorinated biphenyls are an anticipated human carcinogen and have caused cancer in animals.

Potential Health Effects: Transformer oil

Inhalation: No information on significant adverse effects listed.

Skin Contact: Skin contact may result in irritation.

Eye Contact: Contact with this material may cause irritation.

Ingestion: Ingestion of this material is unlikely under normal laboratory conditions.

Listed as a Carcinogen/Potential Carcinogen: Transformer oil

	1 03	110
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs	<u> </u>	
By the Occupational Safety and Health Administration (OSHA)		Х

Ves

No

Potential Health Effects: Aroclor 1260

Inhalation: Inhalation may result in irritation.

Skin contact: Skin contact may result in irritation.

Eye contact: Eye contact may result in irritation.

Ingestion: Ingestion of a significant amount of Aroclor 1254 may result in liver damage.

Listed as a Carcinogen/Potential Carcinogen: Aroclor 1260

	Yes	No	
In the National Toxicology Program (NTP) Report on Carcinogens	<u> </u>		
In the International Agency for Research on Cancer (IARC) Monographs	X		
By the Occupational Safety and Health Administration (OSHA)		<u> </u>	

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Seek medical attention if needed.

Skin Contact: Wash exposed skin with copious amounts of water for at least 15 minutes. Remove any contaminated clothing. Seek medical attention if needed.

Eye Contact: Immediately flush eyes with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: If swallowed, seek immediate medical attention.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: This material presents a slight fire hazard.

Extinguishing Media: Use extinguishing agents appropriate for the surrounding fire.

Fire Fighting: Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): None listed for this material. Method Used: Not applicable.

Autoignition Temperature (°C): Not applicable

Flammability Limits in Air UPPER (Volume %): None listed. LOWER (Volume %): None listed.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Avoid skin contact. Absorb spills with sand of other noncombustible absorbent material. Collect spilled material and place in an appropriate container for disposal.

Disposal: Refer to Section 13, "Disposal Considerations".

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Sealed ampoules of this material should be stored in a dark place below 30 °C.

1

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Transformer oil

OSHA: 5 mg/m³ TWA ACGIH: 5 mg/m³ TWA ACGIH: 10 mg/m³ STEL NIOSH: 5 mg/m³ recommended TWA (10 h) NIOSH: 10 mg/m³ recommended STEL

Exposure Limits: Aroclor 1254

OSHA: 0.5 mg/m³ TWA (skin) ACGIH: 0.5 mg/m³ TWA (skin) NIOSH: 0.001 mg/m³ recommended TWA (10h)

Ventilation: Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: A respiratory protection program that meet OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed if workplace conditions warrant a respirator. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

Eye Protection: Wear safety goggles. An eye wash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: Transformer oil/ Aroclor 1260 solution.

Physical State: Liquid.

Specific gravity: 1.58

Appearance and Odor: Clear to yellowish. Odorless.

Boiling point (° C) : >385

Water Solubility: Insoluble.

pH: Not available.

10. STABILITY AND REACTIVITY

Stability: X Stable ____ Unstable

Stable under normal temperature and pressure.

Conditions to Avoid: Heat and flames.
Incompatible Materials: Oxidizers may produce a fire or explosion hazard.
Fire/Explosion Information: See Section 5, "Fire Fighting Measures".
Hazardous Decomposition: Thermal decomposition produces oxides of carbon.
Hazardous Polymerization: Will Occur X Will Not Occur
11. TOXICOLOGICAL INFORMATION
Route of Entry: X Inhalation X Skin X Ingestion
Toxicity Data:
Transformer oil: None listed.
Aroclor 1260:
Rat (oral)LD ₅₀ : 1315 mg/kg
Health Effects (Acute and Chronic): See section 3: "Hazards Identification" for potential health effects.
12. ECOLOGICAL INFORMATION
Ecotoxicity Data:
Transformer oil: Not available.
Aroclor 1260:
Fish toxicity LC_{50} (Channel catfish [Ictalurus puncttus]) : >400 µg/L 96 hours. Invertebrate toxicity LC_{50} (Cockle Cerastoderma edule): 10000 µg/L 48 hours.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: This material contains polychlorinated biphenyls and should be disposed of in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and ICAO/IATA: This material is not regulated.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4);

SARA Title III Sections 302 (40 CFR 355.30): Not regulated. SARA Title III Sections 304 (40 CFR 355.40): Not regulated. SARA Title III Sections 313 (40 CFR 372.65): Polychlorinated biphenyls. SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: Yes CHRONIC: Yes FIRE: No REACTIVE: No SUDDEN RELEASE: No

OSHA Process Safety (29 CFR 1910.119): Not regulated

State Regulations: California Proposition 65:

Transformer oil: Not regulated.

Aroclor 1260 (polychlorinated biphenyls: Cancer (Oct. 01, 1989), Developmental toxicity (Jan 01, 1991).

CANADIAN Regulations: WHMIS Classification: Not determined

EUROPEAN Regulations:

EC Classification (assigned):

Transformer oil: Not determined.

Aroclor 1260: T Toxic, Xn Harmful

EC Risk Phrases:

Transformer oil: None listed.

Aroclor 1260: R22 Harmful if swallowed. R36 Irritating to eyes. R37 Irritating to respiratory system. R38 Irritating to skin. R45 May cause cancer.

EC Safety Phrases:

Transformer oil: None listed.

Aroclor 1260: S2 Keep out of the reach of children.
S13 Keep away from food, drink and animal feeding stuffs.
S24 Avoid contact with skin.
S25 Avoid contact with eyes.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36 Wear suitable protective clothing.
S46 If swallowed, seek medical advice immediately and show this container or label.

National Inventory Status

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12 (b) Export Notification: Polychlorinated biphenyls, CAS Number: 1336-36-3, Section 6.

16. OTHER INFORMATION

Sources: Symyx Technologies, Inc., MSDS Transformer oil, 07 December 2006. Symyx Technologies, Inc., MSDS Aroclor 1254, 07 December 2006.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.





Health2Fire3Reactivity0Personal
ProtectionH

Material Safety Data Sheet Acetone MSDS

Section 1: Chemical Product	and Company Identification
Product Name: Acetone	Contact Information:
Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808	Sciencelab.com, Inc. 14025 Smith Rd.
CAS#: 67-64-1	Houston, Texas 77396
RTECS: AL3150000	US Sales: 1-800-901-7247 International Sales: 1-281-441-4400
TSCA: TSCA 8(b) inventory: Acetone	Order Online: ScienceLab.com
Cl#: Not applicable.	CHEMTREC (24HR Emergency Telephone), call:
Synonym: 2-propanone; Dimethyl Ketone; Dimethylformaldehyde; Pyroacetic Acid	International CHEMTREC, call: 1-703-527-3887
Chemical Name: Acetone	For non-emergency assistance, call: 1-281-441-4400
Chemical Formula: C3-H6-O	

Section 2: Composition and Information on Ingredients

Composition:		
Name	CAS#	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD50): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC50): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to central nervous system (CNS). The substance may be toxic to kidneys, the reproductive system, liver, skin. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:

Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:

Flammable liquid.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:

Store in a segregated and approved area (flammables area). Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States] TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States] TWA: 500 STEL: 1000 [Austalia] TWA: 1185 STEL: 2375 (mg/m3) [Australia] TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)] TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)] TWA: 1800 STEL: 2400 from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole
Color: Colorless. Clear
pH (1% soln/water): Not available.
Boiling Point: 56.2°C (133.2°F)
Melting Point: -95.35 (-139.6°F)
Critical Temperature: 235°C (455°F)
Specific Gravity: 0.79 (Water = 1)
Vapor Pressure: 24 kPa (@ 20°C)
Vapor Density: 2 (Air = 1)
Volatility: Not available.
Odor Threshold: 62 ppm
Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2
Ionicity (in Water): Not available.
Dispersion Properties: See solubility in water.
Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3000 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 44000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED].

Causes damage to the following organs: central nervous system (CNS). May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenicity) based on studies with yeast (S. cerevisiae), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies. May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

the placental barrier.

Skin: May cause skin irritation. May be harmful if absorbed through the skin.

Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury.

Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizzness, drowsiness, confusion, headache, muscle weakeness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting).

Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also affect the Central Nevous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well at the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects.

Chronic Potential Health Effects:

Skin: May cause dermatitis.

Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fatthead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information
Section 15: Other Regulatory Information Federal and State Regulations: California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Collifornia prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut hazardous material survey.: Acetone Illinois toxic substances disclosure to employee act: Acetone Illinois chemical safety act: Acetone New York release reporting list: Acetone Rhode Island RTK hazardous substances: Acetone Pennsylvania RTK: Acetone Pennsylvania RTK: Acetone
Pennsylvania RTK: Acetone Florida: Acetone Minnesota: Acetone Massachusetts RTK: Acetone Massachusetts spill list: Acetone New Jersey spill list: Acetone New Jersey spill list: Acetone Louisiana spill reporting: Acetone California List of Hazardous Substances (8 CCR 339): Acetone TSCA 8(b) inventory: Acetone
TSCA 4(a) final test rules: Acetone TSCA 8(a) IUR: Acetone Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R11- Highly flammable. R36- Irritating to eyes. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Material safety data sheet issued by: la Commission de la Santé et de la Sécurité du Travail du Québec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. LOLI, RTECS, HSDB databases. Other MSDSs

Other Special Considerations: Not available.

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Material Safety Data Sheet

Science Stuff, Inc. 1104 Newport Ave Austin, TX 78753

Section 1 Identi	fication								Section 6 Ac	cidental Rele	ase Measures	
Product Number:	C2980							With the second s	Avoid water. Ventilate are respiratory p	Remove all a of leak or protection. D	sources of ignit spill. Wear o not disperse (tion. dust
	Zinc Metal Reagent	Health:	ability				$\frac{1}{2}$		into air. Use	non-sparkin	g tools to pick	up
Product Name:	Grade, Powder	Reactiv	abn <u>iy</u> /itv				$\frac{2}{1}$		and place in	closed dry c	ontainer.	
	(Dust)	Hazard	Rating	;		•			Section 7 Ha	indling and S	storage	
Trade/Chemical		Least s	Slight M	lodera	ate H	ligh Ex	treme		Store in a co	ol, dry, well	-ventilated plac	e
Synonyms		0	1	2		3	4		away from in	compatible	materials. Was	n
Formula:	Zn	NA = N	lot App	licable	9 NE	= Not			Contion 9 Evr	pocure Contr	ole & Personal	
RTECS:	ZG8600000	Establis	sneo				ł		Protection		ois & reisonal	
C.A.S	CAS# 7740- 66-6								Respiratory P respirator	Protection:NI	OSH/MSHA-ap	proved
Section 2 Comp	onent Mixture									Mechanical:	Hand NIC)SH
Sara			0/	Dim	Exp	posure					Protection: App	ves
313 Compo	nent CAS NUMD	er	%	Dim	Lin	nits:			Ventilation:	Local		
	etal CAS# 7740	0-66-6	100%	w/w	OS mg	HA TW J/m <i>f</i>	/A 5			Exhaust:	Eye Saf Protection: Gla	ety sses
Section 3 Hazar	d Identification (Also see	e sectio	n 11)					Other Protect laboratory ha	tive Equipme andling proce	ent: Use safe edures.	,
Keep away from	heat and ignition	on sourc	es. Har	mful i	fswa	allowed	1.		Section 9 Ph	ysical and C	hemical Proper	ties
Avoid breathing	vapors. Use wit and clothes. Wa	n adequ ish thoro	ate ven oughly a	after f	n. Av nandl	vola co lina. Ki	eep		Melting		Specific	
container closed	dha cioarcor me								Point:	419° C	Gravity	7.14
Section 4 First /	Aid Measures		es. Har	mful i	fswa	allowed	1.		Boiling Point:	907° C	Percent Volatile by	N/A
Avoid breathing with eyes, skin,	vapors. Use wit and clothes. Wa	h adequ ish thoro	ate ven bughly a	itilatio after h	n. Av	void co ling. K	ontact eep		Vapor Pressure	N/A	Evaporation Rate:	N/A
container closed	I. A PHYSICIAN.	SKIN: W	Vash ex	posec	i are	a with	soap		Vapor Density:	N/A	Evaporation Standard:	
and water.				=					Solubility in Water:	Not soluble	Auto ignition Temperature:	460° C
EYES: Wash eye lids occasionally If not breathing oxygen	es with plenty of . Seek Medical A , give artificial re	water fo Aid. INHA espiratio	or at lea ALATIO n. If br	ast 15 N: Re eathir	min move ng is	utes, I e to fre difficu	ifting esh air. It, give	1	Appearance and Odor:	Gray, blue matallic powder / no odor	Lower Flamm. Limit in Air:	N/E
INGESTION: If study glasses of v person.	swallowed, induc vater. Never give	ce vomit e anythir	ing imn ng by m	nediat houth	ely a to ar	after gi n unco	ving ncious		Flash Point:	information not available	Upper Flamm. Limit in Air:	N/E
Section 5 Fire F	ighting Measures	5							Section 10 S	stability and	Reactivity	
Fire Extinguishe Type:	er Smother with chloride, mag	i dry pov mesium	vder (i. oxide).	e,: sa	nd, s	sodium	1	******	Stability: St	able Condition	ons to Avoid: H	leat
Fire/Explosion Hazards:	Dust, in mois ignite the hyd high tempura	t air can drogen g itures.	i genera jas rele	ate su ased.	fficie Meta	ent hea al burn	it to s at		Materials to	Avoid: Decompositie	on Products:	
Fire Fighting Procedure:	Avoid water. apparatus an contact with	Wear se d protec skin and	elf-conta tive clo l clothin	alned othing 1g.	brea to pi	thing revent			Hydrogen g Hazardous I	as, Zinc oxid Polymerizatio	le fumes on:Will Not Occ	ur
L <u></u>												
									Section 11 A	aditional Inf	ormation	
									Conditions a	ggravated/T	arget organs:	

MSDS :: Zinc Metal

Persons wi disorders r Irritation p mucous may fumes may None know	th preexisting skin nay be more susce ossible to skin, ey embranes, and GI cause "zinc fume n.	or respiratory ptible. Acute: es, lungs, tract. If heated fever". Chronic:
DOT Classi PG II	fication: Zinc Dust	, 4.3, UN1436,
DOT regula time. Pleas of the relev	ations may change te consult the mos vant regulations.	from time to t recent version
Revision No:0	Date Entered: 9/1/2006	Approved by: WPF

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http://www.sciencestuff.com/msds/C2980.html





Fire	3
Reactivity	0
Darconal	

Material Safety Data Sheet **m-Xylene MSDS**

Section 1: Chemical	Product and Company Identification
Product Name: m-Xylene	Contact Information:
Catalog Codes: SLX1066	Sciencelab.com, Inc. 14025 Smith Rd.
CAS#: 108-38-3	Houston, Texas 77396
RTECS: ZE2275000	US Sales: 1-800-901-7247 International Sales: 1 -281-441-4400
TSCA: TSCA 8(b) inventory: m-Xylene	Order Online: ScienceLab.com
CI#: Not applicable.	CHEMTREC (24HR Emergency Telephone), call:
Synonym: m-Methyltoluene	1-000-424-9300
Chemical Name: 1,3-Dimethylbenzene	International CHEMTREC, call: 1-703-527-3887
Chemical Formula: C6H4(CH3)2	For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients **Composition:** % by Weight CAS# Name 100 108-38-3 {m-}Xylene

Toxicological Data on Ingredients: m-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit.].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid, insoluble in water.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) TWA: 434 STEL: 651 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

pH (1% soin/water): Not applicable.

Boiling Point: 139.3°C (282.7°F)

Melting Point: -47.87°C (-54.2°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 6 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility: Easily soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:

Acute oral toxicity (LD50): 5000 mg/kg [Rat.]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit.].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

Other Toxic Effects on Humans: Very hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: 0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier. 0900 Detected in maternal milk in human. Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations: Pennsylvania RTK: m-Xylene Massachusetts RTK: m-Xylene TSCA 8(b) inventory: m-Xylene SARA 313 toxic chemical notification and release reporting: m-Xylene CERCLA: Hazardous substances.: m-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC): R10- Flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travall du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du rÃ"glement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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OSHA comments from the January 19, 1989 Final Rule on Air Contaminants Project extracted from 54FR2332 et. seq. This rule was remanded by the U.S. Circuit Court of Appeals and the limits are not currently in force.

SILVER (METAL DUST AND FUME)

CAS: 7440-22-4; Chemical Formula: Ag

The current OSHA standard for silver metal and soluble compounds (including the metal dust and fume) is 0.01 mg/m^3 , as Ag. NIOSH has no REL for this substance, but the ACGIH has established a 0.1 mg/m^3 TLV for silver metal dust and fume. NIOSH concurs with OSHA's decision not to increase the limit for silver (Ex. 8-47). Silver is a hard, brilliant, white, ductile, malleable metal.

The previous TLV of 0.01 mg/m^3 , which was established for all forms of silver, was designed to protect workers against developing argyria. This condition arises from the accumulation of silver in the body and results in an unsightly, widespread blue-grey discoloration of the skin that can persist for long periods of time. The skin of exposed workers may also become black and have a metallic luster. Argyria may manifest in the conjunctiva of the eye, which may be affected sufficiently to cause lens and visual disturbances.

In arriving at the previous TLV of 0.01 mg/m³ for silver, the ACGIH relied on a publication by Pillsbury and Hill (1939, as cited in ACGIH 1986/Ex. 1-3, p. 529), which stated that an accumulated intake of from 1 to 5 grams of silver would lead to generalized argyria. Assuming a 20-year exposure duration, a 10 m³/day respiratory volume, and a 50-percent body retention, the ACGIH estimated that exposure to 0.05 mg/m³ was sufficient to cause argyria. The former TLV of 0.01 mg/m³ thus appeared to incorporate a safety factor to account for the uncertainties involved in using this approach to develop a TLV. The ACGIH's current TLV of 0.1 mg/m³ for silver metal dust and fume was determined in a similar fashion, except that the ACGIH assumed a lower percent retention and apparently did not incorporate a safety margin (ACGIH 1986/Ex. 1-3).

OSHA received several comments on its proposal to retain the existing limit for silver (Ex. 8-47, 8-57, 3-876, 46, and 105; Tr. pp. 9-126 to 9-127). The American Mining Congress (Ex. 3-876) stated that argyria, the blue-grey discoloration of the skin caused by exposure to silver, is caused only by exposure to the soluble silver salts and not by metallic silver. BP America, a company that operates a silver smelting and refining operation in Utah, is also of the opinion that OSHA should increase its limit for silver (metal, dust, and fumes) because, although argyria "can be cosmetically unpleasant, it is not known to result in any adverse health consequences" (Ex. 8-57).

OSHA responds to these commenters as follows. First, OSHA does not agree that having one's skin discolored, on a semipermanent basis, is a "minor" effect. On the contrary, OSHA believes that argyria causes emotional stress, acute personal discomfort, and feelings of insecurity, all of which are symptoms of severe psychological distress.

In addition, although the American Mining Congress is certain that only the soluble forms cause argyria, OSHA notes that Wolf Wagner, Manager of Industrial Hygiene for BP America, expressed uncertainty on this point at the hearing; he reported that argyria is "most likely due to a soluble silver rather than an insoluble silver" (Ex. 8-57; Tr. pp. 9-126 to 9-127). OSHA agrees that considerable

uncertainty surrounds the issues of the causative agents of argyria and the specific level at which this effect occurs. As the ACGIH (1986/Ex. 1-3, p. 529) reports:

The concentration of silver in the air which will result in generalized argyria is not known with certainty.

Thus, OSHA concludes that the evidence needed to raise the limit for silver is lacking. OSHA is therefore retaining its former limit for silver (metal, dust, and fume) of 0.01 mg/m^3 as an 8-hour TWA.

OSH Publication No. 2	H Home NIOSH Topics Site Index 005-149: cket Guide to Ch	Databases and Information Resource	es NIOSH Products Contact Us September
IPG Home Introduction	Synonyms & Trade Names Chemical N	Names CAS Numbers RTECS Nu	mbers Appendices Search
Mercury com	oounds [except (organ	o) alkyls] (as Hg)	CAS 7439-97-6 (metal)
lg (metal)		· · · · · · · · · · · · · · · · · · ·	RTECS <u>OV4550000</u> (metal
Synonyms & Trade Mercury metal: Colloidal Synonyms of "other" Hg	Names mercury, Metallic mercury, Quicksilver compounds vary depending upon the s	specific compound.	DOT ID & Guide 2809 <u>172</u> (metal)
Exposure Limits	NIOSH REL: Hg Vapor: TWA Other: C 0.1 mg/m ³ [skin]	A 0.05 mg/m ³ [skin]	
	OSHA PEL †: C 0.1 mg/m ³		
DLH 10 mg/m ³ (as Hg)) See: <u>7439976</u>	Conversion	
Physical Descriptio Aetal: Silver-white, heav Ikyls.]	n y, odorless liquid. [Note: "Other" Hg co	mpounds include all inorganic & ar	yl Hg compounds except (organo)
1W: 200.6	BP: 674°F	FRZ: -38°F	Sol: Insoluble
P: 0.0012 mmHg	IP: ?		Sp.Gr: 13.6 (metal)
I.P: NA	UEL: NA	LEL: NA	
letal: Noncombustible L	lquid		· · · · · · · · · · · · · · · · · · ·
n compatibilities & .cetylene, ammonia, chl	Reactivities orine dioxide, azides, calcium (amalgar	m formation), sodium carbide, lithiu	um, rubidium, copper
loopurament Math	ods 40 <u>ethods</u>		
IIOSH 6009; OSHA ID1 ee: <u>NMAM</u> or OSHA M		First Aid (See procedures	3)

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Up to 1.25 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode (APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister) Up to 2.5 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of

concern†

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern

- (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/PAPRTS(canister)
- (APF = 50) Any self-contained breathing apparatus with a full facepiece
- (APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m³:

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positivepressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Other mercury compounds: NIOSH/OSHA

Up to 1 mg/m³:

(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concernt

(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m³:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister) **Up to 5** mg/m³:

(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concernt

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†

- (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/PAPRTS(canister)
- (APF = 50) Any self-contained breathing apparatus with a full facepiece
- (APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m³:

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positivepressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus Important additional information about respirator selection

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

See also: INTRODUCTION See ICSC CARD: 0056 See MEDICAL TESTS: 0136

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C/D/N ISOTOPES INC.

88 Leacock Street Pointe-Claire, Quebec H9R 1H1 Toll-Free (Canada & USA): 1-800-565-4696 Tel.: 1-514-697-6254 • Fax: 1-514-697-6148 www.cdnisotopes.com



MATERIAL SAFETY DATA SHEET

Sheet No. 4090

	D-3004
Product Name:	1,1-Dichloro-2,2-bis(4-chlorophenyl-d ₄)ethane
CAS No.:	93952-20-6
SECTION 2: CHEMICAL INFORM	IATION (UNLABELLED)
Chemical Name:	1,1-DICHLORO-2,2-BIS(4-CHLOROPHENYL)ETHANE
CAS No.:	
Synonyms:	DDD; 1,1-Bis(4-chiorophenyl)-1,2-dichioroetharie
SECTION 3: HAZARDS IDENTIFI	CATION
Known Hazards:	TOXIC, IRRITANT, POSSIBLE CARCINOGEN
SECTION 4: FIRST AID MEASUR	RES
Skin Contact:	Wash with water.
Ingestion:	Medical assistance for gastric lavage.
-	Remove to fresh air, artificial respiration of 0x/0en if 0ecessary.
Inhalation:	Nariove to near an, antiour reepresent of exygen in the easy in
Inhalation:	ASURES
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media:	ASURES Carbon dioxide, dry chemical powder, foam.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCI and phosgene fumes on decomposition.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition. ASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods:	ASURES Carbon dioxide, dry chemical powder, foarn. Wear a self-contained breathing apparatus and protective clothing. Toxic HCI and phosgene fumes on decomposition. EASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST	ASURES Carbon dioxide, dry chemical powder, foarn. Wear a self-contained breathing apparatus and protective clothing. Toxic HCI and phosgene fumes on decomposition. EASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST Usage/Handling Precautions:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition. ASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE Strong fumehood
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST Usage/Handling Precautions: Storage Conditions:	ASURES Carbon dioxide, dry chemical powder, foarn. Wear a self-contained breathing apparatus and protective clothing. Toxic HCI and phosgene fumes on decomposition. EASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE Strong fumehood Store at room temperature. Adequate ventilation. Protect from light.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST Usage/Handling Precautions: Storage Conditions: Storage Conditions:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition. ASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE Strong fumehood Store at room temperature. Adequate ventilation. Protect from light. ROL / PERSONAL PROTECTION
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST Usage/Handling Precautions: Storage Conditions: Storage Conditions: Respiratory Protection:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition. ASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE Strong fumehood Store at room temperature. Adequate ventilation. Protect from light. ROL / PERSONAL PROTECTION Self-contained breathing apparatus or chemical cartridge.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST Usage/Handling Precautions: Storage Conditions: Storage Conditions: Respiratory Protection: Hand Protection:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition. ASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE Strong fumehood Store at room temperature. Adequate ventilation. Protect from light. Rol / PERSONAL PROTECTION Self-contained breathing apparatus or chemical cartridge. Chemical-resistant gloves, solvent-resistant gloves.
Inhalation: SECTION 5: FIRE FIGHTING ME Extinguishing Media: Special Fire Fighting Equipment: Unusual Fire and Explosion Hazards: SECTION 6: ACCIDENTAL RELE Personal Precautions: Spill Clean-up Methods: SECTION 7: HANDLING AND ST Usage/Handling Precautions: Storage Conditions: Storage Conditions: Respiratory Protection: Hand Protection: Eye Protection:	ASURES Carbon dioxide, dry chemical powder, foam. Wear a self-contained breathing apparatus and protective clothing. Toxic HCl and phosgene fumes on decomposition. ASE MEASURES Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Provide adequate ventilation. Carefully scoop up and transfer to a closed container. ORAGE Strong fumehood Store at room temperature. Adequate ventilation. Protect from light. ROL / PERSONAL PROTECTION Self-contained breathing apparatus or chemical cartridge. Chemical-resistant gloves, solvent-resistant gloves. Wear safety goggles. Provide adet on the set of the set
C/D/N ISOTOPES INC. Toll-Free (Canada & USA): 1-800-565-4696 Tel.: 1-514-697-6254 • Fax: 1-514-697-6148 www.cdnisotopes.com



MATERIAL SAFETY DATA SHEET

Sheet No. 4090

	White solid
Melting Point (°C): Volatiles (%):	109-111 Vapour Density (Air = 1): 11 < 1
Flash Point (°C): Autolgnition Temperature (°C):	Not available Not available.
SECTION 10: STABILITY AND R	EACTIVITY
Stability: Incompatibility (Materials to Avoid):	Stable. Bases. Oxidizing/reducing agents.
Hazardous Decomposition Products:	CO/CO ₂ and HCI on combustion.
SECTION 11: TOXICOLOGICAL	INFORMATION
Acute and Chronic Health Hazards Oral LD ₆₀ : TLV:	113 mg/kg (rat) Dermai LDL ₀ : 1200 mg/kg (rabbit) None verified. DDT: 1 mg/m ³ .
Effects of Overexposure:	Irritant. Lethargy. Liver damage. Atrophy of adrenal cortex. Possible carcinogen. Possible mutagen. Possible neoplastic. Death.
SECTION 12: ECOLOGICAL INF	ORMATION
29 Conservation and a second	Data not yet available.
	DERATIONS
Disposal Procedures:	Via licensed disposal company. Dispose of according to federal and local regulations.
233	Contact C/D/N Isotopes Inc.
	Contact C/D/N Isotopes Inc.
SECTION 15: REGULATORY INF	Contact C/D/N Isotopes Inc. FORMATION None verified DDT: 1 ma/m ³
SECTION 15: REGULATORY IN	Contact C/D/N Isotopes Inc. FORMATION None verified. DDT: 1 mg/m ³ .
SECTION 15: REGULATORY INF TLV:	Contact C/D/N Isotopes Inc. CORMATION None verified. DDT: 1 mg/m ³ . TION
SECTION 15: REGULATORY INF TLV: SECTION 16: OTHER INFORMA This product is not radioactive. The data given for the indicated otherwise. Safety data for the labelled con hose of the unlabelled compounds. While the infor- hereto and disclaims all liabilities from reliance that he responsibility of the purchaser and intended use	Contact C/D/N Isotopes Inc. CORMATION None verified. DDT: 1 mg/m ³ . TION his product are those of the corresponding unlabelled product indicated in Section 2, unless specifically mpounds are generally unavailable but the hazards and properties are assumed to be similar or identical to rmation set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect reon. All judgements as to the suitability of the data presented with respect to the use of this product are er.
SECTION 15: REGULATORY IN TLV: SECTION 16: OTHER INFORMA This product is not radioactive. The data given for the ndicated otherwise. Safety data for the labelled com hose of the unlabelled compounds. While the infor hereto and disclaims all liabilities from reliance ther he responsibility of the purchaser and intended use	Contact C/D/N Isotopes Inc. =ORMATION None verified. DDT: 1 mg/m ³ . TION his product are those of the corresponding unlabelled product indicated in Section 2, unless specifically mpounds are generally unavailable but the hazards and properties are assumed to be similar or identical to rmation set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect reon. All judgements as to the suitability of the data presented with respect to the use of this product are er. Date: May 24, 2006
SECTION 15: REGULATORY INI TLV: SECTION 16: OTHER INFORMA This product is not radioactive. The data given for the ndicated otherwise. Safety data for the labelled com- hose of the unlabelled compounds. While the infor rereto and disclaims all liabilities from reliance ther he responsibility of the purchaser and intended use C/D	Contact C/D/N Isotopes Inc. CORMATION None verified. DDT: 1 mg/m ³ . TION his product are those of the corresponding unlabelled product indicated in Section 2, unless specifically mpounds are generally unavailable but the hazards and properties are assumed to be similar or identical to rmation set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect reon. All judgements as to the suitability of the data presented with respect to the use of this product are er. Date: May 24, 2006 VM ISOTOPES INC.
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SECTION 15: REGULATORY INI TLV: SECTION 16: OTHER INFORMA This product is not radioactive. The data given for the ndicated otherwise. Safety data for the labelled com hose of the unlabelled compounds. While the infor here to and disclaims all liabilities from reliance that he responsibility of the purchaser and intended use C/D	Contact C/D/N Isotopes Inc. CORMATION None verified. DDT: 1 mg/m ³ . TION his product are those of the corresponding unlabelled product indicated in Section 2, unless specifically mpounds are generally unavailable but the hazards and properties are assumed to be similar or identical to mation set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect teon. All judgements as to the suitability of the data presented with respect to the use of this product are er. Date: May 24, 2006 VM ISOTOPES INC. Vm.theorem.
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SECTION 15: REGULATORY INI TLV: SECTION 16: OTHER INFORMA This product is not radioactive. The data given for the indicated otherwise. Safety data for the labelled con- those of the unlabelled compounds. While the infor- hereto and disclaims all liabilities from reliance there the responsibility of the purchaser and intended user C/D	Contact C/D/N Isotopes Inc. =ORMATION None verified. DDT: 1 mg/m ³ . TION his product are those of the corresponding unlabelled product indicated in Section 2, unless specifically mpounds are generally unavailable but the hazards and properties are assumed to be similar or identical rmation set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect reon. All judgements as to the suitability of the data presented with respect to the use of this product are er. Date: May 24, 2006 VM ISOTOPES INC. Vm. Math. Gr. Meny Vincent Guay, Ph.D.

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NPG Home Introduction S	<u>ynonyms & Trade Names Chemical N</u>	ames CAS Numbers KTECS Num	<u>ΓΔS 65006-03-2</u>
Coal tar pitch v	olatiles		00000002
. <u>.</u>	<u></u>		RTECS GF8655000
Synonyms & Trade N Synonyms vary depending chrysene, anthracene & be creosote to be coal tar prod	ames upon the specific compound (e.g., py nzo(a)pyrene). [Note: NIOSH conside ducts.]	rene, phenanthrene, acridine, ers coal tar, coal tar pitch, and	DOT ID & Guide 2713 <u>153</u> (acridine)
Exposure	NIOSH REL: Ca TWA 0.1 mg	/m ³ (cyclohexane-extractable fract	ion) <u>See Appendix A See Appendi</u>
Limits	OSHA PEL : TWA 0.2 mg/m ³	(benzene-soluble fraction) [1910.1	002] See Appendix C
DLH Ca [80 mg/m ³] See	65996932 Convers	sion	
Physical Description Black or dark-brown amore	hous residue.		
Properties vary depending he specific compound. Combustible Solids	upon		
Incompatibilities & R Strong oxidizers	eactivities		a sa anga ang ang ang ang ang ang ang ang a
Measurement Metho OSHA <u>58</u> See: NMAM or <u>OSHA Met</u>	d s hods		
Personal Protection Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommenda Change: Daily	& Sanitation (<u>See protection</u>) tion	First Aid (<u>See procedures</u>) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo Swallow: Medical attention in	y ort nmediately
Respirator Recomme At concentrations above (APF = 10,000) Any self-co pressure mode (APF = 10,000) Any suppli mode in combination with Escape: (APF = 50) Any air-purifyir an N100, R100, or P100 fi breathing apparatus	endations NIOSH the NIOSH REL, or where there is a ontained breathing apparatus that has ed-air respirator that has a full facepid an auxiliary self-contained positive-pro- ing, full-facepiece respirator (gas mask lter. <u>Click here</u> for information on sele	no REL, at any detectable conce a full facepiece and is operated in ece and is operated in a pressure-c essure breathing apparatus a) with a chin-style, front- or back-m ction of N, R, or P filters./Any appro	ntration: a pressure-demand or other posit demand or other positive-pressure nounted organic vapor canister hav opriate escape-type, self-contained

Exposure Routes inhalation, skin and/or eye contact	
Symptoms Dermatitis, bronchitis, [potential occupational carcinogen]	:
Target Organs respiratory system, skin, bladder, kidneys	
Cancer Site [lung, kidney & skin cancer]	و رویکه سری و در
See also: INTRODUCTION See ICSC CARD: 1415 See MEDICAL TESTS: 0054	

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NIOSH Pock	ket Guide to	Chemical Haza	ards
NPG Home Introduction S	ynonyms & Trade Names Che	<u>mical Names CAS Numbers RTE</u>	<u>ECS Numbers Appendices Search</u>
Chlorodipheny	l (42% chlorine)		CAS 53469-21-9
emere anprioriy	· · · · · · · · · · · · · · · · · · ·		
C ₆ H ₄ CIC ₆ H ₃ Cl ₂ (ap)	prox)		RIECS <u>10130000</u>
Synonyms & Trade N Aroclor® 1242, PCB, Polyc	ames hlorinated biphenyl	energen en statue	DOT ID & Guide 2315 <u>171</u>
Exposure	NIOSH REL*: Ca TWA	0.001 mg/m ³ See Appendix A [*	Note: The REL also applies to other PCBs.]
Limits	OSHA PEL: TWA 1 m	g/m ³ [skin]	
IDLH Ca [5 mg/m ³] See: <u>{</u>	5 <u>3469219</u> Co	nversion	والمستعد والمنافعة
Physical Description Colorless to light-colored, v	viscous liquid with a mild, hydro	ocarbon odor.	
MW: 258 (approx)	BP: 617-691°F	FRZ: -2°F	Sol: Insoluble
VP: 0.001 mmHg	IP: ?		Sp.Gr(77°F): 1.39
FI.P: NA	UEL: NA	LEL: NA	
Nonflammable Liquid, but e	exposure in a fire results in the ins.	formation of a black soot contain	ing PCBs, polychlorinated dibenzofurans &
Incompatibilities & R Strong oxidizers	eactivities		
Measurement Methon NIOSH 5503; OSHA PV20 See: NMAM or OSHA Meth	ds 89 nods		an a
Personal Protection Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamin Remove: When wet or con Change: Daily Provide: Eyewash, Quick c	& Sanitation (See protection nated taminated	n) First Aid (See prov Eye: Irrigate immedia Skin: Soap wash imm Breathing: Respirato Swallow: Medical attr	<u>cedures)</u> ately nediately ry support ention immediately
Respirator Recomme At concentrations above (APF = 10,000) Any self-co pressure mode (APF = 10,000) Any suppli mode in combination with a Escape: (APF = 50) Any air-purifyin an N100, R100, or P100 fill breathing apparatus	endations NIOSH the NIOSH REL, or where th ontained breathing apparatus t ed-air respirator that has a full an auxiliary self-contained posi g, full-facepiece respirator (ga ter. <u>Click here</u> for information of	ere is no REL, at any detectable hat has a full facepiece and is ope facepiece and is operated in a pr tive-pressure breathing apparatus s mask) with a chin-style, front- op on selection of N, R, or P filters./A	e concentration: erated in a pressure-demand or other positive ressure-demand or other positive-pressure s r back-mounted organic vapor canister having any appropriate escape-type, self-contained

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Symptoms Irritation eyes; chloracne; liver damage; repro	ductive effects; [potential occupational carcinogen]
Target Organs Skin, eyes, liver, reproductive system	
Cancer Site (in animals: tumors of the pituitary gland & li See also: INTRODUCTION See MEDICAL TESTS: 0175	/er, leukemia]

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	IOSH M	tional Institute for	
FER + HEALTHIER + PEOPLE *		dox Databases and Information Res	ources NIOSH Products Contact Us
NIOSH Publication No. 2005-14	9;	dex Databases and information rest	September 2005
NIOSH Pocke	t Guide to (Chemical Hazaı	rds
	ump 8 Trade Names Chan	nical Names I CAS Numbers I RTECS	S Numbers Appendices Search
NPG Home Introduction Syllon	yms & trade Names Onen	Ilical Manea Ono Manuers Miles	
Dieldrin			
C ₁₂ H ₈ Cl ₆ O			RTECS 101750000
Synonyms & Trade Name HEOD; 1,2,3,4,10,10-Hexachlor dimethanonaphthalene	∋s o-6,7-epoxy-1,4,4a,5,6,7,8	3,8a-octahydro-1,4-endo,exo-5,8-	DOT ID & Guide 2761 <u>15</u> 1
Exposure	NIOSH REL: Ca TWA	0.25 mg/m ³ [skin] See Appendix A	
Limits	OSHA PEL TWA 0.25	ma/m ³ [skin]	
		Conversion	an a
IDLH Ca [50 mg/m°] See: 605	<u>71</u> National Carlos and a second statistical statistical statistical statistical statistical statistical statistical s		en en particular de la construction de la construcción de la construcción de la construcción de la construcción
Physical Description Colorless to light-tan crystals wi	th a mild, chemical odor. [i	insecticide]	····
MW: 380.9	BP: Decomposes	MLT: 349°F	Sol: 0.02%
VP(77°F): 8 x 10-7 mmHg	IP: ?		Sp.Gr: 1.75
FI.P: NA	UEL: NA	LEL: NA	1 1 1
Noncombustible Solid			
Incompatibilities & Reac Strong oxidizers, active metals	tivities such as sodium, strong ac	ids, phenols	
Measurement Methods NIOSH <u>S283 (II-3)</u> See: <u>NMAM or OSHA Methods</u>			
Personal Protection & Sa Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contamin Change: Daily Provide: Eyewash, Quick drenc	anitation (<u>See protection</u> I/Daily nated h	n) First Aid (See proceed Eye: Irrigate immediatel Skin: Soap wash immed Breathing: Respiratory s Swallow: Medical attent	<u>tures)</u> ly diately support lion immediately
Respirator Recommenda At concentrations above the I (APF = 10,000) Any self-contain pressure mode (APF = 10,000) Any supplied-ai mode in combination with an au Escape: (APF = 50) Any air-purifying, ful an N100, R100, or P100 filter. O breathing apparatus Important additional information	Ations NIOSH NIOSH REL, or where the ned breathing apparatus the ir respirator that has a full t ixiliary self-contained posit Il-facepiece respirator (gas Click here for information o a about respirator selection	ere is no REL, at any detectable c nat has a full facepiece and is opera facepiece and is operated in a press tive-pressure breathing apparatus mask) with a chin-style, front- or ba on selection of N, R, or P filters./Any	oncentration: ted in a pressure-demand or other positive- sure-demand or other positive-pressure ack-mounted organic vapor canister having appropriate escape-type, self-contained
Exposure Routes inhalation	n, skin absorption, ingestio	on, skin and/or eye contact	

,

Symptoms Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage	, tonic
Target Organs central nervous system, liver, kidneys, skin	
Cancer Site [in animals: lung, liver, thyroid & adrenal gland tumors] See also: INTRODUCTION See ICSC CARD: 0787 See MEDICAL TESTS: 0077	





Health Fire	1 3
Reactivity	2
Personal Protection	E

Material Safety Data Sheet Magnesium MSDS

Section 1: Chemical Product and Company Identification		
Product Name: Magnesium	Contact Information:	
Catalog Codes: SLM4408, SLM2263, SLM3637	Sciencelab.com, Inc. 14025 Smith Rd.	
CAS#: 7439-95-4	Houston, Texas 77396	
RTECS: OM2100000	US Sales: 1-800-901-7247 International Sales: 1-281-441-4400	
TSCA: TSCA 8(b) inventory: Magnesium	Order Online: ScienceLab.com	
CI#: Not applicable.	CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300	
Synonym: Magnesium ribbons, turnings or sticks		
Chemical Name: Magnesium	International CHEWIREC, Call: 1-703-327-3007	
Chemical Formula: Mg	For non-emergency assistance, call: 1-281-441-4400	

Section 2: Composition and Information on Ingredients			
Composition:			
Name	CAS #	% by Weight	
Magnesium	7439-95-4	100	

Toxicological Data on Ingredients: Magnesium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at

least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data	
Flammability of the Product: Flammable.	
Auto-Ignition Temperature: Not available.	
Flash Points: Not available.	
Flammable Limits: Not available.	
Products of Combustion: Some metallic oxides.	
Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat. Flammable in presence of acids, of moisture. Non-flammable in presence of shocks.	
Explosion Hazards in Presence of Various Substances: Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of acids, of moisture.	
Fire Fighting Media and Instructions:	

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:

Magnesium turnings, chips or granules, ribbons, are flammable. They can be easily ignited. They may reignite after fire is extinguished. Produces flammable gases on contact with water and acid. May ignite on contact with water or moist air.

Magnesium fires do not flare up violently unless moisture is present.

Special Remarks on Explosion Hazards: Reacts with acids and water to form hydrogen gas with is highly flammable and eplosive

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid.

Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage:

Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Moisture sensitive. Dangerous when wet.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 24.31 g/mole

Color: Silver-white

pH (1% soln/water): Not applicable.

Boiling Point: 1100°C (2012°F)

Melting Point: 651°C (1203.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.74 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Very slightly soluble in hot water. Insoluble in cold water. Insoluble in chromium trioxides, and mineral acids, alkalies. Slightly soluble with decomposition in hot water. Soluble in concentrated hydrogen fluoride, and ammonium salts.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, incompatible materials, water or moisture, moist air.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Violent chemical reaction with oxidizing agents.

Reacts with water to create hydrogen gas and heat. Must be kept dry.

Reacts with acids to form hydrogen gas which is highly flammable and explosive. Magnesium forms hazardous or explosive mixtures with aluminum and potassium perchlorate; ammonium nitrate; barium nitrate, barium dioxide and zinc; beryllium oxide; boron phosphodiiodide; bromobenzyl trifluoride; cadmium cyanide; cadmium oxide; calcium carbide; carbonates; carbon tetrachloride; chlorine; chlorine trifluoride; chloroform; cobalt cyanide; copper cyanide; copper sulfate(anhydrous), ammonium nitrate, potassium chlorate and water; cupric oxide; cupric sulfate; fluorine; gold cyanide; hydrogen and calcium carbonate; hydrogen iodide; hydrogen peroxide; iodine; lead cyanide; mercuric oxide; mercury cyanide; methyl chloride; molybdenum trioxide; nickel cyanide; nitric acid; nitrogen dioxide; oxygen (liquid); performic acid; phosphates; potassium chlorate; potassium perchlorate; silver nitrate; silver oxide; sodium perchlorate; sodium peroxide; sodium peroxide and carbon dioxide; stannic oxide; sulfates; trichloroethylene; zinc cyanide; zinc oxide.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: May cause skin irritation by mechanical action. May get mechanical injury or embedding of chips/particles in skin. The particles that are embedded in the wounds may retard healing.

Eyes: May cause eye irritation by mechanical action. Mechanical injury may occur. Particles or chips may embed in eye and retard healing.

Inhalation: Low hazard for usual industrial handling. It may cause respiratory tract irritation. However, it is unlikely due to physical form. When Magnesium metal is heated during welding or smelting process, Metal Fume Fever may result from inhalation of magnesium fumes. Metal Fume Fever is a flu-like condition consisting of fever, chills, sweating, aches, pains, cough, weakness, headache, nausea, vomiting, and breathing difficulty. Other symptoms may include metallic taste, increased white blood cell count. There is no permanent ill-effect. Ingestion: Low hazard for usual industrial handling. There are no known reports of serious industrial poisonings with Magnesium. Ingeston of large amounts of chips, turnings or ribbons may cause gastrointestinal tract irritation with nausea, vomiting, and diarrhea. Acute ingestion may also result in Hypermagnesia. Hypermagnesia may cause hypotension, bradycardia, CNS depression, respiratory depression, and impairment of neuromuscular transmission (hyporeflexia, paralysis).

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Magnesium UNNA: 1869 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Magnesium Rhode Island RTK hazardous substances: Magnesium Pennsylvania RTK: Magnesium Massachusetts RTK: Magnesium Massachusetts spill list: Magnesium New Jersey: Magnesium TSCA 8(b) inventory: Magnesium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-4: Flammable solid. CLASS B-6: Reactive and very flammable material.

DSCL (EEC): R11- Highly flammable. R15- Contact with water liberates extremely flammable gases. S7/8- Keep container tightly closed and dry. S43- In case of fire, use dry chemical. Never use water.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 3

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 1

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 06:00 PM

Last Updated: 10/09/2005 06:00 PM

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MATERIAL SAFETY DATA SHEET

221 Rochester Street Avon, New York 14414-9409 (585) 226-6177 CORPORATION ALDON

BB0003 May 19, 2005 MSDS No.: Effective Date:

SECTIO	I NO	NAME 24	HOUR EME	RGENCY	ASSIST	ANCI	ш
roduct	Barium		CH CH	EMTREC			
homical ynonyms	Barium Metal			-424-9300 585-226-6177	Health Fire	- 6	
ormula	Ba		NFPA		Reactivity	5	
Jnit Size	up to 2.5 Kg.		HAZARD RATING		SIMH		
.A.S. No.	7440-39-3		MINIMAL SLIGHT	MODERATE S	3 3 3	4	
SECTIO	II NO	INGREDIENTS OF MI	XTURES				
nincipal (Component(s)		%	T	LV Units		
Bari	ium metal		100%	s	ee Section	۲.	

	:	:					
DAN	GERI FLAMM	ABLE SOLIDI DANGE	ROUS WHEN	u WET.			
AVO	ID CONTACT \	WITH SKIN AND EYES.					
SECTION	N III	PHYSICAL	DATA				
Melting Poin	t (°F)	850°C (1562°F)		Specific Gravity ($H_2O =$	1	3.74	
Boiling Point	(°F)	1695°C (3085°F)		Percent Volatile by Volume (%)		N/A	
Vapor Press	ure (mm Hg)	N/A		Evaporation Rate (=1)		٨A	
Vapor Densi	ty (Air=1)	N/A					
Solubility in \	Water	React violently with w	ater, liberate:	s highly flammable	gases.		
Appearance	& Odor	Silver or gray, slightly	lustrous, sor	newhat malleable r	netal; no c	dor.	
SECTIO	2 N	FIRE AND	EXPLOS	ION HAZARI	DAT/	4	
Flash Point (Method Used)	Flamma	able solid.	Flammable Lit % by Volumo	nits in Air N/A	Lowe	а 	ba
Extinuitshor							

SECTIO	N IV FIRE AND	Î	2	osior	N HAZAR	DA DA	ΠA	
Flash Point		Ш	mmab	ie Lìmits li	n Air	-	OWOL	
(Mothod Usod).	Fiammable solid.	%	by Vo	lumo	N/A			
Extinguishor	· · · · · · · · · · · · · · · · · · ·							

owder, graphite, soda ash. Do NOT use water or carbon dioxide type extinguisher.	
Dry sand, p	
Media	

IREFIGHTING	RES
SPECIAL F	PROCEDU

In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective clothing. Do NOT use water to extinguish fires.

(1996 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.7, GUIDE PAGE NO. 138)

EXPLOSION HAZARDS UNUSUAL FIRE AND

Do NOT use water. Reaction with water produces explosive hydrogen gas and enough heat to ignite gas/air mixture plus toxic, corrosive Barium hydroxide solution.

Water reactive solid, n.o.s., (Barium metal), 4.3, UN2813, PG II D.O.T. Water reactive solid, n.o.s., (Barium metal), 4.3 Approved by U.S. Dopartment of Labor "essentially similar" to form OSHA-20

SECTION V	HEALTH HAZARD DATA	BB0003
Threshold Limited Value	Barium and soluble compounds, as Ba ACGIH 2001: T RTECS No. CQ8370000	WA = 0.5 mg/m ³ .
Effects of Overexposure		
	Caustic burns on skin, eyes and mucous membranes, c blindness may result. Moderately toxic via oral exposur	omeal damage and e route. Target

organs: Central nervous system, kidneys.

First Aid Procedures Emergency and

irst Aid Procedures INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person. EVES: Check for and remove contact lenses. Do NOT flush with water. Carefully remove particles with cotton-tipped applicator. Get immediate medical attention. SKIN: Remove contarninated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult,

give oxygen. Ge	et medical	attention.			
SECTION V	1	RE	EACTIVITY DA	ГA	
Stability Un	stable		Conditions to Av	void	Excessive temperature, heat,
S S	table	×			ignition source, water.
Incompatibili (Materials to	ty Avoid)	Water,	acids, oxidizing agent:	s, chlorinated :	and fluorinated hydrocarbons such as CCI_4 .
Hazardous Decompositic	on Prod	lucts	Hydrogen (expio	síve), barium I	nydroxide solution (caustic/toxic).
Hazardous Pol	ymerizat	tion	Conditions to A	void	
May Occur	Mil No	ot Occur			Not applicable.
	Î	×			
SECTION V	11	S	PILL OR LEAK	PROCED	URES
Steps to be t material is re	aken in leased	case or spille	d Recover for airtight conta	use if not con ainer under pa	taminated. Collect and pack in dry, traffin oil, if possible. Do not sweep up and Do not allow material to
			contaminate contaminate corrosive ba	water source	s or sewers, reaction with water forms
Waste Dîspo:	sal Met	hod Disc	charge, treatment, or dispose disposed guidelines are	osal may be sub intended for th	ject to Foderal, State or Local laws. e disposal of catalog-size quantities only.
This material is EPA (RCRA) pe	a hazardo ermitted di	us waste (a sposer or at	is per RCRA) because n EPA (RCRA) permitt	of its reactivitied disposal fa	 Disposal should be conducted by an icility.
SECTION V	/111.	SI	PECIAL PROTE	ECTION II	NFORMATION
Respiration Protec (Specify Type)	tion 7 C	lone needer ood or wear	d in normal laboratory	handling. If d roved dust ma	usty conditions prevail, work in ventilation isk or respirator.
Ventiletion	Local Ex	chaust	Recommended	Special	No.
Venuation	Mechani	cal (General)	Recommended	Other	No.
Protective GI	oves	٣.	ubber.	Eye Prote	ction Chemical safety goggles.
Other Protective Equipment	Lat	o coat, apror	η, eye wash station, pr	oper gloves, v	rentilation hood.
SECTION	×	ิด	PECIAL PREC/	AUTIONS	
Precautions to in Handling & S Keep container tightly close	be Taker toring ed when not in	8 ਡੇਲ	ore in dry area, away f gon or paraffin oil in al intainer dry.	rom heat and rtight containe	other sources of ignition. Store under r. Protect from moisture and air. Keep
Other Precautic	DIS Read	label on cantaine boratory use anly	r before using. Do not wear cont . Not for drug, food or household	act lenses when wor I use. Koop out of r	king with chemicals. sech of children.
	Avo	ld contact w sh contamin:	/ith skin, eyes and clot ated ciothing.	hing. Wash ti	roroughly after handling. Remove and

Revision No. 7 Date 05/13/05 Approved Michael Raszeja Company MR The information contained herein is familied withing a work Kind. Employent should use this information only as a supplement to other information pathmend by them and must make independent detormizations of autizability and completeness of information non-all sources to assure poper use of these meterials and the stelly and hustin of employees. Huzardous futurential Standards, Pritted on resplate paper.

<u>imbers Appendices Se</u>	earch
CAS 50-29-3	ana ang ang ang ang ang ang ang ang ang
RTECS KJ332	<u>25000</u>
DOT ID & Gu 2761 151	ıide
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naanta tareera eta konstruitziako irrenanta erriteko hirri	a daga ya sa
Sol: Insoluble	
Sp.Gr: 0.99	···
	an tha tha an
<u>s)</u> port immediately	·
entration: in a pressure-demand o -demand or other positi	or other positiv
entration: in a pressure-de -demand or othe mounted organi propriate escape	emand o er posit c vapor -type, s

Symptoms Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of

discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinoge	n]
Target Organs Eyes, skin, central nervous system, kidneys, liver, peripheral nervous system	ł
Cancer Site [in animals: liver, lung & lymphatic tumors] See also: INTRODUCTION See ICSC CARD: 0034 See MEDICAL TESTS: 0065	i posto de la constante de la c

ROBERT NIOSH	Iome NIOSH Tonics Site Inde	x Databases and Information Re	esources NIOSH Products Contact Us
IIOSH Publication No. 200	5-149:		September 200
NIOSH Pock	tet Guide to C	hemical Haza	ards
NPG Home Introduction Sy	nonyms & Trade Names Chemi	cal Names CAS Numbers RTE	CS Numbers Appendices Search
Lead			CAS 7439-92-1
Pb	····· · · · · · · · · · · · · · · · ·		RTECS <u>OF7525000</u>
Synonyms & Trade Na Lead metal, Plumbum	ames		DOT ID & Guide
Exposure Limits	NIOSH REL*: TWA 0.050 compounds (as Pb) see) mg/m ³ <u>See Appendix</u> C [*Note a Appendix C.]	: The REL also applies to other lead
	OSHA PEL*: [1910.1025] lead compounds (as Pb)	TWA 0.050 mg/m ³ See Appen see Appendix C.]	dix C [*Note: The PEL also applies to other
DLH 100 mg/m ³ (as Pb) S	See: 7439921 Convers	sion	en e
Physical Description A heavy, ductile, soft, gray s	solid.		
MW: 207.2	BP: 3164°F	MLT: 621°F	Sol: Insoluble
/P: 0 mmHg (approx)	IP: NA	······	Sp.Gr: 11.34
FI.P: NA	UEL: NA	LEL: NA	
voncombustible Solid in bul	k form.		
Incompatibilities & Re Strong oxidizers, hydrogen	activities peroxide, acids		ang sa
Measurement Method NIOSH 7082, 7105, 7300, 7 See: NMAM or OSHA Metho	s 301, 7303, 7700, 7701, 7702, 9 [.] ods	100, 9102, <u>9105;</u> OSHA ID121,	ID125G, ID206
Personal Protection & Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or conta Change: Daily	Sanitation (See protection)	First Aid (See proce Eye: Irrigate immediat Skin: Soap flush prom Breathing: Respiratory Swallow: Medical atten	adures) ely ptly / support ntion immediately
Respirator Recommer Up to 0.5 mg/m ³ : (APF = 10) Any air-purifying quarter-mask respirators. Cl (APF = 10) Any supplied-air Up to 1.25 mg/m ³ : (APF = 25) Any supplied-air (APF = 25) Any powered, ai Up to 2.5 mg/m ³ : (APF = 50) Any air-purifying or P filters.	ndations (See Appendix E) NI respirator with an N100, R100, ic <u>k here</u> for information on selec respirator respirator operated in a continu r-purifying respirator with a high- , full-facepiece respirator with ar	OSH/OSHA or P100 filter (including N100, F tion of N, R, or P filters. ous-flow mode efficiency particulate filter n N100, R100, or P100 filter. <u>Cli</u>	R100, and P100 filtering facepieces) except ck here for information on selection of N, R,

(APF = 50) Any self-contained breathing apparatus with a full facepiece (APF = 50) Any supplied-air respirator with a full facepiece Up to 50 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode Up to 100 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positivepressure mode (APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter. Click here for information on selection of N, R, or P filters./Any appropriate escape-type, self-contained breathing apparatus Important additional information about respirator selection Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension Target Organs Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue See also: INTRODUCTION See ICSC CARD: 0052 See MEDICAL TESTS: 0127

APPENDIX G

Vapor Barrier Specifications



Stego® Wrap Vapor Barrier

STEGO INDUSTRIES, LLC



Vapor Retarders 07260, 03300

Stego Wrap Vapor Barrier

🙆 Manufacturer

Stego Industries, LLC 216 Avenida Fabricante, Suite 101 San Clemente, CA 92672 Sales, Technical Assistance Ph: (877) 464-7834 Fx: (949) 257-4113 www.stegoindustries.com

I Product Description

USES: Stego Wrap is used as a true below-slab vapor barrier, and as a protection course for below grade waterproofing applications.

COMPOSITION: Stego Wrap Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.

SIZE: Stego Wrap Vapor Barrier comes in rolls 14' x 140' or 1,960 ft² WEIGHT: Stego Wrap rolls weigh approximately 141 lb.

🖪 Technical Data

APPLICABLE STANDARDS

American Society for Testing & Materials (ASTM)

- ASTM E 1745 Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
- ASTM D 882 Test Methods for Tensile Properties of Thin Plastic Sheeting
- ASTM D 1709 Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method
- ASTM E 96 Test Methods for Water Vapor Transmission of Materials
- ASTM E 154 Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover

- ASTM E 631 Terminology of Building Constructions
- ASTM F 1249 Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor
- ASTM E 1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

American Concrete Institute(ACI)

 ACI 302.1R-96 Minimum Thickness (10-mils)

ENVIRONMENTAL FACTORS

Stego Wrap Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

🔄 Installation

UNDERSLAB: Unroll Stego Wrap Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of 6" and tape using Stego Tape. All penetrations must be sealed using a combination of Stego Wrap, Stego Tape and/or Stego Mastic.

VERTICAL WALL: Install Stego Wrap Vapor Barrier over the waterproofing membrane while still tacky. Mechanically fasten Stego Wrap to the wall at the top with termination bar and concrete nails. Drape Stego Wrap down across the footer and under the french drain.

🐼 Availability & Cost

Stego Wrap Vapor Barrier is available nationally via building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' sales department.

🛛 Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. No warranty, express or implied, is given as to the merchantability, fitness for a particular purpose, or otherwise with respect to the products referred to.

Maintenance None required.

🖸 Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website: www.stegoindustries.com

Filing Systems

- Stego Industries' website
- Buildsite
- MasterSpec
- SpecSource

Property & Test	Stego Wrap Vapor Barrie
Underslab Vapor Retarders, ASTM E 1745 Class A	Exceeds
Water Vapor Permeance, ASTM F 1249	0.0084 perms (*0.0035 WVTR)
Tensile Strength, ASTM D 882	79.6 lbf./in.
Puncture Resistance, ASTM D 1709	2326 grams
Chemical Resistance, ASTM E 154	Unaffected
Life Expectancy, ASTM E 154	Indefinite
Thickness	15 mils

Note: perm unit = grains/(ft2 *hr* in.Hg) * WVTR water vapor transmission rate

