February 7, 2013

REVISED
REMEDIAL INVESTIGATION WORK PLAN

Former Paragon Paint and Varnish Company Manufacturing Facility
BCP Site Number C241108
5-43 to 5-49 46th Avenue and
45-38 Vernon Boulevard to
45-40 Vernon Boulevard
Long Island City, New York

Prepared for

VERNON 4540 REALTY, LLC
45 Carleon Avenue
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ROUX ASSOCIATES, INC.
Environmental Consulting & Management

ROUX

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CERTIFICATION

I, Joseph D. Duminuco, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Joseph Dum

February 7, 2013

1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates), on behalf of Vernon 4540 Realty, LLC (Volunteer), has prepared this Remedial Investigation (RI) Work Plan for the property identified as the former Paragon Paint and Varnish Company manufacturing facility located at 5-43 to 5-49 46th Avenue and 45-38 Vernon Boulevard to 45-40 Vernon Boulevard (Tax Block 26, Lot 4) in Long Island City, New York (Site) (Figure 1.). The Site was accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) in September 2008 (Site Number: C241108). The Site is an approximately 0.76 acre lot that consists of four buildings and was utilized for industrial purposes for over 100 years, primarily as a paint manufacturing facility.

The RI has been developed in accordance with the draft BCP Guide (May 2004) and the DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) issued by NYSDEC. The purpose of the RI is to determine the nature and extent of contamination at the Site, characterize environmental media at the Site, qualitatively assess the potential exposure of receptors to Site contaminants, and develop any other additional data necessary to support the development of a Remedial Action Work Plan (RAWP).

1.1 RI Work Plan Document Organization

This RI Work Plan contains a background section (Section 2) describing the Site, Site history, and results of previous environmental investigations; a section defining the objectives and scope of the RI (Section 3); and Sections 4 and 5 that describe various project operations plans (e.g., Quality Assurance/Quality Control, Health and Safety). Reporting requirements and the project schedule are discussed in Section 6. Additionally, tables are provided that summarize all previously collected environmental quality data. Finally, maps are also provided to illustrate Site conditions, previous environmental data, and locations of proposed sampling efforts.

1.2 Project Team Contact Information

Roux Associates' Project Manager and Principal-In-Charge for this Site will be Joseph D. Duminuco, Principal Hydrogeologist. Mr. Duminuco, who is based in Roux Associates' Islandia, New York headquarters office and can be reached at (631) 232-2600, will be responsible for day-to-day management of the project, including preparation of work plans, and scoping and directing field activities. Richard Maxwell, Project Geologist will act as Field Manager for the duration of the project, and will be responsible for implementing and directing field activities onsite.

The name and contact information for the principal Volunteer is as follows:

Mr. Brent L. Carrier
Vernon 4540 Realty, LLC
45 Carleon Avenue
Larchmont, New York 10538

Mr. Richard Wissak
Vernon 4540 Realty, LLC
45-16 Vernon Boulevard
Long Island City, New York 11101

The contact information for the other Volunteers is as follows:

Angela Krevy
Anable Beach, Inc.
375 South End Avenue, 6S
New York, New York 10280

Donald Rattner
549 46th Avenue LLC
94 Joralemon Street, Apartment 3
Brooklyn, New York 11201

Accutest Laboratories of Dayton, New Jersey has been selected to provide analytical services for this project. At this time subcontractors for drilling, waste disposal and other subcontracted services have not yet been selected. This information will be provided to NYSDEC immediately following contractor selection.

2.0 BACKGROUND

This section provides pertinent background information, including a description of the Site and its setting, the known history of the Site, and the results of previous environmental investigations conducted at the Site.

2.1 Site Description and Setting

Property Location	
Property Name:	Former Paragon Paint and Varnish Company Manufacturing Facility
Property Street Address:	5-43 to 5-49 46th Avenue & 45-38 Vernon Boulevard to 45-40 Vernon Boulevard
Property Town, County, State:	Long Island City, Queens County, New York
Property Tax Identification:	Block 26, Lot 4
Property Topographic Quadrangle:	Brooklyn, New York
Nearest Intersection:	46th Avenue and Vernon Boulevard
Area Description:	Residential, commercial and some light industrial

A Site location map is included as Figure 1.

Property Information	
Property Acreage:	0.76-acres
Property Shape:	Irregular
Property Use:	Currently inactive former paint and varnish manufacturing facility.
Number of Buildings:	Four (paint factory, warehouse, garage, and shed).
Number of Stories:	Paint factory: four stories, Warehouse and garage: three stories, shed: one story
Date of Construction:	The buildings were reportedly constructed between 1923 and 1947.
Building Square Footage:	Approximately 69,000 square feet.
Basement/Slab-on-Grade:	The warehouse is underlain by a basement; all other buildings are slab-on grade.

Property Information	
Ceiling Finishes:	Predominately bare with exposed structural elements. Former office areas have drywall with peeling paint.
Floor Finishes:	Carpet, bare concrete, and vinyl tiles
Wall Finishes:	Concrete (manufacturing areas have peeling paint), brick, painted drywall (mostly with peeling paint) and exposed structural elements.
HVAC:	Unknown
Renovation Date:	Undetermined
Renovation Description:	Undetermined
Vehicular Access:	Via 46th Avenue
Other Improvements:	Paved access road off 46th Avenue and a rear courtyard that fronts approximately 60-feet of Anable Basin.
Property Coverage:	Footprints of the subject buildings, and associated courtyard.

The Site is located at 5-43 46th Avenue to 5-49 46th Avenue and 45-38 Vernon Boulevard to 45-40 Vernon Boulevard in Long Island City, New York. The New York City Tax Map identified the Site as Block 26, Lot Number 4. The Site consists of an approximately 33,150-square foot lot improved by one four story former paint factory building, one three story former garage and office, one three story former warehouse, one 1-story shed and a concrete paved access road off 46th Avenue and a rear courtyard that fronts approximately 60 feet of Anable Basin. The buildings were reportedly constructed between 1923 and 1947. A Site Plan is included as Figure 2.

The gross square footage of the on-Site buildings is approximately 69,500 square feet. Floors two through four of the former paint factory building contain the bulk of the paint and varnish manufacturing equipment and bulk liquid mixing tanks including multiple (53) ASTs and a significant amount of piping that still may contain unknown liquids or residues. The one story shed which is attached to the four story former paint factory building, contains a boiler room and a historical varnish cooking pot room that is currently empty. Seven underground varnish cooking pots in addition to two underground storage tanks (USTs) are reported to be located beneath the concrete slab of the shed. The three-story building known as the garage contains offices, a former small paint laboratory and storage space. Nine USTs are reported to be located beneath the concrete slab of the garage. The three-story building known as the warehouse stored raw materials and paint products. Currently, most of that building is empty.

The courtyard is concrete paved and is reported to contain nine USTs. Vehicular access is provided by a concrete paved access road off 46th Avenue, which is reported to contain two USTs.

2.1.1 Property Operations

The site property is currently unoccupied. The Paragon Paint and Varnish Company reportedly ceased operations at the Site in 1998.

2.1.2 Utilities

The following companies and municipalities currently provide utility services to the Site:

Utility	Provider
Electricity:	Consolidated Edison Company of New York
Natural Gas:	National Grid
Sanitary Sewerage:	New York City Department of Environmental Protection (NYCDEP)
Potable Water:	NYCDEP
Solid Waste Removal:	Undetermined

A sump is located in the basement of the warehouse which contains a portable pump attached to a garden hose. Floor drains are located in each of the buildings and appear to connect to the downspout for the roof drains which discharge into the courtyard.

2.1.3 Underground Storage Tanks

There are 29 USTs reported to exist at the property, and there may be additional unknown/unreported USTs. Size, location, and contents (if known) are as follows:

Location	Number of USTs - Capacity (gallons)	Product
Driveway	2 – 550	Unknown
Courtyard	1 – 10,000	Unknown
Courtyard	7 – 20,000	Unknown
Courtyard	1 – 1,200	Unknown
Interior garage	1 – 20,000	Unknown
Interior garage	1 – 550	Unknown
Interior garage	7 – Unknown	Unknown
Interior shed	1 – 1,200	Unknown
Interior shed	1 – 2,000	Unknown
Interior shed	7 – Unknown	Unknown (Varnish cooking pots)

2.1.4 Topography/Hydrogeology

The grade at the Site is generally level with a gentle slope to the northwest towards Anable Basin. The elevation of the Site is approximately seven (7) feet above mean sea level, as shown in the USGS 7.5 Minute Series Topographic Map – Brooklyn Quadrangle (Figure 1). The slope in the surrounding area appears to dip slightly westerly towards the East River located approximately 0.2 miles to the west.

2.1.5 Wetland Areas and Surface Water Bodies

The Site is located adjacent to Anable Basin.

The nearest surface water body is Anable Basin, which is located Adjacent to the northern border of the Site. Anable Basin is approximately 1,000 feet long and intercepts the East River at approximately 0.2 miles to the west. The Site is located within the 100-year flood zone.

2.1.6 Soils

The unconsolidated overburden consists of an unsorted heterogeneous mix of Pleistocene and Recent glacial material (i.e., glacial till) including, silt, sands, and gravel. An intermittent Peat layer was observed at approximately 10 feet below land surface (bls). This overburden is overlain with approximately 10-feet of historic urban fill used to reclaim land from the East River.

2.1.7 Underlying Formation

The geology in the area of the Site consists of Cambrian-Ordovician granitic rock of the Ravenswood Granodiorite Formation (Baskerville, 1994). Approximate depth to bedrock based on borings completed at the Site is 12 to 28 feet bls.

2.1.8 Groundwater

Groundwater is present at approximately 6 to 10 feet bls and, based on the proximity of Anable Basin, potentially subject to tidal fluctuations. Groundwater at the Site is assumed to flow in a generally northwesterly direction towards Anable Basin, regional groundwater is assumed to flow in a westerly direction towards the East River. Groundwater flow direction may also be influenced by local dewatering projects, utilities, building foundations and other subsurface variations in geology.

2.1.9 Neighboring Properties

Review of neighboring properties from the Site and from public thoroughfares, and research of available information regarding the neighboring properties, were performed to identify evidence of environmental concern that could adversely impact the Site. The Site is located in a commercial, residential, and light industrial area of Long Island City, New York.

Direction	Operations
North	Anable Basin and a one story commercial building.
South	46th Avenue, beyond which is an auto repair shop and a light industrial building.
East	East of the garage (south of the paint factory building) is a residential building, a veterinary clinic and a bar. East of the paint factory building is Vernon Boulevard, beyond which is a parking lot utilized by Blood Centers of New York.

Direction	Operations
West	Two-story warehouse.

2.2 Site History

According to available resources, the earliest noted development at the Site, as indicated on an 1898 historical Sanborn fire insurance map, consists of a one to three-story building identified as the Ward and Companies Lard Oil Works building. The current day four-story former paint factory building was originally constructed in 1923. By 1936, the Site, partially occupied by Paragon, consisted of the paint factory building, the shed, and the warehouse building identified as "Chalk Products Company". The 1947 historical Sanborn shows the Site much as it exists today and wholly occupied by Paragon. Paragon owned and operated the Site as a paint manufacturing facility until 1998. Since then the Site has been unutilized.

2.3 Results of Previous Environmental Investigations and Interim Remedial Measures

The following sections provide an overview of previous environmental investigations at the Site. Previous investigations have been performed by TRC Engineers, Inc. (TRC), AKRF, Inc. (AKRF), and EnviroTrac Ltd., (EnviroTrac). and Apex Companies, LLC (Apex).

2.3.1 Phase I Environmental Site Assessment

In September 2005, TRC Engineers, Inc. (TRC) prepared a Phase I Environmental Site Assessment (ESA) titled "Phase I Environmental Site Assessment; 541-549 46th Avenue, 199-205 Vernon Boulevard; Paragon Paint Company; Long Island City, New York" (TRC, 2005). The Phase I ESA was prepared for 94 Joralemon Street in Brooklyn New York 11201. The findings of the Phase I ESA, as presented by TRC, are summarized below:

- The Site has been used for industrial purposes for over 100 years, primarily as a paint manufacturing company. The process used to manufacture paint included the use and storage of petroleum and solvents which given the age and length of operation at the facility it is likely that there have been releases to soil and groundwater. Geotechnical borings conducted in 1975 indicated that there is petroleum contamination located in the courtyard from five feet bls to 10 feet bls. This contamination is located just above the water table that is approximately 10 feet bls.

- There are 24 known USTs at the Site (the number of known USTs has since been revised to 29 and there may be additional unknown/unreported USTs) with approximately

95,000 gallons of capacity. There are 53 known above grade storage tanks (ASTs) that are primarily empty onsite. The contents of these tanks could have included mineral spirits, Stoddard solvents, number 2 fuel oil, kerosene, varnoline, linseed oil, fish oil, alkyd resin in mineral spirits, cycled mineral spirits, "direr" and propylene glycol.

- There are approximately 400 drums located on the Site that are primarily empty (since removed). Two drums appeared to be in poor condition and possibly leaking petroleum or resin.
- A former gasoline station with petroleum-contaminated soil is located east of the Site across Vernon Boulevard. The former gasoline station is located in the presumed upgradient direction in terms of groundwater flow and gasoline releases have the potential to impact groundwater beneath the Site.

2.3.2 Subsurface Investigation Report

AKRF conducted a subsurface investigation at the Site in 2006 on behalf of 549 46th Ave LLC. The results of the subsurface investigation are summarized in a report prepared by AKRF titled "Subsurface Investigation Report; Paragon Paint Company; 549 46th Avenue; Long Island City, New York" dated June 2006 (AKRF, 2006). AKRF's subsurface investigation included the advancement of five soil borings, which were retrofitted with groundwater monitoring wells (MW-1 through MW-5) and the collection of soil, and groundwater samples for laboratory analysis. Boring and monitoring well locations are depicted on Figure 3. Available soil and groundwater analytical data is summarized on Tables 1 through 8. Available monitoring well and soil boring logs are included in Appendix A. AKRF's conclusion of the investigation is as follows:

- Field observations and analytical data indicated that widespread hydrocarbon contamination exists in the shallow soil throughout the Site.
- Light non-aqueous phase liquid (LNAPL) was observed in two of the monitoring wells (MW-2 and MW-3).
- Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) were detected in soil samples collected in borings MW-1, MW-2, MW-3 and MW-4, several of these detections exceeded applicable NYSDEC Technical and Administrative Guidance Memo (TAGM) #4046 Recommended Soil Cleanup Objectives (RSCOs).
- Xylenes were detected in soil at boring MW-2 at concentrations that exceeded applicable NYSDEC TAGM #4046 RSCOs.
- 2-Butanone, or methyl ethyl ketone (MEK) was detected in soil at boring MW-4 at a concentration that exceeds its applicable NYSDEC TAGM #4046 RSCO.

- Napthalene and ethylbenzene were detected in a water sample at MW-4 at concentrations that exceed the NYSDEC Ambient Water Quality Values (AWQVs).
- Metals are present in soil and groundwater samples at concentrations that are consistent with naturally occurring metals in the area.

It should be noted that the laboratory did not prepare a Category B deliverable. Additionally, attempts by Roux Associates to have a Category B deliverable prepared were unsuccessful due to the age of the data; therefore, no conclusions can be made with regard to the analytical data's validity. Detection limits for the soil and groundwater analytical data appear to be within typically acceptable ranges. The case narrative included in the laboratory analytical report notes that all samples were analyzed without any apparent problems.

All of the five monitoring wells installed by AKRF in 2005 were constructed with 10 feet of well screen. Screen intervals typically range from seven or eight feet bls to 17 or 18 feet bls.

Exceedances of the Part 375 Unrestricted Use Standards[1] are as follows:

- Several PAHs and metals (lead and mercury) in MW-1 (10-11);
- Ethylbenzene, acetone, methylene chloride and xylenes in MW-2 (10-12);
- Acetone and methylene chloride in MW-3;
- Lead and mercury in MW-4 (11-12); and
- 2-butanone (MEK), methylene chloride, xylenes, and mercury in MW-4 (15-16).

Note that acetone and methylene chloride were both detected in the laboratory method blank. Exceedances of Part 375 Unrestricted Use Soil Standards and the ambient water-quality standards and guidance Values are presented on Plate 1.

2.3.3 Additional Subsurface Investigation Report

AKRF conducted an additional subsurface investigation at the Site in 2007 on behalf of 549 46th Ave LLC. The results of the additional subsurface investigation are summarized in a report prepared by AKRF titled "Subsurface Investigation Report; Paragon Paint Company;

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[1] Note that the Part 375 Unrestricted Use Standards are being used for comparison purposes only. Their inclusion herein does not suggest that they are an appropriate Site-specific remedial standard.

549-46th Avenue; Long Island City, New York" dated June 2007 (AKRF, 2007). AKRF's additional subsurface investigation included the advancement of eight soil borings which were retrofitted with groundwater monitoring wells (MW-6 through MW-13), the installation of three soil-vapor sampling points inside the paint factory, and the collection of soil, groundwater, and soil-vapor samples for laboratory analysis. Locations of all soil borings, monitoring wells and soil vapor points are depicted on Figure 3. Available analytical data for soil groundwater and soil vapor is summarized on Tables 1 through 9. Available monitoring well and soil boring logs are included in Appendix A. The findings of the additional subsurface investigation are as follows:

- Field observations and analytical data indicated that widespread hydrocarbon contamination exists throughout the Site, including areas beneath the paint factory and warehouse building. The degree of contamination was found to be more evident at the water table (5 to 7 feet below grade) in areas surrounding the underground storage tanks; whereas the degree of contamination was found to be more evident in deeper sediments (12 to 16 feet below grade) in borings further away from the USTs (i.e., MW-1, MW-6, and MW-9).

- LNAPL was observed in monitoring wells MW-1 (near Anable basin), MW-2 (driveway), MW-3 (sidewalk along 46th Avenue), MW-6 (beneath the historical varnish pot area in the northern end of shed), MW-8 (center of courtyard, next to USTs), MW-9 (southern end of the driveway), MW-12 (western property boundary), and MW-13 (western property boundary). The LNAPL was identified as primarily a petroleum-based paint thinner. A second LNAPL, identified as weathered fuel oil, was documented in the sample collected from monitoring well MW-3. Free-phase product samples were found to be less weathered in wells near the USTs and more weathered in wells further away. This suggests the USTs are the probable source for the free-phase product and weathering is occurring as the product disperses away from the source.

- Elevated concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) were detected in soil samples collected from borings MW-6 through MW-9, MW-12, and MW-13. Samples from these borings contained concentrations that exceeded the applicable NYSDEC TAGM #4046 RSCOs.

- There were no polychlorinated biphenyls (PCBs) or pesticides detected in the soil samples above the method detection limits.

- VOCs including isopropylbenzene and isopropyltoluene, which are used in the production of paint products including paint thinner, were detected in groundwater samples from MW-4 and MW-7 at concentrations that exceeded the NYSDEC AWQVs. Residual VOCs were detected in MW-11 at concentrations well below the AWQVs. VOCs were not detected in groundwater samples collected from monitoring wells MW-5 and MW-10.

- PAHs, a subset of SVOCs, were detected in groundwater collected from monitoring well MW-10 at concentrations that exceeded the NYSDEC AWQVs. Bis(2-ethylhexyl) phthalate was detected in monitoring well MW-4 at a concentration of 5 micrograms per liter (μg/L), which is below the AWQV. SVOCs were not detected in monitoring wells MW-5 and MW-7. Due to concentration of SVOCs in the groundwater sample from MW-7, the achievable detection limits for many of the SVOC compounds were above the NYSDEC AWQVs.

- Metals are present in soil and groundwater samples at concentrations that are generally representative of naturally occurring metals in the area or typical urban fill quality.

- Hydrocarbon, alcohol, and solvent-related compounds were detected in the sub-slab and indoor air samples at concentrations ranging from 1.09 micrograms per cubic meter (μg/m^3) to 92.4 μg/m^3. The hydrocarbon compounds included 1,2,4-trimethylbenzene, ethylbenzene, toluene, xylenes, propylene and methyl tert-butyl ether (MTBE), and ranged in concentrations from 2.68 μg/m^3 (1,2,4-trimethylbenzene) in SV-1 to 39.5 μg/m^3 (MTBE) in SV-2. The alcohol compounds included ethanol and isopropanol and were detected at concentrations ranging from 1.3 μg/m^3 (isopropanol) to 92.4 μg/m^3 (ethanol). The solvent-related compounds included 1,2,4-trichlorobenzene, ketones including 2-butanone (MEK) and acetone, methylene chloride, n-heptane, and tetrahydrofuran. These concentrations ranged from 2.34 μg/m^3 of n-heptane in SV-3 to 69.2 μg/m^3 of methylene chloride in SV-3 (SS). The detected concentrations in the sub-slab samples were generally higher than the corresponding ambient air samples, but overall the detections were consistent.

All of the eight monitoring wells installed were constructed with 10-feet of well screen with the exception of MW-9 which was constructed with 12-feet of screen. Additionally, all but two wells were intended to straddle the water table (typically from four feet bls to 14 feet bls); however, MW-11 and MW-12 were constructed with well screen intervals of 14.5 feet bls to 24.5 feet bls and 9.5 feet bls to 19.5 feet bls respectively. The soil boring and monitoring well construction logs are included in Appendix A.

It should be noted that as with the 2006 data, a Category B deliverable was not prepared by the laboratory and was not available; therefore, conclusions regarding the validity of the data cannot be made. Elevated detection limits are noted in soil and groundwater analytical samples for both VOCs and SVOCs. According to the narrative included in the laboratory report, the elevated detection limits are a result of sample dilution.

Exceedances of the Part 375 Unrestricted Use Standards[2] are noted as follows:

- VOCs in borings MW-6 (petroleum hydrocarbons), MW-7 (petroleum hydrocarbons), MW-8 (petroleum hydrocarbons and acetone), MW-9 (petroleum hydrocarbons and acetone), and MW-12 (acetone);
- Multiple PAHs at MW-10 and MW-12; and
- Metals at borings MW-6, MW-7, MW-10, and MW-11.

Exceedances of Part 375 Unrestricted Use Soil Standards and the ambient water-quality standards and guidance Values are presented on Plate 1.

2.3.4 Interim Remedial Measure Monthly Reports

On February 11, 2010, the NYSDEC approved a December 18, 2009, *Revised Interim Remedial Measure Work Plan* prepared by Apex for the Site. The December 18, 2009 Work Plan prescribed the use of vacuum extraction on a monthly basis to recover LNAPL, contaminated groundwater and soil vapor. Apex documented each extraction event in a monthly report (a total of six extraction events were completed by Apex). A gauging summary and IRM recovery summary is presented on Table 10.

A review of available monthly reports indicated one gauging and sampling event occurred in March 2010 followed by six vacuum extraction events which occurred on a monthly basis; the last reported event occurred in August 2010. Apex reported that in total 224 gallons of LNAPL were recovered during the extraction events. Vacuum extraction occurred only at the monitoring wells which exhibited LNAPL on the day of the event, which most often included monitoring wells: MW-6, MW-8, MW-9, MW-12, MW-13, and occasionally other wells. Thirty-five percent of the total LNAPL recovered (78 gallons) was recovered from monitoring well MW-8. Also of note, monitoring well MW-3, which typically contained less than one foot of LNAPL thickness, on the last vacuum extraction event, contained more than seven feet of LNAPL.

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[2] Note that the Part 375 Unrestricted Use Standards are being used for comparison purposes only. Their inclusion herein does not suggest that they are an appropriate Site-specific remedial standard

2.3.5 Offsite Soil Vapor Intrusion Investigation Report

EnviroTrac was retained by NYSDEC to conduct an offsite soil vapor intrusion investigation within four offsite buildings adjacent to the west, north and east Site boundaries. EnviroTrac collected sub-slab soil vapor samples and indoor air samples from within four offsite buildings. Additionally, two outdoor ambient air samples were collected to the west and southwest of the Site. Analytical data for soil vapor sampling is summarized on Table 9.

Laboratory analytical results include the following:

- Tetrachloroethene (PCE) was detected in all collected samples, with ranges in concentrations from 3.2 micrograms per cubic meter (µg/m^3) to 8.9 µg/m^3
- Carbon tetrachloride concentrations ranged from non-detect to 1.5 µg/m^3
- Trichloroethene (TCE) concentrations ranged from non-detect to 12 µg/m^3
- 1,1,1-Trichloroethane (1,1,1-TCA) was non-detect in all but one sample collected (Concentration for the one detection was 1.5 µg/m^3)

In the Summary and Conclusion Section of the Final Report, EnviroTrac noted that the New York State Department of Health (NYSDOH) evaluated the analytical data to determine if vapor mitigation is warranted within any of the sampled structures. In July of 2010 the NYSDOH determined that no additional soil vapor intrusion investigation was warranted at this time for those structures sampled.

2.4 Data Usability

Previous analytical data developed by AKRF was not evaluated by Roux Associates for data usability purposes for preparation of the RI Work Plan. Roux Associates attempted to have the data collected by AKRF validated; however, Category B deliverables were not prepared at the time of generation and were not available through the laboratory preventing validation. This RIWP includes provisions for replicating a portion of the AKRF data in order to provide validation, see Section 3.2.1 for details.

3.0 RI WORK PLAN OBJECTIVES, SCOPE AND RATIONALE

3.1 Objectives and Relationship to RAWP

Conceptual Site Model

The Site subsurface contamination is discussed in this section. The interior contamination will be addressed separately under a Resource Conservation and Recovery Act (RCRA) work plan and is not discussed in this RIWP.

Twenty nine USTs are known to exist at the Site (and there may be additional unknown/unreported USTs). The sizes of all the USTs are not known, however the known sizes range from 550 gallons to 20,000 gallons, with a total capacity of over 175,000 gallons. The majority of the USTs are believed to be steel construction. Based on the reported sizes and the shallow water table at the Site, some of the USTs may be in contact with groundwater. The majority of USTs beneath the buildings have conveyance pipes in concrete pipe trenches and there were no evidence of releases observed during a preliminary inspection. The conveyance pipes from the USTs in the courtyard are below grade and are not visible for inspection. The USTs and conveyance pipes handled liquid raw materials for the manufacture of paints and varnishes for decades. Based on past operational data, the liquids/residues may have included mineral spirits, Stoddard solvents, #2 fuel oil, kerosene, varnoline, linseed oil, fish oil, slay alkyd, xylenes and gasoline among others. The current contents of the USTs as well as the volume of contents are unknown for most of the USTs. No documentation has been found regarding UST integrity.

Historical soil and groundwater analytical data is summarized on Tables 1 through 8. Note that AKRF compared their analytical data to the then-applicable NYSDEC TAGM # 4046 RSCOs, Tables 1 through 8 are compared to NYSEDEC Part 375 Unrestricted and Restricted Residential Use Standards.

Previous investigations have documented the presence of the following environmental concerns:

- Light non-aqueous phase liquid (LNAPL) has been observed in multiple monitoring wells;
- Widespread hydrocarbon contamination exists in shallow soil throughout the Site;

- Exceedances of NYSDEC Part 375 Unrestricted Use Standards for various VOCs in soil samples collected at locations MW-2, MW-3, MW-4, MW-6, MW-7 MW-8 and MW-12;
- Exceedances of NYSDEC Part 375 Unrestricted Use Standards for various SVOCs in soil samples collected at locations MW-1, MW-10, and MW-12;
- Exceedances of NYSDEC Part 375 Unrestricted Use Standards for various metals in soil samples collected at locations MW-1, MW-4, MW-6, MW-7, MW-10 and MW-11;
- Exceedances of NYSDEC Ambient Water Quality Standards and Guidance Values of various VOCs in monitoring wells MW-4 and MW-7; and
- Hydrocarbon, alcohol, and solvent-related compounds have been detected in sub-slab and indoor air samples.

The entire Site is covered either by the concrete floor slabs of the buildings or the concrete courtyard. There was very little staining observed on the concrete indicating that surface spills or overfilling of the USTs were not significant sources of contamination. Therefore, releases from the USTs and/or outdoor underground conveyance pipes are the most likely source(s) of subsurface contamination.

Exposure to the Site contaminants is minimal. As stated above, the Site is currently vacant; the entire Site is covered by concrete so there is no exposure pathway to the subsurface contamination; groundwater beneath the Site is not used for potable service; the NYSDOH determined that no additional soil vapor intrusion investigation was warranted at this time for those structures sampled; and there is no evidence of discharges to the Anable Basin through the bulkhead. Future potential exposures will be mitigated by the following: repair/replacement of the existing deteriorated bulkhead along Anable Basin; removal/containment of the LNAPL; and the installation of vapor barrier/subslab depressurization system in existing buildings that will remain at the Site and in any new construction.

Based on the existing data base for the Site and known data gaps, the following objectives have been identified for the RI Work Plan:

- Perform an inventory of all USTs and their contents.
- Replicate and verify a portion of the data previously collected at the Site.
- Delineate and characterize LNAPL on Site.

- Complete the installation of a comprehensive groundwater monitoring well network.
- Further characterize and delineate the soil and groundwater quality at the Site.

Environmental data collected during the RI will be used to qualitatively assess the potential exposure of receptors to Site contaminants, both on- and off-site, in a Qualitative Exposure Assessment, and develop the information necessary to support the development of a RAWP.

3.2 RI Scope

The scope of the RI will entail replicating a portion of the historic data in order to provide verification and the collection of supplemental Site characterization data so that, together with the historic data including groundwater and soil sampling, the entire Site will be sufficiently characterized to support the development of the site-wide RAWP. To accomplish this, the RI will focus on the following:

- The delineation and characterization of the on-site LNAPL.
- The collection of Site characterization data for the entire Site.
- The collection of groundwater data for the entire Site.
- The performance of a qualitative exposure assessment to identify exposure pathways on- and off- Site (with the exception of offsite soil vapor, see Section 2.3.5), and evaluate contaminant fate and transport.

The RI will investigate the nature and extent of the LNAPL beneath the Site to expedite design of an LNAPL recovery system. An inventory of USTs located at the Site will also be conducted concurrently with the LNAPL investigation. Following characterization of the nature and extent of the LNAPL, a comprehensive Site-wide investigation of both soil and groundwater quality will proceed. The scope of each component of the RI is discussed in the following subsections. Detailed field sampling procedures are provided in the Field Sampling Plan (FSP), Appendix B. The locations of all proposed monitoring wells and soil borings are depicted on Figure 3. All sampling locations will be surveyed. Rationale for each proposed monitoring well/soil boring location as well as proposed analytical parameters for each location is provided on Table 11. The minimum reporting limits to be achieved for each proposed analytical parameter is listed on Table 12.

3.2.1 Replicating and Verifying Previous Data

As noted in Section 2.4, the data collected previously at the Site has not been validated. The historic data consists of a significant dataset that would require considerable effort to replicate in its entirety. In order to provide data verification, as a first step in performing the RI, a portion of the data will be replicated. Should analytical results of the replicated and historic data be consistent, the historic data will be considered representative of Site conditions and will be used as a starting point in performing the RI as described below. If discrepancies are noted, the RIWP will then be revised to account for replication of all appropriate historic data.

When replacing monitoring wells MW-1, MW-2, and MW-7, replication of the historic soil data will be provided. In addition, one well installation inside the factory will provide the coverage of the site for comparison purposes. The monitoring wells will be installed in the manner described in Section 3.2.3 and soil samples from each boring will be collected in the manner described in Section 3.2.6 below.

Historic groundwater data will be validated through collection of groundwater samples from all existing monitoring wells that do not contain LNAPL. Groundwater samples will be collected from the existing monitoring well network in the manner described in Section 3.2.7.

3.2.2 Site Reconnaissance

The location and quantity of all USTs and existing monitoring wells will be confirmed. The man ways, access ports, sumps, fill ports and vents for all USTs will be documented for the future evaluation of UST contents.

Additionally, during the Site reconnaissance, access to proposed monitoring well and soil boring locations will be evaluated. Any modifications to the RI deemed necessary following the Site reconnaissance will be documented and submitted to NYSDEC for approval.

3.2.3 LNAPL Investigation

As an initial step during the Site reconnaissance, the existing monitoring well network will be gauged for the presence of LNAPL. Additionally, five soil borings will be installed and converted to monitoring wells (MW-14 through MW-18) to further evaluate the extent and configuration of the LNAPL plume. Furthermore, a review of well construction logs for existing monitoring wells MW-1, MW-2, and MW-7 revealed that these wells are screened improperly for LNAPL monitoring (the top of the well screens are located below the water table, hence precluding any LNAPL that may be present from entering the wells), therefore Roux Associates will replace monitoring wells MW-1, MW-2, and MW-7 and adjust the screen zones accordingly. Also, monitoring well MW-6 is one-inch in diameter (not ideal for LNAPL monitoring) and located proximate to the underground varnish cooking pots which will be unearthed as an initial step in the UST inventory task (discussed in Section 3.2.4). Due to the well's small diameter and likelihood of being compromised during evaluation of the underground cooking pots, MW-6 will be decommissioned prior to and replaced following the varnish cooking pot evaluation.

Prior to subsurface activity, soil boring/monitoring well locations will be cleared for utilities and USTs using hand digging methods to a depth of 5 ft bls. Shallow soil samples will be collected using a hand auger prior to utilizing a vactron or air knife in the event that such equipment becomes necessary to pre-clear boring locations. Following pre-clearing, monitoring wells will be installed utilizing a Geoprobe drill rig equipped with hollow-stem augers or similar drill rig, soil samples collected from the monitoring well boring will be collected in the manner described in section 3.2.6 below.

Each monitoring well will be constructed of four-inch diameter poly vinyl chloride (PVC) and consist of ten feet of 0.020-inch slot well screen that will intersect the water table at approximately three to four feet below the top of the screen. Historical data indicates that the LNAPL at the Site consists largely of mineral spirits; available data suggests that PVC is compatible with mineral spirits. This is supported by the fact that the monitoring wells that currently exist at the Site have been in place for five years and are not compromised; however, in the unlikely event that the wells become compromised, they will be replaced with stainless steel screens. Following installation each monitoring well will be developed using a submersible pump to ensure good hydraulic connection with the surrounding saturated deposits. Detailed procedures regarding well development are also found in the FSP (Appendix B). All monitoring wells will be surveyed to obtain horizontal and vertical survey coordinates.

Two weeks following well development, the entire monitoring well network will be gauged using an electronic oil/water interface probe capable of detecting an LNAPL thickness of 0.01 feet. The gauging data will be used to develop a RAWP and/or a product recovery interim remedial measure (IRM).

3.2.4 UST Inventory

Of primary importance is to ensure the USTs are no longer a contributing source of LNAPL to the environment. Therefore, occurring concurrently with the LNAPL investigation, Roux Associates will attempt to locate, inspect, estimate the volume, characterize the contents, and prepare an inventory for the 29 reported USTs. We anticipate that the inventory will include demolition of the concrete floor of the shed in the area of the varnish cooking pots. It appears a second concrete floor was poured on top of the previous floor grade and as such, there is no access to the suspected cooking pot location. If product is determined to be present in the USTs, a product recovery plan will be proposed as an IRM. The final disposition of the USTs will be addressed in the RAWP.

3.2.5 LNAPL Sampling

As part of this task, LNAPL samples will be collected from all USTs and monitoring wells to be analyzed by a laboratory for fingerprinting to determine the type and characteristics of the LNAPL, including hazardous waste criteria. This sampling will include viscosity, density, corrosivity, ignitability, reactivity, TCLP, solubility, fingerprinting, and other parameters as deemed necessary. This information will be used to develop the RAWP, and will assist in the designing of a LNAPL recovery system.

3.2.6 Soil Investigation

To effectively evaluate soil quality throughout the Site, 37 monitoring wells or soil borings will be installed (MW-1R, MW-2R, MW-6R, MW-7R, MW-14 through MW-23, and SB-5 through SB-27). Prior to subsurface activity, soil boring locations will be cleared for utilities and USTs using hand digging methods to a depth of 5 feet bls. Shallow soil samples will be collected using a hand auger prior to utilizing a vactron or air knife in the event that such equipment becomes necessary to pre-clear boring locations. At each soil boring location, following pre-clearing, soil samples will be collected using a Geoprobe direct push sampler, locations may be slightly altered as field conditions require. Soil samples will be collected continuously in four foot increments from five feet bls to seven feet below the water table. Soil samples will be screened for impacts using visual and olfactory observations; a photoionization detector will be used to screen for VOCs. In the event that impacted soils are identified, the boring will be advanced until impacts are no longer observed (i.e., clean soil) or bedrock is encountered. Each four-foot increment will be collected in dedicated acetate sleeves or similar. The sleeve will be laid on a piece of polyethylene sheeting and opened. Soil samples in the sleeve will be separated into two-foot sections and screened for VOCs with PID. Following the PID screening, a portion of soil from each two-foot section will be placed into pre-cleaned sample jars and placed on ice in a cooler at 4°C. All remaining soils will be visually characterized according to the Unified Soils Classification System (USCS) and placed into zip-lock plastic storage bags and homogenized. .

Three or four soil samples will be collected and submitted for laboratory analysis from each location as follows:

Soil samples to be collected in the event no impacts are observed:

- A soil sample from 0-2 feet below the surface or below the concrete floor;
- The depth interval just above the observed water table will be submitted for laboratory analysis; and
- A soil sample from the terminal depth of each boring will be submitted for laboratory analysis.

If impacts are observed the following samples will be collected for analysis:

- A soil sample from 0-2 feet below the surface or below the concrete floor;
- The depth interval just above the observed water table will be submitted for laboratory analysis;
- The sample that contains the highest field screening results for VOCs (via PID, visual and/or olfactory observations) will be submitted for laboratory analysis (this may coincide with a another interval); and
- A soil sample from the first clean interval below the observed impacts will be collected.

All soil samples will be analyzed for the full target compound list plus the 30 (10 volatile organic compounds and 20 semi-volatile organic compounds) highest concentration tentatively identified compounds (TICs) and the full target analyte list (TAL) via United States Environmental Protection Agency (USEPA) Method 8260, Method 8270, Method 8010, and Method 6010. Additionally, provided the historic data is verified as described in Section 3.3.1, a portion (25%) of all soil samples collected will be analyzed for PCBs and pesticides in order to confirm that they are not a compound of concern at the Site. Should the historic data not be verifiable, all soil samples will be analyzed for PCBs and pesticides. All soil samples will be analyzed at laboratory with a current New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) Contract Laboratory Protocol (CLP) certification for each of the parameters noted above. Samples will be analyzed on a standard turnaround time and will be reported as Category B data deliverables. The laboratory analytical data will be submitted to an independent data validator and a Data Usability Summary Report (DUSR) will be prepared.

Soil borings will be backfilled with bentonite chips or clean sand. The ground surface will be restored with either concrete or asphalt to match pre-installation conditions. All soil cuttings generated during the soil sampling task will be containerized for offsite disposal.

3.2.7 Groundwater Investigation

Three additional monitoring wells (MW-19 through MW-21) will be installed in areas that are predicted to be outside the LNAPL impacted area and proposed in locations that will allow for groundwater flow triangulation and groundwater quality sampling. The monitoring wells will be installed in the same manner as described in Section 3.2.3. The proposed monitoring well locations are shown on Figure 3.

To characterize groundwater flow and quality conditions, following well installation and development, the entire network of monitoring wells will be gauged. As part of the gauging round, water-level measurements will be recorded for all monitoring wells to further define groundwater flow patterns beneath the Site. The wells will be gauged using an electronic oil/water interface probe capable of detecting an LNAPL thickness of 0.01 feet.

Following the groundwater gauging event, a comprehensive groundwater sampling event will be completed. Groundwater samples will be collected from all wells that do not contain LNAPL or LNAPL sheen. To ensure groundwater samples collected are representative of the conditions in the surrounding aquifer, monitoring wells will be purged prior to sample collection using low flow sampling procedures as outlined in USEPA document titled “Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples From Monitoring Wells” (USEPA, 2010). Additional information regarding groundwater sampling procedures can be found in the FSP (Appendix B).

Groundwater samples will be collected and analyzed for:

- Organic contaminants - the full target compound list plus the 30 (10 volatile organic compounds and 20 semi-volatile organic compounds) highest concentration tentatively identified compounds (TICs);
- A portion (25%) of the groundwater samples will also be analyzed for PCBs and pesticides to confirm they are not a compound of concern at the Site (assumes verification of historic data, otherwise 100%);
- Inorganic compounds - the full target analyte list (TAL); and
- Field parameters will also be collected during well sampling.

All groundwater samples will be analyzed at laboratory with a current NYSDOH ELAP CLP certification for each of the parameters noted above. Samples will be analyzed on a standard turnaround time and will be reported as Category B data deliverables and a DUSR will be prepared. More information on sample analysis is provided in the QAPP (Appendix C).

In order to allow for a more thorough understanding of Site conditions, two deep monitoring wells will be installed; one in the courtyard (MW-23) and one in the paint factory (MW-22). Both wells will extend to the top of bedrock and will have deep screen zones.

3.2.8 Contingency Sampling

If, during the subsurface investigation, piping or other anomalies are discovered, additional soil sampling will occur along those structures. This additional sampling will be presented to DEC for approval.

3.2.9 LNAPL Recovery Interim Remedial Measure.

The NYSDEC approved a LNAPL Recovery Interim Remedial Measure Work Plan on November 17, 2011 which proposed weekly manual LNAPL recovery events. The manual

LNAPL recovery IRM events began on December 22, 2012. As of September 11, 2011, 635 gallons of LNAPL have been recovered during 29 IRM events. The manual LNAPL recovery IRM events will continue until the 4-inch diameter monitoring wells proposed above are installed, at which time a more robust method for LNAPL recovery will be evaluated.

3.2.10 Qualitative Exposure Assessment

A qualitative exposure assessment (EA) will be performed following the collection of all RI data. The EA will include a discussion on offsite soil vapor as well. The EA will be performed in accordance with Section 3.3(c)4 of DER-10 and the NYSDOH guidance for performing a qualitative EA (NYSDEC DER-10; Technical Guidance for Site Investigation and Remediation; Appendix 3 B). The results of the qualitative EA will be provided in the RI report.

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROTOCOLS

The goal of the QA/QC aspect of the RI is to ensure that suitable and verifiable data results from sampling and analysis performed. To accomplish this, a Quality Assurance Project Plan (QAPP) has been prepared and is provided as Appendix C.

5.0 HEALTH AND SAFETY

A Site-specific Health and Safety (H&S) Plan has been prepared for the Site and is provided in Appendix D.

A Community Air Monitoring Program is included as Appendix E.

6.0 REPORTING AND SCHEDULE

Roux Associates will initiate the RI within four weeks of NYSDEC's approval of the Work Plan. The NYSDEC will be notified at least five days prior to the start of field investigation activities. Approximately six weeks will be required for completion of all field-related investigation tasks.

Roux Associates anticipates that the analytical results from the replacement/verification samples will be received and evaluated within two weeks of initiating the investigation. Collection of samples will continue at the site utilizing increased holding times for PCBs/Pesticides analyses while a determination is being made on useability. A recommendation report with supporting information will be sent to NYSDEC by email for approval. While the investigation continues, as analytical data is received and reviewed, it may be necessary to schedule an interim review meeting with NYSDEC to discuss additional delineation.

Following the completion of the RI, a RI report will be prepared. The RI report will include all data developed during the RI, and will meet the technical requirements of NYSDEC's DER-10; Technical Guidance for Site Investigation and Remediation. Analytical data generated during the RI will be submitted electronically to NYSDEC using the Environmental Information Management System (EIMS) procedures described in the NYSDEC's Electronic Data Deliverable (EDD) Guidance. Additionally, a Data Usability Summary Report will be prepared for all data generated for the RI.

Following completion of the RI Report a Remedial Action Work Plan (RAWP) will be prepared. The RAWP will provide a detailed description of the remedial action and the remedial technology to be conducted for each area of concern.

The RI Report will be submitted to the NYSDEC for review eight weeks following receipt of all analytical data. A full project scheduled is attached as Figure 4.

7.0 REFERENCES

United States Geological Survey. Bedrock and Engineering Geologic Maps of New York County – Charles A. Baskerville, 1994 (Baskerville, 1994).

TRC Engineers, Inc. Phase I Environmental Site Assessment (TRC 2005), 541-549 46th Avenue, 199-205 Vernon Boulevard, Paragon Paint Company, Long Island City, New York; TRC Project Number: 49205-0000-00000. September 9, 2005.

AKRF, Inc. Subsurface Investigation Report (AKRF, 2006), Paragon Paint Company 549 46th Avenue, Long Island City, New York. AKRF Project Number: 10702-0004. June, 2006.

AKRF, Inc. Subsurface Investigation Report (AKRF, 2007), Paragon Paint Company 549 46th Avenue, Long Island City, New York. AKRF Project Number: 10702-0204. June, 2007.

United States Environmental Protection Agency. Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. Revised - January 19, 2010.

TABLES

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-1	MW-2	MW-3	MW-4	MW-4	MW-5
			Sample Date:	5/24/2006	5/24/2006	5/25/2006	5/23/2006	5/23/2006	5/25/2006
			Sample Depth (ft bls):	(10-11)	(10-12)	(10-12)	(11-12)	(15-16)	(10-11)
1,1,1,2-Tetrachloroethane	--	--		NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	680	100000		1.1 U	530 U	500 U	0.99 U	45 U	1.2 U
1,1,2,2-Tetrachloroethane	--	--		1.6 U	530 U	500 U	1.4 U	45 U	1.7 U
1,1,2-Trichloroethane	--	--		1.3 U	800 U	750 U	1.2 U	68 U	1.4 U
1,1-Dichloroethane	270	26000		1.1 U	800 U	750 U	0.96 U	68 U	1.1 U
1,1-Dichloroethene	330	100000		1.4 U	930 U	870 U	1.3 U	79 U	1.5 U
1,1-Dichloropropene	--	--		NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	--	--		NA	NA	NA	NA	NA	NA
1,2,3-Trichloropropane	--	--		NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	--	--		NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	3600	52000		NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	--	--		NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	--	--		NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1100	100000		NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	20	3100		1.3 U	800 U	750 U	1.2 U	68 U	1.4 U
1,2-Dichloropropane	--	--		1.4 U	1200 U	1100 U	1.3 U	100 U	1.5 U
1,3,5-Trimethylbenzene	8400	52000		NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2400	49000		NA	NA	NA	NA	NA	NA
1,3-Dichloropropane	--	--		NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1800	13000		NA	NA	NA	NA	NA	NA
1,4-Dichlorobutane	--	--		NA	NA	NA	NA	NA	NA
2,2-Dichloropropane	--	--		NA	NA	NA	NA	NA	NA
2-Butanone (MEK)	120	100000		2.3 U	1600 U	1500 U	2.1 U	**490 J**	2.5 U
2-Hexanone	--	--		3.3 U	1100 U	1000 U	3 U	91 U	3.5 U
4-Methyl-2-pentanone (MIBK)	--	--		1.5 U	930 U	870 U	1.4 U	79 U	1.6 U
Acetone	50	100000		18 JB	**2500 JB**	**2400 JB**	13 JB	**970 JB**	11 JB
Acrolein	--	--		NA	NA	NA	NA	NA	NA
Acrylonitrile	--	--		NA	NA	NA	NA	NA	NA
Benzene	60	4800		1.1 U	530 U	500 U	1 U	45 U	1.2 U
Bromobenzene	--	--		NA	NA	NA	NA	NA	NA
Bromochloromethane	--	--		NA	NA	NA	NA	NA	NA
Bromodichloromethane	--	--		1.1 U	530 U	500 U	0.99 U	45 U	1.2 U
Bromoform	--	--		1.3 U	1100 U	1000 U	1.2 U	91 U	1.4 U

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Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-1	MW-2	MW-3	MW-4	MW-4	MW-5
			Sample Date:	5/24/2006	5/24/2006	5/25/2006	5/23/2006	5/23/2006	5/25/2006
			Sample Depth (ft bls):	(10-11)	(10-12)	(10-12)	(11-12)	(15-16)	(10-11)
Bromomethane	--	--		1.1 U	1600 U	1500 U	0.97 U	140 U	1.1 U
Carbon disulfide	--	--		1.2 J	1200 U	1100 U	0.72 U	100 U	1.9 J
Carbon tetrachloride	760	2400		1 U	1300 U	1200 U	0.92 U	110 U	1.1 U
Chlorobenzene	1100	100000		1 U	530 U	500 U	0.93 U	45 U	1.1 U
Chloroethane	--	--		2.5 U	1100 U	1000 U	2.2 U	91 U	2.6 U
Chloroform	370	49000		0.69 U	930 U	870 U	0.63 U	79 U	0.73 U
Chloromethane	--	--		1.2 U	670 U	620 U	1.1 U	57 U	1.2 U
cis-1,2-Dichloroethene	250	100000		1.3 U	800 U	750 U	1.2 U	68 U	1.4 U
cis-1,3-Dichloropropene	--	--		1 U	670 U	620 U	0.92 U	57 U	1.1 U
Dibromochloromethane	--	--		0.53 U	670 U	620 U	0.48 U	57 U	0.57 U
Dibromomethane	--	--		NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	--	--		NA	NA	NA	NA	NA	NA
Ethyl ether	--	--		NA	NA	NA	NA	NA	NA
Ethyl Methacrylate	--	--		NA	NA	NA	NA	NA	NA
Ethylbenzene	1000	41000		1 U	**1600 J**	1200 U	0.93 U	110 U	1.1 U
Hexachlorobutadiene	--	--		NA	NA	NA	NA	NA	NA
Iodomethane	--	--		NA	NA	NA	NA	NA	NA
Isopropylbenzene	--	--		NA	NA	NA	NA	NA	NA
m+p-Xylene	--	--		NA	NA	NA	NA	NA	NA
Methylene chloride	50	100000		11 JB	**710 JB**	**670 JB**	9.7 JB	**130 JB**	9.9 JB
MTBE	930	100000		1.2 U	400 U	370 U	1.1 U	34 U	1.3 U
Naphthalene	12000	100000		330 J	1600	1400 U	69 U	4400	74 U
n-Butylbenzene	12000	100000		NA	NA	NA	NA	NA	NA
n-Propylbenzene	3900	100000		NA	NA	NA	NA	NA	NA
o-Chlorotoluene	--	--		NA	NA	NA	NA	NA	NA
o-Xylene	--	--		NA	NA	NA	NA	NA	NA
p-Chlorotoluene	--	--		NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	--	--		NA	NA	NA	NA	NA	NA
sec-Butylbenzene	11000	100000		NA	NA	NA	NA	NA	NA
Styrene	--	--		1.4 U	670 U	620 U	1.3 U	57 U	1.5 U
tert-Butylbenzene	5900	100000		NA	NA	NA	NA	NA	NA
Tetrachloroethene	1300	19000		0.91 U	670 U	620 U	0.83 U	57 U	0.97 U
Tetrahydrofuran	--	--		NA	NA	NA	NA	NA	NA

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Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-1 5/24/2006 (10-11)	MW-2 5/24/2006 (10-12)	MW-3 5/25/2006 (10-12)	MW-4 5/23/2006 (11-12)	MW-4 5/23/2006 (15-16)	MW-5 5/25/2006 (10-11)
Toluene	700	100000		1.1 U	400 U	370 U	0.99 U	34 U	1.2 U
trans-1,2-Dichloroethene	190	100000		0.75 U	670 U	620 U	0.68 U	57 U	0.8 U
trans-1,3-Dichloropropene	--	--		1.2 U	400 U	370 U	1.1 U	34 U	1.3 U
trans-1,4-Dichloro-2-butene	--	--		NA	NA	NA	NA	NA	NA
Trichloroethene	470	21000		0.88 U	930 U	870 U	0.8 U	79 U	0.94 U
Trichlorofluoromethane	--	--		NA	NA	NA	NA	NA	NA
Vinyl acetate	--	--		NA	NA	NA	NA	NA	NA
Vinyl chloride	20	900		1.1 U	1100 U	1000 U	1 U	91 U	1.2 U
Xylenes (total)	260	100000		2.5 U	**28000**	1200 U	2.3 U	**380 J**	2.7 U

J - Estimated value
B - Detected in Laboratory Method Blank
U - Indicates that the compound was analyzed for but not detected
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC
Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC
Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

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Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)
1,1,1,2-Tetrachloroethane	--	--		860 U	18000 U	18000 U	19000 U	19000 U	620 U
1,1,1-Trichloroethane	680	100000		860 U	18000 U	18000 U	19000 U	19000 U	620 U
1,1,2,2-Tetrachloroethane	--	--		860 U	18000 U	18000 U	19000 U	19000 U	620 U
1,1,2-Trichloroethane	--	--		1300 U	27000 U	27000 U	29000 U	28000 U	940 U
1,1-Dichloroethane	270	26000		1300 U	27000 U	27000 U	29000 U	28000 U	940 U
1,1-Dichloroethene	330	100000		860 U	18000 U	18000 U	19000 U	19000 U	620 U
1,1-Dichloropropene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,2,3-Trichlorobenzene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,2,3-Trichloropropane	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
1,2,4-Trichlorobenzene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,2,4-Trimethylbenzene	3600	52000		**170000**	**450000**	**200000**	97000 U	**110000**	**12000**
1,2-Dibromo-3-chloropropane	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,2-Dibromoethane	--	--		3400 U	71000 U	73000 U	78000 U	75000 U	2500 U
1,2-Dichlorobenzene	1100	100000		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,2-Dichloroethane	20	3100		860 U	18000 U	18000 U	19000 U	19000 U	620 U
1,2-Dichloropropane	--	--		3000 U	62000 U	64000 U	68000 U	65000 U	2200 U
1,3,5-Trimethylbenzene	8400	52000		**96000**	**210000**	91000 U	97000 U	94000 U	5100
1,3-Dichlorobenzene	2400	49000		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,3-Dichloropropane	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,4-Dichlorobenzene	1800	13000		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
1,4-Dichlorobutane	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
2,2-Dichloropropane	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
2-Butanone (MEK)	120	100000		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
2-Hexanone	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
4-Methyl-2-pentanone (MIBK)	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Acetone	50	100000		8600 U	180000 U	180000 U	190000 U	190000 U	**17000**
Acrolein	--	--		21000 U	440000 U	460000 U	480000 U	470000 U	16000 U
Acrylonitrile	--	--		3400 U	71000 U	73000 U	78000 U	75000 U	2500 U
Benzene	60	4800		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Bromobenzene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Bromochloromethane	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Bromodichloromethane	--	--		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Bromoform	--	--		3400 U	71000 U	73000 U	78000 U	75000 U	2500 U

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)
Bromomethane	--	--		1700 U	36000 U	36000 U	39000 U	37000 U	1200 U
Carbon disulfide	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Carbon tetrachloride	760	2400		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Chlorobenzene	1100	100000		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Chloroethane	--	--		1700 U	36000 U	36000 U	39000 U	37000 U	1200 U
Chloroform	370	49000		1300 U	27000 U	27000 U	29000 U	28000 U	940 U
Chloromethane	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
cis-1,2-Dichloroethene	250	100000		860 U	18000 U	18000 U	19000 U	19000 U	620 U
cis-1,3-Dichloropropene	--	--		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Dibromochloromethane	--	--		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Dibromomethane	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Dichlorodifluoromethane	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Ethyl ether	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Ethyl Methacrylate	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Ethylbenzene	1000	41000		**7600**	**22000**	18000 U	19000 U	19000 U	620 U
Hexachlorobutadiene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Iodomethane	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Isopropylbenzene	--	--		23000	60000	45000	26000	19000 U	1100
m+p-Xylene	--	--		12000	36000 U	36000 U	39000 U	37000 U	1600
Methylene chloride	50	100000		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
MTBE	930	100000		1700 U	36000 U	36000 U	39000 U	37000 U	1200 U
Naphthalene	12000	100000		**19000**	89000 U	91000 U	97000 U	94000 U	3100 U
n-Butylbenzene	12000	100000		**26000**	**76000**	**57000**	**42000**	**29000**	2800
n-Propylbenzene	3900	100000		**46000**	**120000**	**97000**	**56000**	**33000**	2100
o-Chlorotoluene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
o-Xylene	--	--		1700 U	36000 U	36000 U	39000 U	37000 U	1200 U
p-Chlorotoluene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
p-Isopropyltoluene	--	--		11000	31000	18000 U	20000	19000 U	1200
sec-Butylbenzene	11000	100000		10000	**36000**	**40000**	**35000**	19000 U	1200
Styrene	--	--		1700 U	36000 U	36000 U	39000 U	37000 U	1200 U
tert-Butylbenzene	5900	100000		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Tetrachloroethene	1300	19000		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Tetrahydrofuran	--	--		17000 U	360000 U	360000 U	390000 U	370000 U	12000 U

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)
Toluene	700	100000		1300 U	27000 U	27000 U	29000 U	28000 U	940 U
trans-1,2-Dichloroethene	190	100000		1300 U	27000 U	27000 U	29000 U	28000 U	940 U
trans-1,3-Dichloropropene	--	--		860 U	18000 U	18000 U	19000 U	19000 U	620 U
trans-1,4-Dichloro-2-butene	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Trichloroethene	470	21000		860 U	18000 U	18000 U	19000 U	19000 U	620 U
Trichlorofluoromethane	--	--		4300 U	89000 U	91000 U	97000 U	94000 U	3100 U
Vinyl acetate	--	--		8600 U	180000 U	180000 U	190000 U	190000 U	6200 U
Vinyl chloride	20	900		1700 U	36000 U	36000 U	39000 U	37000 U	1200 U
Xylenes (total)	260	100000		NA	NA	NA	NA	NA	NA

J - Estimated value
B - Detected in Laboratory Method Blank
U - Indicates that the compound was analyzed for but not detected
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC
Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC
Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-8	MW-9	MW-9	MW-10	MW-10	MW-11
			Sample Date:	4/23/2007	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007
			Sample Depth (ft bls):	(6-7)	(14-15)	(15.5)	(12-12.5)	(5-6)	(25-26)
1,1,1,2-Tetrachloroethane	--	--		1200 U	590 U	650 U	780 U	2.9 U	3 U
1,1,1-Trichloroethane	680	100000		1200 U	590 U	650 U	780 U	2.9 U	3 U
1,1,2,2-Tetrachloroethane	--	--		1200 U	590 U	650 U	780 U	2.9 U	3 U
1,1,2-Trichloroethane	--	--		1800 U	880 U	970 U	1200 U	4.4 U	4.6 U
1,1-Dichloroethane	270	26000		1800 U	880 U	970 U	1200 U	4.4 U	4.6 U
1,1-Dichloroethene	330	100000		1200 U	590 U	650 U	780 U	2.9 U	3 U
1,1-Dichloropropene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,2,3-Trichlorobenzene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,2,3-Trichloropropane	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
1,2,4-Trichlorobenzene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,2,4-Trimethylbenzene	3600	52000		**7000**	**29000**	**23000**	3900 U	15 U	15 U
1,2-Dibromo-3-chloropropane	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,2-Dibromoethane	--	--		4800 U	2400 U	2600 U	3100 U	12 U	12 U
1,2-Dichlorobenzene	1100	100000		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,2-Dichloroethane	20	3100		1200 U	590 U	650 U	780 U	2.9 U	3 U
1,2-Dichloropropane	--	--		4200 U	2000 U	2300 U	2700 U	10 U	11 U
1,3,5-Trimethylbenzene	8400	52000		6000 U	**9200**	7100	3900 U	15 U	15 U
1,3-Dichlorobenzene	2400	49000		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,3-Dichloropropane	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,4-Dichlorobenzene	1800	13000		6000 U	2900 U	3200 U	3900 U	15 U	15 U
1,4-Dichlorobutane	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
2,2-Dichloropropane	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
2-Butanone (MEK)	120	100000		12000 U	5900 U	6500 U	7800 U	29 U	30 U
2-Hexanone	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
4-Methyl-2-pentanone (MIBK)	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Acetone	50	100000		12000 U	**13000**	**14000**	7800 U	29 U	30 U
Acrolein	--	--		30000 U	15000 U	16000 U	20000 U	74 U	76 U
Acrylonitrile	--	--		4800 U	2400 U	2600 U	3100 U	12 U	12 U
Benzene	60	4800		1200 U	590 U	650 U	780 U	2.9 U	3 U
Bromobenzene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Bromochloromethane	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Bromodichloromethane	--	--		1200 U	590 U	650 U	780 U	2.9 U	3 U
Bromoform	--	--		4800 U	2400 U	2600 U	3100 U	12 U	12 U

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-8	MW-9	MW-9	MW-10	MW-10	MW-11
			Sample Date:	4/23/2007	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007
			Sample Depth (ft bls):	(6-7)	(14-15)	(15.5)	(12-12.5)	(5-6)	(25-26)
Bromomethane	--	--		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
Carbon disulfide	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Carbon tetrachloride	760	2400		1200 U	590 U	650 U	780 U	2.9 U	3 U
Chlorobenzene	1100	100000		1200 U	590 U	650 U	780 U	2.9 U	3 U
Chloroethane	--	--		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
Chloroform	370	49000		1800 U	880 U	970 U	1200 U	4.4 U	4.6 U
Chloromethane	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
cis-1,2-Dichloroethene	250	100000		1200 U	590 U	650 U	780 U	2.9 U	3 U
cis-1,3-Dichloropropene	--	--		1200 U	590 U	650 U	780 U	2.9 U	3 U
Dibromochloromethane	--	--		1200 U	590 U	650 U	780 U	2.9 U	3 U
Dibromomethane	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Dichlorodifluoromethane	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Ethyl ether	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Ethyl Methacrylate	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Ethylbenzene	1000	41000		1200 U	700	820	780 U	2.9 U	3 U
Hexachlorobutadiene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Iodomethane	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Isopropylbenzene	--	--		2800	2300	3300	780 U	2.9 U	3 U
m+p-Xylene	--	--		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
Methylene chloride	50	100000		12000 U	5900 U	6500 U	7800 U	29 U	30 U
MTBE	930	100000		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
Naphthalene	12000	100000		6000 U	4700	3700	3900 U	15 U	15 U
n-Butylbenzene	12000	100000		4100	8100	9400	780 U	2.9 U	3 U
n-Propylbenzene	3900	100000		**6500**	**5300**	**6100**	780 U	2.9 U	3 U
o-Chlorotoluene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
o-Xylene	--	--		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
p-Chlorotoluene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
p-Isopropyltoluene	--	--		1200 U	3500	2800	780 U	2.9 U	3 U
sec-Butylbenzene	11000	100000		3100	4000	6200	780 U	2.9 U	3 U
Styrene	--	--		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
tert-Butylbenzene	5900	100000		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Tetrachloroethene	1300	19000		1200 U	590 U	650 U	780 U	2.9 U	3 U
Tetrahydrofuran	--	--		24000 U	12000 U	13000 U	16000 U	59 U	61 U

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in μg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-8	MW-9	MW-9	MW-10	MW-10	MW-11
			Sample Date:	4/23/2007	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007
			Sample Depth (ft bls):	(6-7)	(14-15)	(15.5)	(12-12.5)	(5-6)	(25-26)
Toluene	700	100000		1800 U	880 U	970 U	1200 U	4.4 U	4.6 U
trans-1,2-Dichloroethene	190	100000		1800 U	880 U	970 U	1200 U	4.4 U	4.6 U
trans-1,3-Dichloropropene	--	--		1200 U	590 U	650 U	780 U	2.9 U	3 U
trans-1,4-Dichloro-2-butene	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Trichloroethene	470	21000		1200 U	590 U	650 U	780 U	2.9 U	3 U
Trichlorofluoromethane	--	--		6000 U	2900 U	3200 U	3900 U	15 U	15 U
Vinyl acetate	--	--		12000 U	5900 U	6500 U	7800 U	29 U	30 U
Vinyl chloride	20	900		2400 U	1200 U	1300 U	1600 U	5.9 U	6.1 U
Xylenes (total)	260	100000		NA	NA	NA	NA	NA	NA

J - Estimated value
B - Detected in Laboratory Method Blank
U - Indicates that the compound was analyzed for but not detected
μg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC
Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC
Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-11 4/24/2007 (7-8)	MW-12 4/25/2007 (17-18)	MW-12 4/25/2007 (3-4)	MW-12 4/25/2007 (8-9)
1,1,1,2-Tetrachloroethane	--	--		620 U	3.2 U	3.3 U	3.2 U
1,1,1-Trichloroethane	680	100000		620 U	3.2 U	3.3 U	3.2 U
1,1,2,2-Tetrachloroethane	--	--		620 U	3.2 U	3.3 U	3.2 U
1,1,2-Trichloroethane	--	--		920 U	4.8 U	4.9 U	4.7 U
1,1-Dichloroethane	270	26000		920 U	4.8 U	4.9 U	4.7 U
1,1-Dichloroethene	330	100000		620 U	3.2 U	3.3 U	3.2 U
1,1-Dichloropropene	--	--		3100 U	16 U	16 U	16 U
1,2,3-Trichlorobenzene	--	--		3100 U	16 U	16 U	16 U
1,2,3-Trichloropropane	--	--		6200 U	32 U	33 U	32 U
1,2,4-Trichlorobenzene	--	--		3100 U	16 U	16 U	16 U
1,2,4-Trimethylbenzene	3600	52000		3100 U	180	19	120
1,2-Dibromo-3-chloropropane	--	--		3100 U	16 U	16 U	16 U
1,2-Dibromoethane	--	--		2500 U	13 U	13 U	13 U
1,2-Dichlorobenzene	1100	100000		3100 U	16 U	16 U	16 U
1,2-Dichloroethane	20	3100		620 U	3.2 U	3.3 U	3.2 U
1,2-Dichloropropane	--	--		2200 U	11 U	12 U	11 U
1,3,5-Trimethylbenzene	8400	52000		3100 U	70	16 U	52
1,3-Dichlorobenzene	2400	49000		3100 U	16 U	16 U	16 U
1,3-Dichloropropane	--	--		3100 U	16 U	16 U	16 U
1,4-Dichlorobenzene	1800	13000		3100 U	16 U	16 U	16 U
1,4-Dichlorobutane	--	--		6200 U	32 U	33 U	32 U
2,2-Dichloropropane	--	--		3100 U	16 U	16 U	16 U
2-Butanone (MEK)	120	100000		6200 U	32 U	33 U	32 U
2-Hexanone	--	--		6200 U	32 U	33 U	32 U
4-Methyl-2-pentanone (MIBK)	--	--		6200 U	32 U	33 U	32 U
Acetone	50	100000		**14000**	32 U	**240**	32 U
Acrolein	--	--		15000 U	80 U	82 U	79 U
Acrylonitrile	--	--		2500 U	13 U	13 U	13 U
Benzene	60	4800		620 U	3.2 U	3.3 U	3.2 U
Bromobenzene	--	--		3100 U	16 U	16 U	16 U
Bromochloromethane	--	--		3100 U	16 U	16 U	16 U
Bromodichloromethane	--	--		620 U	3.2 U	3.3 U	3.2 U
Bromoform	--	--		2500 U	13 U	13 U	13 U

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-11 4/24/2007 (7-8)	MW-12 4/25/2007 (17-18)	MW-12 4/25/2007 (3-4)	MW-12 4/25/2007 (8-9)
Bromomethane	--	--		1200 U	6.4 U	6.6 U	6.3 U
Carbon disulfide	--	--		6200 U	32 U	33 U	32 U
Carbon tetrachloride	760	2400		620 U	3.2 U	3.3 U	3.2 U
Chlorobenzene	1100	100000		620 U	3.2 U	3.3 U	3.2 U
Chloroethane	--	--		1200 U	6.4 U	6.6 U	6.3 U
Chloroform	370	49000		920 U	4.8 U	4.9 U	4.7 U
Chloromethane	--	--		3100 U	16 U	16 U	16 U
cis-1,2-Dichloroethene	250	100000		620 U	3.2 U	3.3 U	3.2 U
cis-1,3-Dichloropropene	--	--		620 U	3.2 U	3.3 U	3.2 U
Dibromochloromethane	--	--		620 U	3.2 U	3.3 U	3.2 U
Dibromomethane	--	--		6200 U	32 U	33 U	32 U
Dichlorodifluoromethane	--	--		6200 U	32 U	33 U	32 U
Ethyl ether	--	--		3100 U	16 U	16 U	16 U
Ethyl Methacrylate	--	--		6200 U	32 U	33 U	32 U
Ethylbenzene	1000	41000		620 U	9.4	3.3 U	3.2 U
Hexachlorobutadiene	--	--		3100 U	16 U	16 U	16 U
Iodomethane	--	--		6200 U	32 U	33 U	32 U
Isopropylbenzene	--	--		620 U	19	25	10
m+p-Xylene	--	--		1200 U	31	6.6 U	11
Methylene chloride	50	100000		6200 U	32 U	33 U	32 U
MTBE	930	100000		1200 U	6.4 U	6.6 U	6.3 U
Naphthalene	12000	100000		3100 U	31	22	25
n-Butylbenzene	12000	100000		620 U	23	34	23
n-Propylbenzene	3900	100000		620 U	36	48	22
o-Chlorotoluene	--	--		3100 U	16 U	16 U	16 U
o-Xylene	--	--		1200 U	22	6.6 U	7.5
p-Chlorotoluene	--	--		3100 U	16 U	16 U	16 U
p-Isopropyltoluene	--	--		620 U	9.6	3.5	9.2
sec-Butylbenzene	11000	100000		620 U	12	63	11
Styrene	--	--		1200 U	6.4 U	6.6 U	6.3 U
tert-Butylbenzene	5900	100000		3100 U	16 U	16 U	16 U
Tetrachloroethene	1300	19000		620 U	3.2 U	3.3 U	3.2 U
Tetrahydrofuran	--	--		12000 U	64 U	66 U	63 U

Table 1. Summary of Volatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-11	MW-12	MW-12	MW-12
			Sample Date:	4/24/2007	4/25/2007	4/25/2007	4/25/2007
			Sample Depth (ft bls):	(7-8)	(17-18)	(3-4)	(8-9)
Toluene	700	100000		920 U	4.8 U	4.9 U	4.7 U
trans-1,2-Dichloroethene	190	100000		920 U	4.8 U	4.9 U	4.7 U
trans-1,3-Dichloropropene	--	--		620 U	3.2 U	3.3 U	3.2 U
trans-1,4-Dichloro-2-butene	--	--		3100 U	16 U	16 U	16 U
Trichloroethene	470	21000		620 U	3.2 U	3.3 U	3.2 U
Trichlorofluoromethane	--	--		3100 U	16 U	16 U	16 U
Vinyl acetate	--	--		6200 U	32 U	33 U	32 U
Vinyl chloride	20	900		1200 U	6.4 U	6.6 U	6.3 U
Xylenes (total)	260	100000		NA	NA	NA	NA

J - Estimated value
B - Detected in Laboratory Method Blank
U - Indicates that the compound was analyzed for but not detected
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-1	MW-2	MW-3	MW-4	MW-4	MW-5
			Sample Date:	5/24/2006	5/24/2006	5/25/2006	5/23/2006	5/23/2006	5/25/2006
			Sample Depth (ft bls):	(10-11)	(10-12)	(10-12)	(11-12)	(15-16)	(10-11)
1,1'-Biphenyl	--	--		NA	NA	NA	NA	NA	NA
1,2,4,5-Tetrachlorobenzene	--	--		NA	NA	NA	NA	NA	NA
1-Chloronaphthalene	--	--		NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	--	--		NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	--	--		NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	--	--		NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	--	--		NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	--	--		NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	--	--		NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	--	--		NA	NA	NA	NA	NA	NA
2,6-Dichlorophenol	--	--		NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	--	--		NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	--	--		NA	NA	NA	NA	NA	NA
2-Chlorophenol	--	--		NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	--	--		150 J	600	1300 U	64 U	950	69 U
2-Methylphenol	330	100000		NA	NA	NA	NA	NA	NA
2-Nitroaniline	--	--		NA	NA	NA	NA	NA	NA
2-Nitrophenol	--	--		NA	NA	NA	NA	NA	NA
2-Picoline	--	--		NA	NA	NA	NA	NA	NA
3&4-Methylphenol	--	--		NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	--	--		NA	NA	NA	NA	NA	NA
3-Methylcholanthrene	--	--		NA	NA	NA	NA	NA	NA
3-Nitroaniline	--	--		NA	NA	NA	NA	NA	NA
4,6-Dinitro-o-cresol	--	--		NA	NA	NA	NA	NA	NA
4-Aminobiphenyl	--	--		NA	NA	NA	NA	NA	NA
4-Bromophenyl phenyl ether	--	--		NA	NA	NA	NA	NA	NA
4-Chloroaniline	--	--		NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	--	--		NA	NA	NA	NA	NA	NA
4-Nitroaniline	--	--		NA	NA	NA	NA	NA	NA
4-Nitrophenol	--	--		NA	NA	NA	NA	NA	NA
7,12-Dimethylbenz(a)anthracene	--	--		NA	NA	NA	NA	NA	NA
A,A-Dimethylphenethylamine	--	--		NA	NA	NA	NA	NA	NA
Acenaphthene	20000	100000		650 J	72 U	5400 J	67 U	62 U	72 U
Acenaphthylene	100000	100000		110 U	54 U	980 U	50 U	46 U	53 U
Acetophenone	--	--		NA	NA	NA	NA	NA	NA
a-Naphthylamine	--	--		NA	NA	NA	NA	NA	NA

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-1	MW-2	MW-3	MW-4	MW-4	MW-5
			Sample Date:	5/24/2006	5/24/2006	5/25/2006	5/23/2006	5/23/2006	5/25/2006
			Sample Depth (ft bls):	(10-11)	(10-12)	(10-12)	(11-12)	(15-16)	(10-11)
Aniline	--	--		NA	NA	NA	NA	NA	NA
Anthracene	100000	100000		1900	72 U	1700 J	140 J	62 U	72 U
Azobenzene	--	--		NA	NA	NA	NA	NA	NA
Benzidine	--	--		NA	NA	NA	NA	NA	NA
Benzo(e)pyrene	--	--		NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	1000	1000		**6000**	160 J	1100 U	510	63 JH	59 U
Benzo[a]pyrene	1000	1000		**5600**	160 J	980 U	470	46 U	160 J
Benzo[b]fluoranthene	1000	1000		**5300 M**	210 J	2200 U	520	110 U	120 U
Benzo[g,h,i]perylene	100000	100000		7300	150 J	880 U	620	61 J	48 U
Benzo[k]fluoranthene	800	3900		**2700 M**	86 J	880 U	210 JM	42 U	48 U
Benzoic Acid	--	--		NA	NA	NA	NA	NA	NA
Benzyl Alcohol	--	--		NA	NA	NA	NA	NA	NA
Bis(2-chloroethoxy)methane	--	--		NA	NA	NA	NA	NA	NA
Bis(2-chloroethyl) ether	--	--		NA	NA	NA	NA	NA	NA
Bis(2-chloroisopropyl)ether	--	--		NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl) phthalate	--	--		NA	NA	NA	NA	NA	NA
b-Naphthylamine	--	--		NA	NA	NA	NA	NA	NA
Butylbenzyl phthalate	--	--		NA	NA	NA	NA	NA	NA
Carbazole	--	--		NA	NA	NA	NA	NA	NA
Chlorobenzilate	--	--		NA	NA	NA	NA	NA	NA
Chrysene	1000	3900		**5000**	200 J	1000 U	500	64 J	55 U
Dibenzo[a,h]anthracene	330	330		**2300 H**	49 U	880 U	100 JM	42 U	48 U
Dibenzofuran	7000	59000		NA	NA	NA	NA	NA	NA
Diethyl phthalate	--	--		NA	NA	NA	NA	NA	NA
Dimethoate	--	--		NA	NA	NA	NA	NA	NA
Dimethyl phthalate	--	--		NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	--	--		NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	--	--		NA	NA	NA	NA	NA	NA
Ethyl Methanesulfonate	--	--		NA	NA	NA	NA	NA	NA
Fluoranthene	100000	100000		8100	390 J	1000 U	770	110 J	55 U
Fluorene	30000	100000		560 J	57 U	9300	52 U	49 U	56 U
Hexachlorobenzene	330	1200		NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	--	--		NA	NA	NA	NA	NA	NA
Hexachloroethane	--	--		NA	NA	NA	NA	NA	NA
Hexachloropropene	--	--		NA	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	500	500		**5800 H**	120 J	810 U	440	43 J	44 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in μg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-1	MW-2	MW-3	MW-4	MW-4	MW-5
			Sample Date:	5/24/2006	5/24/2006	5/25/2006	5/23/2006	5/23/2006	5/25/2006
			Sample Depth (ft bls):	(10-11)	(10-12)	(10-12)	(11-12)	(15-16)	(10-11)
Isodrin	--	--		NA	NA	NA	NA	NA	NA
Isophorone	--	--		NA	NA	NA	NA	NA	NA
Methyl methanesulfonate	--	--		NA	NA	NA	NA	NA	NA
NDPA/DPA	--	--		NA	NA	NA	NA	NA	NA
Nitrobenzene	--	--		NA	NA	NA	NA	NA	NA
Nitrosodi-n-butylamine	--	--		NA	NA	NA	NA	NA	NA
Nitrosodipiperidine	--	--		NA	NA	NA	NA	NA	NA
n-Nitrosodimethylamine	--	--		NA	NA	NA	NA	NA	NA
n-Nitrosodi-n-propylamine	--	--		NA	NA	NA	NA	NA	NA
p-Chloro-m-cresol	--	--		NA	NA	NA	NA	NA	NA
p-Dimethylaminoazobenzene	--	--		NA	NA	NA	NA	NA	NA
Pentachlorobenzene	--	--		NA	NA	NA	NA	NA	NA
Pentachloronitrobenzene	--	--		NA	NA	NA	NA	NA	NA
Pentachlorophenol	800	6700		NA	NA	NA	NA	NA	NA
Perylene	--	--		NA	NA	NA	NA	NA	NA
Phenacetin	--	--		NA	NA	NA	NA	NA	NA
Phenanthrene	100000	100000		5900	290 J	21000	600	120 J	51 U
Phenol	330	100000		NA	NA	NA	NA	NA	NA
Pronamide	--	--		NA	NA	NA	NA	NA	NA
Pyrene	100000	100000		11000	400 J	1900 J	1000	150 J	60 U
Pyridine	--	--		NA	NA	NA	NA	NA	NA

J - Estimated value
U - Indicates that the compound was analyzed for but not detected
M - Manually integrated compound
H - Alternate peak selection upon analytical review
μg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)
1,1'-Biphenyl	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
1,2,4,5-Tetrachlorobenzene	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
1-Chloronaphthalene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
1-Methylnaphthalene	--	--		7700 U	21000	40000 U	4300 U	4100 U	2100 U
2,4,5-Trichlorophenol	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
2,4,6-Trichlorophenol	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
2,4-Dichlorophenol	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
2,4-Dimethylphenol	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
2,4-Dinitrophenol	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
2,4-Dinitrotoluene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
2,6-Dichlorophenol	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
2,6-Dinitrotoluene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
2-Chloronaphthalene	--	--		9200 U	24000 U	48000 U	5100 U	4900 U	2500 U
2-Chlorophenol	--	--		9200 U	24000 U	48000 U	5100 U	4900 U	2500 U
2-Methylnaphthalene	--	--		7700 U	20000 U	40000 U	5000	4100 U	2100 U
2-Methylphenol	330	100000		9200 U	24000 U	48000 U	5100 U	4900 U	2500 U
2-Nitroaniline	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
2-Nitrophenol	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
2-Picoline	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
3&4-Methylphenol	--	--		9200 U	24000 U	48000 U	5100 U	4900 U	2500 U
3,3'-Dichlorobenzidine	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
3-Methylcholanthrene	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
3-Nitroaniline	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
4,6-Dinitro-o-cresol	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
4-Aminobiphenyl	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
4-Bromophenyl phenyl ether	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
4-Chloroaniline	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
4-Chlorophenyl phenyl ether	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
4-Nitroaniline	--	--		11000 U	27000 U	56000 U	6000 U	5800 U	2900 U
4-Nitrophenol	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
7,12-Dimethylbenz(a)anthracene	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
A,A-Dimethylphenethylamine	--	--		77000 U	200000 U	400000 U	43000 U	41000 U	21000 U
Acenaphthene	20000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Acenaphthylene	100000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Acetophenone	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
a-Naphthylamine	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-6 4/17/2007 (10-11)	MW-6D 4/17/2007 (13-14)	MW-6 4/17/2007 (14-15)	MW-7A 4/17/2007 (4-5)	MW-7A 4/17/2007 (6-7)	MW-8 4/23/2007 (13-14)
Aniline	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Anthracene	100000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Azobenzene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzidine	--	--		77000 U	200000 U	400000 U	43000 U	41000 U	21000 U
Benzo(e)pyrene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzo[a]anthracene	1000	1000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzo[a]pyrene	1000	1000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzo[b]fluoranthene	1000	1000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzo[g,h,i]perylene	100000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzo[k]fluoranthene	800	3900		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Benzoic Acid	--	--		77000 U	200000 U	400000 U	43000 U	41000 U	21000 U
Benzyl Alcohol	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Bis(2-chloroethoxy)methane	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Bis(2-chloroethyl) ether	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Bis(2-chloroisopropyl)ether	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Bis(2-ethylhexyl) phthalate	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
b-Naphthylamine	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
Butylbenzyl phthalate	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Carbazole	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Chlorobenzilate	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
Chrysene	1000	3900		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Dibenzo[a,h]anthracene	330	330		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Dibenzofuran	7000	59000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Diethyl phthalate	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Dimethoate	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
Dimethyl phthalate	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Di-n-butyl phthalate	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Di-n-octyl phthalate	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Ethyl Methanesulfonate	--	--		23000 U	59000 U	120000 U	13000 U	12000 U	6200 U
Fluoranthene	100000	100000		8400	20000 U	40000 U	4300 U	4100 U	2100 U
Fluorene	30000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Hexachlorobenzene	330	1200		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Hexachlorocyclopentadiene	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Hexachloroethane	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Hexachloropropene	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Indeno[1,2,3-cd]pyrene	500	500		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)
Isodrin	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Isophorone	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Methyl methanesulfonate	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
NDPA/DPA	--	--		23000 U	59000 U	120000 U	13000 U	12000 U	6200 U
Nitrobenzene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Nitrosodi-n-butylamine	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Nitrosodipiperidine	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
n-Nitrosodimethylamine	--	--		77000 U	200000 U	400000 U	43000 U	41000 U	21000 U
n-Nitrosodi-n-propylamine	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
p-Chloro-m-cresol	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
p-Dimethylaminoazobenzene	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Pentachlorobenzene	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
Pentachloronitrobenzene	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Pentachlorophenol	800	6700		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
Perylene	--	--		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Phenacetin	--	--		15000 U	39000 U	80000 U	8500 U	8200 U	4200 U
Phenanthrene	100000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Phenol	330	100000		11000 U	27000 U	56000 U	6000 U	5800 U	2900 U
Pronamide	--	--		31000 U	78000 U	160000 U	17000 U	16000 U	8300 U
Pyrene	100000	100000		7700 U	20000 U	40000 U	4300 U	4100 U	2100 U
Pyridine	--	--		77000 U	200000 U	400000 U	43000 U	41000 U	21000 U

J - Estimated value
U - Indicates that the compound was analyzed for but not detected
M - Manually integrated compound
H - Alternate peak selection upon analytical review
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
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Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC
Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-8	MW-9	MW-9	MW-10	MW-11	MW-11
			Sample Date:	4/23/2007	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007
			Sample Depth (ft bls):	(6-7)	(14-15)	(15.5)	(5-6)	(25-26)	(7-8)
1,1'-Biphenyl	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
1,2,4,5-Tetrachlorobenzene	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
1-Chloronaphthalene	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
1-Methylnaphthalene	--	--		7900 U	750	2200 U	390 U	410 U	410 U
2,4,5-Trichlorophenol	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
2,4,6-Trichlorophenol	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
2,4-Dichlorophenol	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
2,4-Dimethylphenol	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
2,4-Dinitrophenol	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
2,4-Dinitrotoluene	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
2,6-Dichlorophenol	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
2,6-Dinitrotoluene	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
2-Chloronaphthalene	--	--		9500 U	470 U	2600 U	470 U	490 U	490 U
2-Chlorophenol	--	--		9500 U	470 U	2600 U	470 U	490 U	490 U
2-Methylnaphthalene	--	--		11000	910	2200 U	390 U	410 U	410 U
2-Methylphenol	330	100000		9500 U	470 U	2600 U	470 U	490 U	490 U
2-Nitroaniline	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
2-Nitrophenol	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
2-Picoline	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
3&4-Methylphenol	--	--		9500 U	470 U	2600 U	470 U	490 U	490 U
3,3'-Dichlorobenzidine	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
3-Methylcholanthrene	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
3-Nitroaniline	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
4,6-Dinitro-o-cresol	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
4-Aminobiphenyl	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
4-Bromophenyl phenyl ether	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
4-Chloroaniline	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
4-Chlorophenyl phenyl ether	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
4-Nitroaniline	--	--		11000 U	550 U	3000 U	550 U	570 U	580 U
4-Nitrophenol	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
7,12-Dimethylbenz(a)anthracene	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
A,A-Dimethylphenethylamine	--	--		79000 U	3900 U	22000 U	3900 U	4100 U	4100 U
Acenaphthene	20000	100000		7900 U	390 U	2200 U	390 U	410 U	410 U
Acenaphthylene	100000	100000		7900 U	390 U	2200 U	390 U	410 U	410 U
Acetophenone	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
a-Naphthylamine	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-8	MW-9	MW-9	MW-10	MW-11	MW-11
			Sample Date:	4/23/2007	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007
			Sample Depth (ft bls):	(6-7)	(14-15)	(15.5)	(5-6)	(25-26)	(7-8)
Aniline	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Anthracene	100000	100000		7900 U	390 U	2200 U	390 U	410 U	410 U
Azobenzene	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Benzidine	--	--		79000 U	3900 U	22000 U	3900 U	4100 U	4100 U
Benzo(e)pyrene	--	--		7900 U	390 U	2200 U	960	410 U	410 U
Benzo[a]anthracene	1000	1000		7900 U	520	2200 U	**1500**	410 U	410 U
Benzo[a]pyrene	1000	1000		7900 U	390 U	2200 U	**1400**	410 U	410 U
Benzo[b]fluoranthene	1000	1000		7900 U	400	2200 U	**1800**	410 U	410 U
Benzo[g,h,i]perylene	100000	100000		7900 U	390 U	2200 U	860	410 U	410 U
Benzo[k]fluoranthene	800	3900		7900 U	390 U	2200 U	740	410 U	410 U
Benzoic Acid	--	--		79000 U	3900 U	22000 U	3900 U	4100 U	4100 U
Benzyl Alcohol	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Bis(2-chloroethoxy)methane	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Bis(2-chloroethyl) ether	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Bis(2-chloroisopropyl)ether	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Bis(2-ethylhexyl) phthalate	--	--		16000 U	2600	4300 U	1100	1400	820 U
b-Naphthylamine	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
Butylbenzyl phthalate	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Carbazole	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Chlorobenzilate	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
Chrysene	1000	3900		7900 U	470	2200 U	**1400**	410 U	410 U
Dibenzo[a,h]anthracene	330	330		7900 U	390 U	2200 U	390 U	410 U	410 U
Dibenzofuran	7000	59000		7900 U	390 U	2200 U	390 U	410 U	410 U
Diethyl phthalate	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Dimethoate	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
Dimethyl phthalate	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Di-n-butyl phthalate	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Di-n-octyl phthalate	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Ethyl Methanesulfonate	--	--		24000 U	1200 U	6500 U	1200 U	1200 U	1200 U
Fluoranthene	100000	100000		7900 U	1600	2200 U	2200	410 U	410 U
Fluorene	30000	100000		7900 U	390 U	2200 U	390 U	410 U	410 U
Hexachlorobenzene	330	1200		7900 U	390 U	2200 U	390 U	410 U	410 U
Hexachlorocyclopentadiene	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Hexachloroethane	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Hexachloropropene	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Indeno[1,2,3-cd]pyrene	500	500		7900 U	390 U	2200 U	**710**	410 U	410 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	Sample Designation:	MW-8	MW-9	MW-9	MW-10	MW-11	MW-11
			Sample Date:	4/23/2007	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007
			Sample Depth (ft bls):	(6-7)	(14-15)	(15.5)	(5-6)	(25-26)	(7-8)
Isodrin	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Isophorone	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Methyl methanesulfonate	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
NDPA/DPA	--	--		24000 U	1200 U	6500 U	1200 U	1200 U	1200 U
Nitrobenzene	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Nitrosodi-n-butylamine	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Nitrosodipiperidine	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
n-Nitrosodimethylamine	--	--		79000 U	3900 U	22000 U	3900 U	4100 U	4100 U
n-Nitrosodi-n-propylamine	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
p-Chloro-m-cresol	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
p-Dimethylaminoazobenzene	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Pentachlorobenzene	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
Pentachloronitrobenzene	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Pentachlorophenol	800	6700		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
Perylene	--	--		7900 U	390 U	2200 U	390 U	410 U	410 U
Phenacetin	--	--		16000 U	780 U	4300 U	780 U	810 U	820 U
Phenanthrene	100000	100000		7900 U	1500	2200 U	1000	410 U	410 U
Phenol	330	100000		11000 U	550 U	3000 U	550 U	570 U	580 U
Pronamide	--	--		32000 U	1600 U	8600 U	1600 U	1600 U	1600 U
Pyrene	100000	100000		7900 U	1300	2200 U	1900	410 U	410 U
Pyridine	--	--		79000 U	3900 U	22000 U	3900 U	4100 U	4100 U

J - Estimated value
U - Indicates that the compound was analyzed for but not detected
M - Manually integrated compound
H - Alternate peak selection upon analytical review
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC
Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC
Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-12 4/25/2007 (17-18)	MW-12 4/25/2007 (3-4)	MW-12 4/25/2007 (8-9)
1,1'-Biphenyl	--	--		430 U	4400 U	420 U
1,2,4,5-Tetrachlorobenzene	--	--		1700 U	18000 U	1700 U
1-Chloronaphthalene	--	--		430 U	4400 U	420 U
1-Methylnaphthalene	--	--		430 U	4400 U	420 U
2,4,5-Trichlorophenol	--	--		430 U	4400 U	420 U
2,4,6-Trichlorophenol	--	--		430 U	4400 U	420 U
2,4-Dichlorophenol	--	--		850 U	8800 U	840 U
2,4-Dimethylphenol	--	--		430 U	4400 U	420 U
2,4-Dinitrophenol	--	--		1700 U	18000 U	1700 U
2,4-Dinitrotoluene	--	--		430 U	4400 U	420 U
2,6-Dichlorophenol	--	--		850 U	8800 U	840 U
2,6-Dinitrotoluene	--	--		430 U	4400 U	420 U
2-Chloronaphthalene	--	--		510 U	5300 U	510 U
2-Chlorophenol	--	--		510 U	5300 U	510 U
2-Methylnaphthalene	--	--		430 U	4400 U	420 U
2-Methylphenol	330	100000		510 U	5300 U	510 U
2-Nitroaniline	--	--		430 U	4400 U	420 U
2-Nitrophenol	--	--		1700 U	18000 U	1700 U
2-Picoline	--	--		1700 U	18000 U	1700 U
3&4-Methylphenol	--	--		510 U	5300 U	510 U
3,3'-Dichlorobenzidine	--	--		850 U	8800 U	840 U
3-Methylcholanthrene	--	--		1700 U	18000 U	1700 U
3-Nitroaniline	--	--		430 U	4400 U	420 U
4,6-Dinitro-o-cresol	--	--		1700 U	18000 U	1700 U
4-Aminobiphenyl	--	--		850 U	8800 U	840 U
4-Bromophenyl phenyl ether	--	--		430 U	4400 U	420 U
4-Chloroaniline	--	--		430 U	4400 U	420 U
4-Chlorophenyl phenyl ether	--	--		430 U	4400 U	420 U
4-Nitroaniline	--	--		600 U	6100 U	590 U
4-Nitrophenol	--	--		850 U	8800 U	840 U
7,12-Dimethylbenz(a)anthracene	--	--		850 U	8800 U	840 U
A,A-Dimethylphenethylamine	--	--		4300 U	44000 U	4200 U
Acenaphthene	20000	100000		430 U	4400 U	420 U
Acenaphthylene	100000	100000		430 U	4400 U	420 U
Acetophenone	--	--		1700 U	18000 U	1700 U
a-Naphthylamine	--	--		1700 U	18000 U	1700 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-12	MW-12	MW-12
			Sample Date:	4/25/2007	4/25/2007	4/25/2007
			Sample Depth (ft bls):	(17-18)	(3-4)	(8-9)
Aniline	--	--		850 U	8800 U	840 U
Anthracene	100000	100000		430 U	4400 U	420 U
Azobenzene	--	--		430 U	4400 U	420 U
Benzidine	--	--		4300 U	44000 U	4200 U
Benzo(e)pyrene	--	--		430 U	4600	420 U
Benzo[a]anthracene	1000	1000		430 U	**7100**	420 U
Benzo[a]pyrene	1000	1000		430 U	**5900**	420 U
Benzo[b]fluoranthene	1000	1000		430 U	**5900**	420 U
Benzo[g,h,i]perylene	100000	100000		430 U	4500	420 U
Benzo[k]fluoranthene	800	3900		430 U	4400 U	420 U
Benzoic Acid	--	--		4300 U	44000 U	4200 U
Benzyl Alcohol	--	--		850 U	8800 U	840 U
Bis(2-chloroethoxy)methane	--	--		430 U	4400 U	420 U
Bis(2-chloroethyl) ether	--	--		430 U	4400 U	420 U
Bis(2-chloroisopropyl)ether	--	--		430 U	4400 U	420 U
Bis(2-ethylhexyl) phthalate	--	--		850	8800 U	840 U
b-Naphthylamine	--	--		1700 U	18000 U	1700 U
Butylbenzyl phthalate	--	--		430 U	4400 U	420 U
Carbazole	--	--		430 U	4400 U	420 U
Chlorobenzilate	--	--		1700 U	18000 U	1700 U
Chrysene	1000	3900		430 U	**6600**	420 U
Dibenzo[a,h]anthracene	330	330		430 U	4400 U	420 U
Dibenzofuran	7000	59000		430 U	4400 U	420 U
Diethyl phthalate	--	--		430 U	4400 U	420 U
Dimethoate	--	--		1700 U	18000 U	1700 U
Dimethyl phthalate	--	--		430 U	4400 U	420 U
Di-n-butyl phthalate	--	--		430 U	4400 U	420 U
Di-n-octyl phthalate	--	--		430 U	4400 U	420 U
Ethyl Methanesulfonate	--	--		1300 U	13000 U	1300 U
Fluoranthene	100000	100000		430 U	12000	420 U
Fluorene	30000	100000		430 U	4400 U	420 U
Hexachlorobenzene	330	1200		430 U	4400 U	420 U
Hexachlorocyclopentadiene	--	--		850 U	8800 U	840 U
Hexachloroethane	--	--		430 U	4400 U	420 U
Hexachloropropene	--	--		850 U	8800 U	840 U
Indeno[1,2,3-cd]pyrene	500	500		430 U	4400 U	420 U

Table 2. Summary of Semivolatile Organic Compounds in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-12	MW-12	MW-12
			Sample Date:	4/25/2007	4/25/2007	4/25/2007
			Sample Depth (ft bls):	(17-18)	(3-4)	(8-9)
Isodrin	--	--		850 U	8800 U	840 U
Isophorone	--	--		430 U	4400 U	420 U
Methyl methanesulfonate	--	--		1700 U	18000 U	1700 U
NDPA/DPA	--	--		1300 U	13000 U	1300 U
Nitrobenzene	--	--		430 U	4400 U	420 U
Nitrosodi-n-butylamine	--	--		850 U	8800 U	840 U
Nitrosodipiperidine	--	--		1700 U	18000 U	1700 U
n-Nitrosodimethylamine	--	--		4300 U	44000 U	4200 U
n-Nitrosodi-n-propylamine	--	--		430 U	4400 U	420 U
p-Chloro-m-cresol	--	--		430 U	4400 U	420 U
p-Dimethylaminoazobenzene	--	--		850 U	8800 U	840 U
Pentachlorobenzene	--	--		1700 U	18000 U	1700 U
Pentachloronitrobenzene	--	--		850 U	8800 U	840 U
Pentachlorophenol	800	6700		1700 U	18000 U	1700 U
Perylene	--	--		430 U	4400 U	420 U
Phenacetin	--	--		850 U	8800 U	840 U
Phenanthrene	100000	100000		430 U	8800	420 U
Phenol	330	100000		600 U	6100 U	590 U
Pronamide	--	--		1700 U	18000 U	1700 U
Pyrene	100000	100000		430 U	11000	420 U
Pyridine	--	--		4300 U	44000 U	4200 U

J - Estimated value
U - Indicates that the compound was analyzed for but not detected
M - Manually integrated compound
H - Alternate peak selection upon analytical review
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 3. Summary of Metals in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-1	MW-2	MW-3	MW-4	MW-4	MW-5
			Sample Date:	5/24/2006	5/24/2006	5/25/2006	5/23/2006	5/23/2006	5/25/2006
			Sample Depth (ft bls):	(10-11)	(10-12)	(10-12)	(11-12)	(15-16)	(10-11)
Aluminum	--	--		NA	NA	NA	NA	NA	NA
Antimony	--	--		NA	NA	NA	NA	NA	NA
Arsenic	13	16		6.2	1.6	1.4	2.6	2	1.5
Barium	350	400		104	45	20.4	91.9	121	16
Beryllium	7.2	72		NA	NA	NA	NA	NA	NA
Cadmium	2.5	4.3		1	1.3	1.1	1.3	0.96	1.2
Calcium	--	--		NA	NA	NA	NA	NA	NA
Chromium	30	180		10.8	9.6	10.9	10.8	23.6	8.3
Cobalt	--	--		NA	NA	NA	NA	NA	NA
Copper	50	270		NA	NA	NA	NA	NA	NA
Iron	--	--		NA	NA	NA	NA	NA	NA
Lead	63	400		**170**	41.3	6.1	**80.2**	11.3	4.2
Magnesium	--	--		NA	NA	NA	NA	NA	NA
Manganese	1600	2000		NA	NA	NA	NA	NA	NA
Mercury	0.18	0.81		**0.85**	0.018	0.013	**1.6**	**1**	0.015
Nickel	30	310		NA	NA	NA	NA	NA	NA
Potassium	--	--		NA	NA	NA	NA	NA	NA
Selenium	3.9	180		1.6	2.1	1.8	2.1	1.5	1.9
Silver	2	180		0.32	0.41	0.36	0.41	0.31	0.38
Sodium	--	--		NA	NA	NA	NA	NA	NA
Thallium	--	--		NA	NA	NA	NA	NA	NA
Vanadium	--	--		NA	NA	NA	NA	NA	NA
Zinc	109	10000		NA	NA	NA	NA	NA	NA

U - Indicates that the compound was analyzed for but not detected
mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
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Part 375 Unrestricted Use Standards
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NA - Compound was not analyzed by laboratory

Table 3. Summary of Metals in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)	(6-7)
Aluminum	--	--		3100	6000	5500	7600	7800	9000	8600
Antimony	--	--		2.3	2.3	2.4	2.6	2.4	2.5	2.4
Arsenic	13	16		**21**	10	6.5	3	3.5	3.2	5.6
Barium	350	400		41	26	16	14	13	18	9.7
Beryllium	7.2	72		0.23	0.23	0.24	0.35	0.28	0.43	0.42
Cadmium	2.5	4.3		0.46	0.46	0.48	0.51	0.49	0.5	0.47
Calcium	--	--		9700	4200	780	1000	1600	1000	690
Chromium	30	180		8.8	11	8	11	11	12	11
Cobalt	--	--		2.4	5.4	4.2	4	6.3	8	7.7
Copper	50	270		33	16	10	8.4	12	14	15
Iron	--	--		19000	21000	18000	16000	12000	17000	13000
Lead	63	400		63	11	5.4	6.8	9.4	6.4	6.2
Magnesium	--	--		1200	2400	2400	2200	2600	3000	3000
Manganese	1600	2000		75	220	400	92	97	310	90
Mercury	0.18	0.81		0.12	0.09	0.09	0.1	0.1	0.1	0.1
Nickel	30	310		6.2	16	11	9.8	14	15	16
Potassium	--	--		730	720	500	600	660	760	700
Selenium	3.9	180		2.3	0.93	0.95	1	0.98	2.5	2.4
Silver	2	180		0.46	0.46	0.48	0.51	0.49	0.5	0.47
Sodium	--	--		240	170	110	150	110	270	240
Thallium	--	--		0.91	0.93	0.95	1	0.98	2.5	2.4
Vanadium	--	--		13	15	11	14	14	19	15
Zinc	109	10000		53	55	27	23	30	76	33

U - Indicates that the compound was analyzed for but not detected
mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 3. Summary of Metals in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-9	MW-9	MW-10	MW-11	MW-11	MW-12	MW-12
			Sample Date:	4/23/2007	4/23/2007	4/24/2007	4/24/2007	4/24/2007	4/25/2007	4/25/2007
			Sample Depth (ft bls):	(14-15)	(15.5)	(5-6)	(25-26)	(7-8)	(17-18)	(3-4)
Aluminum	--	--		5400	7300	3500	4300	7300	7100	7300
Antimony	--	--		2.3	2.6	2.3	2.4	2.4	2.6	2.6
Arsenic	13	16		3.3	3.4	8	0.93	2.1	1.4	6.2
Barium	350	400		28	22	120	30	30	13	71
Beryllium	7.2	72		0.32	0.38	0.28	0.34	0.24	0.3	0.36
Cadmium	2.5	4.3		0.46	0.52	0.47	0.48	0.49	0.51	0.52
Calcium	--	--		3200	1900	6200	1200	1100	560	4100
Chromium	30	180		11	21	9.2	8.9	13	14	11
Cobalt	--	--		3.9	8.6	4.5	4.3	3.1	4.1	5.1
Copper	50	270		17	17	29	11	10	11	21
Iron	--	--		10000	13000	8900	13000	9500	13000	12000
Lead	63	400		15	10	**210**	3.1	12	4.8	63
Magnesium	--	--		2000	2300	1800	2000	2600	2700	2300
Manganese	1600	2000		110	150	120	120	70	120	180
Mercury	0.18	0.81		0.09	0.1	**0.53**	0.1	0.1	0.1	0.1
Nickel	30	310		10	19	11	7.6	10	12	12
Potassium	--	--		910	1300	570	1300	1000	640	790
Selenium	3.9	180		2.3	2.6	2.3	2.4	2.4	2.6	2.6
Silver	2	180		0.46	0.52	0.47	0.48	0.49	0.51	0.52
Sodium	--	--		1500	2100	1400	220	920	140	440
Thallium	--	--		2.3	2.6	2.3	2.4	2.4	2.6	2.6
Vanadium	--	--		8.3	12	12	16	16	16	16
Zinc	109	10000		130	70	**250**	33	61	31	84

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mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC
Part 375 Unrestricted Use Standards
Shaded data indicates that parameter was detected above the NYSDEC
Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 3. Summary of Metals in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-12 4/25/2007 (8-9)
Aluminum	--	--		7000
Antimony	--	--		2.5
Arsenic	13	16		1.5
Barium	350	400		9
Beryllium	7.2	72		0.3
Cadmium	2.5	4.3		0.5
Calcium	--	--		510
Chromium	30	180		12
Cobalt	--	--		4
Copper	50	270		11
Iron	--	--		13000
Lead	63	400		5.4
Magnesium	--	--		2600
Manganese	1600	2000		120
Mercury	0.18	0.81		0.1
Nickel	30	310		12
Potassium	--	--		590
Selenium	3.9	180		2.5
Silver	2	180		0.5
Sodium	--	--		120
Thallium	--	--		2.5
Vanadium	--	--		15
Zinc	109	10000		30

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mg/kg - Milligrams per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Restricted Residential Standards available
Bold data indicates that parameter was detected above the NYSDEC
Part 375 Unrestricted Use Standards
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Part 375 Restricted Residential Standards
NA - Compound was not analyzed by laboratory

Table 4. Summary of Polychlorinated Biphenyls in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-6D 4/17/2007 (13-14)	MW-6 4/17/2007 (14-15)	MW-7A 4/17/2007 (4-5)	MW-8 4/23/2007 (6-7)	MW-9 4/23/2007 (14-15)	MW-10 4/24/2007 (5-6)	MW-11 4/24/2007 (7-8)	MW-12 4/25/2007 (17-18)
Aroclor-1016	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Aroclor-1221	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Aroclor-1232	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Aroclor-1242	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Aroclor-1248	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Aroclor-1254	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Aroclor-1260	--	--		39.2 U	40.2 U	42.7 U	39.7 U	39.2 U	39.2 U	41.2 U	42.7 U
Total PCBs	100	1000		0	0	0	0	0	0	0	0

U - Indicates that the compound was analyzed for but not detected

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Restricted Residential Standards available

PCBs - Polychlorinated Biphenyls

Table 4. Summary of Polychlorinated Biphenyls in Soil, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-12 4/25/2007 (8-9)
Aroclor-1016	--	--		42.2 U
Aroclor-1221	--	--		42.2 U
Aroclor-1232	--	--		42.2 U
Aroclor-1242	--	--		42.2 U
Aroclor-1248	--	--		42.2 U
Aroclor-1254	--	--		42.2 U
Aroclor-1260	--	--		42.2 U
Total PCBs	100	1000		0

U - Indicates that the compound was analyzed for but not detected

µg/kg - Micrograms per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Restricted Residential Standards available

PCBs - Polychlorinated Biphenyls

Table 5. Summary of Pesticides in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:**	MW-6	MW-6D	MW-6	MW-7A	MW-7A	MW-8	MW-8
			Sample Date:	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/17/2007	4/23/2007	4/23/2007
			Sample Depth (ft bls):	(10-11)	(13-14)	(14-15)	(4-5)	(6-7)	(13-14)	(6-7)
4,4'-DDD	3.3	13000		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
4,4'-DDE	3.3	8900		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
4,4'-DDT	3.3	7900		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Aldrin	5	97		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
alpha-BHC	20	480		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
beta-BHC	36	360		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Chlordane	--	--		NA	78.4 U	80.3 U	85.5 U	NA	NA	79.4 U
cis-Chlordane	--	--		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
delta-BHC	40	100000		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Dieldrin	5	200		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Endosulfan I	2400	24000		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Endosulfan II	2400	24000		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Endosulfan sulfate	2400	24000		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Endrin aldehyde	--	--		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Endrin ketone	--	--		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Endrin	14	11000		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
gamma-BHC (Lindane)	100	1300		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Heptachlor epoxide	--	--		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Heptachlor	42	2100		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U
Methoxychlor	--	--		NA	78.4 U	80.3 U	85.5 U	NA	NA	79.4 U
Toxaphene	--	--		NA	78.4 U	80.3 U	85.5 U	NA	NA	79.4 U
trans-Chlordane	--	--		NA	19.6 U	20.1 U	21.4 U	NA	NA	19.8 U

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µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Standards available
NA - Compound was not analyzed by laboratory

Table 5. Summary of Pesticides in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-9 4/23/2007 (14-15)	MW-9 4/23/2007 (15.5)	MW-10 4/24/2007 (5-6)	MW-11 4/24/2007 (25-26)	MW-11 4/24/2007 (7-8)	MW-12 4/25/2007 (17-18)	MW-12 4/25/2007 (3-4)
4,4'-DDD	3.3	13000		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
4,4'-DDE	3.3	8900		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
4,4'-DDT	3.3	7900		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Aldrin	5	97		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
alpha-BHC	20	480		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
beta-BHC	36	360		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Chlordane	--	--		78.4 U	NA	78.4 U	NA	16.5 U	17.1 U	NA
cis-Chlordane	--	--		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
delta-BHC	40	100000		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Dieldrin	5	200		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Endosulfan I	2400	24000		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Endosulfan II	2400	24000		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Endosulfan sulfate	2400	24000		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Endrin aldehyde	--	--		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Endrin ketone	--	--		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Endrin	14	11000		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
gamma-BHC (Lindane)	100	1300		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Heptachlor epoxide	--	--		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Heptachlor	42	2100		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA
Methoxychlor	--	--		78.4 U	NA	78.4 U	NA	16.5 U	17.1 U	NA
Toxaphene	--	--		78.4 U	NA	78.4 U	NA	16.5 U	17.1 U	NA
trans-Chlordane	--	--		19.6 U	NA	19.6 U	NA	4.12 U	4.27 U	NA

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NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Standards available
NA - Compound was not analyzed by laboratory

Table 5. Summary of Pesticides in Soil, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	**Sample Designation:** **Sample Date:** **Sample Depth (ft bls):**	MW-12 4/25/2007 (8-9)
4,4'-DDD	3.3	13000		4.22 U
4,4'-DDE	3.3	8900		4.22 U
4,4'-DDT	3.3	7900		4.22 U
Aldrin	5	97		4.22 U
alpha-BHC	20	480		4.22 U
beta-BHC	36	360		4.22 U
Chlordane	--	--		16.9 U
cis-Chlordane	--	--		4.22 U
delta-BHC	40	100000		4.22 U
Dieldrin	5	200		4.22 U
Endosulfan I	2400	24000		4.22 U
Endosulfan II	2400	24000		4.22 U
Endosulfan sulfate	2400	24000		4.22 U
Endrin aldehyde	--	--		4.22 U
Endrin ketone	--	--		4.22 U
Endrin	14	11000		4.22 U
gamma-BHC (Lindane)	100	1300		4.22 U
Heptachlor epoxide	--	--		4.22 U
Heptachlor	42	2100		4.22 U
Methoxychlor	--	--		16.9 U
Toxaphene	--	--		16.9 U
trans-Chlordane	--	--		4.22 U

U - Indicates that the compound was analyzed for but not detected
µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
NYSDEC - New York State Department of Environmental Conservation
-- No NYSDEC Part 375 Standards available
NA - Compound was not analyzed by laboratory

Table 6. Summary of Volatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	FIELD BLANK	FIELD BLANK	MW-1	MW-4	MW-4	MW-5	MW-5
		Sample Date:	5/3/2007	6/5/2006	6/5/2006	5/2/2007	6/5/2006	5/2/2007	6/5/2006
1,1,1,2-Tetrachloroethane	5		0.5 U	NA	NA	2.5 U	NA	0.5 U	NA
1,1,1-Trichloroethane	5		0.5 U	0.4 U	0.4 U	2.5 U	0.4 U	0.5 U	0.4 U
1,1,2,2-Tetrachloroethane	5		0.5 U	0.4 U	0.4 U	2.5 U	0.4 U	0.5 U	0.4 U
1,1,2-Trichloroethane	1		0.75 U	0.6 U	0.6 U	3.8 U	0.6 U	0.75 U	0.6 U
1,1-Dichloroethane	5		0.75 U	0.6 U	0.6 U	3.8 U	0.6 U	0.75 U	0.6 U
1,1-Dichloroethene	5		0.5 U	0.7 U	0.7 U	2.5 U	0.7 U	0.5 U	0.7 U
1,1-Dichloropropene	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,2,3-Trichlorobenzene	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,2,3-Trichloropropane	0.04		5 U	NA	NA	25 U	NA	5 U	NA
1,2,4-Trichlorobenzene	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,2,4-Trimethylbenzene	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,2-Dibromo-3-chloropropane	0.04		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,2-Dibromoethane	5		2 U	NA	NA	10 U	NA	2 U	NA
1,2-Dichlorobenzene	3		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,2-Dichloroethane	0.6		0.5 U	0.6 U	0.6 U	2.5 U	0.6 U	0.5 U	0.6 U
1,2-Dichloropropane	1		1.8 U	0.9 U	0.9 U	8.8 U	0.9 U	1.8 U	0.9 U
1,3,5-Trimethylbenzene	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,3-Dichlorobenzene	3		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,3-Dichloropropane	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,4-Dichlorobenzene	3		2.5 U	NA	NA	12 U	NA	2.5 U	NA
1,4-Dichlorobutane	--		5 U	NA	NA	25 U	NA	5 U	NA
2,2-Dichloropropane	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
2-Butanone (MEK)	50		5 U	1.2 U	1.2 U	25 U	1.2 U	5 U	1.2 U
2-Hexanone	50		5 U	0.8 U	0.8 U	25 U	0.8 U	5 U	0.8 U
4-Methyl-2-pentanone (MIBK)	--		5 U	0.7 U	0.7 U	25 U	0.7 U	5 U	0.7 U
Acetone	50		5 U	2.3 J	1.4 U	25 U	1.4 U	5 U	1.4 U
Acrolein	5		12 U	NA	NA	62 U	NA	12 U	NA
Acrylonitrile	5		5 U	NA	NA	25 U	NA	5 U	NA
Benzene	1		0.5 U	0.4 U	0.4 U	2.5 U	0.4 U	0.5 U	0.4 U
Bromobenzene	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
Bromochloromethane	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
Bromodichloromethane	50		0.5 U	0.4 U	0.4 U	2.5 U	0.4 U	0.5 U	0.4 U
Bromoform	50		2 U	0.8 U	0.8 U	10 U	0.8 U	2 U	0.8 U
Bromomethane	5		1 U	1.2 U	1.2 U	5 U	1.2 U	1 U	1.2 U

Table 6. Summary of Volatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	FIELD BLANK	FIELD BLANK	MW-1	MW-4	MW-4	MW-5	MW-5
		Sample Date:	5/3/2007	6/5/2006	6/5/2006	5/2/2007	6/5/2006	5/2/2007	6/5/2006
Carbon disulfide	60		5 U	0.9 U	0.9 U	25 U	0.9 U	5 U	0.9 U
Carbon tetrachloride	5		0.5 U	1 U	1 U	2.5 U	1 U	0.5 U	1 U
Chlorobenzene	5		0.5 U	0.4 U	0.4 U	2.5 U	0.4 U	0.5 U	0.4 U
Chloroethane	5		1 U	0.8 U	0.8 U	5 U	0.8 U	1 U	0.8 U
Chloroform	7		0.75 U	0.7 U	0.7 U	3.8 U	0.7 U	0.75 U	0.7 U
Chloromethane	--		2.5 U	0.5 U	0.5 U	12 U	0.5 U	2.5 U	0.5 U
cis-1,2-Dichloroethene	5		0.5 U	0.6 U	0.6 U	2.5 U	0.6 U	0.5 U	0.6 U
cis-1,3-Dichloropropene	5		0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	50		0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	5		5 U	NA	NA	25 U	NA	5 U	NA
Dichlorodifluoromethane	5		5 U	NA	NA	25 U	NA	5 U	NA
Ethyl ether	--		2.5 U	NA	NA	12 U	NA	2.5 U	NA
Ethyl Methacrylate	--		5 U	NA	NA	25 U	NA	5 U	NA
Ethylbenzene	5		0.5 U	1 U	2.4 J	2.5 U	**5.1**	0.5 U	1.2 J
Hexachlorobutadiene	0.5		0.6 U	NA	NA	3 U	NA	0.6 U	NA
Iodomethane	--		5 U	NA	NA	25 U	NA	5 U	NA
Isopropylbenzene	5		0.5 U	NA	NA	**56**	NA	0.5 U	NA
m+p-Xylene	5		1 U	NA	NA	5 U	NA	1 U	NA
Methylene chloride	5		5 U	0.87 J	0.4 U	25 U	0.4 U	5 U	0.4 U
MTBE	10		1 U	0.3 U	0.3 U	5 U	0.3 U	1 U	1.5 J
Naphthalene	10		2.5 U	NA	0.7 U	**20**	**27**	2.5 U	0.7 U
n-Butylbenzene	5		0.5 U	NA	NA	**36**	NA	0.5 U	NA
n-Propylbenzene	5		0.5 U	NA	NA	**82**	NA	0.5 U	NA
o-Chlorotoluene	--		2.5 U	NA	NA	12 U	NA	2.5 U	NA
o-Xylene	5		1 U	NA	NA	5 U	NA	1 U	NA
p-Chlorotoluene	--		2.5 U	NA	NA	12 U	NA	2.5 U	NA
p-Isopropyltoluene	5		0.5 U	NA	NA	**8.9**	NA	0.5 U	NA
sec-Butylbenzene	5		0.5 U	NA	NA	**53**	NA	0.5 U	NA
Styrene	5		1 U	0.5 U	0.5 U	5 U	0.5 U	1 U	0.5 U
tert-Butylbenzene	5		2.5 U	NA	NA	**21**	NA	2.5 U	NA
Tetrachloroethene	5		0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U
Tetrahydrofuran	50		10 U	NA	NA	50 U	NA	10 U	NA
Toluene	5		0.75 U	0.3 U	0.3 U	3.8 U	0.3 U	0.75 U	0.3 U
trans-1,2-Dichloroethene	5		0.75 U	0.5 U	0.5 U	3.8 U	0.5 U	0.75 U	0.5 U

Table 6. Summary of Volatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:** **Sample Date:**	FIELD BLANK 5/3/2007	FIELD BLANK 6/5/2006	MW-1 6/5/2006	MW-4 5/2/2007	MW-4 6/5/2006	MW-5 5/2/2007	MW-5 6/5/2006
trans-1,3-Dichloropropene	--		0.5 U	0.8 U	0.8 U	2.5 U	0.8 U	0.5 U	0.8 U
trans-1,4-Dichloro-2-butene	--		2.5 U	NA	NA	12 U	NA	2.5 U	NA
Trichloroethene	5		0.5 U	0.7 U	0.7 U	2.5 U	0.7 U	0.5 U	0.7 U
Trichlorofluoromethane	5		2.5 U	NA	NA	12 U	NA	2.5 U	NA
Vinyl acetate	--		5 U	NA	NA	25 U	NA	5 U	NA
Vinyl chloride	2		1 U	0.8 U	0.8 U	5 U	0.8 U	1 U	0.8 U
Xylenes (total)	5		NA	1 U	4.7 J	NA	1 U	NA	1 U

NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
µg/L -Micrograms per liter
J - Estimated Value
U - Compound was analyzed for but not detected
- - No NYSDEC AWQSGV available
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs
NA - Compound was not analyzed by laboratory

Table 6. Summary of Volatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	MW-7	MW-10	MW-11	TRIP BLANK	TRIP BLANK
		Sample Date:	5/2/2007	5/2/2007	5/2/2007	5/3/2007	6/5/2006
1,1,1,2-Tetrachloroethane	5		5 U	0.5 U	0.5 U	0.5 U	NA
1,1,1-Trichloroethane	5		5 U	0.5 U	0.5 U	0.5 U	0.4 U
1,1,2,2-Tetrachloroethane	5		5 U	0.5 U	0.5 U	0.5 U	0.4 U
1,1,2-Trichloroethane	1		7.5 U	0.75 U	0.75 U	0.75 U	0.6 U
1,1-Dichloroethane	5		7.5 U	0.75 U	0.75 U	0.75 U	0.6 U
1,1-Dichloroethene	5		5 U	0.5 U	0.5 U	0.5 U	0.7 U
1,1-Dichloropropene	5		25 U	2.5 U	2.5 U	2.5 U	NA
1,2,3-Trichlorobenzene	5		25 U	2.5 U	2.5 U	2.5 U	NA
1,2,3-Trichloropropane	0.04		50 U	5 U	5 U	5 U	NA
1,2,4-Trichlorobenzene	5		25 U	2.5 U	2.5 U	2.5 U	NA
1,2,4-Trimethylbenzene	5		25 U	2.5 U	4	2.5 U	NA
1,2-Dibromo-3-chloropropane	0.04		25 U	2.5 U	2.5 U	2.5 U	NA
1,2-Dibromoethane	5		20 U	2 U	2 U	2 U	NA
1,2-Dichlorobenzene	3		25 U	2.5 U	2.5 U	2.5 U	NA
1,2-Dichloroethane	0.6		5 U	0.5 U	0.5 U	0.5 U	0.6 U
1,2-Dichloropropane	1		18 U	1.8 U	1.8 U	1.8 U	0.9 U
1,3,5-Trimethylbenzene	5		25 U	2.5 U	2.5 U	2.5 U	NA
1,3-Dichlorobenzene	3		25 U	2.5 U	2.5 U	2.5 U	NA
1,3-Dichloropropane	5		25 U	2.5 U	2.5 U	2.5 U	NA
1,4-Dichlorobenzene	3		25 U	2.5 U	2.5 U	2.5 U	NA
1,4-Dichlorobutane	--		50 U	5 U	5 U	5 U	NA
2,2-Dichloropropane	5		25 U	2.5 U	2.5 U	2.5 U	NA
2-Butanone (MEK)	50		50 U	5 U	5 U	5 U	1.2 U
2-Hexanone	50		50 U	5 U	5 U	5 U	0.8 U
4-Methyl-2-pentanone (MIBK)	--		50 U	5 U	5 U	5 U	0.7 U
Acetone	50		50 U	5 U	5 U	5 U	2.7 J
Acrolein	5		120 U	12 U	12 U	12 U	NA
Acrylonitrile	5		50 U	5 U	5 U	5 U	NA
Benzene	1		5 U	0.5 U	0.5 U	0.5 U	0.4 U
Bromobenzene	5		25 U	2.5 U	2.5 U	2.5 U	NA
Bromochloromethane	5		25 U	2.5 U	2.5 U	2.5 U	NA
Bromodichloromethane	50		5 U	0.5 U	0.5 U	0.5 U	0.4 U
Bromoform	50		20 U	2 U	2 U	2 U	0.8 U
Bromomethane	5		10 U	1 U	1 U	1 U	1.2 U

Table 6. Summary of Volatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	MW-7	MW-10	MW-11	TRIP BLANK	TRIP BLANK
		Sample Date:	5/2/2007	5/2/2007	5/2/2007	5/3/2007	6/5/2006
Carbon disulfide	60		50 U	5 U	5 U	5 U	0.9 U
Carbon tetrachloride	5		5 U	0.5 U	0.5 U	0.5 U	1 U
Chlorobenzene	5		5 U	0.5 U	0.5 U	0.5 U	0.4 U
Chloroethane	5		10 U	1 U	1 U	1 U	0.8 U
Chloroform	7		7.5 U	0.75 U	0.75 U	0.75 U	0.7 U
Chloromethane	--		25 U	2.5 U	2.5 U	2.5 U	0.5 U
cis-1,2-Dichloroethene	5		5 U	0.5 U	0.5 U	0.5 U	0.6 U
cis-1,3-Dichloropropene	5		5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	50		5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	5		50 U	5 U	5 U	5 U	NA
Dichlorodifluoromethane	5		50 U	5 U	5 U	5 U	NA
Ethyl ether	--		25 U	2.5 U	2.5 U	2.5 U	NA
Ethyl Methacrylate	--		50 U	5 U	5 U	5 U	NA
Ethylbenzene	5		5 U	0.5 U	0.5 U	0.5 U	1 U
Hexachlorobutadiene	0.5		6 U	0.6 U	0.6 U	0.6 U	NA
Iodomethane	--		50 U	5 U	5 U	5 U	NA
Isopropylbenzene	5		**87**	0.5 U	0.9	0.5 U	NA
m+p-Xylene	5		10 U	1 U	1 U	1 U	NA
Methylene chloride	5		50 U	5 U	5 U	5 U	1.1 J
MTBE	10		10 U	1 U	1.8	1 U	0.3 U
Naphthalene	10		25 U	2.5 U	2.5 U	2.5 U	NA
n-Butylbenzene	5		5 U	0.5 U	0.5 U	0.5 U	NA
n-Propylbenzene	5		5 U	0.5 U	0.55	0.5 U	NA
o-Chlorotoluene	--		25 U	2.5 U	2.5 U	2.5 U	NA
o-Xylene	5		10 U	1 U	1 U	1 U	NA
p-Chlorotoluene	--		25 U	2.5 U	2.5 U	2.5 U	NA
p-Isopropyltoluene	5		5 U	0.5 U	0.5 U	0.5 U	NA
sec-Butylbenzene	5		**280**	0.5 U	0.5 U	0.5 U	NA
Styrene	5		10 U	1 U	1 U	1 U	0.5 U
tert-Butylbenzene	5		**98**	2.5 U	2.5 U	2.5 U	NA
Tetrachloroethene	5		5 U	0.5 U	4	0.5 U	0.5 U
Tetrahydrofuran	50		100 U	10 U	10 U	10 U	NA
Toluene	5		7.5 U	0.75 U	0.75 U	0.75 U	0.3 U
trans-1,2-Dichloroethene	5		7.5 U	0.75 U	0.75 U	0.75 U	0.5 U

Table 6. Summary of Volatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:** **Sample Date:**	MW-7 5/2/2007	MW-10 5/2/2007	MW-11 5/2/2007	TRIP BLANK 5/3/2007	TRIP BLANK 6/5/2006
trans-1,3-Dichloropropene	--		5 U	0.5 U	0.5 U	0.5 U	0.8 U
trans-1,4-Dichloro-2-butene	--		25 U	2.5 U	2.5 U	2.5 U	NA
Trichloroethene	5		5 U	0.5 U	0.5 U	0.5 U	0.7 U
Trichlorofluoromethane	5		25 U	2.5 U	2.5 U	2.5 U	NA
Vinyl acetate	--		50 U	5 U	5 U	5 U	NA
Vinyl chloride	2		10 U	1 U	1 U	1 U	0.8 U
Xylenes (total)	5		NA	NA	NA	NA	1 U

NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
µg/L -Micrograms per liter
J - Estimated Value
U - Compound was analyzed for but not detected
- - No NYSDEC AWQSGV available
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs
NA - Compound was not analyzed by laboratory

Table 7. Summary of Semivolatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	MW-1	MW-4	MW-4	MW-5	MW-5	MW-7	MW-10	MW-11
		Sample Date:	6/5/2006	5/2/2007	6/5/2006	5/2/2007	6/5/2006	5/2/2007	5/2/2007	5/2/2007
1,1'-Biphenyl	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
1,2,4,5-Tetrachlorobenzene	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
1-Chloronaphthalene	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
1-Methylnaphthalene	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
2,4,5-Trichlorophenol	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
2,4,6-Trichlorophenol	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
2,4-Dichlorophenol	5		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
2,4-Dimethylphenol	50		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
2,4-Dinitrophenol	10		NA	28 U	NA	29 U	NA	2900 U	140 U	29 U
2,4-Dinitrotoluene	5		NA	5.7 U	NA	5.7 U	NA	590 U	29 U	5.7 U
2,6-Dichlorophenol	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
2,6-Dinitrotoluene	5		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
2-Chloronaphthalene	10		NA	5.7 U	NA	5.7 U	NA	590 U	29 U	5.7 U
2-Chlorophenol	--		NA	5.7 U	NA	5.7 U	NA	590 U	29 U	5.7 U
2-Methylnaphthalene	--		0.6 U	4.8 U	4 J	4.8 U	0.6 U	490 U	24 U	4.8 U
2-Methylphenol	--		NA	5.7 U	NA	5.7 U	NA	590 U	29 U	5.7 U
2-Nitroaniline	5		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
2-Nitrophenol	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
2-Picoline	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
3&4-Methylphenol	--		NA	5.7 U	NA	5.7 U	NA	590 U	29 U	5.7 U
3,3'-Dichlorobenzidine	5		NA	48 U	NA	48 U	NA	4900 U	240 U	48 U
3-Methylcholanthrene	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
3-Nitroaniline	5		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
4,6-Dinitro-o-cresol	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
4-Aminobiphenyl	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
4-Bromophenyl phenyl ether	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
4-Chloroaniline	5		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
4-Chlorophenyl phenyl ether	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
4-Nitroaniline	5		NA	6.7 U	NA	6.7 U	NA	680 U	34 U	6.7 U
4-Nitrophenol	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
7,12-Dimethylbenz(a)anthracene	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
A,A-Dimethylphenethylamine	--		NA	48 U	NA	48 U	NA	4900 U	240 U	48 U
Acenaphthene	20		0.8 U	4.8 U	0.8 U	4.8 U	0.8 U	490 U	24 U	4.8 U
Acenaphthylene	20		0.8 U	4.8 U	0.8 U	4.8 U	0.8 U	490 U	24 U	4.8 U
Acetophenone	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
a-Naphthylamine	--		NA	24 U	NA	24 U	NA	2400 U	120 U	24 U

Table 7. Summary of Semivolatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan,
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	MW-1	MW-4	MW-4	MW-5	MW-5	MW-7	MW-10	MW-11
		Sample Date:	6/5/2006	5/2/2007	6/5/2006	5/2/2007	6/5/2006	5/2/2007	5/2/2007	5/2/2007
Aniline	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
Anthracene	50		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Azobenzene	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Benzidine	5		NA	48 U	NA	48 U	NA	4900 U	240 U	48 U
Benzo(e)pyrene	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Benzo[a]anthracene	0.002		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Benzo[a]pyrene	0		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Benzo[b]fluoranthene	0.002		2 U	4.8 U	2 U	4.8 U	2 U	490 U	24 U	4.8 U
Benzo[g,h,i]perylene	--		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Benzo[k]fluoranthene	0.002		0.9 U	4.8 U	0.9 U	4.8 U	0.9 U	490 U	24 U	4.8 U
Benzoic Acid	--		NA	48 U	NA	48 U	NA	4900 U	240 U	48 U
Benzyl Alcohol	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Bis(2-chloroethoxy)methane	5		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Bis(2-chloroethyl) ether	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Bis(2-chloroisopropyl)ether	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Bis(2-ethylhexyl) phthalate	5		NA	5	NA	4.8 U	NA	490 U	24 U	4.8 U
b-Naphthylamine	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
Butylbenzyl phthalate	50		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Carbazole	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Chlorobenzilate	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
Chrysene	0.002		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Dibenzo[a,h]anthracene	--		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Dibenzofuran	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Diethyl phthalate	50		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Dimethoate	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
Dimethyl phthalate	50		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Di-n-butyl phthalate	50		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Di-n-octyl phthalate	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Ethyl Methanesulfonate	--		NA	14 U	NA	14 U	NA	1500 U	72 U	14 U
Fluoranthene	50		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Fluorene	50		0.8 U	4.8 U	0.8 U	4.8 U	0.8 U	490 U	24 U	4.8 U
Hexachlorobenzene	0.04		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Hexachlorocyclopentadiene	5		NA	28 U	NA	29 U	NA	2900 U	140 U	29 U
Hexachloroethane	5		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Hexachloropropene	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Indeno[1,2,3-cd]pyrene	0.002		1 U	6.7 U	1 U	6.7 U	1 U	680 U	34 U	6.7 U

Table 7. Summary of Semivolatile Organic Compounds in Groundwater, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	MW-1	MW-4	MW-4	MW-5	MW-5	MW-7	MW-10	MW-11
		Sample Date:	6/5/2006	5/2/2007	6/5/2006	5/2/2007	6/5/2006	5/2/2007	5/2/2007	5/2/2007
Isodrin	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Isophorone	50		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Methyl methanesulfonate	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
NDPA/DPA	--		NA	14 U	NA	14 U	NA	1500 U	72 U	14 U
Nitrobenzene	0.4		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Nitrosodi-n-butylamine	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Nitrosodipiperidine	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
n-Nitrosodimethylamine	--		NA	48 U	NA	48 U	NA	4900 U	240 U	48 U
n-Nitrosodi-n-propylamine	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
p-Chloro-m-cresol	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
p-Dimethylaminoazobenzene	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Pentachlorobenzene	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
Pentachloronitrobenzene	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Pentachlorophenol	1		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Perylene	--		NA	4.8 U	NA	4.8 U	NA	490 U	24 U	4.8 U
Phenacetin	--		NA	9.5 U	NA	9.6 U	NA	980 U	48 U	9.6 U
Phenanthrene	50		0.7 U	4.8 U	0.8 J	4.8 U	0.7 U	490 U	24 U	4.8 U
Phenol	1		NA	6.7 U	NA	6.7 U	NA	680 U	34 U	6.7 U
Pronamide	--		NA	19 U	NA	19 U	NA	2000 U	97 U	19 U
Pyrene	50		1 U	4.8 U	1 U	4.8 U	1 U	490 U	24 U	4.8 U
Pyridine	50		NA	48 U	NA	48 U	NA	4900 U	240 U	48 U

NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
µg/L -Micrograms per liter
J - Estimated Value
U - Compound was analyzed for but not detected
- - No NYSDEC AWQSGV available
NA - Compound was not analyzed by laboratory

Table 8. Summary of Metals in Groundwater, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:**	MW-1	MW-1	MW-4	MW-4	MW-4	MW-4	MW-5	MW-5
		Sample Date:	6/5/2006	6/5/2006	5/2/2007	5/2/2007	6/5/2006	6/5/2006	5/2/2007	5/2/2007
			Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Aluminum	--		NA	NA	100 U	79000	NA	NA	230	5100
Antimony	3		NA	NA	50 U	50 U	NA	NA	50 U	50 U
Arsenic	25		3.9 U	3.9 U	7	**39**	12.4 B	16.1 B	5 U	5 U
Barium	1000		55.1	96.2	82	894	74.6	563	87	201
Beryllium	3		NA	NA	5 U	5 U	NA	NA	5 U	5 U
Cadmium	5		1.1 U	1.1 U	5 U	5 U	1.1 U	1.1 U	5 U	5 U
Calcium	--		NA	NA	27000	35000	NA	NA	110000	120000
Chromium	50		1.3 U	3.9 B	10 U	**130**	1.3 U	18.7	10 U	10 U
Cobalt	--		NA	NA	20 U	69	NA	NA	20 U	20 U
Copper	200		NA	NA	10 U	**238**	NA	NA	10 U	10 U
Iron	--		NA	NA	50	130000	NA	NA	190	23000
Lead	25		3 U	17	10 U	**91**	3 U	**31.3**	10 U	10 U
Magnesium	--		NA	NA	5600	28000	NA	NA	8700	10000
Manganese	300		NA	NA	**497**	**2250**	NA	NA	**785**	**911**
Mercury	0.7		0.07 U	0.07 U	0.2 U	0.2 U	0.07 U	0.07 U	0.2 U	0.2 U
Nickel	100		NA	NA	25 U	**123**	NA	NA	25 U	25 U
Potassium	--		NA	NA	8900	29000	NA	NA	24000	26000
Selenium	10		5 U	5 U	10 U	10	5 U	5 U	10 U	10 U
Silver	50		1.1 U	1.1 U	7 U	7 U	1.1 U	1.1 U	7 U	7 U
Sodium	20000		NA	NA	4000	12000	NA	NA	**630000**	**680000**
Thallium	0.5		NA	NA	20 U	20 U	NA	NA	20 U	20 U
Vanadium	--		NA	NA	10 U	196	NA	NA	10 U	12
Zinc	2000		NA	NA	50 U	442	NA	NA	50 U	50 U

NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
µg/L -Micrograms per liter
U - Compound was analyzed for but not detected
B - Detected in Laboratory Method Blank
- - No NYSDEC AWQSGV available
Bold data indicates that parameter was detected above the NYSDEC AWQSGVs
NA - Compound was not analyzed by laboratory

Table 8. Summary of Metals in Groundwater, Revised Remedial InvestigationWork Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	**Sample Designation:** **Sample Date:**	MW-5 6/5/2006 Dissolved	MW-5 6/5/2006 Total	MW-7 5/2/2007 Dissolved	MW-7 5/2/2007 Total	MW-10 5/2/2007 Dissolved	MW-10 5/2/2007 Total	MW-11 5/2/2007 Dissolved	MW-11 5/2/2007 Total
Aluminum	--		NA	NA	100 U	63000	100 U	11000	100 U	41000
Antimony	3		NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Arsenic	25		3.9 U	4.7 B	5 U	**102**	5 U	23	5 U	18
Barium	1000		88.9	348	49	780	38	109	130	446
Beryllium	3		NA	NA	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	5		1.1 U	1.1 U	5 U	5 U	5 U	5 U	5 U	5 U
Calcium	--		NA	NA	91000	200000	100000	110000	78000	92000
Chromium	50		1.3 U	12.1	10 U	**160**	10 U	30	10 U	**60**
Cobalt	--		NA	NA	20 U	81	20 U	20 U	20 U	32
Copper	200		NA	NA	10 U	**454**	10 U	59	10 U	107
Iron	--		NA	NA	320	130000	300	17000	210	67000
Lead	25		3 U	**44.1**	10 U	**1240**	10 U	**251**	10 U	**42**
Magnesium	--		NA	NA	10000	30000	280000	320000	110000	150000
Manganese	300		NA	NA	**316**	**1550**	63	262	**782**	**1610**
Mercury	0.7		0.07 U	0.07 U	0.2 U	**2**	0.2 U	**2.3**	0.2 U	0.2 U
Nickel	100		NA	NA	25 U	**110**	25 U	25 U	25 U	67
Potassium	--		NA	NA	18000	29000	160000	180000	81000	100000
Selenium	10		5 U	5 U	10 U	**12**	10 U	10 U	10 U	10 U
Silver	50		1.1 U	1.1 U	7 U	7 U	7 U	7 U	7 U	7 U
Sodium	20000		NA	NA	**31000**	**40000**	**2700000**	**3000000**	**770000**	**810000**
Thallium	0.5		NA	NA	20 U	20 U	20 U	20 U	20 U	20 U
Vanadium	--		NA	NA	10 U	148	10 U	22	10 U	82
Zinc	2000		NA	NA	50 U	1160	50 U	330	50 U	253

NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
µg/L -Micrograms per liter
U - Compound was analyzed for but not detected
B - Detected in Laboratory Method Blank
- - No NYSDEC AWQSGV available
Bold data indicates that parameter was detected above the NYSDEC AWQSGV
NA - Compound was not analyzed by laboratory

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in $\mu g/m^3$)	**Sample Designation:**	OUTSIDE AIR	SV-1 (AA)	SV-1 (SS)	SV-2 (AA)	SV-2 (SS)	SV-3 (AA)	SV-3 (SS)	SV-4 (SS)
	Sample Date:	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007
1,1,1-Trichloroethane		2.72 U	2.72 U	5.92 U	2.72 U	2.72 U	2.72 U	2.72 U	2.72 U
1,1,2,2-Tetrachloroethane		3.43 U	3.43 U	7.44 U	3.43 U	3.43 U	3.43 U	3.43 U	3.43 U
1,1,2-Trichloroethane		2.72 U	2.72 U	5.92 U	2.72 U	2.72 U	2.72 U	2.72 U	2.72 U
1,1-Dichloroethane		2.02 U	2.02 U	4.39 U	2.02 U	2.02 U	2.02 U	2.02 U	2.02 U
1,1-Dichloroethene		1.98 U	1.98 U	4.3 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U
1,2,4-Trichlorbenzene		3.71 U	3.71 U	8.04 U	3.71 U	**6.07**	3.71 U	3.71 U	3.71 U
1,2,4-Trimethylbenzene		2.46 U	**4.35**	**13.2**	**2.57**	**6.97**	**3.93**	**7.07**	**8.22**
1,2-Dibromoethane		3.84 U	3.84 U	8.33 U	3.84 U	3.84 U	3.84 U	3.84 U	3.84 U
1,2-Dichlorobenzene		3 U	3 U	6.52 U	3 U	3 U	3 U	3 U	3 U
1,2-Dichloroethane		2.02 U	2.02 U	4.39 U	2.02 U	2.02 U	2.02 U	2.02 U	2.02 U
1,2-Dichloropropane		2.31 U	2.31 U	5.01 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U
1,3,5-Trimethybenzene		2.46 U	2.46 U	5.33 U	2.46 U	2.46 U	2.46 U	2.46 U	2.46 U
1,3-Butadiene		1.1 U	1.1 U	2.4 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
1,3-Dichlorobenzene		3 U	3 U	6.52 U	3 U	3 U	3 U	3 U	3 U
1,4-Dichlorobenzene		3 U	3 U	6.52 U	3 U	3 U	3 U	3 U	3 U
1,4-Dioxane		3.6 U	3.6 U	7.81 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
2,2,4-Trimethylpentane		2.33 U	2.33 U	5.06 U	2.33 U	2.33 U	2.33 U	2.33 U	2.33 U
2-Butanone		1.47 U	**5.42**	3.2 U	**5.23**	1.47 U	**19.6**	**3.42**	**3.23**
2-Hexanone		2.05 U	2.05 U	4.44 U	2.05 U	2.05 U	2.05 U	2.05 U	2.05 U
3-Chloropropene		1.56 U	1.56 U	3.39 U	1.56 U	1.56 U	1.56 U	1.56 U	1.56 U
4-Ethyltoluene		2.46 U	2.46 U	5.33 U	2.46 U	2.46 U	2.46 U	2.46 U	2.46 U
4-Methyl-2-pentanone		2.05 U	2.05 U	4.44 U	2.05 U	2.05 U	2.05 U	2.05 U	2.05 U
Acetone		**22.3**	**13.5**	**28.9**	**16.7**	**15.1**	**30**	**24.3**	**29.2**
Benzene		1.6 U	1.6 U	3.46 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Benzyl chloride		2.59 U	2.59 U	5.61 U	2.59 U	2.59 U	2.59 U	2.59 U	2.59 U
Bromodichloromethane		3.35 U	3.35 U	7.26 U	3.35 U	3.35 U	3.35 U	3.35 U	3.35 U
Bromoform		5.16 U	5.16 U	11.2 U	5.16 U	5.16 U	5.16 U	5.16 U	5.16 U
Bromomethane		1.94 U	1.94 U	4.21 U	1.94 U	1.94 U	1.94 U	1.94 U	1.94 U
Carbon disulfide		**3.54**	**5.15**	**6.77**	**3.78**	**23.3**	**3.82**	**10.2**	**7.36**
Carbon tetrachloride		3.14 U	3.14 U	6.82 U	3.14 U	3.14 U	3.14 U	3.14 U	3.14 U
Chlorobenzene		2.3 U	2.3 U	4.99 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U
Chloroethane		1.32 U	1.32 U	2.86 U	1.32 U	1.32 U	1.32 U	1.32 U	1.32 U
Chloroform		2.44 U	2.44 U	5.29 U	2.44 U	2.44 U	2.44 U	2.44 U	2.44 U
Chloromethane		**1.21**	**1.09**	2.24 U	**1.19**	1.03 U	1.03 U	1.03 U	1.03 U
cis-1,2-Dichloroethene		1.98 U	1.98 U	4.3 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U
cis-1,3-Dichloropropene		2.27 U	2.27 U	4.92 U	2.27 U	2.27 U	2.27 U	2.27 U	2.27 U
Cyclohexane		1.72 U	1.72 U	3.73 U	1.72 U	1.72 U	1.72 U	1.72 U	1.72 U
Dibromochloromethane		4.26 U	4.26 U	9.24 U	4.26 U	4.26 U	4.26 U	4.26 U	4.26 U
Dichlorodifluoromethane		4.94 U	4.94 U	10.7 U	4.94 U	4.94 U	4.94 U	4.94 U	4.94 U
Ethanol		**4.03**	**6.57**	**92.4**	**5.49**	**15.6**	**9.91**	**13.7**	**91.1**

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Sample Designation:	OUTSIDE AIR	SV-1 (AA)	SV-1 (SS)	SV-2 (AA)	SV-2 (SS)	SV-3 (AA)	SV-3 (SS)	SV-4 (SS)
Parameter **Sample Date:**	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007	5/3/2007
(Concentrations in $\mu g/m^3$)								
Ethyl Acetate	1.8 U	1.8 U	3.91 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Ethylbenzene	2.17 U	2.17 U	4.71 U	2.17 U	**2.8**	2.17 U	**2.78**	**2.64**
Freon-113	3.83 U	3.83 U	8.31 U	3.83 U	3.83 U	3.83 U	3.83 U	3.83 U
Freon-114	3.49 U	3.49 U	7.58 U	3.49 U	3.49 U	3.49 U	3.49 U	3.49 U
Hexachlorobutadiene	5.33 U	5.33 U	11.6 U	5.33 U	5.33 U	5.33 U	5.33 U	5.33 U
m+p-Xylene	4.34 U	**6.27**	**14.9**	4.34 U	**10.2**	**6.69**	**9.97**	**9.64**
Isopropanol	1.23 U	1.23 U	**8.68**	**1.3**	**10.6**	1.23 U	**9.15**	**3.98**
Methyl tert butyl ether	1.8 U	1.8 U	**26.8**	1.8 U	**39.5**	1.8 U	**37.8**	**13.7**
Methylene chloride	**101 D**	**14.4**	**16.3**	**65.6**	**8.55**	**28**	**69.2**	**36.3**
n-Heptane	2.05 U	2.05 U	4.44 U	2.05 U	**3.87**	**2.34**	**3.07**	2.05 U
n-Hexane	3.52 U	3.52 U	7.64 U	3.52 U	3.52 U	3.52 U	3.52 U	3.52 U
o-Xylene	2.17 U	**2.4**	**6.38**	2.17 U	**4.42**	**2.58**	**4.48**	**4.41**
Propylene	1.72 U	1.72 U	3.73 U	1.72 U	**5.04**	1.72 U	1.72 U	1.72 U
Styrene	2.13 U	2.13 U	4.62 U	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U
tert-Butyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	3.39 U	3.39 U	7.35 U	3.39 U	3.39 U	3.39 U	3.39 U	3.39 U
Tetrahydrofuran	1.47 U	1.47 U	3.2 U	1.47 U	**2.61**	1.47 U	**2.89**	**3.3**
Toluene	**2.33**	**8.29**	**11.1**	**7.5**	**10.3**	**17.1**	**12.8**	**6.9**
trans-1,2-Dichloroethene	1.98 U	1.98 U	4.3 U	1.98 U	1.98 U	1.98 U	1.98 U	1.98 U
trans-1,3-Dichloropropene	2.27 U	2.27 U	4.92 U	2.27 U	2.27 U	2.27 U	2.27 U	2.27 U
Trichloroethene	2.68 U	2.68 U	5.82 U	2.68 U	2.68 U	2.68 U	2.68 U	2.68 U
Trichlorofluoromethane	2.81 U	2.81 U	6.09 U	2.81 U	2.81 U	2.81 U	2.81 U	2.81 U
Vinyl acetate	1.76 U	1.76 U	3.82 U	1.76 U	1.76 U	1.76 U	1.76 U	1.76 U
Vinyl bromide	2.18 U	2.18 U	4.74 U	2.18 U	2.18 U	2.18 U	2.18 U	2.18 U
Vinyl chloride	1.28 U	1.28 U	2.77 U	1.28 U	1.28 U	1.28 U	1.28 U	1.28 U

$\mu g/m^3$ - Micrograms per cubic meter
U - Indicates that the compound was analyzed for but not detected
D - Sample required re-analysis on dilution for compound that exceeded calibration on initial analysis
ND - Sample was analyzed for but not detected, reporting limits were not available
NA - Compound was not tested for by laboratory
Bold data indicates that parameter was detected

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/m^3)	**Sample Designation:** **Sample Date:**	C241108A-BA-4542-20100318 3/18/2010 Property D	C241108A-IA-4524-20100318 3/18/2010 Property B	C241108A-IA-4528-20100318 3/18/2010 Property C
1,1,1-Trichloroethane		ND	ND	ND
1,1,2,2-Tetrachloroethane		ND	ND	ND
1,1,2-Trichloroethane		ND	ND	ND
1,1-Dichloroethane		ND	ND	ND
1,1-Dichloroethene		ND	ND	ND
1,2,4-Trichlorbenzene		ND	ND	ND
1,2,4-Trimethylbenzene		**5.6**	**4.6**	**21**
1,2-Dibromoethane		ND	ND	ND
1,2-Dichlorobenzene		ND	ND	ND
1,2-Dichloroethane		ND	ND	ND
1,2-Dichloropropane		ND	ND	ND
1,3,5-Trimethybenzene		**2.1**	ND	**6.3**
1,3-Butadiene		NA	NA	NA
1,3-Dichlorobenzene		ND	ND	ND
1,4-Dichlorobenzene		**2.6**	ND	**2.8**
1,4-Dioxane		ND	ND	ND
2,2,4-Trimethylpentane		**2.5**	ND	**22**
2-Butanone		**4**	**120**	**7**
2-Hexanone		NA	NA	NA
3-Chloropropene		NA	NA	NA
4-Ethyltoluene		NA	NA	NA
4-Methyl-2-pentanone		**0.86**	ND	**2.1**
Acetone		NA	NA	NA
Benzene		**2.8**	**3.2**	**19**
Benzyl chloride		ND	ND	ND
Bromodichloromethane		ND	ND	ND
Bromoform		ND	ND	ND
Bromomethane		ND	ND	ND
Carbon disulfide		NA	NA	NA
Carbon tetrachloride		**0.46**	ND	**0.58**
Chlorobenzene		ND	ND	ND
Chloroethane		ND	ND	ND
Chloroform		**0.72**	ND	**3.4**
Chloromethane		**1.1**	ND	ND
cis-1,2-Dichloroethene		ND	ND	ND
cis-1,3-Dichloropropene		ND	ND	ND
Cyclohexane		**1.5**	ND	**8.1**
Dibromochloromethane		ND	ND	ND
Dichlorodifluoromethane		**2.7**	ND	**2.4**
Ethanol		**40**	**170**	**960**

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

	Sample Designation:	C241108A-BA-4542-20100318	C241108A-IA-4524-20100318	C241108A-IA-4528-20100318
Parameter	**Sample Date:**	3/18/2010	3/18/2010	3/18/2010
(Concentrations in µg/m^3)		Property D	Property B	Property C
Ethyl Acetate		NA	NA	NA
Ethylbenzene		**2.7**	**6.7**	**15**
Freon-113		ND	ND	**0.62**
Freon-114		ND	ND	ND
Hexachlorobutadiene		ND	ND	ND
m+p-Xylene		**9.6**	**23**	**54**
Isopropanol		NA	NA	NA
Methyl tert butyl ether		ND	ND	ND
Methylene chloride		**4.2**	**4000**	**8.2**
n-Heptane		NA	NA	NA
n-Hexane		**4.6**	ND	**24**
o-Xylene		**3.3**	**5.2**	**17**
Propylene		NA	NA	NA
Styrene		**0.47**	**12**	**2.2**
tert-Butyl alcohol		**12**	ND	ND
Tetrachloroethene		**6**	ND	**5.5**
Tetrahydrofuran		NA	NA	NA
Toluene		**18**	**790**	**120**
trans-1,2-Dichloroethene		ND	ND	ND
trans-1,3-Dichloropropene		ND	ND	ND
Trichloroethene		**0.52**	ND	**0.45**
Trichlorofluoromethane		**2.1**	ND	**2.3**
Vinyl acetate		NA	NA	NA
Vinyl bromide		NA	NA	NA
Vinyl chloride		ND	ND	ND

µg/m^3 - Micrograms per cubic meter
U - Indicates that the compound was analyzed for but not detected
D - Sample required re-analysis on dilution for compound that exceeded calibration on initial analysis
ND - Sample was analyzed for but not detected, reporting limits were not available
NA - Compound was not tested for by laboratory
Bold data indicates that parameter was detected

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in μg/m^3)	**Sample Designation:** **Sample Date:**	C241108A-IA-4542-20100318 3/18/2010 Property D	C241108A-IA-537-20100318 3/18/2010 Property A	C241108A-OA-4542-20100318 3/18/2010 Property D
1,1,1-Trichloroethane		ND	ND	ND
1,1,2,2-Tetrachloroethane		ND	ND	ND
1,1,2-Trichloroethane		ND	ND	ND
1,1-Dichloroethane		ND	ND	ND
1,1-Dichloroethene		ND	ND	ND
1,2,4-Trichlorbenzene		ND	ND	ND
1,2,4-Trimethylbenzene		**5**	**6.5**	**5.4**
1,2-Dibromoethane		ND	ND	ND
1,2-Dichlorobenzene		ND	ND	ND
1,2-Dichloroethane		ND	ND	ND
1,2-Dichloropropane		ND	ND	ND
1,3,5-Trimethybenzene		**1.6**	**1.9**	**1.7**
1,3-Butadiene		NA	NA	NA
1,3-Dichlorobenzene		ND	ND	ND
1,4-Dichlorobenzene		**3.1**	**1.4**	**2.9**
1,4-Dioxane		ND	ND	ND
2,2,4-Trimethylpentane		**3.5**	**7.9**	**3.2**
2-Butanone		**5.2**	**4.3**	**3.9**
2-Hexanone		NA	NA	NA
3-Chloropropene		NA	NA	NA
4-Ethyltoluene		NA	NA	NA
4-Methyl-2-pentanone		**1.8**	**3.1**	**1.2**
Acetone		NA	NA	NA
Benzene		**4.1**	**6.4**	**3.8**
Benzyl chloride		ND	ND	ND
Bromodichloromethane		ND	ND	ND
Bromoform		ND	ND	ND
Bromomethane		ND	ND	ND
Carbon disulfide		NA	NA	NA
Carbon tetrachloride		**0.46**	**0.41**	**0.43**
Chlorobenzene		ND	ND	ND
Chloroethane		ND	ND	ND
Chloroform		**1.1**	**0.49**	**0.46**
Chloromethane		**1.4**	**1.3**	**1.3**
cis-1,2-Dichloroethene		ND	ND	ND
cis-1,3-Dichloropropene		ND	ND	ND
Cyclohexane		**2.2**	**3**	**2**
Dibromochloromethane		ND	ND	ND
Dichlorodifluoromethane		**2.9**	**2.5**	**2.7**
Ethanol		**200**	**76**	**87**

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

	Sample Designation:	C241108A-IA-4542-20100318	C241108A-IA-537-20100318	C241108A-OA-4542-20100318
Parameter	**Sample Date:**	3/18/2010	3/18/2010	3/18/2010
(Concentrations in µg/m^3)		Property D	Property A	Property D
Ethyl Acetate		NA	NA	NA
Ethylbenzene		**4.4**	**5.3**	**4.3**
Freon-113		ND	ND	ND
Freon-114		ND	ND	ND
Hexachlorobutadiene		ND	ND	ND
m+p-Xylene		**15**	**19**	**15**
Isopropanol		NA	NA	NA
Methyl tert butyl ether		ND	ND	ND
Methylene chloride		**4.4**	**4.2**	**3.8**
n-Heptane		NA	NA	NA
n-Hexane		**5.9**	**8.6**	**5.1**
o-Xylene		**4.2**	**5.9**	**4.2**
Propylene		NA	NA	NA
Styrene		**0.87**	**0.82**	**0.73**
tert-Butyl alcohol		ND	ND	ND
Tetrachloroethene		**5.7**	**3.3**	**6**
Tetrahydrofuran		NA	NA	NA
Toluene		**29**	**52**	**27**
trans-1,2-Dichloroethene		ND	ND	ND
trans-1,3-Dichloropropene		ND	ND	ND
Trichloroethene		**0.55**	**0.27**	**0.53**
Trichlorofluoromethane		**2.6**	**2**	**2.1**
Vinyl acetate		NA	NA	NA
Vinyl bromide		NA	NA	NA
Vinyl chloride		ND	ND	ND

µg/m^3 - Micrograms per cubic meter
U - Indicates that the compound was analyzed for but not detected
D - Sample required re-analysis on dilution for compound that exceeded calibration on initial analysis
ND - Sample was analyzed for but not detected, reporting limits were not available
NA - Compound was not tested for by laboratory
Bold data indicates that parameter was detected

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/m^3)	**Sample Designation:** **Sample Date:**	C241108A-OA-537-20100318 3/18/2010 Property A	C241108A-SSA-4524-20100318 3/18/2010 Property B	C241108A-SSA-4528-20100318 3/18/2010 Property C
1,1,1-Trichloroethane		ND	ND	**1.5**
1,1,2,2-Tetrachloroethane		ND	ND	ND
1,1,2-Trichloroethane		ND	ND	ND
1,1-Dichloroethane		ND	ND	ND
1,1-Dichloroethene		ND	ND	ND
1,2,4-Trichlorbenzene		ND	ND	ND
1,2,4-Trimethylbenzene		ND	**14**	**26**
1,2-Dibromoethane		ND	ND	ND
1,2-Dichlorobenzene		ND	ND	ND
1,2-Dichloroethane		ND	ND	ND
1,2-Dichloropropane		ND	ND	ND
1,3,5-Trimethybenzene		ND	ND	**7.1**
1,3-Butadiene		NA	NA	NA
1,3-Dichlorobenzene		ND	ND	ND
1,4-Dichlorobenzene		ND	ND	**4.4**
1,4-Dioxane		ND	ND	ND
2,2,4-Trimethylpentane		**2.5**	ND	**10**
2-Butanone		**3.8**	ND	**13**
2-Hexanone		NA	NA	NA
3-Chloropropene		NA	NA	NA
4-Ethyltoluene		NA	NA	NA
4-Methyl-2-pentanone		**1.2**	ND	**1.9**
Acetone		NA	NA	NA
Benzene		**2.9**	**3.7**	**10**
Benzyl chloride		ND	ND	ND
Bromodichloromethane		ND	ND	ND
Bromoform		ND	ND	ND
Bromomethane		ND	ND	ND
Carbon disulfide		NA	NA	NA
Carbon tetrachloride		**0.42**	ND	**0.46**
Chlorobenzene		ND	ND	ND
Chloroethane		ND	ND	ND
Chloroform		**0.4**	ND	**2.4**
Chloromethane		**1.2**	ND	ND
cis-1,2-Dichloroethene		ND	ND	ND
cis-1,3-Dichloropropene		ND	ND	ND
Cyclohexane		**1.9**	ND	**6.7**
Dibromochloromethane		ND	ND	ND
Dichlorodifluoromethane		**2.6**	ND	ND
Ethanol		**62**	**19**	**630**

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/m^3)	**Sample Designation:** **Sample Date:**	C241108A-OA-537-20100318 3/18/2010 Property A	C241108A-SSA-4524-20100318 3/18/2010 Property B	C241108A-SSA-4528-20100318 3/18/2010 Property C
Ethyl Acetate		NA	NA	NA
Ethylbenzene		**2.4**	**10**	**19**
Freon-113		ND	ND	ND
Freon-114		ND	ND	ND
Hexachlorobutadiene		ND	ND	ND
m+p-Xylene		**6.2**	**43**	**72**
Isopropanol		NA	NA	NA
Methyl tert butyl ether		ND	ND	ND
Methylene chloride		**5.6**	**330**	**3.6**
n-Heptane		NA	NA	NA
n-Hexane		**4.2**	**12**	**12**
o-Xylene		**1.4**	**13**	**23**
Propylene		NA	NA	NA
Styrene		ND	ND	**2.5**
tert-Butyl alcohol		ND	ND	ND
Tetrachloroethene		**4.3**	**5.6**	**8.9**
Tetrahydrofuran		NA	NA	NA
Toluene		**20**	**84**	**97**
trans-1,2-Dichloroethene		ND	ND	ND
trans-1,3-Dichloropropene		ND	ND	ND
Trichloroethene		**0.43**	ND	**0.31**
Trichlorofluoromethane		**2**	ND	**1.2**
Vinyl acetate		NA	NA	NA
Vinyl bromide		NA	NA	NA
Vinyl chloride		ND	ND	ND

µg/m^3 - Micrograms per cubic meter
U - Indicates that the compound was analyzed for but not detected
D - Sample required re-analysis on dilution for compound that exceeded calibration on initial analysis
ND - Sample was analyzed for but not detected, reporting limits were not available
NA - Compound was not tested for by laboratory
Bold data indicates that parameter was detected

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter (Concentrations in µg/m^3)	**Sample Designation:** **Sample Date:**	C241108A-SSA-4542-20100318 3/18/2010 Property D	C241108A-SSA-537-20100318 3/18/2010 Property A
1,1,1-Trichloroethane		ND	ND
1,1,2,2-Tetrachloroethane		ND	ND
1,1,2-Trichloroethane		ND	ND
1,1-Dichloroethane		ND	ND
1,1-Dichloroethene		**0.49**	ND
1,2,4-Trichlorbenzene		ND	ND
1,2,4-Trimethylbenzene		**29**	**20**
1,2-Dibromoethane		ND	ND
1,2-Dichlorobenzene		ND	ND
1,2-Dichloroethane		ND	ND
1,2-Dichloropropane		ND	ND
1,3,5-Trimethybenzene		**7.8**	**5**
1,3-Butadiene		NA	NA
1,3-Dichlorobenzene		ND	ND
1,4-Dichlorobenzene		**7.6**	**4.8**
1,4-Dioxane		ND	ND
2,2,4-Trimethylpentane		**1.6**	**1.1**
2-Butanone		**4**	**3.9**
2-Hexanone		NA	NA
3-Chloropropene		NA	NA
4-Ethyltoluene		NA	NA
4-Methyl-2-pentanone		ND	ND
Acetone		NA	NA
Benzene		**4.9**	**2.7**
Benzyl chloride		ND	ND
Bromodichloromethane		ND	ND
Bromoform		ND	ND
Bromomethane		ND	ND
Carbon disulfide		NA	NA
Carbon tetrachloride		**1.5**	**0.28**
Chlorobenzene		ND	ND
Chloroethane		ND	ND
Chloroform		**13**	**0.86**
Chloromethane		**0.85**	ND
cis-1,2-Dichloroethene		ND	ND
cis-1,3-Dichloropropene		ND	ND
Cyclohexane		**6.4**	**3.8**
Dibromochloromethane		ND	ND
Dichlorodifluoromethane		**2.6**	**2.4**
Ethanol		**3.9**	**6.7**

Table 9. Summary of Soil Vapor Sampling, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Parameter			
	Sample Designation:	C241108A-SSA-4542-20100318	C241108A-SSA-537-20100318
	Sample Date:	3/18/2010	3/18/2010
(Concentrations in µg/m^3)		Property D	Property A
Ethyl Acetate		NA	NA
Ethylbenzene		**21**	**13**
Freon-113		ND	ND
Freon-114		ND	ND
Hexachlorobutadiene		ND	ND
m+p-Xylene		**79**	**54**
Isopropanol		NA	NA
Methyl tert butyl ether		ND	ND
Methylene chloride		**0.84**	**1.1**
n-Heptane		NA	NA
n-Hexane		**6.1**	**4**
o-Xylene		**26**	**17**
Propylene		NA	NA
Styrene		**2.1**	**1.2**
tert-Butyl alcohol		**4.2**	**1.4**
Tetrachloroethene		**3.5**	**3.2**
Tetrahydrofuran		NA	NA
Toluene		**66**	**44**
trans-1,2-Dichloroethene		ND	ND
trans-1,3-Dichloropropene		ND	ND
Trichloroethene		**12**	ND
Trichlorofluoromethane		**1.9**	**1.9**
Vinyl acetate		NA	NA
Vinyl bromide		NA	NA
Vinyl chloride		ND	ND

µg/m^3 - Micrograms per cubic meter
U - Indicates that the compound was analyzed for but not detected
D - Sample required re-analysis on dilution for compound that exceeded calibration on initial analysis
ND - Sample was analyzed for but not detected, reporting limits were not available
NA - Compound was not tested for by laboratory
Bold data indicates that parameter was detected

Table 10. Summary of Well Gauging and IRM Recovery, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Well ID	Date	Depth to LNAPL (ft)	Depth to Water (ft)	Apparent LNAPL Thickness (ft)	Total LNAPL Removed Per Event (gal)	Total Fluids Removed Per Event (gal)	Comments
MW-1	6/5/2006	ND	6	NA	--	--	Paint thinner/mineral spirits.
MW-1	5/2/2007	6.83	7.45	0.62	--	--	Paint thinner/mineral spirits.
MW-1	3/2/2010	5.94	5.95	0.01	--	0	Waste characterization measurement.
MW-1	3/16/2010	NP	5.47	0	0	0	Sheen observed, No extraction this period.
MW-1	4/13/2010	--	--	--	0	0	Well covered by debris and inaccessible.
MW-1	5/11/2010	6.89	NA (see comments)	--	1.1	4.5	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-1	6/8/2010	NP	6.67	0	0	0	No LNAPL. No extraction this period.
MW-1	7/13/2010	NP	6.4	0	0	0	No LNAPL. No extraction this period.
MW-1	8/10/2010	NP	6.53	0	0	0	No LNAPL. No extraction this period.
MW-2	6/5/2006	6.7	7.03	0.33	--	--	Paint thinner/mineral spirits.
MW-2	5/2/2007	6.79	6.81	0.02	--	--	Paint thinner/mineral spirits.
MW-2	3/2/2010	NP	6.5	0	--	0	Waste characterization measurement.
MW-2	3/16/2010	NP	6.56	0	0	0	Sheen observed, No extraction this period.
MW-2	4/13/2010	NP	6.49	0	0	0	Sheen observed, No extraction this period.
MW-2	5/11/2010	6.7	NA (see comments)	--	0	0.9	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-2	6/8/2010	NP	7.21	0	0	0	No LNAPL. No extraction this period.
MW-2	7/13/2010	NP	7.57	0	0	0	No LNAPL. No extraction this period.
MW-2	8/10/2010	NP	7.77	0	0	0	No LNAPL. No extraction this period.
MW-3	6/5/2006	6.15	6.42	0.27	--	--	Paint thinner/mineral spirits and weathered fuel oil.
MW-3	5/2/2007	6.94	7.3	0.36	--	--	Paint thinner/mineral spirits and weathered fuel oil.
MW-3	3/2/2010	6.5	7.51	1.01	--	0	Waste characterization measurement.
MW-3	3/16/2010	6.15	7.46	1.31	3	12	Round 1 gauging.
MW-3	4/13/2010	7.6	7.61	0.01	0	0	Sheen / 0.01' only. No extraction this period.
MW-3	5/11/2010	6.77	NA (see comments)	--	0	0	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-3	6/8/2010	7	7.36	0.36	0	0	Negligible recoverable LNAPL, No extraction this period.
MW-3	7/13/2010	7.18	7.86	0.68	0	0	Negligible recoverable LNAPL, No extraction this period.
MW-3	8/10/2010	7.22	15	7.78	5	5	All LNAPL in gauging. Good recovery.

Table 10. Summary of Well Gauging and IRM Recovery, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Well ID	Date	Depth to LNAPL (ft)	Depth to Water (ft)	Apparent LNAPL Thickness (ft)	Total LNAPL Removed Per Event (gal)	Total Fluids Removed Per Event (gal)	Comments
MW-4	6/5/2006	ND	8.87	NA	--	--	
MW-4	5/2/2007	ND	9.51	NA	--	--	
MW-4	3/2/2010	NP	9.42	0	--	0	Waste characterization measurement.
MW-4	3/16/2010	NP	8.92	0	0	0	Sheen observed, No extraction this period.
MW-4	4/13/2010	NP	9.46	0	0	0	No LNAPL but some orange biofouling evident.
MW-4	5/11/2010	9.58	NA (see comments)	--	0	0	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-4	6/8/2010	NP	9.81	0	0	0	No LNAPL. No extraction this period.
MW-4	7/13/2010	NP	10.11	0	0	0	No LNAPL. No extraction this period.
MW-4	8/10/2010	NP	10.51	0	0	0	No LNAPL. No extraction this period.
MW-5	6/5/2006	ND	5.46	NA	--	--	
MW-5	5/2/2007	ND	5.68	NA	--	--	
MW-5	3/2/2010	NP	6.22	0	--	0	Waste characterization measurement.
MW-5	3/16/2010	NP	5.01	0	0	0	No LNAPL, No extraction this period.
MW-5	4/13/2010	NP	6.58	0	0	0	No LNAPL, No extraction this period.
MW-5	5/11/2010	6.59	NA (see comments)	--	0	0	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. No residual product on IP probe.
MW-5	6/8/2010	NA (see comments)	--	--	0	0	Inaccessible due to stripped nut.
MW-5	7/13/2010	NP	6.51	0	0	0	No LNAPL, No extraction this period.
MW-5	8/10/2010	NP	6.59	0	0	0	No LNAPL, No extraction this period.
MW-6	5/2/2007	9.91	13.41	3.5	--	--	Paint thinner/mineral spirits.
MW-6	3/2/2010	--	--	--	--	0	Well Inaccessible.
MW-6	3/16/2010	9.59	12.53	2.94	0	0	Equipment problems with 1-inch wells; no LNAPL removal.
MW-6	4/13/2010	9.69	13.75	4.06	1.8	7	Low volume due to small diameter recovery well.
MW-6	5/11/2010	9.87	NA (see comments)	--	7.4	9.8	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-6	6/8/2010	10	14.01	4.01	0	0	Very poor recovery despite LNAPL, less than 1 gallon.

Table 10. Summary of Well Gauging and IRM Recovery, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Well ID	Date	Depth to LNAPL (ft)	Depth to Water (ft)	Apparent LNAPL Thickness (ft)	Total LNAPL Removed Per Event (gal)	Total Fluids Removed Per Event (gal)	Comments
MW-6	7/13/2010	10.2	14.01	3.81	10.2	20.3	Error in field notes from drum gauging. LNAPL fraction estimated only based upon visual observations. Higher than typical LNAPL fraction noted due to slurping approach during first event to minimize groundwater in recovered total fluids. Higher volume recovery due to longer extraction times relative to other wells.
MW-6	8/10/2010	10.31	14	3.69	6.4	6.4	LNAPL fraction based on drum gauging at end of day. Very good LNAPL recovery.
MW-7	5/2/2007	ND	1.43	NA	--	--	
MW-7	3/2/2010	1.36	3.35	1.99	--	0	Waste characterization measurement.
MW-7	3/16/2010	1	2.91	1.91	0	0	Equipment problems with 1-inch wells; no LNAPL removal.
MW-7	4/13/2010	1.37	3.33	1.96	2.6	10.5	Low volume due to small diameter recovery well.
MW-7	5/11/2010	2.27	NA (see comments)	--	0	0	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product (darker liquid) was present on IP probe.
MW-7	6/8/2010	2.95	3.23	0.28	0	0	Negligible recoverable LNAPL, No extraction this period.
MW-7	7/13/2010	NP	1.43	0	0	0	No LNAPL, No extraction this period.
MW-7	8/10/2010	NP	1.56	0	0	0	No LNAPL, No extraction this period.
MW-8	5/2/2007	6.02	10.31	4.29	--	--	Paint thinner/mineral spirits.
MW-8	3/2/2010	--	--	--	--	0	Well Inaccessible.
MW-8	3/16/2010	6.42	9.75	3.33	9	18	Round 1 Vacuum Extraction.
MW-8	3/16/2010	5.9	7.79	1.89	9	18	Round 2 vacuum extraction on same day.
MW-8	4/13/2010	5.86	10.33	4.47	4.4	17.5	LNAPL recovery quickly turned to mostly water.
MW-8	5/11/2010	6.1	NA (see comments)	--	4.9	9.8	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-8	6/8/2010	6.26	10.25	3.99	13.6	13.6	Good LNAPL Recovery.
MW-8	7/13/2010	6.49	10.52	4.03	6	8.8	LNAPL fraction based upon drum gauging at end of day.
MW-8	8/10/2010	6.57	10.43	3.86	32	66.3	LNAPL fraction based upon drum gauging at end of day.
MW-9	5/2/2007	6.32	7.18	0.86	--	--	Paint thinner/mineral spirits.
MW-9	3/2/2010	5.69	8.97	3.28	--	0	Waste characterization measurement.
MW-9	3/16/2010	5.58	7.67	2.09	4.8	9.6	Round 1 Vacuum Extraction.
MW-9	3/16/2010	5.7	5.92	0.22	0	0	Insufficient recharge for second extraction.
MW-9	4/13/2010	6.69	7.77	1.08	0.4	1.4	LNAPL recovery quickly turned to mostly water.

Table 10. Summary of Well Gauging and IRM Recovery, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Well ID	Date	Depth to LNAPL (ft)	Depth to Water (ft)	Apparent LNAPL Thickness (ft)	Total LNAPL Removed Per Event (gal)	Total Fluids Removed Per Event (gal)	Comments
MW-9	5/11/2010	7.19	NA (see comments)	--	1.3	2.7	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-9	6/8/2010	7.12	9.7	2.58	11.1	11.1	Excellent LNAPL recovery.
MW-9	7/13/2010	7.2	11.24	4.04	2	8.8	LNAPL fraction based upon drum gauging at end of day.
MW-9	8/10/2010	7.18	11.45	4.27	5.7	11	LNAPL fraction based upon drum gauging at end of day.
MW-10	5/2/2007	ND	6.32	NA	--	--	
MW-10	3/2/2010	NP	7.14	0	--	0	Waste characterization measurement.
MW-10	3/16/2010	NP	5.41	0	0	0	No LNAPL.
MW-10	4/13/2010	NP	6.07	0	0	0	Sheen / 0.01' only. No extraction this period.
MW-10	5/11/2010	7.13	NA (see comments)	--	0	0	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-10	6/8/2010	NP	3.34	0	0	0	No LNAPL. No extraction this period.
MW-10	7/13/2010	NP	7.58	0	0	0	No LNAPL. No extraction this period.
MW-10	8/10/2010	NP	6.49	0	0	0	No LNAPL. No extraction this period.
MW-11	5/2/2007	ND	6.41	NA	--	--	
MW-11	3/2/2010	NP	6.21	0	--	0	Waste characterization measurement.
MW-11	3/16/2010	NP	6.14	0	0	0	No LNAPL.
MW-11	4/13/2010	NP	5.84	0	0	0	No LNAPL.
MW-11	5/11/2010	6.52	NA (see comments)	--	0	0	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-11	6/8/2010	NP	6.89	0	0	0	No LNAPL. No extraction this period.
MW-11	7/13/2010	NP	6.95	0	0	0	No LNAPL. No extraction this period.
MW-11	8/10/2010	NP	6.82	0	0	0	No LNAPL. No extraction this period.
MW-12	5/2/2007	8.49	9.24	0.75	--	--	
MW-12	3/2/2010	8.14	12.73	4.59	--	0	Waste characterization measurement.
MW-12	3/16/2010	6.46	12.47	6.01	9	18	Round 1 Vacuum Extraction.
MW-12	3/16/2010	7.44	18.98	11.54	13.5	18	Round 2 Vacuum Extraction on Same Day .
MW-12	4/13/2010	6.46	12.79	6.33	0.7	2.8	LNAPL recovery quickly turned to mostly water.

Table 10. Summary of Well Gauging and IRM Recovery, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Well ID	Date	Depth to LNAPL (ft)	Depth to Water (ft)	Apparent LNAPL Thickness (ft)	Total LNAPL Removed Per Event (gal)	Total Fluids Removed Per Event (gal)	Comments
MW-12	5/11/2010	7.44	NA (see comments)	--	2.2	4.5	IP Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-12	6/8/2010	7.8	9.75	1.95	1.8	5.1	Good initial LNAPL recovery, but quickly turned to mostly water.
MW-12	7/13/2010	7.85	11.23	3.38	1.8	8.8	LNAPL fraction based on drum gauging at end of day.
MW-12	8/10/2010	7.9	8.93	1.03	2.7	5.7	LNAPL recovery quickly turned to mostly water.
MW-13	5/2/2007	7.01	13.31	6.3	--	--	Paint thinner/mineral spirits.
MW-13	3/2/2010	6.57	12.71	6.14	--	0	Waste characterization measurement.
MW-13	3/16/2010	6.12	13.03	6.91	7.2	14.4	Round 1 Vacuum Extraction.
MW-13	3/16/2010	6.96	13.49	6.53	9	18	Round 2 vacuum extraction on same day.
MW-13	4/13/2010	7.19	10.84	3.65	17.5	35	Good LNAPL Recovery.
MW-13	5/11/2010	7.1	NA (see comments)	--	7.4	9.8	Probe water sensor not functioning in field, only able to get DTP, not able to get DTW or corresponding product thickness readings. However, residual product was present on IP probe.
MW-13	6/8/2010	7.12	13.02	5.9	2.5	3.1	Good initial LNAPL recovery, but quickly turned to mostly water.
MW-13	7/13/2010	7.41	13.06	5.65	5	8.8	LNAPL fraction based on drum gauging at end of day.
MW-13	8/10/2010	7.45	13.1	5.65	2.6	9.7	LNAPL fraction based on drum gauging at end of day.

Notes:
LNAPL - Light Non-Aqueous Phase Liquid
NP - No LNAPL present
NA - Interface Probe malfunctioned during the May 11, 2010 field event and data is not available
ft - Feet
gal - Gallons
DTW - Depth to water
DTP - Depth to LNAPL

Table 11. Proposed Soil Boring/Monitoring Well Rationale, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Soil Boring/ Monitoring Well	**Location**	**Rationale**	**Sample Analysis (Soil)**[1]	**Sample Analysis (Groundwater)**
MW-1R[2]	Northern portion of courtyard	Sentinel well for northern extent of LNAPL migration (replacement well)	TCL+30, TAL Metals, Pesticides and PCBs	TCL+30, TAL Metals, Pesticides and PCBs
MW-2R[2]	Driveway west of warehouse	To delineate southern/southwestern extent of LNAPL (replacement well)	TCL+30, TAL Metals, Pesticides and PCBs	TCL+30, TAL Metals, Pesticides and PCBs
MW-6R	Inside northern portion of shed	To delineate northeastern extent of LNAPL (replacement well)	TCL+30, TAL Metals	TCL+30, TAL Metals
MW-7R[2]	Inside northern portion of warehouse	To delineate southern extent of LNAPL under warehouse building (replacement well)	TCL+30, TAL Metals, Pesticides and PCBs	TCL+30, TAL Metals, Pesticides and PCBs
MW-14	Northwest corner of paint factory building.	To delineate the eastern extent of LNAPL under the building, assess groundwater quality	TCL+30, TAL Metals	TCL+30, TAL Metals
MW-15	Southeast corner of courtyard	To delineate the eastern extent of LNAPL	TCL+30, TAL Metals, Pesticides and PCBs	TCL+30, TAL Metals
MW-16	West side of courtyard adjacent to USTs	To further delineate LNAPL on the western portion of the Site	TCL+30, TAL Metals	TCL+30, TAL Metals
MW-17	46th Avenue Sidewalk	To delineate the western extent of LNAPL observed in MW-9	TCL+30, TAL Metals	TCL+30, TAL Metals
MW-18	46th Avenue Sidewalk	To delineate the eastward extent of LNAPL observed in MW-3	TCL+30, TAL Metals, Pesticides and PCBs	TCL+30, TAL Metals
MW-19	Basement of warehouse	To delineate the southern extent of LNAPL, assess groundwater quality beneath the building	TCL+30, TAL Metals	TCL+30, TAL Metals, Pesticides and PCBs
MW-20	Southwest corner inside paint factory building.	To delineate the southeastern extent of LNAPL. assess groundwater quality beneath the building	TCL+30, TAL Metals, Pesticides and PCBs	TCL+30, TAL Metals, Pesticides and PCBs
MW-21	Sidewalk on Corner of Vernon Boulevard and 46th Avenue	Groundwater triangulation, assess upgradient groundwater quality	TCL+30, TAL Metals	TCL+30, TAL Metals, Pesticides and PCBs
MW-22	Center of paint factory building	Well will extend to bedrock in order to assess impacts related to dense contaminates	TCL+30, TAL Metals	TCL+30, TAL Metals
MW-23	Center of courtyard	Well will extend to bedrock in order to assess impacts related to dense contaminates	TCL+30, TAL Metals	TCL+30, TAL Metals

Table 11. Proposed Soil Boring/Monitoring Well Rationale, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Soil Boring/ Monitoring Well	Location	Rationale	Sample Analysis (Soil)[1]	Sample Analysis (Groundwater)
B-5	Courtyard North of USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals	NA
B-6	Inside shed, adjacent to underground cooking pots	Assess soil impacts adjacent to underground cooking pots	TCL+30, TAL Metals	NA
B-7	Courtyard adjacent to USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals	NA
B-8	Courtyard North of USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals, pesticides and PCBs	NA
B-9	Courtyard west of USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals, pesticides and PCBs	NA
B-10	Driveway, adjacent to USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals	
B-11	46th Avenue Sidewalk	Assess soil impacts between known LNAPL occurrences	TCL+30, TAL Metals	NA
B-12	Central portion of paint factory building	Assess soil impacts under paint factory building	TCL+30, TAL Metals	NA
B-13	Central portion of paint factory building	Assess soil impacts under paint factory building	TCL+30, TAL Metals	NA
B-14	Southeast corner inside paint factory building	Assess soil impacts under paint factory building	TCL+30, TAL Metals	NA
B-15	West side of paint factory building	Assess soil impacts under paint factory building	TCL+30, TAL Metals	NA
B-16	Northeast corner of paint factory building	Assess soil impacts under paint factory building	TCL+30, TAL Metals, pesticides and PCBs	NA
B-17	Northern portion of garage	Assess soil impacts under garage	TCL+30, TAL Metals	NA
B-18	Inside garage, adjacent to USTs	Assess soil impacts under garage, adjacent to USTs	TCL+30, TAL Metals	NA
B-19	Inside garage, adjacent to USTs	Assess soil impacts under garage, adjacent to USTs	TCL+30, TAL Metals	NA
B-20	Inside garage, adjacent to USTs	Assess soil impacts under garage, adjacent to USTs	TCL+30, TAL Metals	NA
B-21	Inside garage, adjacent to USTs	Assess soil impacts under garage, adjacent to USTs	TCL+30, TAL Metals	NA
B-22	Northwest portion of warehouse, adjacent to courtyard USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals, pesticides and PCBs	NA

Table 11. Proposed Soil Boring/Monitoring Well Rationale, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, New York

Soil Boring/ Monitoring Well	**Location**	**Rationale**	**Sample Analysis (Soil)[1]**	**Sample Analysis (Groundwater)**
B-23	Northeast portion of warehouse, adjacent to courtyard USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals	NA
B-24	Eastern side of warehouse, adjacent to garage USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals	NA
B-25	Eastern side of warehouse, adjacent to garage USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals, pesticides and PCBs	NA
B-26	Eastern side of warehouse, adjacent to garage USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals	NA
B-27	West side of warehouse, adjacent to driveway USTs	Assess soil impacts adjacent to USTs	TCL+30, TAL Metals, pesticides and PCBs	NA

Notes:

1 - Three to four soil samples will be collected per boring: shallow, highest PID response, at the water table and at the terminal depth of each boring

2 - Monitoring wells MW-1R, MW-2R and MW-7R are being installed in order to verify the historic Site data

TCL+30 - Full Target Compound List plus the 30 (10 volatile organic compounds and 20 semi-volatile organic compounds) highest concentration tenatively identified compounds

TAL - Full Target Analyte List

LNAPL - Light non-aqueous phase liquid

PCBs - Polychlorinated biphenyls

USTs - Underground storage tanks

NA - Not applicable

Table 12. Reporting Limits and Method Detection Limits for Soil and Aqueous Analytical Results
Revised Remedial Investigation Work Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Compound	CAS No.	SOIL			AQUEOUS		
		RL	MDL	Units	RL	MDL	Units
TCL Volatile Organics SW846 8260B							
Acetone	67-64-1	10	1.7	ug/kg	10	3.3	ug/l
Benzene	71-43-2	1	0.12	ug/kg	1	0.24	ug/l
Bromochloromethane	74-97-5	5	0.27	ug/kg	5	0.3	ug/l
Bromodichloromethane	75-27-4	5	0.11	ug/kg	1	0.21	ug/l
Bromoform	75-25-2	5	0.15	ug/kg	4	0.21	ug/l
Bromomethane	74-83-9	5	0.27	ug/kg	2	0.22	ug/l
2-Butanone (MEK)	78-93-3	10	2.4	ug/kg	10	2.4	ug/l
Carbon disulfide	75-15-0	5	0.12	ug/kg	2	0.19	ug/l
Carbon tetrachloride	56-23-5	5	0.13	ug/kg	1	0.22	ug/l
Chlorobenzene	108-90-7	5	0.11	ug/kg	1	0.23	ug/l
Chloroethane	75-00-3	5	0.23	ug/kg	1	0.26	ug/l
Chloroform	67-66-3	5	0.083	ug/kg	1	0.2	ug/l
Chloromethane	74-87-3	5	0.19	ug/kg	1	0.21	ug/l
Cyclohexane	110-82-7	5	0.12	ug/kg	5	0.35	ug/l
1,2-Dibromo-3-chloropropane	96-12-8	10	0.89	ug/kg	10	0.54	ug/l
Dibromochloromethane	124-48-1	5	0.16	ug/kg	1	0.14	ug/l
1,2-Dibromoethane	106-93-4	1	0.13	ug/kg	2	0.2	ug/l
1,2-Dichlorobenzene	95-50-1	5	0.19	ug/kg	1	0.22	ug/l
1,3-Dichlorobenzene	541-73-1	5	0.19	ug/kg	1	0.22	ug/l
1,4-Dichlorobenzene	106-46-7	5	0.18	ug/kg	1	0.3	ug/l
Dichlorodifluoromethane	75-71-8	5	0.23	ug/kg	5	0.27	ug/l
1,1-Dichloroethane	75-34-3	5	0.14	ug/kg	1	0.11	ug/l
1,2-Dichloroethane	107-06-2	1	0.14	ug/kg	1	0.26	ug/l
1,1-Dichloroethene	75-35-4	5	0.26	ug/kg	1	0.19	ug/l
cis-1,2-Dichloroethene	156-59-2	5	0.18	ug/kg	1	0.19	ug/l
trans-1,2-Dichloroethene	156-60-5	5	0.24	ug/kg	1	0.21	ug/l
1,2-Dichloropropane	78-87-5	5	0.15	ug/kg	1	0.48	ug/l
cis-1,3-Dichloropropene	10061-01-5	5	0.14	ug/kg	1	0.21	ug/l
trans-1,3-Dichloropropene	10061-02-6	5	0.16	ug/kg	1	0.19	ug/l
1,4-Dioxane	123-91-1	130	60	ug/kg	130	75	ug/l
Ethylbenzene	100-41-4	1	0.26	ug/kg	1	0.23	ug/l
Freon 113	76-13-1	5	0.43	ug/kg	5	0.53	ug/l
2-Hexanone	591-78-6	5	0.62	ug/kg	5	1.1	ug/l
Isopropylbenzene	98-82-8	5	0.074	ug/kg	2	0.45	ug/l
Methyl Acetate	79-20-9	5	2.6	ug/kg	5	1.2	ug/l
Methylcyclohexane	108-87-2	5	0.17	ug/kg	5	0.26	ug/l
Methyl Tert Butyl Ether	1634-04-4	1	0.24	ug/kg	1	0.16	ug/l
4-Methyl-2-pentanone(MIBK)	108-10-1	5	0.75	ug/kg	5	0.83	ug/l
Methylene chloride	75-09-2	5	1.3	ug/kg	2	0.7	ug/l
Styrene	100-42-5	5	0.092	ug/kg	5	0.21	ug/l
1,1,2,2-Tetrachloroethane	79-34-5	5	0.13	ug/kg	1	0.21	ug/l
Tetrachloroethene	127-18-4	5	0.17	ug/kg	1	0.28	ug/l
Toluene	108-88-3	1	0.11	ug/kg	1	0.23	ug/l
1,2,3-Trichlorobenzene	87-61-6	5	0.16	ug/kg	5	0.28	ug/l
1,2,4-Trichlorobenzene	120-82-1	5	0.14	ug/kg	5	0.2	ug/l
1,1,1-Trichloroethane	71-55-6	5	0.11	ug/kg	1	0.24	ug/l
1,1,2-Trichloroethane	79-00-5	5	0.17	ug/kg	1	0.29	ug/l
Trichloroethene	79-01-6	5	0.17	ug/kg	1	0.22	ug/l
Trichlorofluoromethane	75-69-4	5	0.3	ug/kg	5	0.27	ug/l
Vinyl chloride	75-01-4	5	0.14	ug/kg	1	0.21	ug/l
m,p-Xylene		1	0.17	ug/kg	1	0.42	ug/l

Table 12. Reporting Limits and Method Detection Limits for Soil and Aqueous Analytical Results
Revised Remedial Investigation Work Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

		SOIL			AQUEOUS		
Compound	**CAS No.**	**RL**	**MDL**	**Units**	**RL**	**MDL**	**Units**
TCL Volatile Organics SW846 8260B, continued							
o-Xylene	95-47-6	1	0.14	ug/kg	1	0.24	ug/l
Xylene (total)	1330-20-7	1	0.14	ug/kg	1	0.24	ug/l
TCL Semivolatiles SW846 8270D							
2-Chlorophenol	95-57-8	5	1	ug/kg	5	0.97	ug/l
4-Chloro-3-methyl phenol	59-50-7	5	1	ug/kg	5	1.8	ug/l
2,4-Dichlorophenol	120-83-2	5	1.6	ug/kg	5	1.2	ug/l
2,4-Dimethylphenol	105-67-9	5	1.7	ug/kg	5	1.5	ug/l
2,4-Dinitrophenol	51-28-5	20	1.2	ug/kg	20	17	ug/l
4,6-Dinitro-o-cresol	534-52-1	20	1.2	ug/kg	20	0.99	ug/l
2-Methylphenol	95-48-7	2	1.1	ug/kg	2	1	ug/l
3&4-Methylphenol		2	1.3	ug/kg	2	0.93	ug/l
2-Nitrophenol	88-75-5	5	1.1	ug/kg	5	1.5	ug/l
4-Nitrophenol	100-02-7	10	1.7	ug/kg	10	5.2	ug/l
Pentachlorophenol	87-86-5	10	1.7	ug/kg	10	1.4	ug/l
Phenol	108-95-2	2	1.1	ug/kg	2	1.3	ug/l
2,3,4,6-Tetrachlorophenol	58-90-2	5	1	ug/kg	5	0.94	ug/l
2,4,5-Trichlorophenol	95-95-4	5	1.2	ug/kg	5	1.6	ug/l
2,4,6-Trichlorophenol	88-06-2	5	0.94	ug/kg	5	1.3	ug/l
Acenaphthene	83-32-9	1	0.29	ug/kg	1	0.26	ug/l
Acenaphthylene	208-96-8	1	0.32	ug/kg	1	0.23	ug/l
Acetophenone	98-86-2	5	0.18	ug/kg	2	0.29	ug/l
Anthracene	120-12-7	1	0.35	ug/kg	1	0.29	ug/l
Atrazine	1912-24-9	5	0.2	ug/kg	5	0.49	ug/l
Benzaldehyde	100-52-7	5	0.23	ug/kg	5	3.3	ug/l
Benzo(a)anthracene	56-55-3	1	0.33	ug/kg	1	0.23	ug/l
Benzo(a)pyrene	50-32-8	1	0.31	ug/kg	1	0.23	ug/l
Benzo(b)fluoranthene	205-99-2	1	0.33	ug/kg	1	0.46	ug/l
Benzo(g,h,i)perylene	191-24-2	1	0.37	ug/kg	1	0.32	ug/l
Benzo(k)fluoranthene	207-08-9	1	0.38	ug/kg	1	0.51	ug/l
4-Bromophenyl phenyl ether	101-55-3	2	0.36	ug/kg	2	0.36	ug/l
Butyl benzyl phthalate	85-68-7	2	0.58	ug/kg	2	0.29	ug/l
1,1'-Biphenyl	92-52-4	2	0.12	ug/kg	1	0.3	ug/l
2-Chloronaphthalene	91-58-7	2	0.31	ug/kg	2	0.3	ug/l
4-Chloroaniline	106-47-8	5	0.32	ug/kg	5	0.53	ug/l
Carbazole	86-74-8	2	0.46	ug/kg	1	0.36	ug/l
Caprolactam	105-60-2	2	0.32	ug/kg	2	0.69	ug/l
Chrysene	218-01-9	1	0.34	ug/kg	1	0.29	ug/l
bis(2-Chloroethoxy)methane	111-91-1	2	0.4	ug/kg	2	0.31	ug/l
bis(2-Chloroethyl)ether	111-44-4	2	0.3	ug/kg	2	0.31	ug/l
bis(2-Chloroisopropyl)ether	108-60-1	2	0.3	ug/kg	2	0.45	ug/l
4-Chlorophenyl phenyl ether	7005-72-3	2	0.3	ug/kg	2	0.31	ug/l
2,4-Dinitrotoluene	121-14-2	2	0.44	ug/kg	2	0.43	ug/l
2,6-Dinitrotoluene	606-20-2	2	0.38	ug/kg	2	0.46	ug/l
3,3'-Dichlorobenzidine	91-94-1	5	0.25	ug/kg	5	0.36	ug/l
Dibenzo(a,h)anthracene	53-70-3	1	0.34	ug/kg	1	0.38	ug/l
Dibenzofuran	132-64-9	2	0.3	ug/kg	5	0.27	ug/l
Di-n-butyl phthalate	84-74-2	2	0.22	ug/kg	2	0.56	ug/l
Di-n-octyl phthalate	117-84-0	2	0.49	ug/kg	2	0.31	ug/l
Diethyl phthalate	84-66-2	2	0.34	ug/kg	2	0.33	ug/l
Dimethyl phthalate	131-11-3	2	0.35	ug/kg	2	0.28	ug/l

Table 12. Reporting Limits and Method Detection Limits for Soil and Aqueous Analytical Results
Revised Remedial Investigation Work Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

Compound	CAS No.	SOIL			AQUEOUS		
		RL	MDL	Units	RL	MDL	Units
TCL Semivolatiles SW846 8270D, continued							
bis(2-Ethylhexyl)phthalate	117-81-7	2	0.88	ug/kg	2	0.59	ug/l
Fluoranthene	206-44-0	1	0.44	ug/kg	1	0.32	ug/l
Fluorene	86-73-7	1	0.33	ug/kg	1	0.28	ug/l
Hexachlorobenzene	118-74-1	2	0.33	ug/kg	1	0.34	ug/l
Hexachlorobutadiene	87-68-3	1	0.28	ug/kg	1	0.51	ug/l
Hexachlorocyclopentadiene	77-47-4	10	1	ug/kg	10	7.1	ug/l
Hexachloroethane	67-72-1	5	0.28	ug/kg	2	0.55	ug/l
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.35	ug/kg	1	0.37	ug/l
Isophorone	78-59-1	2	0.27	ug/kg	2	0.27	ug/l
2-Methylnaphthalene	91-57-6	2	0.56	ug/kg	1	0.38	ug/l
2-Nitroaniline	88-74-4	5	0.44	ug/kg	5	1.1	ug/l
3-Nitroaniline	99-09-2	5	0.4	ug/kg	5	1.3	ug/l
4-Nitroaniline	100-01-6	5	0.39	ug/kg	5	1.7	ug/l
Naphthalene	91-20-3	1	0.27	ug/kg	1	0.26	ug/l
Nitrobenzene	98-95-3	2	0.29	ug/kg	2	0.42	ug/l
N-Nitroso-di-n-propylamine	621-64-7	2	0.24	ug/kg	2	0.3	ug/l
N-Nitrosodiphenylamine	86-30-6	5	0.6	ug/kg	5	0.31	ug/l
Phenanthrene	85-01-8	1	0.46	ug/kg	1	0.29	ug/l
Pyrene	129-00-0	1	0.38	ug/kg	1	0.27	ug/l
1,2,4,5-Tetrachlorobenzene	95-94-3	5	0.31	ug/kg	2	0.31	ug/l
Metals Method 200.7/6060							
Aluminum	7429-90-5	50	0.74	mg/kg	200	16.09	ug/l
Antimony	7440-36-0	2	0.15	mg/kg	6	1.44	ug/l
Arsenic	7440-38-2	2	0.129	mg/kg	8	0.97	ug/l
Barium	7440-39-3	20	0.054	mg/kg	200	0.66	ug/l
Beryllium	7440-41-7	0.2	0.02	mg/kg	1	0.44	ug/l
Cadmium	7440-43-9	0.5	0.025	mg/kg	3	0.24	ug/l
Calcium	7440-70-2	500	2.347	mg/kg	5000	39.44	ug/l
Chromium	7440-47-3	1	0.113	mg/kg	10	0.91	ug/l
Cobalt	7440-48-4	5	0.031	mg/kg	50	0.59	ug/l
Copper	7440-50-8	2.5	0.128	mg/kg	10	1.27	ug/l
Iron	7439-89-6	50	0.786	mg/kg	100	23.61	ug/l
Lead	7439-92-1	2	0.113	mg/kg	3	1.66	ug/l
Magnesium	7439-95-4	500	3.063	mg/kg	5000	15.81	ug/l
Manganese	7439-96-5	1.5	0.048	mg/kg	15	0.4	ug/l
Nickel	7440-02-0	4	0.105	mg/kg	10	0.94	ug/l
Potassium	7440-09-7	1000	13.753	mg/kg	10000	62.42	ug/l
Selenium	7782-49-2	2	0.239	mg/kg	10	2.43	ug/l
Silver	7440-22-4	0.5	0.063	mg/kg	10	0.85	ug/l
Sodium	7440-23-5	1000	12.907	mg/kg	10000	12.8	ug/l
Thallium	7440-28-0	1	0.218	mg/kg	10	1.73	ug/l
Metals Method 200.7/6060							
Vanadium	7440-62-2	5	0.101	mg/kg	50	0.77	ug/l
Zinc	7440-66-6	2	0.193	mg/kg	20	2.81	ug/l
Metals		**SW846 7471A**			**EPA 245.1/SW846 7470A**		
Mercury	7439-97-6	0.034	0.013	mg/kg	0.2	0.075	ug/l

Table 12. Reporting Limits and Method Detection Limits for Soil and Aqueous Analytical Results
Revised Remedial Investigation Work Plan, Former Paragon Paint Manufacturing Facility, Long Island City, New York

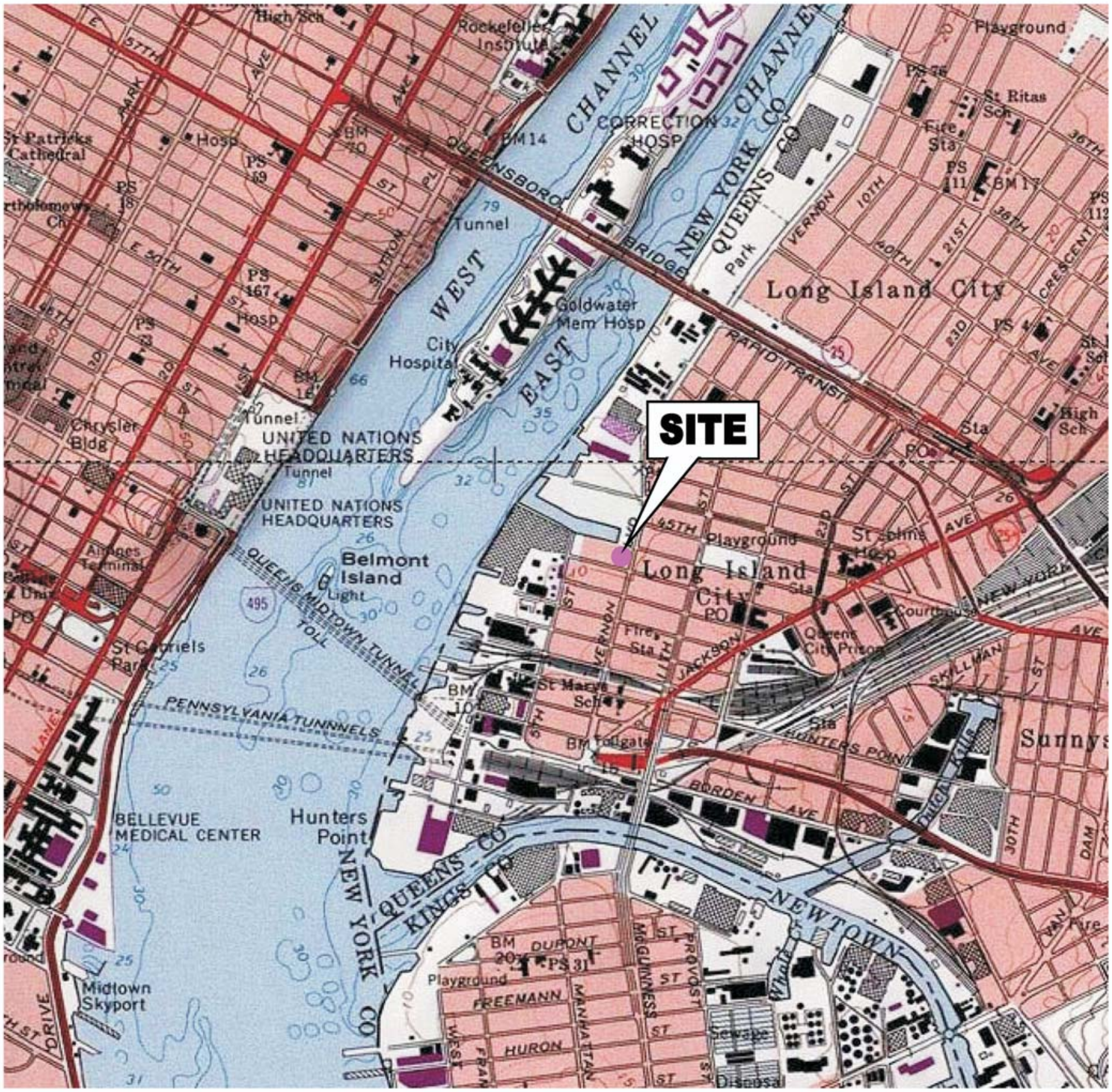
Compound	CAS No.	SOIL			AQUEOUS		
		RL	MDL	Units	RL	MDL	Units
Polychlorinated Biphenyls SW846 8082A							
Aroclor 1016	12674-11-2	50	13	ug/kg	50	13	ug/l
Aroclor 1221	11104-28-2	50	30	ug/kg	50	27	ug/l
Aroclor 1232	11141-16-5	50	25	ug/kg	50	39	ug/l
Aroclor 1242	53469-21-9	50	16	ug/kg	50	8.6	ug/l
Aroclor 1248	12672-29-6	50	15	ug/kg	50	15	ug/l
Aroclor 1254	11097-69-1	50	23	ug/kg	50	14	ug/l
Aroclor 1260	11096-82-5	50	16	ug/kg	50	21	ug/l
Aroclor 1268	11100-14-4	50	15	ug/kg	50	13	ug/l
Aroclor 1262	37324-23-5	50	16	ug/kg	50	6	ug/l
TCL Pesticides SW846 8081B							
Aldrin	309-00-2	1	0.5	ug/kg	1	0.95	ug/l
alpha-BHC	319-84-6	1	0.75	ug/kg	1	0.4	ug/l
beta-BHC	319-85-7	1	0.7	ug/kg	1	0.38	ug/l
delta-BHC	319-86-8	1	0.58	ug/kg	1	0.62	ug/l
gamma-BHC (Lindane)	58-89-9	1	0.46	ug/kg	1	0.41	ug/l
alpha-Chlordane	5103-71-9	1	0.65	ug/kg	1	0.5	ug/l
gamma-Chlordane	5103-74-2	1	0.51	ug/kg	1	0.23	ug/l
Dieldrin	60-57-1	1	0.77	ug/kg	1	0.33	ug/l
4,4'-DDD	72-54-8	1	0.51	ug/kg	1	0.36	ug/l
4,4'-DDE	72-55-9	1	0.59	ug/kg	1	0.3	ug/l
4,4'-DDT	50-29-3	1	0.73	ug/kg	1	0.6	ug/l
Endrin	72-20-8	1	0.51	ug/kg	1	0.64	ug/l
Endosulfan sulfate	1031-07-8	1	0.91	ug/kg	1	0.64	ug/l
Endrin aldehyde	7421-93-4	1	0.95	ug/kg	1	0.29	ug/l
Endrin ketone	53494-70-5	1	0.65	ug/kg	1	0.41	ug/l
Endosulfan-I	959-98-8	1	0.48	ug/kg	1	0.3	ug/l
Endosulfan-II	33213-65-9	1	0.66	ug/kg	1	0.28	ug/l
Heptachlor	76-44-8	1	0.61	ug/kg	1	0.84	ug/l
Heptachlor epoxide	1024-57-3	1	0.49	ug/kg	1	0.38	ug/l
Methoxychlor	72-43-5	2	0.71	ug/kg	2	0.82	ug/l
Toxaphene	8001-35-2	25	13	ug/kg	25	15	ug/l

Notes:
Information provided by Accutest Laboratories

Soils will be reported on a dry weight basis which will result in a proportionate increase in the RL's (i.e. – a 50% solids sample will have a 2x increase in the RL). Also if any single component is present in excess of the calibration range high standard then a corresponding dilution may be required that will result in a higher RL.

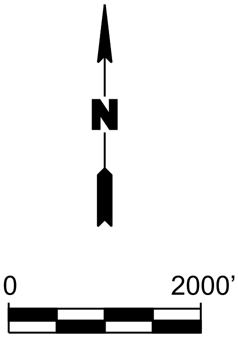
RL - Reporting Limits
MDL - Method Detection Limits
ug/kg - Micrograms per kilogram
ug/l - Micrograms per liter

FIGURES



QUADRANGLE LOCATION

SOURCE:
USGS; 1995, Central Park & Brooklyn
7.5 Minute Topographic Quadrangle



Title:

SITE LOCATION MAP

FORMER PARAGON PAINT AND VARNISH
COMPANY MANUFACTURING FACILITY
5-49 46TH AVENUE & 45-40 VERNON BOULEVARD
LONG ISLAND CITY, NEW YORK

Prepared for:

VERNON 4540 REALTY LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.M.	Date: 11OCT11	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	1
Project Mgr.: R.M.	Project No.: 2051.0001Y000	
File: 2051.0001Y105.01.CDR		

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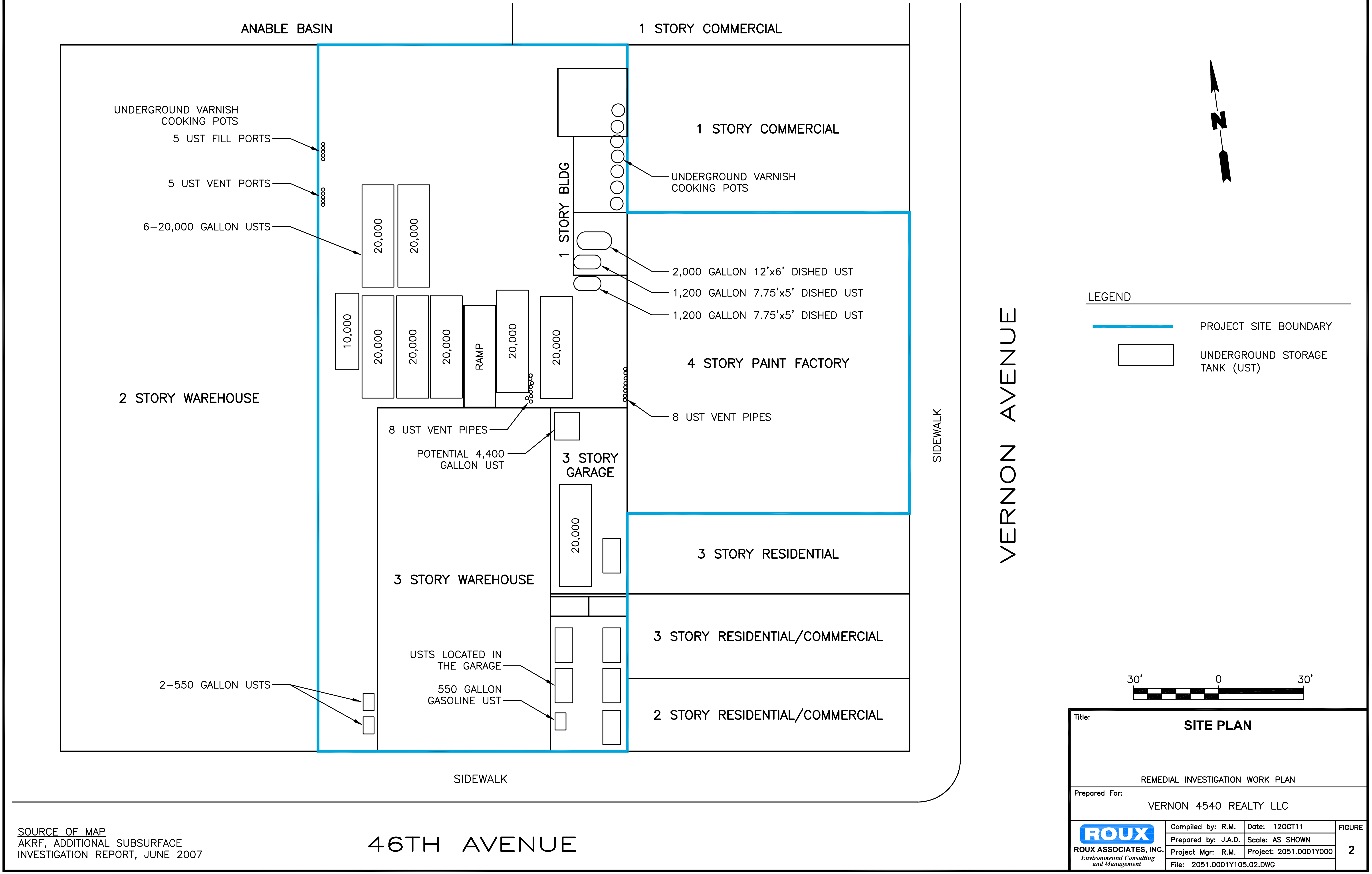


SOURCE OF MAP
AKRF, ADDITIONAL SUBSURFACE
INVESTIGATION REPORT, JUNE 2007

V:\CAD\PROJECTS\2051Y\0001Y\105\2051.0001Y105.02.DWG

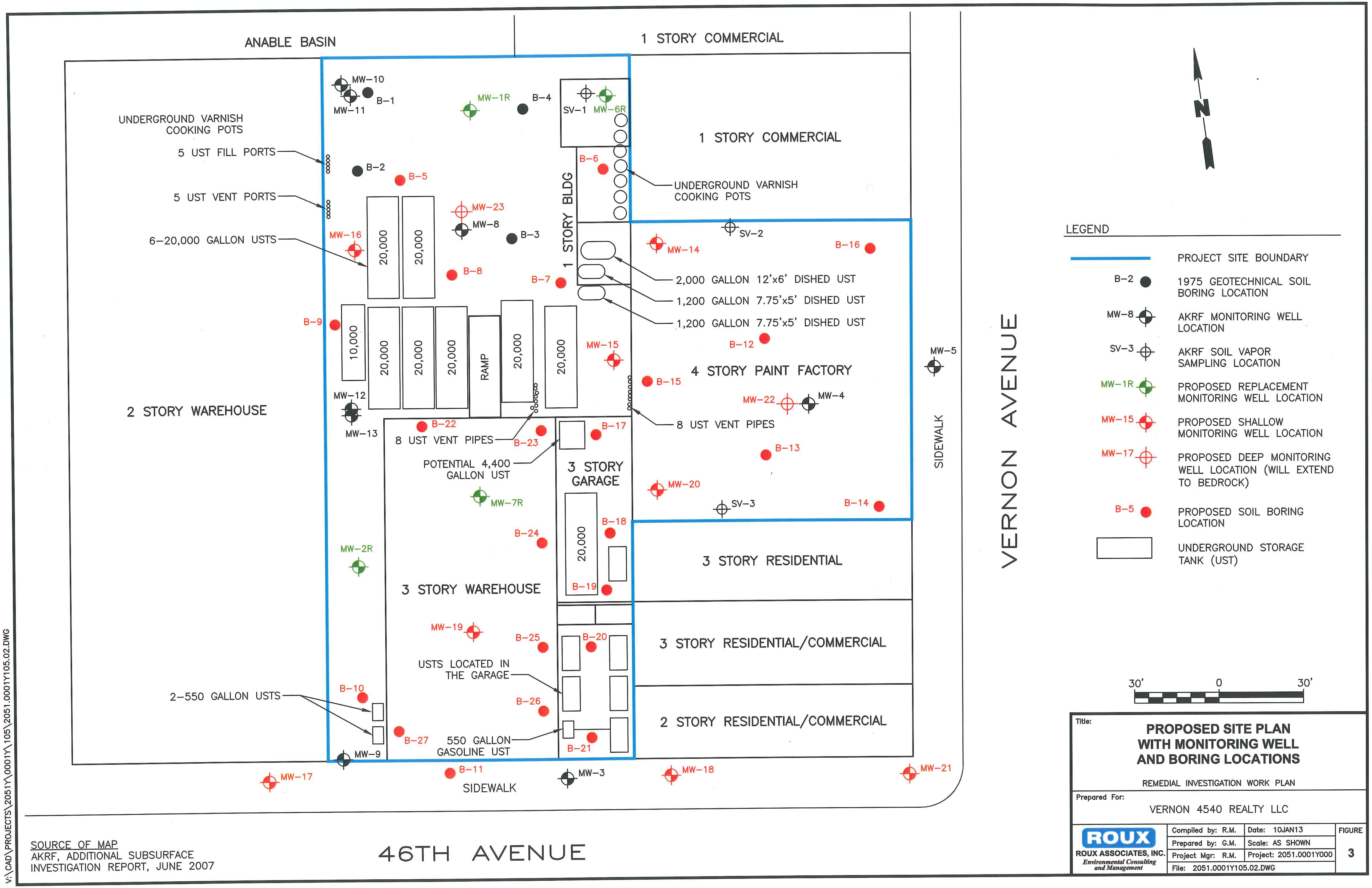
Title:
SITE PLAN

REMEDIAL INVESTIGATION WORK PLAN

Prepared For:
VERNON 4540 REALTY LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting and Management

Compiled by: R.M.	Date: 12OCT11	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	2
Project Mgr: R.M.	Project: 2051.0001Y000	
File: 2051.0001Y105.02.DWG		



SOURCE OF MAP
AKRF, ADDITIONAL SUBSURFACE INVESTIGATION REPORT, JUNE 2007

V:\CAD\PROJECTS\2051Y\0001Y\105\2051.0001Y105.02.DWG

Title:

PROPOSED SITE PLAN WITH MONITORING WELL AND BORING LOCATIONS

REMEDIAL INVESTIGATION WORK PLAN

Prepared For:

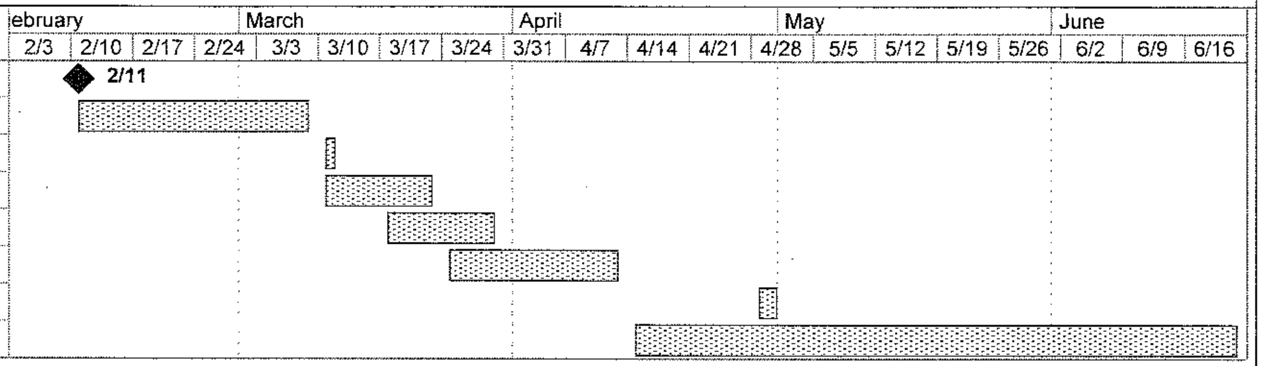
VERNON 4540 REALTY LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting and Management

Compiled by: R.M.	Date: 10JAN13	FIGURE
Prepared by: G.M.	Scale: AS SHOWN	3
Project Mgr: R.M.	Project: 2051.0001Y000	
File: 2051.0001Y105.02.DWG		

Figure 4. Proposed Remedial Investigation Schedule, Former Paragon Paint Manufacturing Facility, Long Island City, New York.

ID	Task Name	Duration	Start	Finish
1	NYSDEC Approval of Revised RIWP	0 days	Mon 2/11/13	Mon 2/11/13
2	Solicit Bids and Select Subcontractors	4 wks	Mon 2/11/13	Fri 3/8/13
3	Sample Existing Monitoring Well Network	1 day	Mon 3/11/13	Mon 3/11/13
4	Install Replacement/Verification Soil Boring/Monitoring Wells (includes one week turnaround time on laboratory analytical results)	10 days	Mon 3/11/13	Fri 3/22/13
5	Perform UST Inventory and LNAPL Sampling	10 days	Mon 3/18/13	Fri 3/29/13
6	Installation of Soil Borings/Monitoring Wells	3 wks	Mon 3/25/13	Fri 4/12/13
7	Gauge All Monitoring Wells and Sample All Monitoring Wells that do not contain LNAPL	2 days	Mon 4/29/13	Tue 4/30/13
8	Prepare Remedial Investigation Report	10 wks	Mon 4/15/13	Fri 6/21/13



Project: Former Paragon Paint Manufacturing Facility
Date: Thu 1/10/13

Task	▨	Progress	▬	Summary	▬	External Tasks	▨	Deadline ⇩
Split	┆	Milestone	◆	Project Summary	▬	External Milestone ◆		

APPENDICES

A. Monitoring Well/Soil Boring Logs
B. Field Sampling Plan
C. Quality Assurance Project Plan
D. Site Health and Safety Plan
E. Community Air Monitoring Plan

APPENDIX A

Monitoring Well/Soil Boring Logs

# SOIL BORING LOG	**Paragon Paint Company** **AKRF Project Number: 10643**	**Boring No.** **MW-1** **Sheet 1** **of 1**

440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow-Stem Auger
Sampling Method:	Split Spoon
Driller :	ADT, Inc
Weather:	Clear 70°
Sampler:	AKRF/Bryan Zieroff

Drilling			
Start		**Finish**	
Time	14:00	**Time**	17:30
Date	5/24/06	**Date**	5/24/06

Depth (feet)	**Blow Counts**	**Recovery (Inches)**	**Surface Condition:** Concrete pad	**Odor**	**Moisture**	**PID**	**NAPL**	**Samples Collected for Lab Analysis**
1 2	NA NA		Concrete: (12 inches). Process gravel.					
3 4	16 30 14 8	0	(No recovery)					
5 6	6 4 3 3	2	SAND, fine to course; some Silt; little fine Gravel; dark brown, very loose (FILL).	no odor	moist	0	none	
7 8	4 1 3 4	2	SAND, fine to course; some Silt; little fine Gravel; trace brick; dark brown, very loose (FILL).	fuel oil	v. moist	10	none	
9 10	6 5 4 7	59	SAND, fine to course; some Silt; little fine Gravel; dark brown, very loose; petroleum staining (FILL).	fuel oil	v. moist	59	none	
11 12	3 1 2 2	22	(0-12") SAND, fine to medium; some Silt; little coarse sand; dark brown. (12-22') Silt and fine Sand; some organic plant material; light brown.	slight fuel oil	wet saturated	111 5	none	MW-1 (10 -11)
13 14	2 1 2 3	10	SAND, fine to medium; some silt; little coarse sand; trace fine Gravel; dark brown/gray.	slight fuel oil	saturated	46	none	
15 16	37 50/3"	10	SAND, fine to medium; some Silt; little coarse Sand; trace fine Gravel; dark brown/gray. Cobbles, Boulders.			42	none	
17 18			Cobbles, Boulders. Ground through cobbles to 18 ft bg.				none	
19 20			End of boring at 19 feet below grade.				none	

Notes:

Groundwater encountered at 10' below grade.

Three inch split spoon used for samples collected from 10 to 12 ft and 14 to 16 ft.

# SOIL BORING LOG	**Paragon Paint Company** **AKRF Project Number: 10643**	**Boring No.** **MW-2** **Sheet 1 of 1**

AKRF

440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow-Stem Auger
Sampling Method:	Split Spoon
Driller :	ADT, Inc
Weather:	Clear 70°
Sampler:	AKRF/Bryan Zieroff

Drilling			
Start		**Finish**	
Time	10:00	**Time**	13:00
Date	5/24/06	**Date**	5/24/06

Depth (feet)	**Blow Counts**	**Recovery (Inches)**	**Surface Condition:** Concrete driveway	**Odor**	**Moisture**	**PID**	**NAPL**	**Samples Collected for Lab Analysis**
1 **2**			Concrete: (12 inches) Process gravel					
3 **4**	**7** **6** **3** **3**	**7**	SAND, fine to medium; some Silt; trace coarse Sand; trace bricks and fine Gravel; brown (FILL).	no odor	moist	0	none	
5 **6**	**1** **2** **3** **1**	**8**	SAND, fine to medium; some Silt; trace coarse Sand; trace bricks and fine Gravel; brown (FILL).	no odor	moist	0	none	
7 **8**	**20** **1** **2** **8**	**6**	SAND, fine to medium; some Silt; trace coarse Sand; trace bricks and fine Gravel; brown (FILL). (Brick lodged in tip of splitspoon)	no odor	moist	0	none	
9 **10**	**35** **21** **38** **8**	**8**	SILT and fine SAND; little medium to course Sand; trace Gravel; dark brown.	no odor	v. moist	0	none	
11 **12**	**1** **1** **1** **2**	**9.5**	SILT and fine SAND; little medium Sand; trace organics; dark brown.	fuel oil	wet	403	none	MW-2 (10 -12)
13 **14**	**8** **7** **4** **6**	**2**	SILT and fine SAND; little medium Sand; trace organics; dark brown.	fuel oil	saturated	412	none	
15 **16**	**W.O.H.** **2**	**7**	(0 to 5 ") SILT and fine SAND; little Clay; trace organics; dark brown. (5 to 7") SILT, and fine sand; little clay; brown.	fuel oil	saturated	159	none	
17 **18**	**5** **12** **14** **35**	**24**	(0-12") SILT and fine SAND; little medium Sand; trace Clay; brown. (12-24') SAND, fine; some medium, little Silt, light brown; dense.	v. slight fuel oil	saturated	7.7	none	
19 **20**			End of borehole at 19 feet below grade.					

Notes:

Groundwater encountered at 10' below grade.

W.O.H. = Weight of hammer. Three inch split spoon used from 16 to 18 feet below grade

SOIL BORING LOG	**Paragon Paint Company** **AKRF Project Number: 10643**	**Boring No.** **MW-3** **Sheet 1** **of 1**

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow-Stem Auger
Sampling Method:	Split Spoon
Driller :	ADT, Inc
Weather:	Clear 80°
Sampler:	AKRF/Bryan Zieroff

Drilling			
Start		**Finish**	
Time	8:30	**Time**	12:30
Date	5/25/06	**Date**	5/25/06

Depth (feet)	**Blow Counts**	**Recovery (Inches)**	**Surface Condition:** Concrete sidewalk	**Odor**	**Moisture**	**PID**	**NAPL**	**Samples Collected for Lab Analysis**
1 2 3 4			Concrete sidewalk: 10 inches Hand dig with post hole digger to 4 feet below grade to clear borehole for utilities SAND, medium to coarse; little fine Gravel; little silt; trace brick, wood and ash; dark brown; loose (FILL).	petroleum odor	moist	14 56	none	
5 6	3 9 6 3	0	No recovery in split spoon due to loose soils (FILL)				none	
7 8	4 5 6 5	0	No recovery in split spoon due to loose soils (FILL)				none	
9 10	6 10 7 8	13	SAND, fine to medium; little Silt; trace coarse Sand; dark brown, wet at 9 ft bg.	degraded petroleum odor	v.moist wet	153	none	
11 12	7 12 10 11	16	SAND, fine to medium; little Silt; trace coarse Sand; dark brown, wet at 9 ft bg.	degraded petroleum odor	saturated	234	none	MW-3 (10-12)
13 14	10 11 11 11	24	SAND, fine, and SILT; little medium Sand; dark brown	degraded petroleum odor	saturated	181	none	
15 16	1 5 6 7	14	SAND, fine, and SILT; little medium Sand; dark brown	no odor	saturated	6	none	
17 18			Auguered to 17 feet below grade. End of boring at 17 feet below grade.					
19 20								

Notes:

Groundwater encountered at 10' below grade.

Three inch split spoon used for sampling between 8 and 16 feet below grade

SOIL BORING LOG

Paragon Paint Company

AKRF Project Number: 10643

Boring No. **MW-4**

Sheet 1 **of 1**

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow-Stem Auger
Sampling Method:	Split Spoon
Driller :	ADT, Inc
Weather:	Clear 70°
Sampler:	AKRF/Eric Kutter

Drilling			
Start		**Finish**	
Time	11:30	**Time**	18:00
Date	5/23/06	**Date**	5/23/06

Depth (feet)	**Blow Counts**	**Recovery (Inches)**	**Surface Condition:**	**Odor**	**Moisture**	**PID**	**NAPL**	**Samples Collected for Lab Analysis**
1 2			Concrete floor: 6 inches Process gravel					
3 4	5 2 1 2	0	No recovery					
5 6	5 3 1 1	3	SAND and SILT; little Gravel, trace glass; brown (FILL).	none	moist	0	none	
7 8	5 8 8 15	0.5	SAND and SILT; little Gravel, reddish brown (FILL).	none	moist	0	none	
9 10	11 10 10 15	14	(0-8") SAND and SILT, some Gravel; reddish brown (FILL). (8-14") SAND and SILT, dark brown (FILL).	none	moist v. moist	0	none	
11 12	15 10 9 9	12	SAND and SILT; trace slag; gray (FILL). SAND and SILT; brown/grey.	none	wet saturated	0	none	
13 14	10 11 11 10	8	SAND and SILT; trace Gravel; gray.	mild odor	saturated	0	none	
15 16	8 4 11 16	18	SAND and SILT; trace Gravel; gray.	solvent odor	saturated	600 864	none	MW-2 (14-16)
17 18	12 30 18 22	16	SAND and SILT; trace Gravel; gray.	solvent odor	saturated	188 850	none	
19 20	8 4 4 8	19	SAND and SILT; trace Gravel; gray. End of boring at 20 feet below grade.	strong solvent odor	saturated	60 956	none	

Notes:

Groundwater encountered at 10' below grade.

SOIL BORING LOG

Paragon Paint Company

AKRF Project Number: 10643

Boring No. **MW-5**

Sheet 1 **of 1**

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow-Stem Auger
Sampling Method:	Split Spoon
Driller :	ADT, Inc
Weather:	Clear 70°
Sampler:	AKRF/Bryan Zieroff

Drilling			
Start		**Finish**	
Time	14:00	**Time**	17:30
Date	5/24/06	**Date**	5/24/06

Depth (feet)	**Blow Counts**	**Recovery (Inches)**	**Surface Condition:** concrete sidewalk	**Odor**	**Moisture**	**PID**	**NAPL**	**Samples Collected for Lab Analysis**
1 2 3 4 5			Concrete sidewalk: 3 inches Hand dig to 5 feet below grade to clear borehole of utilities. SAND, little fine gravel; little cobbles; light brown; moist; loose (FILL). Cobbles.	none		0	none	
6 7	8 7 6 6	11	SAND, fine to medium, some Silt; little coarse Sand; brown (FILL).	none	moist	0	none	
8 9	1 2 1 1	12	SAND, fine to medium, some coarse; little Silt; dark brown (FILL).	none	very moist	0	none	
10 11	12 8 6 6	24	(0-8") SAND, fine to medium, some coarse; little Silt; dark brown (FILL)> (8-16") PEAT, dark brown. (16-24") SAND, fine; some Silt; little organics; grey.	none	wet saturated	0	none	
12 13	4 6 6 8	24	(0-12") SILT, some fine to medium Sand; little clay; gray. SAND, fine; some Silt; little medium Sand; gray.	none	saturated	0	none	
14 15	5 7 7 7	19	SAND, fine; some Silt; little medium Sand; gray.	none	saturated	0	none	
16 17	6 7 8 11	22	SILT; some fine Sand; gray.	none	saturated	0	none	
18 19			Auger to 18 feet below grade. End of borehole at 18 feet below grade.					
20								

Notes:

Groundwater encountered at 10' below grade.

SOIL BORING LOG

Paragon Paint, LIC
AKRF Project Number: 10702

Boring No. MW-6
Sheet 1 of 1

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Direct Push Probe
Sampling Method:	3' Macrocore
Driller :	Fleet
Weather:	Overcast, cool
Sampler:	E.P.

Drilling			
Start		**Finish**	
Time	8:48	**Time**	10:25
Date	4/17/07		4/17/2007

Depth (feet)	Recovery (Inches)	Surface Condition: CONCRETE	Odor	Moisture	PID	NAPL	Samples Collected for Lab Analysis
1 2 3	16"	CONCRETE (4 inches). 8-12": GRAVEL (sub base). 12-16": CONCRETE.	None None	Dry Dry	ND ND	None None	
4 5 6	20"	0-3": CONCRETE. 3-20": Dark brown fine SAND, trace SILT, fine GRAVEL (FILL).	None Strong Petroleum-like	Dry Moist	ND 0.8	None None	MW-6 (MS MW-6 (MSD)
7 8 9	26"	0-10": Dark brown fine SAND, trace SILT (FILL). 10-26": Brown fine SAND and SILT (FILL).	Strong Petroleum-like	Moist V. Moist	15.3 233	Slight sheen	
10 11 12	28"	Dark gray fine SILT and SAND.	Strong Petroleum-like	Saturated	ND 635 128	Slight sheen	MW-6 (10'-11')
13 14 15	32"	Dark gray fine SAND and SILT.	Strong Petroleum-like	Saturated	1,065	Free Product	MW-6D (13'-14') MW-6 (14'-15")
16 17 18	36"	0-24": Dark gray fine SAND and SILT. 24-36": Gray fine SAND and SILT.	Strong Petroleum-like	Saturated Saturated	1,105 563	Free Product Reduced sheen	
19 20							

Notes: **End of boring @ 18' below grade. Groundwater table @ ~9' below floor (~6' below grade)**
Petroleum odor similar to gasoline with different component - possible mineral spirits.
ND = None Detected

SOIL BORING LOG

Paragon Paint, LIC

AKRF Project Number: 10702

Boring No. **MW-7**

Sheet 1 of 1

AKRF

440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method: Direct Push Probe
Sampling Method: 3' Macrocore
Driller : Fleet
Weather: Overcast, cool
Sampler: E.P.

Drilling			
Start		**Finish**	
Time	12:17	**Time**	15:00
Date	4/17/07		4/17/2007

Depth (feet)	Recovery (Inches)	Surface Condition: CONCRETE	Odor	Moisture	PID	NAPL	Samples Collected for Lab Analysis
1		CONCRETE (12 inches)					
2	20"	0-14": Process GRAVEL.		Dry			
3		14-20": Dark brown to light gray fine SAND, trace SILT.	Petroleum-like	moist	310		
4	14"	0-6": Dark brown fine SAND and SILT, trace fine GRAVEL.	Strong Petroleum - like	Saturated	199	Sheen	**MW-7 (4'-5')**
5		6-14": Light gray SILT, trace fine SAND, Organics.		Saturated	414	Sheen	**MW-7 (6'-7')**
6							
7	6"	Light brown SILT, trace fine SAND.	Petroleum - like	Saturated	187	None	
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Notes: **End of boring @ 7' below basement floor (~12' below grade) on presumed bedrock. Groundwater encountered @~1.5' below floor.**

SOIL BORING LOG	**Paragon Paint, LIC** **AKRF Project Number: 10702**	**Boring No.** **MW-8** **Sheet 1 of 1**

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow Stem Auger
Sampling Method:	2' Split spoon
Driller :	Paragon/SDS
Weather:	Clear, sunny
Sampler:	E.P.

Drilling			
Start		**Finish**	
Time	9:00	**Time**	12:15
Date	4/23/07		4/23/2007

Depth (feet)	Recovery (Inches)	Blows	**Surface Condition:** **Concrete (0-0.7' below grade)**	Odor/NAPL	Moisture	PID	Samples Collected for Lab Analysis
1			Concrete pad (6 inches). Road base gravel.	None	dry	ND	
2	N/A		Dark brown fine SILTY SAND and PAINT/CAULK (FILL).		moist		
3 4	6"	2 3 3 4	Dark brown fine SILTY SAND and PAINT/CAULK, some fine Gravel (secondary concrete slab).	None	moist	ND	
5 6	12"	2 3 3 4	Dark brown to gray SILTY SAND.	Slight Sheen	V. Moist	33.1	
7 8	24"	6 4 5 4	Dark brown to gray SILTY SAND.	Petroleum Product	Saturated	437 307	MW-8 (6'-7')
9 10	24"	4 4 3 6	Dark brown to gray SILTY SAND.	Petroleum Product	Saturated	355 376	
11 12	24"	3 4 5 7	Dark brown to gray SILTY SAND.	Petroleum Product	Saturated	250 250	
13 14	24"	5 8 8 13	Dark brown to gray SILTY SAND.	Petroleum Product	Saturated	340 225	MW-8 (13'-14')
15 16							
17 18							
19 20							

Notes: End of boring @ 14' below grade, groundwater @ ~5' below grade.
ND = None Detected.

SOIL BORING LOG	**Paragon Paint, LIC** **AKRF Project Number: 10702**	**Boring No. MW-9** **Sheet 1 of 1**

AKRF

440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow Stem Auger
Sampling Method:	2' Split spoon
Driller :	Paragon/SDS
Weather:	Clear, sunny
Sampler:	E.P.

Drilling			
Start		**Finish**	
Time	13:05	**Time**	13:40
Date	4/23/07		4/23/2007

Depth (feet)	Recovery (inches)	Blows	**Surface Condition:** **Concrete (0.3'-0.5')**	Odor/NAPL	Moisture	PID	Samples Collected for Lab Analysis
1							
2	6"	3 4	Light brown fine SAND, trace fine SILT, trace fine GRAVEL (FILL).	None	Dry	ND	
3 4	0"	1 1 3 2	No recovery, very loose material.	N/A	N/A	N/A	
5 6	6"	6 6 10 11	Top 2": Medium GRAVEL (FILL) Middle 2": BRICK (FILL). Bottom 2": Dark brown SILT and SAND, trace BRICK (FILL).	None	Moist	ND	
7 8	8"	5 1 2 2	Very loose dark brown SILT and SAND, trace BRICK (FILL).	None	Saturated	ND	
9 10	0"	1 1 1 1	No recovery, very loose material	N/A	N/A	N/A	
11 12	24"	3 1 3 4	Dark Brown SILTY SAND.	Slight Sheen	Saturated	282 150	
13 14	24"	5 7 7 8	Dark Brown SILTY SAND.	Saturated with Product	Saturated	340 225	**Sample MW-9 (14'-15')**
15 16	10"	31 50/.4	Top 4": Gray fine SAND, trace SILT, fine GRAVEL. Bottom 8": Dark brown fine SILTY SAND.	Saturated with Product	Saturated	400 220	**Sample MW-9 (15.5')**
17 18							
19 20							

Notes: Auger refusal @ 15.6' below grade, groundwater @ ~5' below grade.
ND = None Detected.

SOIL BORING LOG	**Paragon Paint, LIC** **AKRF Project Number: 10702**	**Boring No. MW-10** **Sheet 1 of 1**

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow Stem Auger
Sampling Method:	2' Split spoon
Driller :	Paragon/SDS
Weather:	Clear, warm
Sampler:	E.P.

Drilling			
Start		**Finish**	
Time	9:22	**Time**	13:15
Date	4/24/07		4/24/2007

Depth (feet)	Recovery (Inches)	Blows	**Surface Condition:** **Vegetation, concrete**	Odor/NAPL	Moisture	PID	Samples Collected for Lab Analysis
1 2			CONCRETE slab (2.5 feet)		Dry		
3 4	10"	50/.3 ---	Very dense brown SAND and GRAVEL, BRICK (FILL)	None	Dry	ND	
5 6	9"	9 4 3 7	(0-3") Gray fine SAND, trace fine to Gravel (3-6") Brown to gray fine SAND, trace fine Gravel (quartz)	None	Moist	ND	**MW-10** **(5'-6')**
7 8	6"	5 3 2 6	Loose WOOD, Organics (FILL)	None	Saturated	ND	
9 10	6"	50/5"	Very dense WOOD, Organics (FILL)	None	Saturated	ND	
11 12	4"	50/4"	Very dense WOOD, Organics (FILL)	None	Saturated	ND	
13 14	2"	6 50/4"	Very dense WOOD.	None	Saturated	ND	**MW-10** **(12'-12.5')**
15 16		---					
17 18 19 20		--- --- ---					

Notes: End of boring @ 12.5' below grade. Groundwater @ ~6' below grade.
ND=None Detected

SOIL BORING LOG

Paragon Paint, LIC

AKRF Project Number: 10702

Boring No. MW-11

Sheet 1 of 2

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method: Hollow Stem Auger
Sampling Method: 2' Split spoon
Driller: Paragon/SDS
Weather: Clear, warm
Sampler: E.P.

Drilling			
Start		**Finish**	
Time	13:20	**Time**	16:30
Date	4/24/07		4/24/2007

Depth (feet)	Recovery (inches)	Blows	Surface Condition: Vegetation, concrete	Odor/NAPL	Moisture	PID	Samples Collected for Lab Analysis
1 2	4"	1 1 1 1	BRICK, some brown fine SILTy fine SAND (FILL).	None	Dry	ND	
3 4	4"	50/4"	BRICK, some brown fine silty fine SAND (FILL).	None	Dry	ND	
5 6	5"	13 4 9 10	No competent sample, loose FILL material in spoon.	None	V. Moist	ND	
7 8	14"	10 5 2 2	Dark gray fine SILT and SAND, trace CLAY, trace BRICK (FILL).	Slight Petroleum-like	Wet Saturated	9.0 ND	**MW-11 (7'-8')**
9 10	10"	4 2 1 1	Dark brown fine SAND, trace fine SILT, trace fine GRAVEL (FILL).	None	Saturated	ND	
11 12	19"	1 1 1 1	Dark brown fine SAND, trace fine SILT, trace fine GRAVEL (FILL).	None	Saturated	ND	
13 14	24"	Weight of hammer	Dark brown fine SAND, trace fine SILT, trace fine GRAVEL (FILL).	None	Saturated	1.0	
15 16	18"	1 1 2 2	0-9": Red to brown CLAY, trace fine SILT (FILL). 9-18": Dark brown fine SILT, trace fine SAND, trace Organics.	None None	Saturated Saturated	ND ND	
17 18	24"	1 1 2 8	0-12": Dark brown fine SILT, trace fine SAND, trace Organics. 12-24": Gray fine SAND and SILT.	None None	Saturated Saturated	ND ND	
19 20	22"	2 3 8 12	0-11": Dark brown fine SILT, trace fine SAND, trace Organics. 11-22": Brown fine SILT and SAND, trace fine GRAVEL.	None None	Saturated Saturated	ND ND	

Notes: Auger refusal @ 24.5' below grade. Groundwater @ ~6' below grade.
ND = None Detected.

SOIL BORING LOG

Paragon Paint, LIC

AKRF Project Number: 10702

Boring No. MW-11

Sheet 2 of 2

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Drilling Method:	Hollow Stem Auger
Sampling Method:	2' Split spoon
Driller :	Paragon/SDS
Weather:	Clear, warm
Sampler:	E.P.

Drilling			
Start		**Finish**	
Time	13:20	**Time**	16:30
Date	4/24/07		4/24/2007

Depth (feet)	Recovery (Inches)	Blows	**Surface Condition:** **Vegetation, concrete**	Odor/NAPL	Moisture	PID	Samples Collected for Lab Analysis
21 22	24"	19 12 7 6	0-12": Brown SAND, trace Organics. 12-24": Dark brown fine SAND, trace fine GRAVEL.	None None	Saturated Saturated	ND ND	
23 24	24"	14 14 12 10	Brown SAND, some fine GRAVEL.	None None	Saturated	ND ND	
25 26	10"	21 50/.4	0-5"; Brown fine SAND, some fine GRAVEL 5-10": Brown SAND, trace fine GRAVEL.	None	Saturated	ND	**MW-11 (25'-26')**
27 28	14"	10 5 2 2	Loose dark gray fine SILT and SAND, trace Clay, trace BRICK.	None	Saturated	ND ND	
29 30							
31 32							
33 34							
35 36							
37 38							
39 40							

Notes: Auger refusal @ 24.5' below grade. Groundwater @ ~6' below grade.
ND = None Detected.

SOIL BORING LOG

AKRF
440 Park Avenue South, New York, NY 10016
Phone (212) 696-0670 Fax (212) 726-0942

Paragon Paint, LIC
AKRF Project Number: 10702

Boring No. **MW-12**
Sheet 1 of 1

Drilling Method: Hollow Stem Auger
Sampling Method: 2' Split spoon
Driller : Paragon/SDS
Weather: Clear, warm
Sampler: E.P.

Drilling			
Start		Finish	
Time	7:20	Time	8:50
Date	4/25/07		4/25/2007

Depth (feet)	Recovery (Inches)	Blows	Surface Condition: Concrete	Odor/NAPL	Moisture	PID	Samples Collected for Lab Analysis
1 2	6"	1 2	Brown fine SAND, trace SILT	None	Dry	ND	
3 4	12"	1 2 1 2	0-6": Brown fine SAND, trace SILT (FILL). 6-12": Dark brown fine SAND and SILT (FILL).	None Slight Petroleum-like	Moist	ND 15.8	MW-12 (3'-4')
5 6	14"	7 10 11 8	Medium dense dark brown fine SAND and SILT (FILL).	Petroleum-like	Moist	18 267	
7 8	16"	11 6 7 10	Medium dense dark brown fine SAND and SILT, trace fine GRAVEL (FILL).	Mineral Spirit-like	Wet	150 240	
9 10	14"	5 2 2 2	Loose dark brown SILT, trace CLAY, trace Organics.	Mineral Spirit-like	Saturated	278 169	
11 12	20"	2 2 3 4	Loose dark brown SILT, trace CLAY, trace Organics.	Mineral Spirit-like	Saturated Saturated	69 267	
13 14	12"	4 4 8 10	Medium dense brown fine SAND and SILT, trace Organics.	Mineral Spirit-like	Saturated	260 260	
15 16	12"	2 3 4 6	Loose brown fine SAND, trace fine GRAVEL.	Diminishing odors	Saturated	64.6 60.0	
17 18	16"	12 14 13 16	0-8": Brown fine SAND, trace fine GRAVEL. GRAVEL.	Diminishing odors	Saturated Saturated	18.2 262.0	
19 20	16"	11 19 50/4"	0-6": Red to brown SILT, trace CLAY, fine GRAVEL. 6-16": Dark gray fine SAND and SILT, some Schist (Bedrock).	Diminishing odors None	Saturated Saturated	40 18	MW-12 (17'-18')

Notes: Possible Bedrock encountered @ 19.5' below grade. Groundwater encountered @ ~7' below grade.
ND = None Detected.

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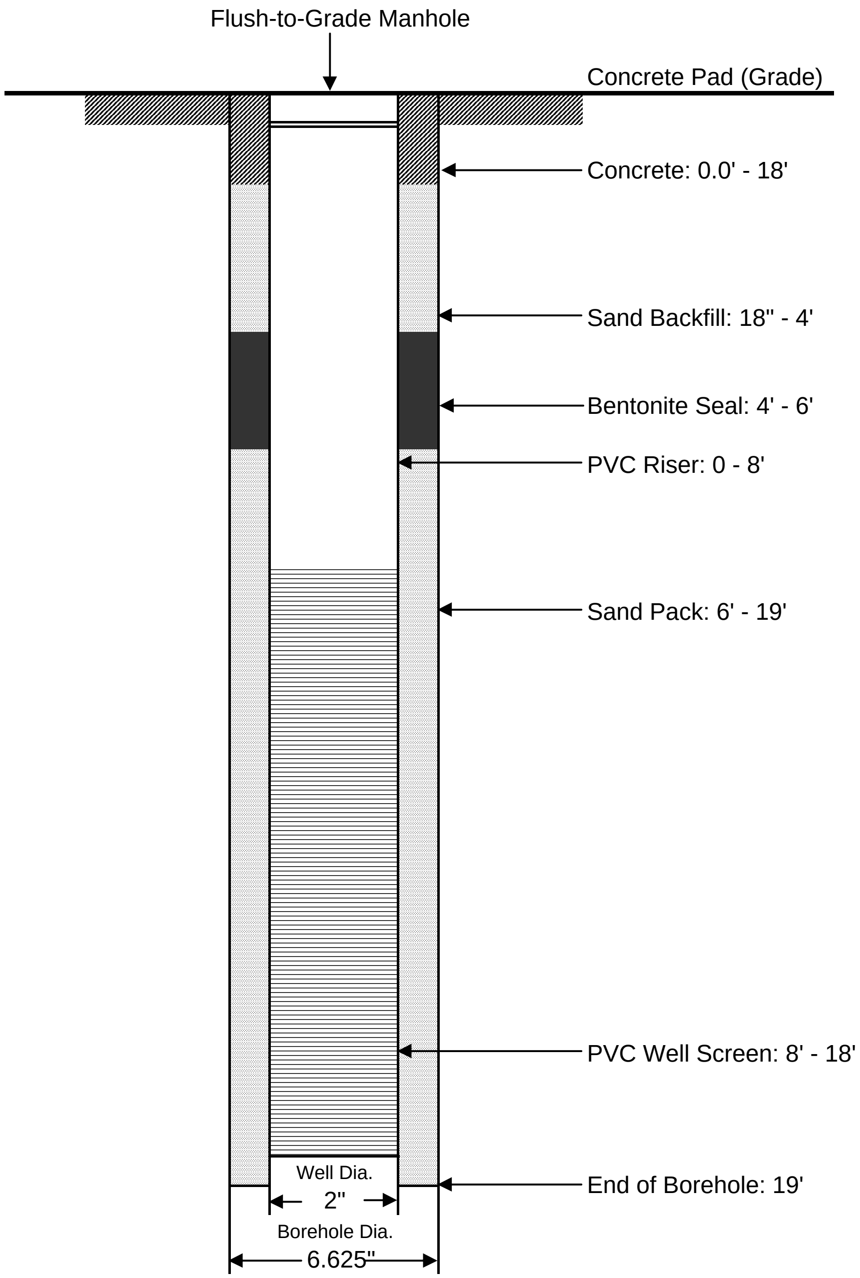
Environmental Consultants

Well Construction Log

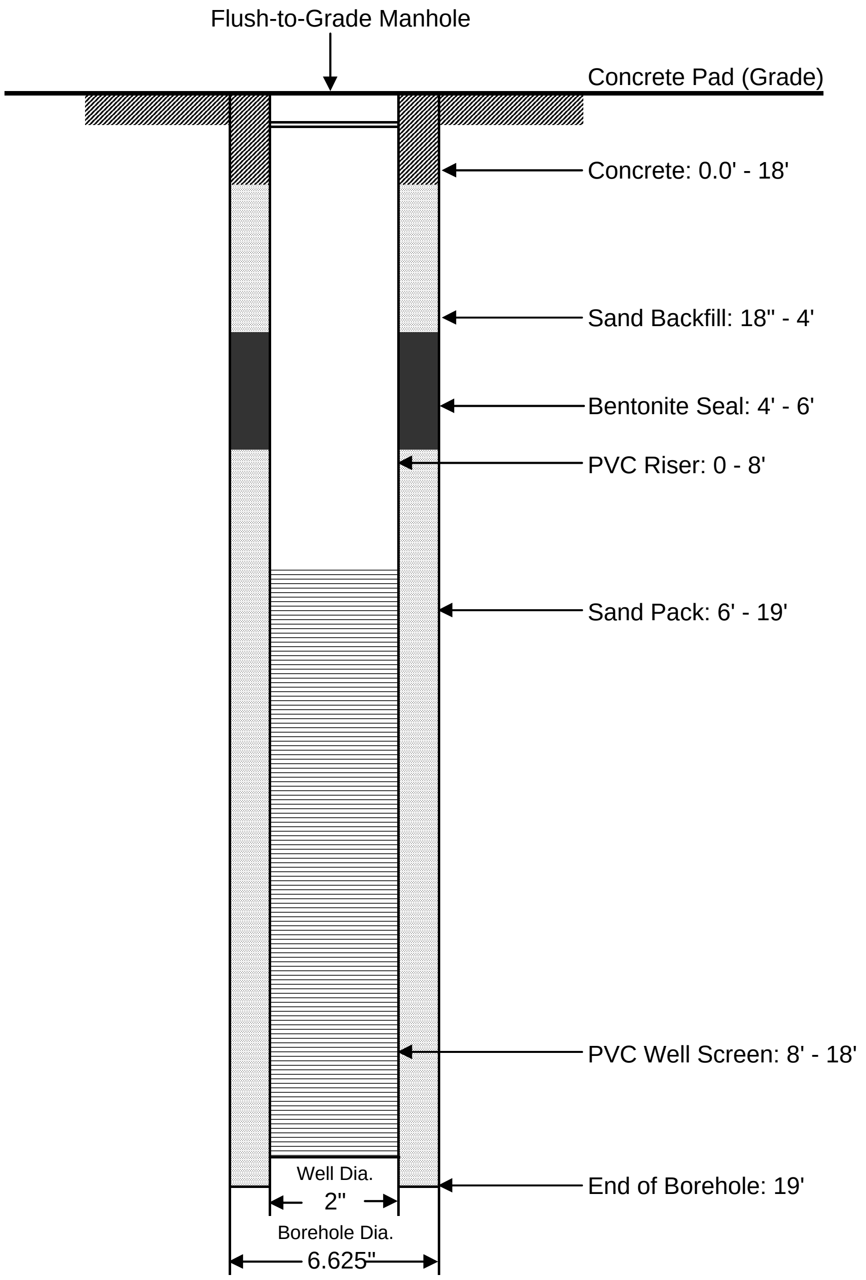
Well No: **MW-1**	**Job Number:**	10702	**Client:** Paragon Paint Company
	Location:	Paragon Paint, Queens, NY	**Driller:** ADT
	Date Start:	5/24/2006	**Drilling Method:** Hollow Stem Auger
	Date Finish:	5/24/2006	**Logged By:** Bryan Zieroff/AKRF



AKRF
Environmental Consultants

Well Construction Log

Well No: **MW-2**	**Job Number:**	10702	**Client:** Paragon Paint Company
	Location:	Paragon Paint, Queens, NY	**Driller:** ADT
	Date Start:	5/24/2006	**Drilling Method:** Hollow Stem Auger
	Date Finish:	5/24/2006	**Logged By:** Bryan Zieroff/AKRF



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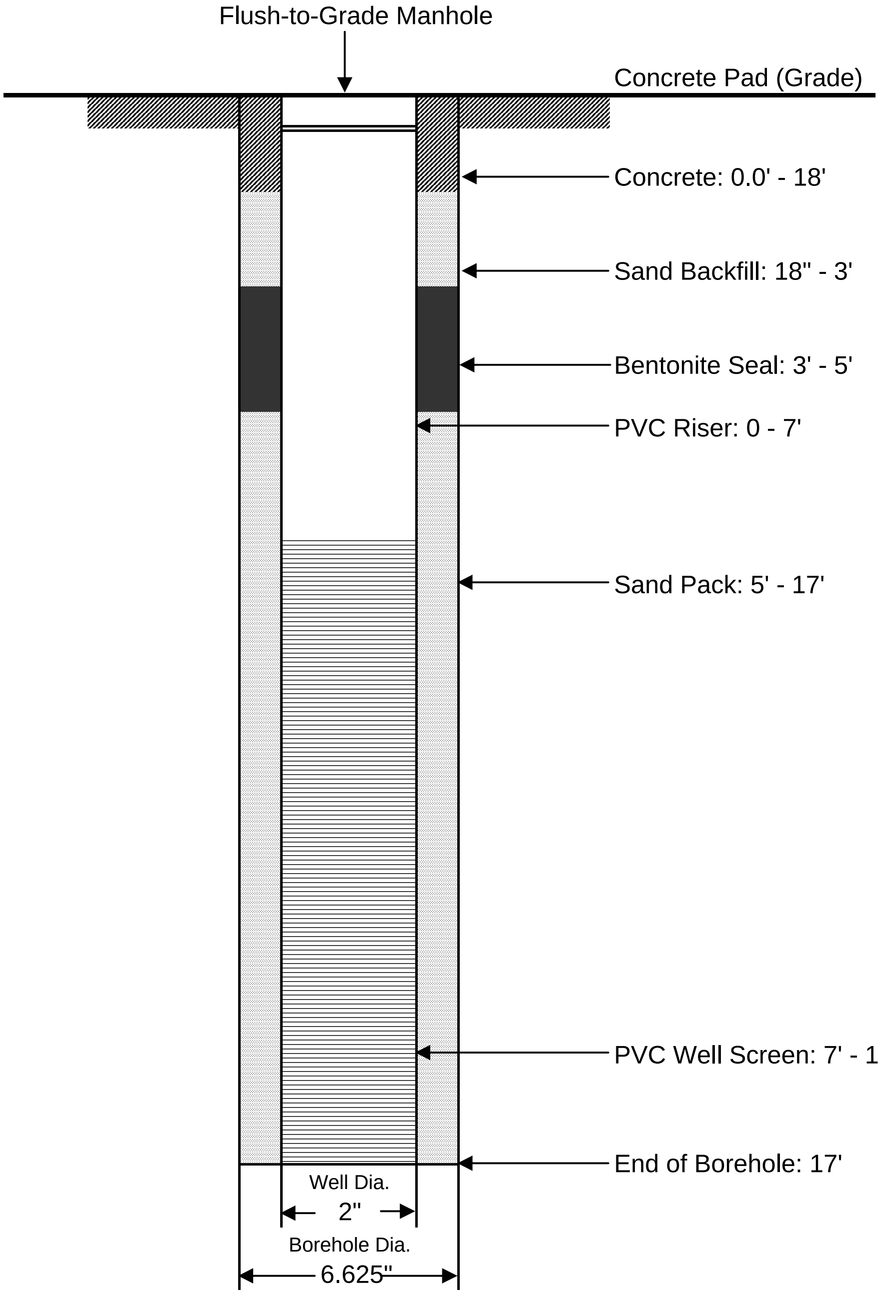
Well Construction Log

Well No: **MW-3**	**Job Number:** 10702	**Client:** Paragon Paint Company	
	Location: Paragon Paint, Queens, NY	**Driller:** ADT	
	Date Start: 5/25/2006	**Drilling Method:** Hollow Stem Auger	
	Date Finish: 5/25/2006	**Logged By:** Bryan Zieroff/AKRF	



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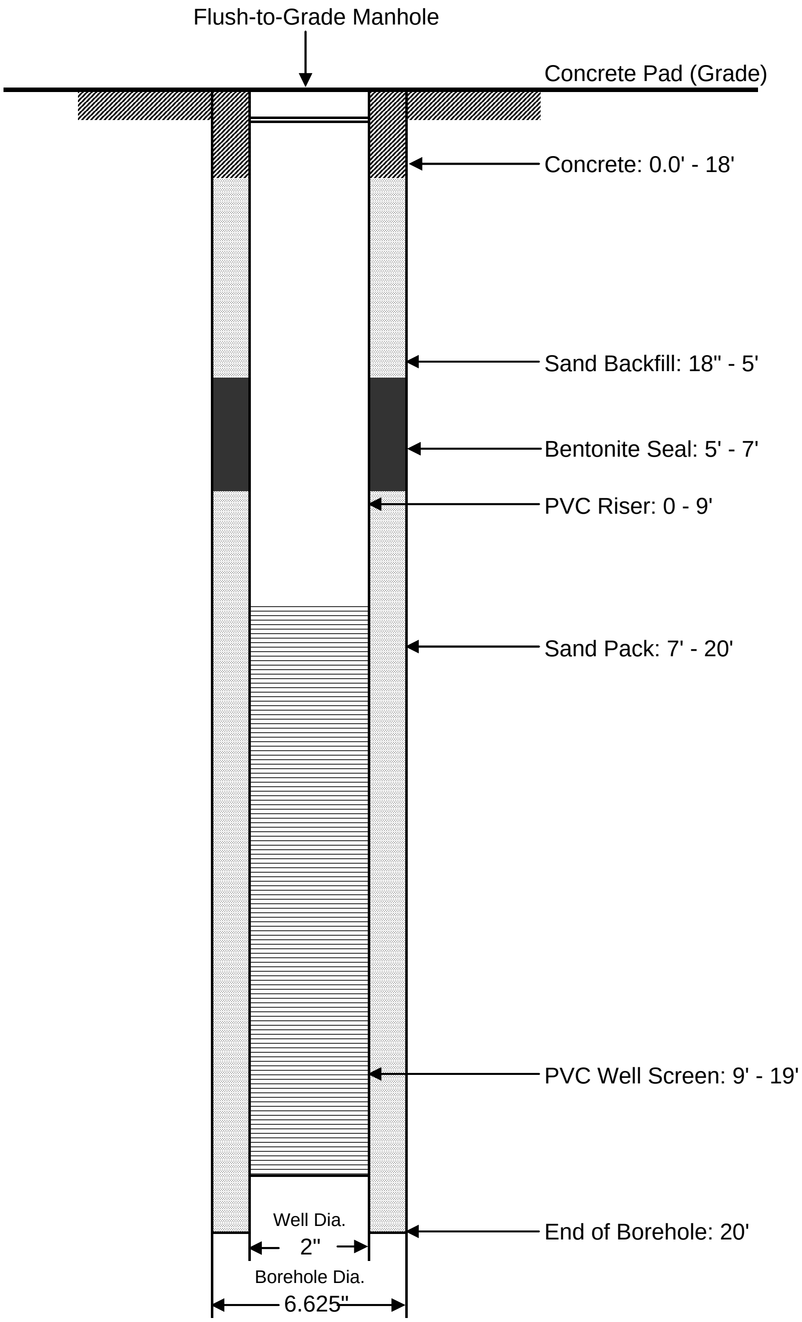
Well Construction Log

Well No:	**Job Number:**	10702	**Client:** Paragon Paint Company
MW-4	**Location:**	Paragon Paint, Queens, NY	**Driller:** ADT
	Date Start:	5/23/2006	**Drilling Method:** Hollow Stem Auger
	Date Finish:	5/23/2006	**Logged By:** Eric Kutter/AKRF



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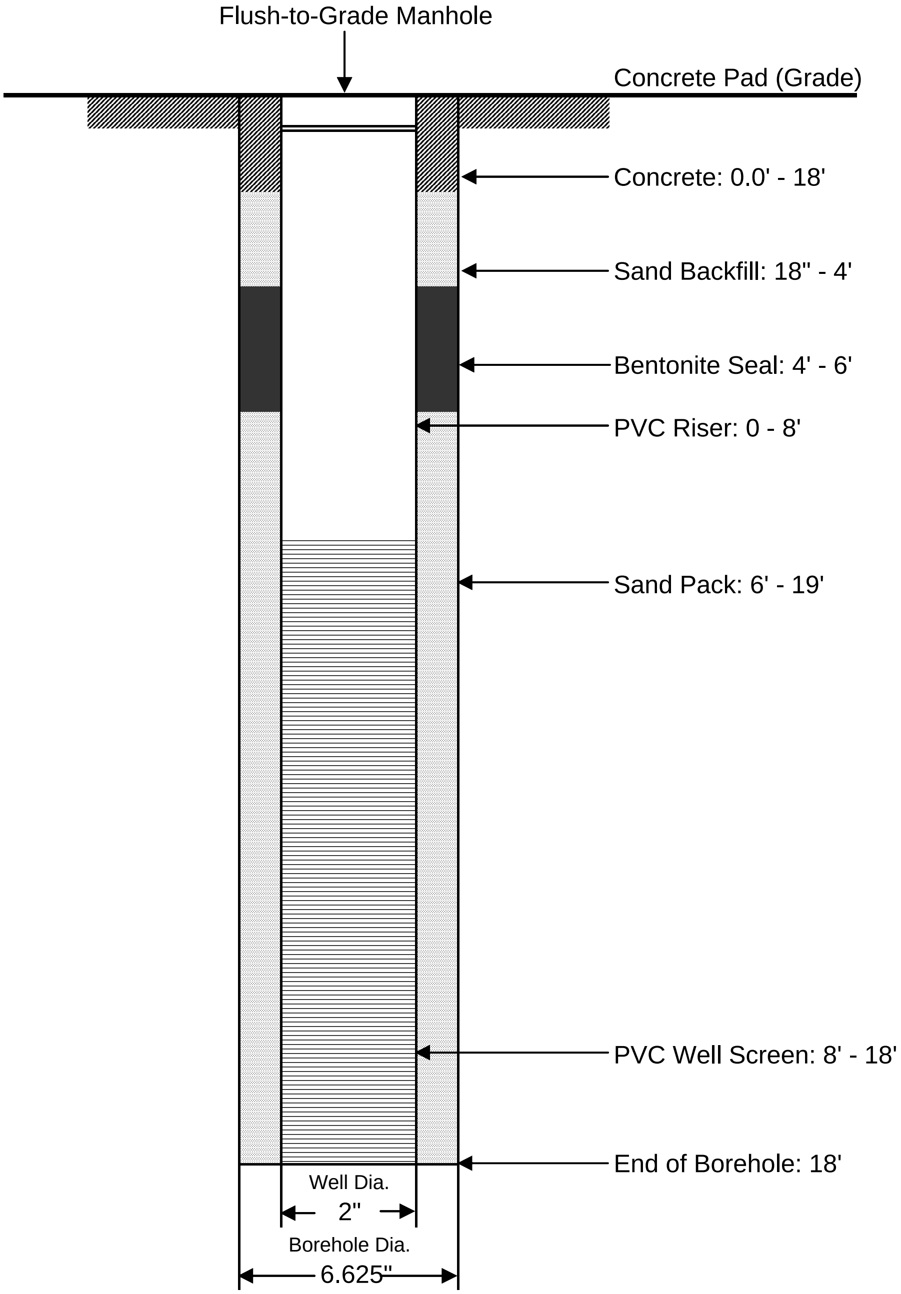
Environmental Consultants

Well Construction Log

Well No:	**Job Number:**	10702	**Client:** Paragon Paint Company
MW-5	**Location:**	Paragon Paint, Queens, NY	**Driller:** ADT
	Date Start:	5/25/2006	**Drilling Method:** Hollow Stem Auger
	Date Finish:	5/25/2006	**Logged By:** Bryan Zieroff/AKRF



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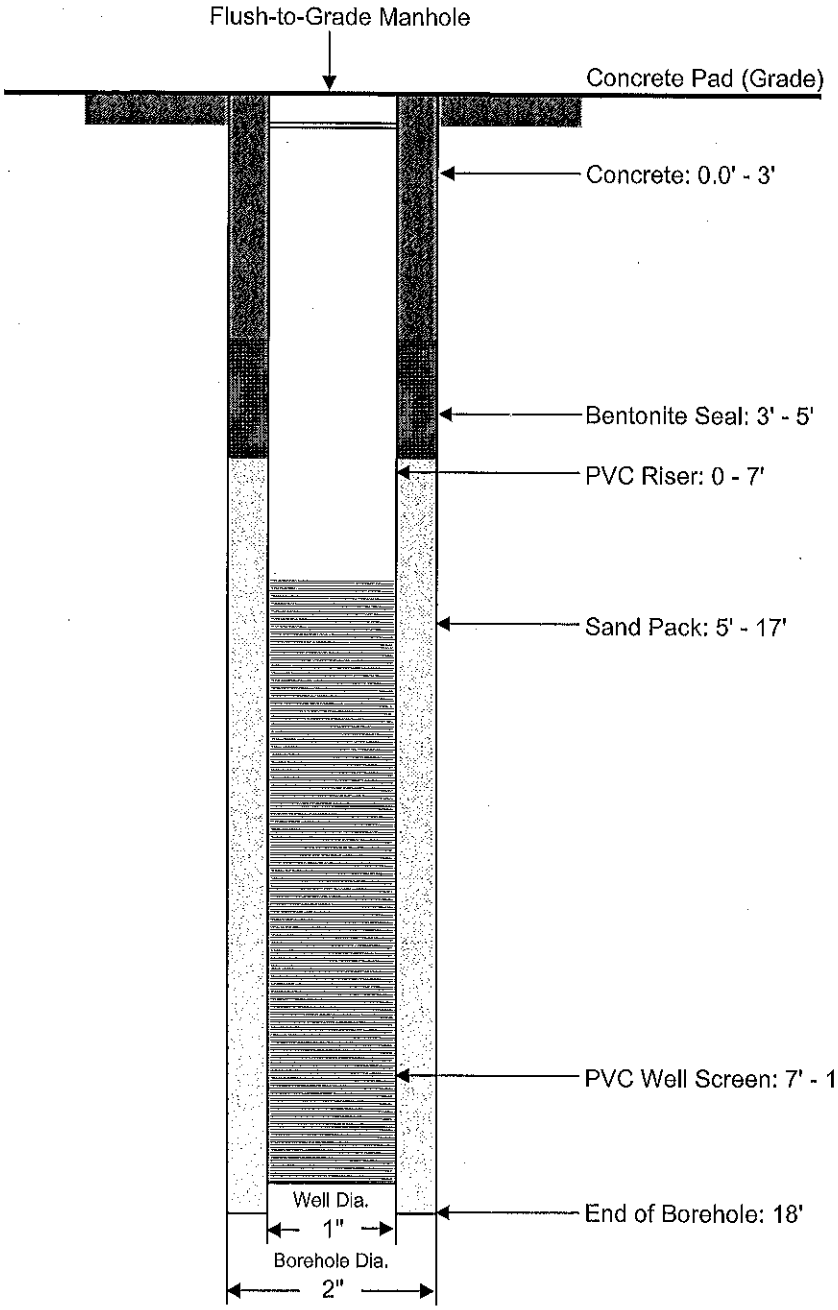
Well Construction Log

Well No: **MW-6**	**Job Number:**	10702	**Client:** Paragon Paint Company
	Location:	Paragon Paint, Queens, NY	**Driller:** ADT
	Date Start:	5/24/2006	**Drilling Method:** Hollow Stem Auger
	Date Finish:	5/24/2006	**Logged By:** Bryan Zieroff/AKRF



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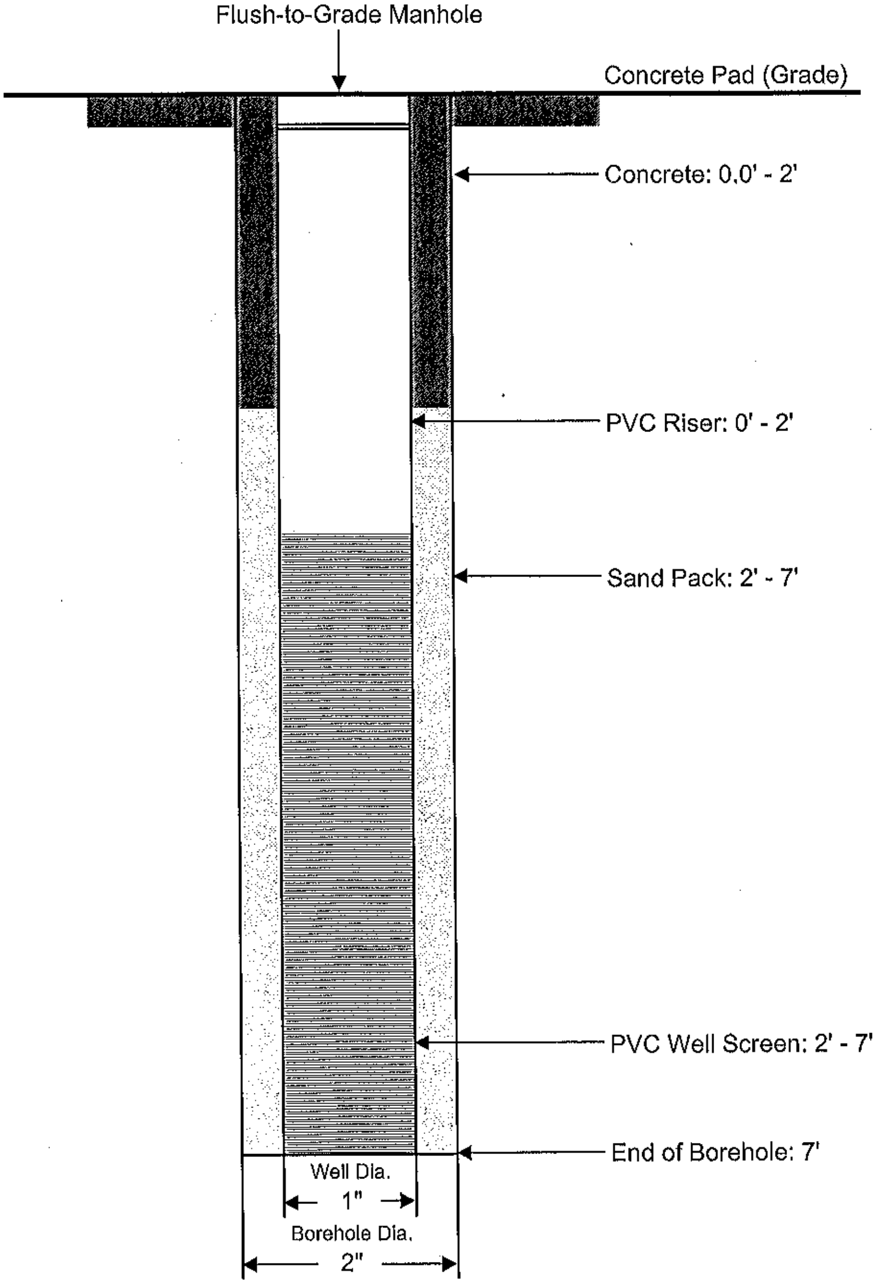
Well Construction Log

Well No: **MW-7**	**Job Number:**	10702	**Client:** Paragon Paint
	Location:	Paragon Paint, LIC, NY	**Driller:** Fleet
	Date Start:	4/17/2007	**Drilling Method:** Direct Push Probe
	Date Finish:	4/17/2007	**Logged By:** Eric Park/AKRF



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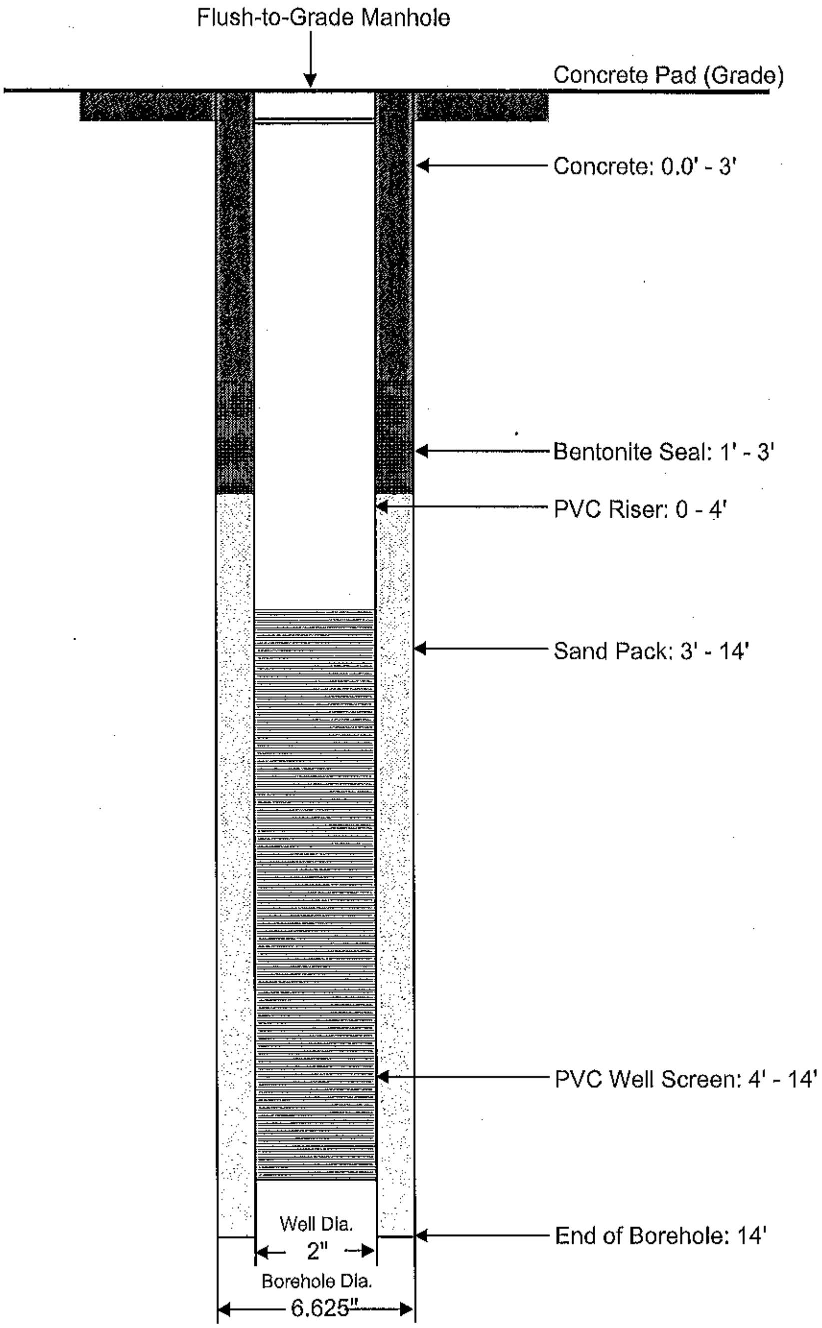
Well Construction Log

Well No: **MW-8**	**Job Number:**	10702	**Client:** Paragon Paint
	Location:	Paragon Paint, LIC, NY	**Driller:** Paragon/SDS
	Date Start:	4/23/2007	**Drilling Method:** Hollow Stem Auger
	Date Finish:	4/23/2007	**Logged By:** Eric Park/AKRF



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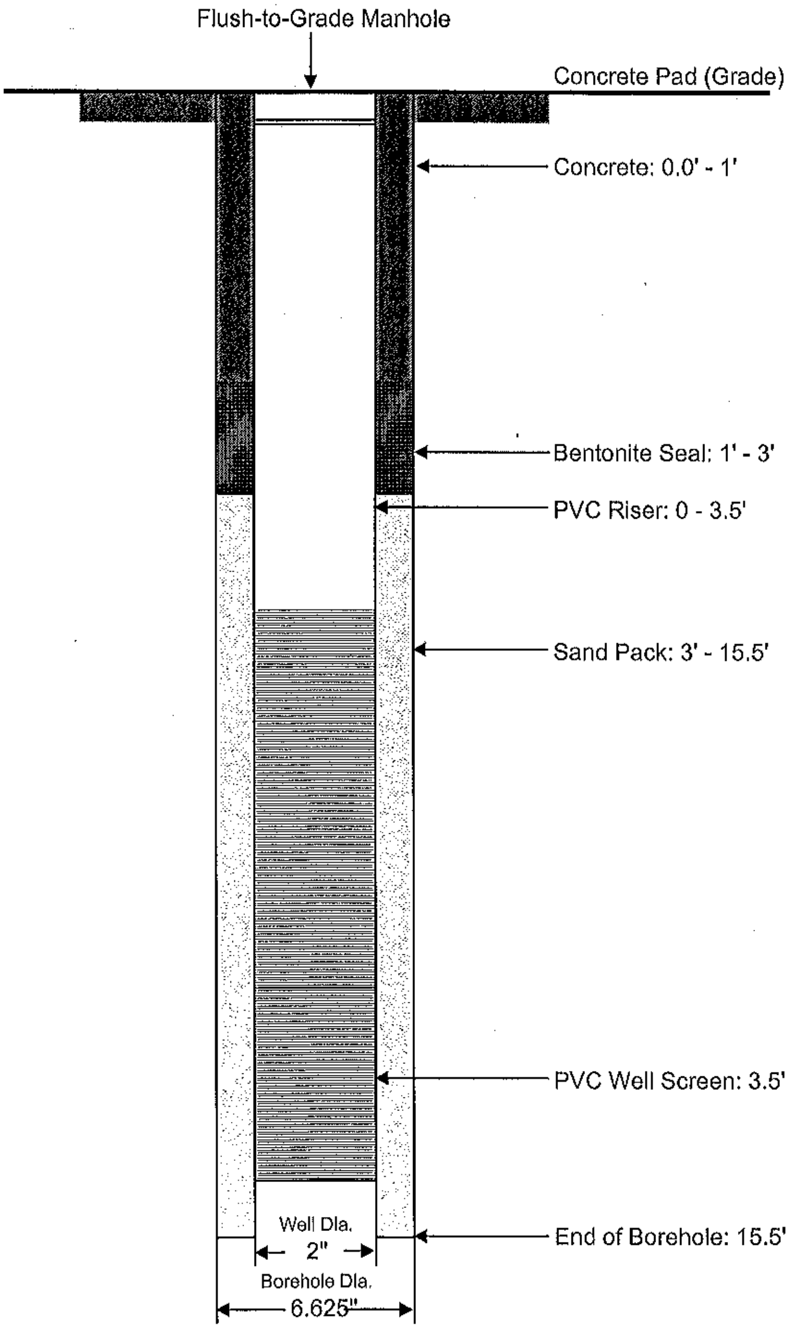
Well Construction Log

Well No:	**Job Number:** 10702		**Client:** Paragon Paint
MW-9	**Location:**	Paragon Paint, LIC, NY	**Driller:** Paragon/SDS
	Date Start:	4/23/2007	**Drilling Method:** Hollow Stem Auger
	Date Finish:	4/23/2007	**Logged By:** Eric Park/AKRF



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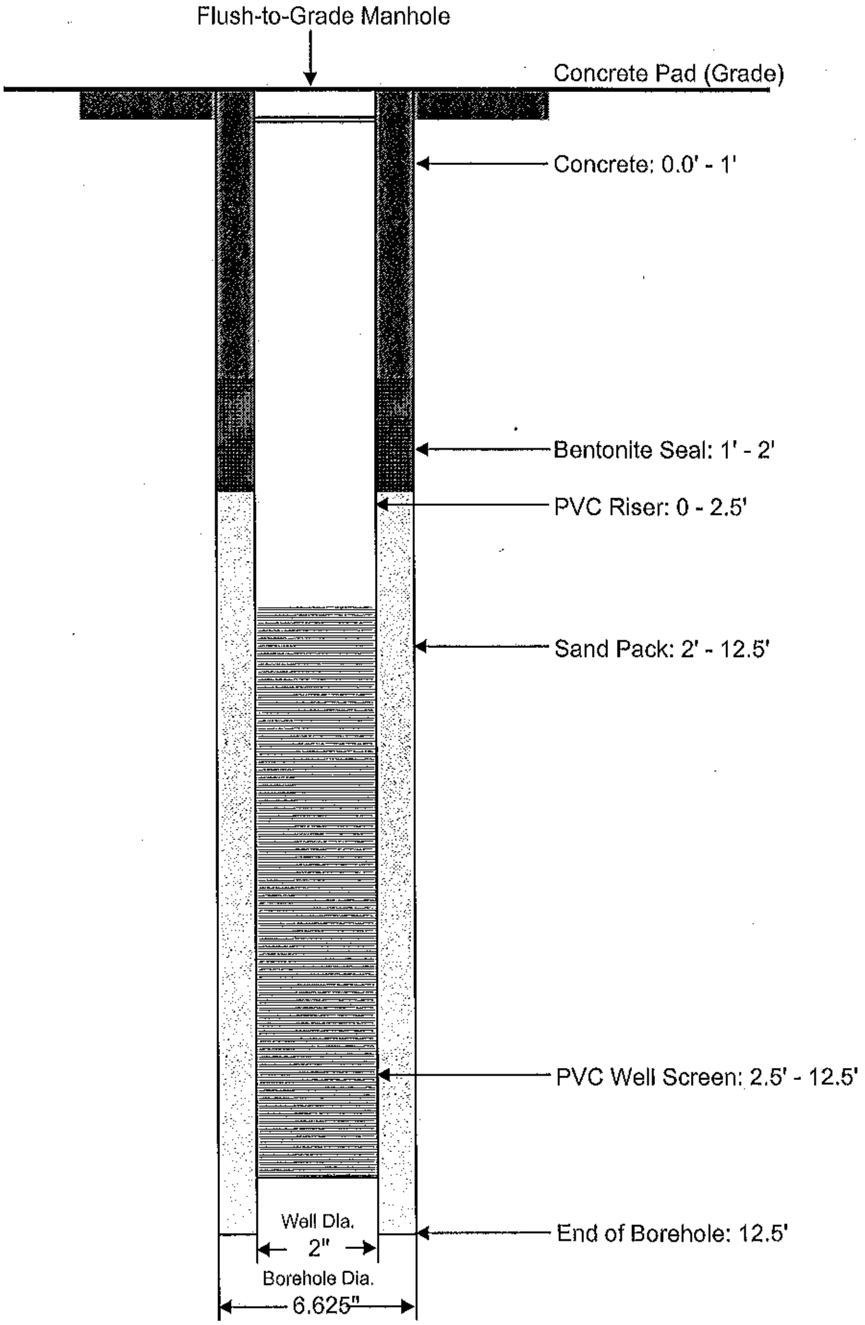
Well Construction Log

Well No: **MW-10**	**Job Number:**	10702	**Client:** Paragon Paint
	Location:	Paragon Paint, LIC, NY	**Driller:** Paragon/SDS
	Date Start:	4/24/2007	**Drilling Method:** Hollow Stem Auger
	Date Finish:	4/24/2007	**Logged By:** Eric Park/AKRF



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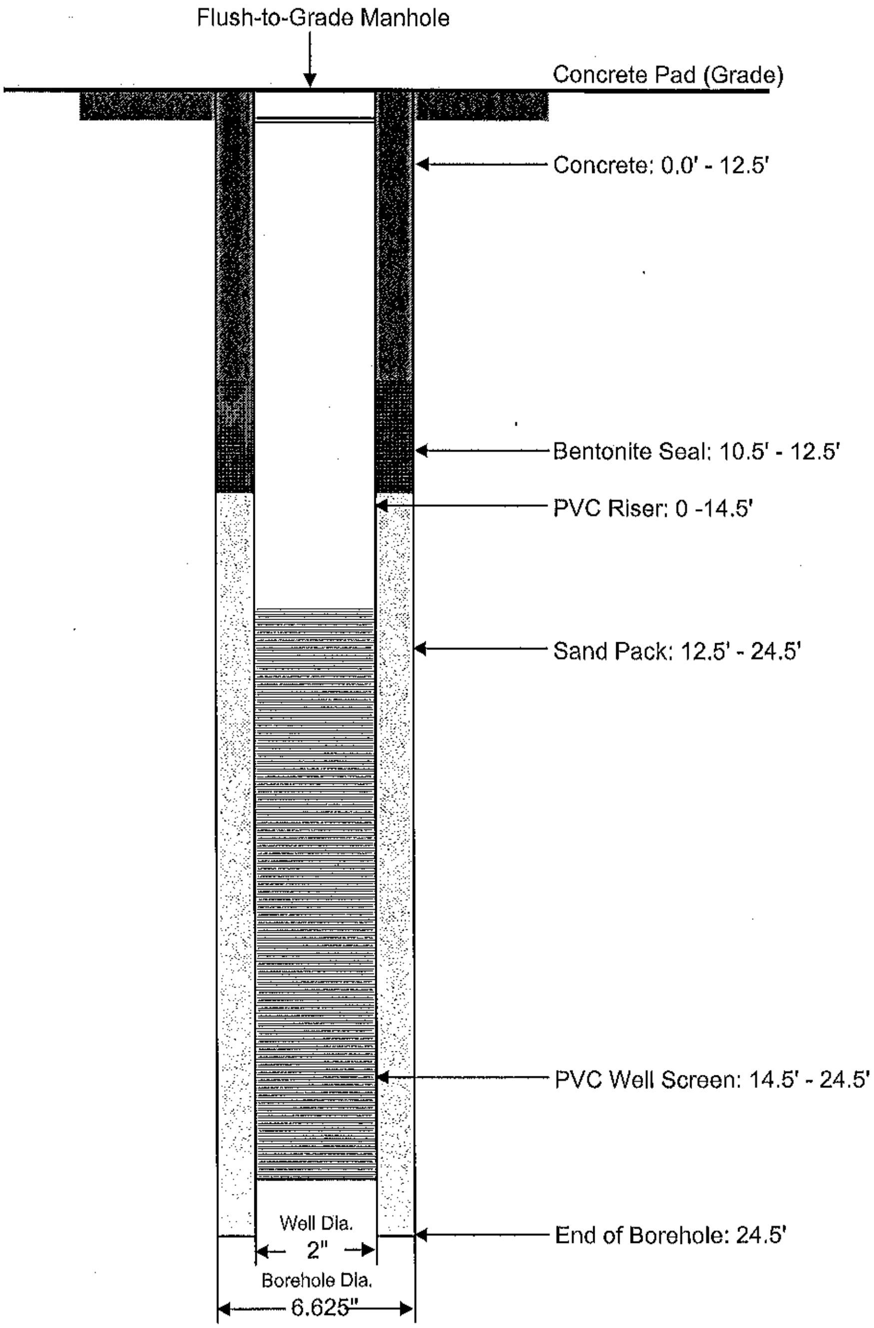
Well Construction Log

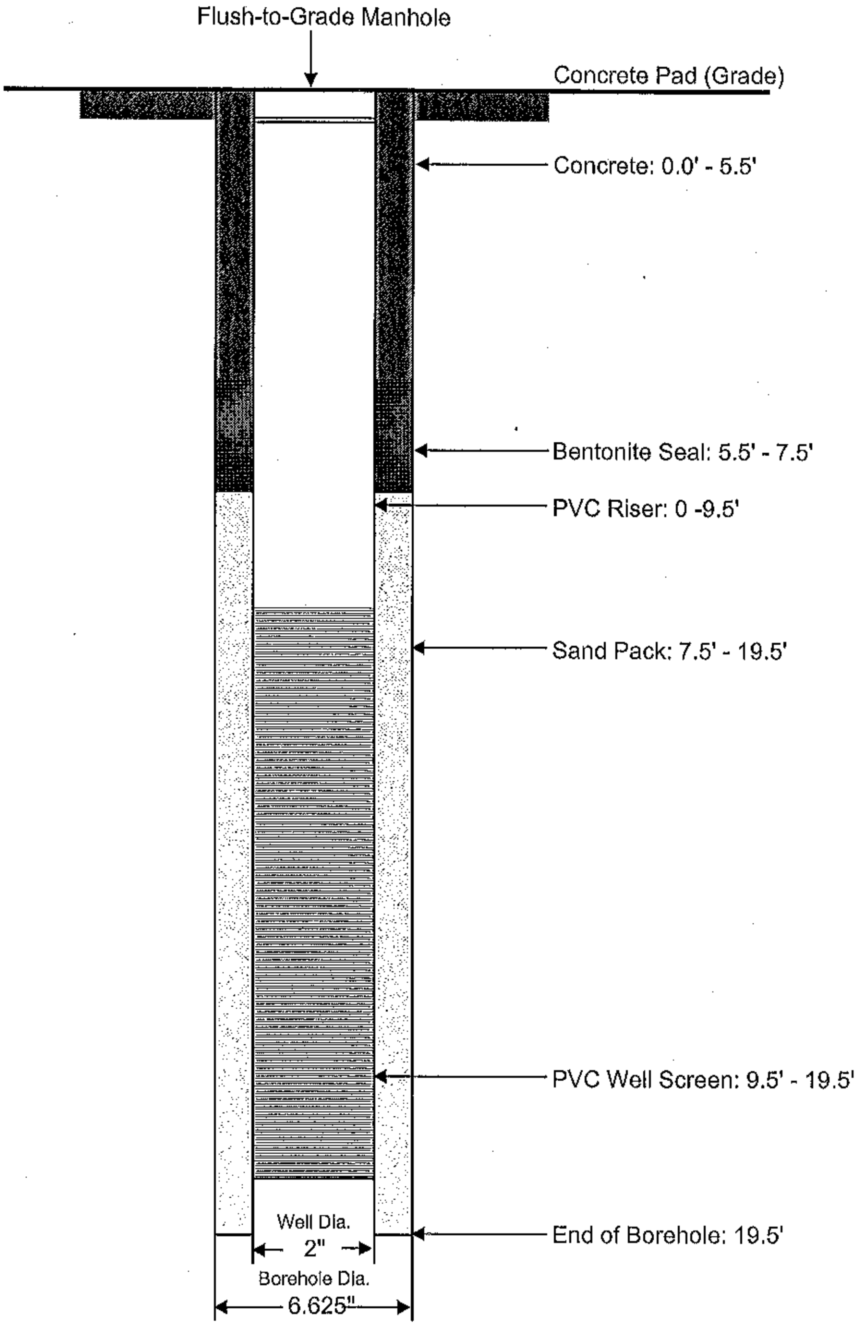
Well No:	**Job Number:** 10702		**Client:** Paragon Paint
MW-11	**Location:**	Paragon Paint, LIC, NY	**Driller:** Paragon/SDS
	Date Start:	4/24/2007	**Drilling Method:** Hollow Stem Auger
	Date Finish:	4/24/2007	**Logged By:** Eric Park/AKRF



AKRF
Environmental Consultants

Well Construction Log

Well No:				
MW-12	**Job Number:**	10702	**Client:** Paragon Paint	
	Location:	Paragon Paint, LIC, NY	**Driller:** Paragon/SDS	
	Date Start:	4/25/2007	**Drilling Method:** Hollow Stem Auger	
	Date Finish:	4/25/2007	**Logged By:** Eric Park/AKRF	



AKRF
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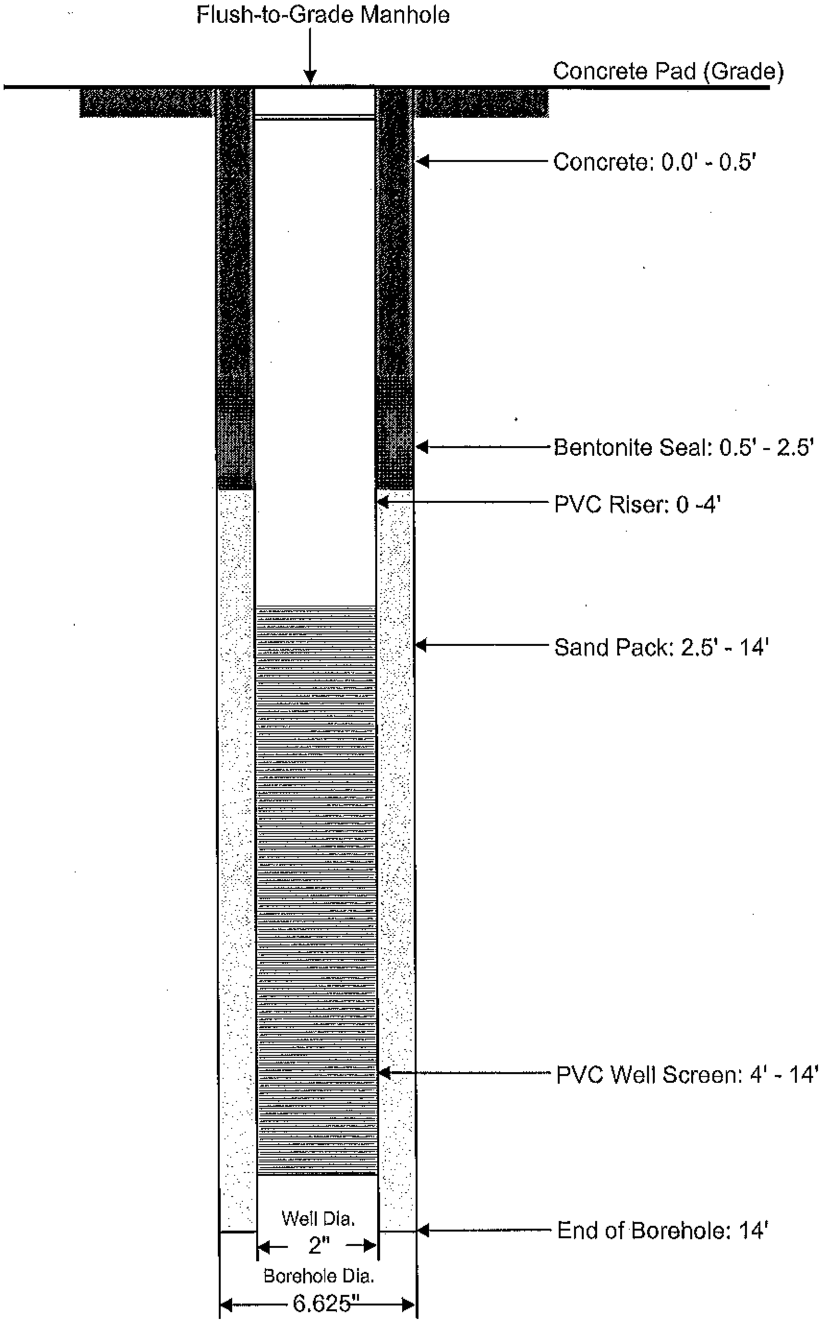
Well Construction Log

Well No: **MW-13**	**Job Number:** 10702		**Client:** Paragon Paint
	Location:	Paragon Paint, LIC, NY	**Driller:** Paragon/SDS
	Date Start:	4/25/2007	**Drilling Method:** Hollow Stem Auger
	Date Finish:	4/25/2007	**Logged By:** Eric Park/AKRF



APPENDIX B

Field Sampling Plan

February 7, 2013

FIELD SAMPLING PLAN

Former Paragon Paint and Varnish Company Manufacturing Facility
BCP Site Number C241108
5-43 to 5-49 46th Avenue and
45-38 Vernon Boulevard to
45-40 Vernon Boulevard
Long Island City, New York

Prepared for

VERNON 4540 REALTY, LLC
45 Carleon Avenue
Larchmont, New York 10538

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) has developed a Remedial Investigation (RI) Work Plan to further determine the nature and extent of potential environmental impacts to the facility identified as the former Paragon Paint manufacturing facility located at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York (Site). This Field Sampling Plan (FSP) was developed to describe in detail the methods and procedures to be followed by field personnel during the implementation of the fieldwork associated with the RI.

The FSP was prepared in accordance with directives provided in the DER-10 Technical Guidance for Site Investigation and Remediation (May 2010) issued by the New York State Department of Environmental Conservation (NYSDEC), as well as relevant NYSDEC Technical and Administrative Guidance Memoranda (TAGMs), and provides guidelines and procedures to be followed by field personnel during performance of the RI. Information contained in this FSP relates to sampling objectives, sampling locations, sampling frequencies, sample designations, sampling equipment, sample handling, sample analysis, and decontamination.

2.0 SAMPLING OBJECTIVES

This FSP was developed based upon a detailed review of available information obtained during previous investigations and is designed to obtain the additional data necessary to achieve the objectives of the RI. This FSP describes in detail the sampling and data gathering methods to be used during implementation of the RI.

The objective of the proposed sampling is to further characterize the nature and extent of the known contamination on Site, to evaluate any additional areas of concern (AOCs) and to obtain a current representation of the environmental conditions at the Site.

The scope of work discussed in the FSP includes five of the tasks described in the RI Work Plan, these tasks include:

- Light non-aqueous phase liquid (LNAPL) investigation;
- Underground storage tank inventory;
- Light non-aqueous phase liquid sampling;
- Soil investigation; and
- Groundwater investigation.

The sampling procedures associated with characterization of soil, groundwater and LNAPL are discussed in detail in Section 4 of this FSP. A discussion of the data quality objectives (DQOs) is provided in the Quality Assurance Project Plan (QAPP) located in Appendix C of the RI Work Plan.

3.0 SAMPLE MEDIA, LOCATIONS, ANALYTICAL SUITES, AND FREQUENCY

The media to be sampled during the RI include soil, groundwater and LNAPL. Sampling locations, analytical suites, and frequency vary by medium. A discussion of the sampling schedule for each medium is provided below, while the assumed number of field samples to be collected for each medium, including quality control (QC) samples, is shown in Table 1. Proposed sample locations (proposed monitoring wells and soil borings) are shown on Figure 3 of the RI Work Plan. Specifics regarding the collection of samples at each location and for each task are provided in Section 4 of this FSP.

3.1 Soil Sampling

Soil samples underlying the Site will be collected at 37 locations (monitoring wells and soil borings) as shown in Figure 3 of the RI Work Plan. All samples will be analyzed for the full Target Compound List (TCL) plus the 30 (10 VOC and 20 SVOC organic compounds) highest concentration tentatively identified compounds (TICs), and Target Analyte List (TAL) metals. Additionally, provided the historic data is verified as described in Section 3.2.1, a portion (25%) of all soil samples collected will also be analyzed for TCL pesticides and TCL polychlorinated biphenyl's (PCBs). In the event that the historic data cannot be validated all soil sampled will be analyzed for PCBs and pesticides.

All soil samples will be analyzed at a laboratory with a current New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) Contract Laboratory Protocol (CLP) certification for each of the parameters noted above. Samples will be analyzed on a standard turnaround time and will be reported as Category B data deliverables.

3.2 Groundwater Sampling

There are 13 existing monitoring wells at the Site, over the course of the RI, 10 additional monitoring wells will be installed (four existing wells will also be replaced). All 23 monitoring wells will be gauged using an electronic interface probe capable of detecting LNAPL with an accuracy of +/- 0.01 feet. Groundwater samples will be collected from those wells that do not exhibit any LNAPL. Samples will be analyzed for the full TCL list plus the 30 highest concentration tentatively identified compounds and TAL metals. Additionally, provided the historic data is verified as described in Section 3.2.1 of the RIWP, a portion (25%) of the groundwater samples collected will also be analyzed for TCL pesticides (USEPA Method 8081) and TCL PCBs (USEPA Method 8082). In the event that the historic data cannot be verified all groundwater samples will be analyzed for PCBs and pesticides. Field parameters, including temperature, pH, conductivity, redox potential, dissolved oxygen, and turbidity will also be measured.

All Groundwater samples will be analyzed at a laboratory with a current NYSDOH ELAP CLP certification for each of the parameters noted above. Samples will be analyzed on a standard turnaround time and will be reported as Category B data deliverables.

3.3 Light Non-Aqueous Phase Liquid Sampling

Light non aqueous phase liquid samples will be collected from each of the underground storage tanks (USTs) and monitoring wells located at the Site to be analyzed for fingerprinting to determine the type and characteristics of the LNAPL. Laboratory analyses may include viscosity, density, corrosivity, solubility, reactivity, TCLP and fingerprinting among others.

4.0 FIELD INVESTIGATION PROCEDURES

This section provides a detailed discussion of the field procedures to be followed during the performance of each field task described in Section 2.0 of the FSP. Proposed sampling locations were determined based upon the information collected during previous investigations and are shown on Figure 3 of the RI Work Plan.

Roux Associates' Standard Operating Procedures (SOPs) that are relevant to this scope of work are included in Attachment 1 and will be referenced where applicable. Additional information regarding QA/QC protocols and methods may be found in the QAPP (Appendix C of the RI Work Plan).

4.1 Light Non-aqueous Phase Liquid Investigation

Procedures for the advancement of soil borings and the installation of monitoring wells are provided below:

Soil Boring/Sampling

Prior to subsurface activity, soil boring/monitoring well locations will be cleared for utilities and USTs using vacuum-assisted excavation methods (i.e., air knife and/or Vactron) or hand digging methods to a depth of 5 feet (ft) below land surface (bls). Soil samples from the land surface to 5 ft bls will be collected by hand prior to utilization of the air knife and/or vactron.

Borings will be advanced using a Geoprobe™ truck or track-mounted direct-push drill rig equipped with hollow-stem augers. Samples of the soil profile will be collected in continuous four or five-foot increments using a 2-inch-diameter macrocore sampler. Soil samples will be screened for impacts using visual and olfactory observations; a photoionization detector (PID) will be used to screen for VOCs. In the event that impacted soils are identified, the boring will be advanced until impacts are no longer observed (i.e., clean soil) or bedrock is encountered. Each four or five-foot increment will be collected in dedicated acetate sleeves or similar. The sleeve will be laid on a piece of polyethylene sheeting and opened. Soil samples in the sleeve will be separated into two-foot sections and screened for VOCs with a PID. Following the PID screening, soil samples will be collected for laboratory analysis as described below. Soil samples selected for analysis will be placed into pre-cleaned sample jars and placed on ice in a cooler at 4°C. All remaining soils will be visually characterized according to the Unified Soils Classification System (USCS).

Three or four soil samples will be collected and submitted for laboratory analysis from each location as follows:

Soil samples to be collected in the event no impacts are observed:

- A soil sample from 0-2 feet below the surface or below the concrete floor;
- The depth interval just above the observed water table will be submitted for laboratory analysis; and
- A soil sample from the terminal depth of each boring will be submitted for laboratory analysis.

If impacts are observed the following samples will be collected for analysis:

- A soil sample from 0-2 feet below the surface or below the concrete floor;
- The depth interval just above the observed water table will be submitted for laboratory analysis;
- The sample that contains the highest field screening results for VOCs (via PID, visual and/or olfactory observations) will be submitted for laboratory analysis (this may coincide with a another interval); and
- A soil sample from the first clean interval below the observed impacts will be collected.

Additional details regarding soil-sampling protocols are described in Roux Associates' Standard Operating Procedure for the Collection of Soil Samples for Laboratory Analysis, which is provided in Attachment 1.

Monitoring Well Installation

Following soil sampling activities, monitoring wells will be installed at select locations (see figure 3 of the RI Work Plan for locations). Each of the monitoring wells will be constructed of four-inch diameter poly vinyl chloride (PVC) and consist of ten feet of 0.020-inch slot well screen that will intersect the water table at approximately three to four feet below the top of the screen. Historical data indicates that the LNAPL at the Site consists largely of mineral spirits; available data suggests that PVC is compatible with mineral spirits. This is supported by the fact that the monitoring wells that currently exist at the Site have been in place for five years and are not compromised; however, in the unlikely event that the wells become compromised, they will be replaced with stainless steel screens. A sand pack will be placed around the well screen, extending two feet above the top of the screened zone. Once the driller confirms the depth of the sand pack, a minimum two-foot-thick bentonite pellet seal will be placed above the sand pack. Once the pellets have been allowed to hydrate, a cement-bentonite grout will be pumped into the remaining annular space from the bottom up using a tremie pipe lowered to just above the bentonite seal. The wells will be completed using locking well plugs, and flush mounted, bolt down, watertight, manhole covers cemented into place. This procedure may be modified for the monitoring wells that are to be installed in the basement of the warehouse to allow for adequate well screen exposure.

Following installation each monitoring well will be developed using a submersible pump and a surge block to ensure good hydraulic connection with the surrounding saturated deposits. All monitoring wells will be surveyed to obtain horizontal and vertical survey coordinates.

4.2 Underground Storage Tank Inventory

Roux Associates will attempt to locate, inspect, estimate the volume, characterize the contents, and prepare an inventory for the 29 reported USTs and any unknown/unreported USTs that are discovered during the course of the investigation. We anticipate that the inventory will include demolition of the concrete floor of the shed in the area of the varnish cooking pots. It appears a second concrete floor was poured on top of the previous floor grade and as such, there is no access to the suspected cooking pot location.

Specific procedures regarding the UST inventory have not yet been developed because a detailed inspection of the UST access ways, ports, sumps, fill ports and vent lines has not occurred. Once it is known how accessing the inside of each of the USTs will be accomplished, detailed procedures will be prepared.

4.3 Light Non-aqueous Phase Liquid Sampling

As noted in Section 3.3, samples of LNAPL will be collected and submitted for laboratory analysis from each UST and monitoring well. Samples will be collected from each UST and monitoring well observed to contain LNAPL using a disposal bailer carefully lowered to the top of the air/LNAPL interface. The bailer will be allowed to fill from the bottom to help prevent water from entering the bailer. Samples will then be transferred to laboratory supplied glassware and shipped under proper chain-of-custody procedures to an environmental forensic laboratory for further analysis.

4.4 Soil Investigation

Soil boring installation and soil sampling procedures are discussed above in Section 4.1.

4.5 Groundwater Investigation

To characterize groundwater flow and quality conditions, following well installation and development, the entire network of monitoring wells will be gauged and sampled. Groundwater samples will be collected no sooner than two weeks following development of the wells. As part of the gauging round, water-level measurements will be recorded for all monitoring wells to further define groundwater flow patterns beneath the Site. The wells will be gauged using an electronic oil/water interface probe capable of detecting an LNAPL thickness of 0.01 feet.

Following the groundwater gauging event, a comprehensive groundwater sampling event will be completed. Groundwater samples will be collected from all wells that do not contain LNAPL or LNAPL sheen. To ensure groundwater samples collected are representative of the conditions in the surrounding aquifer, monitoring wells will be purged prior to sample collection using low flow sampling procedures as outlined in USEPA document titled “Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples From Monitoring Wells” (USEPA, 2010) (Attachment 3). Additional details for the collection of groundwater samples are included in Roux Associates SOPs (Attachment 1).

5.0 SAMPLE HANDLING AND ANALYSIS

To ensure quality data acquisition and collection of representative samples, there are selective procedures to minimize sample degradation or contamination. These include procedures for preservation of the samples as well as sample packaging and shipping procedures.

5.1 Field Sample Handling

A detailed discussion of the number and types of samples to be collected during each task, as well as the analyses to be performed can be found in Section 3.0 of this FSP. The types of containers, volumes needed, and preservation techniques for the aforementioned testing parameters are presented in Table 2.

5.2 Sample Custody Documentation

The purpose of documenting sample custody is to confirm that the integrity and handling of the samples is not subject to question. Sample custody will be maintained from the point of sampling through the analysis. Specific procedures regarding sample tracking from the field to the laboratory are described in Roux Associates' SOP for Sample Handling (Attachment 1).

Each individual collecting samples is personally responsible for the care and custody of the samples. All sample labels should be pre-printed or filled out using waterproof ink. The technical staff will review all field activities with the Field Team Leader to determine whether proper custody procedures were followed during the fieldwork and to decide if additional samples are required.

All samples being shipped off-site for analysis must be accompanied by a properly completed chain of custody form (Attachment 2). The sample numbers will be listed on the chain of custody form. When transferring the possession of samples, individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to/from a secure storage area, and to the laboratory.

Samples will be packaged for laboratory pick up and/or shipment with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be locked and/or secured with strapping tape in at least two locations for shipment to the laboratory.

5.3 Sample Shipment

Laboratory courier services will be used for the majority of sample transport on this project. However, in the event that samples are shipped to the laboratory the following procedures will apply. Sample packaging and shipping procedures are based upon USEPA specifications, as well as U.S. Department of Transportation (DOT) regulations. The procedures vary according to potential sample analytes, concentration, and matrix, and are designed to provide optimum protection for the samples and the public. Sample packaging and shipment must be performed using the general outline described below. Additional information regarding sample handling is provided in Roux Associates' SOP for Sample Handling (Attachment 1).

All samples will be shipped within 12 hours of collection (when possible) and will be preserved appropriately from the time of sample collection. A description of the sample packing and shipping procedures is presented below:

1. Prepare cooler(s) for shipment.
    - Tape drain(s) of cooler shut;
    - Affix "This Side Up" arrow labels and "Fragile" labels on each cooler; and
    - Place mailing label with laboratory address on top of cooler(s).
2. Arrange sample containers in groups by sample number or analyte.
3. Ensure that all bottle labels are completed correctly. Place clear tape over bottle labels to prevent moisture accumulation from causing the label to peel off.
4. Arrange containers in front of assigned coolers.
5. Place packaging material at the bottom of the cooler to act as a cushion for the sample containers.
6. Arrange containers in the cooler so that they are not in contact with the cooler or other samples.
7. Fill remaining spaces with packaging material.
8. Ensure all containers are firmly packed with packaging material.
9. If ice is required to preserve the samples, ice cubes should be repackaged in double Zip-Lock™ bags, and placed on top of the packaging material.
10. Sign chain of custody form (or obtain signature) and indicate the time and date it was relinquished to Federal Express or other carrier, as appropriate.

11. Separate chain of custody forms. Seal proper copies within a large Zip-Lock™ bag and tape to cooler. Retain copies of all forms.
12. Close lid and latch.
13. Secure each cooler using custody seals.
14. Tape cooler shut on both ends.
15. Relinquish to Federal Express or other courier service as appropriate. Retain airbill receipt for project records. (Note: All samples will be shipped for “NEXT A.M.” delivery).
16. Telephone laboratory contact and provide him/her with the following shipment information:
    - sampler’s name;
    - project name;
    - number of samples sent according to matrix and concentration; and
    - airbill number.

6.0 SITE CONTROL PROCEDURES

Site control procedures, including decontamination and waste handling and disposal, are discussed below.

6.1 Decontamination

In an attempt to avoid the spread of contamination, all drilling and sampling equipment must be decontaminated at a reasonable frequency in a properly designed and located decontamination area. Detailed procedures for the decontamination of field and sampling equipment are included in Roux Associates' SOPs for the Decontamination of Field Equipment, which is provided in Attachment 1. The location of the decontamination area will be determined prior to the start of field operations. The decontamination area will be constructed to ensure that all wash water generated during decontamination can be collected and containerized for proper disposal.

6.2 Waste Handling and Disposal

All waste materials (drill cuttings, decontamination water, etc.) generated during the RI will be consolidated and stored in appropriate bulk containers (drums, etc.), and temporarily staged at an investigation-derived-waste storage area onsite. Roux Associates will then coordinate waste characterization and disposal by appropriate means.

Table 1. Remedial Investigation Field and Quality Control Sampling Summary, Field Sampling Plan, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, NY

Sample Medium	**Target Analytes**	**Field Samples**	**Replicates**[1]	**Trip Blanks**[2]	**Field Blanks**[3]	**Matrix Spikes**[1]	**Spike Duplicates**[1]	**Total No. of Samples**
Soil	TCL VOCs + 10	148	8	20	20	5	5	206
	TCL SVOCs +20	148	8	NA	20	5	5	186
	TCL Pesticides	37	2	NA	20	2	2	63
	TCL PCBs	37	2	NA	20	2	2	63
	TAL Metals	148	8	NA	20	5	5	186
Groundwater	TCL VOCs + 10	36	2	2	2	2	2	46
	TCL SVOCs +20	36	2	NA	2	2	2	44
	TAL Metals (total)	36	2	NA	2	2	2	44
	TCL Pesticides	9	1	NA	2	2	2	16
	TCL PCBs	9	1	NA	2	2	2	16
	TAL Metals (dissolved)	36	2	NA	2	2	2	44

Notes:

[1] Based on 1 per 20 samples or 1 per Sample Delivery Group (3 days max)

[2] Based on 1 cooler per day

[3] Based on 1 per day

TCL - USEPA Contract Laboratory Program Target Compound List

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

PCBs - Polychlorinated Biphenyls

TAL - USEPA Contract Laboratory Program Target Analyte List

NA - Not applicable

Table 2. Preservation, Holding Times and Sample Containers, Field Sampling Plan, Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, NY

Analysis	Sample Medium	Bottle Type	Preservation[(a)]	Holding Time[(b)]
TAL Metals (total) SW-846 6010/7471	Soil	8 oz wide mouth glass, Teflon lined cap	Cool to 4°C	180 days, Hg 28 days
	Water	500 ml plastic, Teflon lined cap	Cool to 4°C, nitric acid	180 days, Hg 28 days
TCL Volatile Organic Compounds (VOCs) SW-846 8260B	Soil	2 oz wide mouth glass, Teflon lined cap	Cool to 4°C	14 days from sample collection
	Water	3- 40 ml glass, Teflon lined cap	Cool to 4°C, HCL	14 days from sample collection
TCL Semivolatile Organic Compounds (SVOCs) SW-846 8270C	Soil	8 oz wide mouth glass, Teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis
	Water	2- 1 liter amber glass, Teflon lined cap	Cool to 4°C	7 days to extract, 40 days to analysis
TCL Pesticides SW-846 8081A	Soil	8 oz wide mouth glass, Teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis
	Water	2- 1 liter amber glass, Teflon lined cap	Cool to 4°C	7 days to extract, 40 days to analysis
TCL Polychlorinated biphenyls (PCBs) SW-846 8082	Soil	8 oz wide mouth glass, Teflon lined cap	Cool to 4°C	14 days to extract, 40 days to analysis
	Water	2- 1 liter amber glass, Teflon lined cap	Cool to 4°C	7 days to extract, 40 days to analysis

Notes:

(a) All soil and groundwater samples to be preserved in ice immediately after collection and during transport

(b) Days from date of sample collection.

TAL - Target analyte List

TCL - Target Compound List

oz - Ounces
ml - Milliliters
HCL - Hydrochloric acid

Attachment 1

Roux Associates'
Standard Operating Procedure for
Tasks Described in this Field Sampling Plan

STANDARD OPERATING PROCEDURE 3.1
FOR COLLECTION OF QUALITY CONTROL SAMPLES FOR WATER-QUALITY DATA

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to explain the quality control (QC) measures taken to ensure the integrity of the samples collected and to establish the guidelines for the collection of QC samples. The objective of the QC program is to ensure that water-quality data of known and reliable quality are developed.

Because valid water-chemistry data are integral to a hydrogeologic investigation that characterizes water-quality conditions, the data will be confirmed by QC samples. Without checks on the sampling and analytical procedures, the potential exists for contradictory or incorrect results. The acceptance of water-quality data by regulatory agencies and in litigation-support investigations depends heavily on the proper QC program to justify the results presented. The QC sampling requirements must be determined by the project manager and be clearly defined in the work plan. If data validation (for in-house purposes or for compliance with the United States Environmental Protection Agency [USEPA] regulations) is stipulated as part of the hydrogeologic investigation, QC sampling must be conducted.

2.0 QUALITY CONTROL SAMPLES

2.1 Samples taken for analysis of compounds require the use of quality control samples to monitor sampling activities and laboratory performance. Types of quality control samples may include replicate and/or replicate split, trip blank, field equipment blank, matrix spike and matrix spike duplicate, and fortification. A discussion pertaining to each quality control sample follows:

a. Replicate and Replicate Split - Replicate sample analysis is done to check on the reproducibility of results either within a laboratory or between laboratories. A replicate sample is called a split sample when it is collected with or turned over to a second party (e.g., regulatory agency, consulting firm) for an independent analysis. Replicate samples are aliquots (equal portions) from a sample in a common container.

To collect a replicate sample, water from the bailer or pump will be distributed first to fill one container and then to fill the second container. Adequate water should be available to fill the bottles completely before they are capped. If the water is insufficient to fill all the bottles at once, then incrementally fill each bottle with water from two or more bailer volumes or pump cycles.

For some test substances, water may have to be accumulated in a common container and then decanted slowly into the sample bottles. The work plan should be checked for a description of how replicate samples are to be collected. Additionally, in the case of wells that recover slowly and produce insufficient water to fill all the replicate sample containers, the containers should be filled incrementally and kept on ice in the cooler in between filling periods.

b. Trip Blank - A trip blank sample is a sample bottle that is filled with "clean" (e.g., distilled/deionized) water in the laboratory, and travels unopened with the sample bottles. (The USEPA now uses the phrase "demonstrated analyte free water.") It is opened in the laboratory and analyzed along with the field samples for the constituent(s) of interest to detect if contamination has occurred during field handling, shipment, or in the laboratory. Trip blanks are primarily used to check for "artificial" contamination of the sample caused by airborne volatile organic compounds (VOCs) but may also be used to check for "artificial" contamination of the sample by a test substance or other analyte(s). One trip blank per cooler containing VOC samples, or test substance of other analyte(s) of interest would accompany each day's samples.

c. Field Equipment Blank - A field equipment blank (field blank) sample is collected to check on the sampling procedures implemented in the field. A field blank is made with "clean" (e.g., distilled/deionized/demonstrated analyte free) water by exposing it to sampling processes (i.e., the clean water must pass through the actual sampling equipment). For example, if samples are being collected with a bailer, the field blank would be made by pouring the clean water into a bailer which has been decontaminated and is ready for sampling, and then pouring from the bailer into the sample containers. If a metals equipment blank is to be made, and the water was filtered, then the sample must be filtered (i.e., exposed to the sampling process). One equipment blank would be incorporated into the sampling program for each day's collection of samples and analyzed for the identical suite of constituents as the sample. In some situations one equipment blank will be required for each type of sampling procedure (e.g., split-spoon, bailer, hand auger).

A special type of field blank may be needed where ambient air quality may be poor. This field blank sample would be taken to determine if airborne contaminants will interfere with constituent identification or quantification. This field blank sample is a sample bottle that is filled and sealed with "clean" (e.g., distilled/deionized/demonstrated analyte free) water in the analytical laboratory, and travels unopened with the sample bottles. It is opened in the field and exposed to the air at a location(s) to check for potential atmospheric interference(s). The field blank is resealed and shipped to the contract laboratory for analysis.

d. Matrix Spike and Matrix Spike Duplicate - Spikes of compounds (e.g., standard compound, test substance, etc.) may be added to samples in the laboratory to determine if the ground-water matrix is interfering with constituent identification or quantification, as well as a check for systematic errors and lack of sensitivity of analytical equipment. Samples for spikes are collected in the identical manner as for standard analysis, and shipped to the laboratory for spiking. Matrix spike duplicate sample collection, and laboratory spiking and analysis is done to check on the reproducibility of matrix spike results.

e. Fortification - A fortification, which is performed in the field, is used to check on the laboratory's ability to recover the test substance (analyte) added as well as its stability between fortification and analysis.

A field fortification (spike) is prepared by filling the container(s) with field or distilled/deionized/demonstrated analyte free water (as specified by the laboratory) to a predetermined volume (as specified by the laboratory) and adding the spike (supplied by the laboratory). The predetermined volume of water is measured with a clean (decontaminated) graduated cylinder. Field spikes will be prepared following the collection, labeling, and sealing of nonspiked samples in a separate cooler. The spike is kept at a safe distance from the sampling point (e.g., in the hotel room).

2.2 The work plan must be referred to for details regarding the type of QC samples to be collected and the QC sample collection method.

3.0 PROCEDURE

3.1 Implement QC sampling as outlined above, depending on the type of QC sample(s) specified in the work plan.

3.2 Ensure unbiased handling and analysis of replicate and blank QC samples by concealing their identity by means of coding so that the analytical laboratory cannot determine which samples are included for QC purposes. Attempt to use a code that will not cause confusion if additional samples are collected or additional monitoring wells are installed. For example, if there are three existing monitoring wells (MW-1, 2 and 3), do not label the QC blank MW-4. If an additional monitoring well were installed, confusion could result.

3.3 Label matrix spike and field fortification (spike) QC samples so that the analytical laboratory knows which samples are to be spiked in the laboratory and which samples were fortified (spiked) in the field, respectively. In certain situations, the field fortification will be "blind" or undisclosed to the laboratory to independently verify their analytical ability.

3.4 Verify that each sample is placed in an individual "zip-lock" bag, wrapped with "bubble wrap," and placed in its appropriate container (holder) in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the analytical laboratory. Consult the site work plan to determine if a particular ice is specified as the preservative for transportation (e.g., the USEPA prefers the use of wet ice because they claim that blue ice will not hold the samples at 4° Centigrade/Celsius).

3.5 Document the QC samples on the appropriate field form and in the field notebook. On the chain-of-custody form, replicate and blank QC samples will be labeled using the codes (Number 3.2, above), and matrix spike and field fortification QC samples will be identified as such (Number 3.3, above).

3.6 Follow standard shipping procedures for samples (i.e., retain one copy of the chain-of-custody form, secure the cooler with sufficient packing tape and a custody seal, forward the samples via overnight [express] mail or hand deliver to the designated analytical laboratory preferably within 24 hours but no later than 48 hours after sampling). However, check the site work plan for information on the analyte(s), as some have to be analyzed immediately (e.g., CN).

END OF PROCEDURE

STANDARD OPERATING PROCEDURE 4.2 FOR MEASURING WATER LEVELS USING AN ELECTRONIC SOUNDING DEVICE (M-SCOPE)

Date: May 5, 2000

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for using m-scopes. A m-scope is an electronic sounding device used to measure the depth to ground water below an established (surveyed) measuring point (MP). Measuring the depth to water (DTW) below the surveyed MP provides information for calculating ground-water elevations needed to construct ground-water elevation maps and determine the direction of ground-water flow.

M-scopes can be less accurate than a steel tape because the wire can kink, measurement increment marks can shift, and the tip may have been cut off and replaced without proper documentation. Thus, it is mandatory that a m-scope be calibrated before use.

2.0 DECONTAMINATION

The m-scope must be pre-cleaned (decontaminated) using a non-phosphate, laboratory-grade solution and rinsed with copious amounts of distilled or deionized water. This process is repeated before each measurement and following the final measurement.

3.0 CALIBRATION

The m-scope must be calibrated before being used to measure water levels. Calibration is accomplished by measuring the water level with the m-scope followed by a measurement using a steel tape. This dual measurement procedure is continued until the individual is confident that measurements taken using both devices are similar and the m-scope is reliable. The calibration procedure is documented in the field notebook or on an appropriate field form, and initialed and dated.

4.0 PROCEDURE

4.1 If the well is not vented, then remove the cap and wait several minutes for the water level to equilibrate. Take several measurements to ensure that the water level measured is in equilibrium with the aquifer (i.e., not changing substantially).

4.2 The manufacturer's model must be noted because some have switches, lights, beepers, or a combination of the above.

4.3 The 1-foot or 5-foot marked intervals on the electrical line must be checked to ensure that they have not shifted, and the bottom of the probe has not been cut. Check on a periodic basis that the cord has not kinked.

4.4 The water-level measurement is taken by lowering the probe into the well until the instrument-specific detection method (e.g., light, beeper, or both) is activated by contacting the water.

4.5 The electrical line is held at the MP and, using a ruler (e.g., carpenter's folding ruler) or an engineer's scale, the distance from the "held" point to the nearest marked interval is measured. The distance measured is added to, or subtracted from, the marked interval reading. The result is the DTW.

4.6 Measurements will be taken accurately and to the nearest 0.01 foot.

4.7 After measuring all wells in an area, always re-measure at least one well, preferably the first well measured, to see if the static water level has changed (e.g., due to pumping in the area, tidal effects, etc.). If a significant change has occurred, it may be necessary to re-measure other wells.

4.8 If there are previous water-level measurements available for the wells, then have these data available to compare the measurements with those just taken. Use these data to see if water levels are similar or if they have changed. If water levels have changed, then check if the changes are consistent (i.e., all up or all down) and make sense.

4.9 Water-level elevations are calculated by subtracting the DTW from the MP and a water-elevation map is constructed (contoured) on a well location map. This also provides a check to evaluate if the water levels make sense (or anomalies are evidenced). Re-measure the well(s) where anomalies are found as a check on the initial measurement(s).

4.10 If anomalies persist or water-level trends are different from the historical database, then check to see if hydrogeologic conditions and/or stresses have changed (e.g., discharge areas, pumping and/or injection wells, etc.).

4.11 All pertinent data will be documented in the field notebook, and initialed and dated.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for purging a well prior to the collection of a ground-water sample. Purging (evacuating) a well involves the removal of the standing column of water in the well to allow “fresh” (representative) formation water to enter the well. Two conventionally used methods for well purging include: 1) discharge of a specified number of casing volumes of water (which is more commonly used); and 2) pumping until specific indicator parameters (e.g., specific conductance, pH, temperature) stabilize. Wells must be purged prior to sampling to ensure the collection of representative formation ground water for water-quality analysis.

For accepted, existing sampling and analysis programs, the same purging method will be used each time to maintain consistency. For new sampling and analysis programs, the basis for the purging technique(s) will be site-specific field conditions, client input, the experience of Roux Associates, Inc. and regulatory agency(ies) guidelines (e.g., some states permit purging a low-yield well to dryness while others insist that some water remains in the well).

2.0 EQUIPMENT AND MATERIALS

2.1 The following equipment may be needed to purge a monitoring well before sampling:

a. Bailers.

b. Centrifugal pumps.

c. Electrical submersible pumps.

d. Peristaltic pumps.

e. Positive gas-displacement devices.

f. Bladder pumps.

g. Hand-operated diaphragm or bilge pump(s).

h. Teflon™ tape, electrical tape.

i. Tape measure (stainless steel, steel, fiberglass) with 0.01-foot measurement increments and chalk (e.g., blue carpenter’s) or m-scope.

j. Appropriate discharge hose and valves.

k. Appropriate discharge tubing (e.g., polypropylene) if using a peristaltic pump.

l. Appropriate compressed gas if using bladder-type or gas-displacement device.

m. Extension cord(s) or portable generator (and fuel) if using an electric submersible pump.

n. Non-absorbent cord (e.g., polypropylene, etc.), cotton (absorbent) cord.

o. Tripod(s).

p. Water Well Handbook.

q. Explosimeter.

r. Flow meter.

2.2 Bailers or centrifugal pumps are recommended for shallow, small diameter monitoring wells. For deep wells, or large diameter wells, a submersible pump is recommended.

3.0 DECONTAMINATION

Each piece of equipment that is used to evacuate wells (e.g., bailers, pumps, hoses) will be decontaminated thoroughly prior to the introduction of the equipment into the well and prior to leaving the site. Additionally, disposable items (e.g., cord, tubing) will be changed between each well purged and discarded in an appropriate manner.

4.0 PROCEDURE

4.1 The depth to water (DTW) is measured and subtracted from the sounded (total) depth of the well to calculate the length of the column of standing water in the well (in feet).

4.2 The volume of the standing water in the well is calculated by multiplying the length of standing water by a coefficient which equates the diameter of the well to gallons per linear foot. (Refer to the attached table from the Water Well Handbook for the coefficient or use the following equation [V=(7.48 gal/ft3)(r2h), where V is volume of water in gallons, r is the radius of the well casing in feet, and h is the height of the water column in the well in feet].)

4.3 If purging is performed by evacuating a specified number of casing volumes, then three to five volumes are purged (typical regulatory agency requirement).

4.4 If wells are screened in low permeability formations, then the well may go dry prior to removing the specified volume of water. If the recovery rate is fairly rapid and time allows, then remove more than one casing volume; otherwise, the evacuation of one casing volume may suffice. (Refer to the site sampling and analysis plan [SAP] for details of purging a low-yield well.)

4.5 Evacuation will occur from the top of the water column in the well to ensure that "fresh" formation water enters the bottom of the well through the screen, moves up as standing water is removed from the top, and all standing water is removed (i.e., only representative formation water is in the well).

4.6 The volume of water purged from the well must be measured and can be calculated directly by discharging into containers of known volume or can be calculated by multiplying rate of flow by time.

4.7 If a submersible or centrifugal pump is used, then the intake is set just below the dynamic (pumping) water level in the well. The rate of flow in gallons per minute (gpm) can be measured using a calibrated bucket (e.g., 5-gallon) if the rate is relatively low, or a 55-gallon drum if the rate is relatively high, and a watch capable of measuring time in second intervals. A precalibrated flow meter may also be used if available.

4.8 After the specified number of casing volumes have been evacuated from the well, the pump intake is lifted slowly until it breaks suction to confirm that any standing water above the intake has been purged.

4.9 If a bailer is used, then the bailer is lowered only deep enough to remove water from the top of the water column and a 5-gallon bucket is used to measure the volume of water evacuated.

4.10 If purging is not executed by evacuating a specified number of well volumes, then purging is performed by pumping or bailing the well until specific indicator parameters (e.g., specific conductance, pH, temperature) stabilize. The volume of water removed is documented on an appropriate field form or in the field notebook.

4.11 Water purged from the well will be disposed of in accordance with the appropriate method outlined in the site SAP.

4.12 If historic site data indicate that explosive gases could be present and accumulate in the well, then an explosimeter will be used to check vapor concentrations in wells at the site prior to beginning the purging procedure. Vapor concentrations in a well that exceed the 25 percent lower explosive limit (LEL) will require specific precautionary measures to allow purging the well without danger of explosion or fire (e.g., use of cotton cord for bailers or lowering pumping devices, non-electric powered pumps). These conditions will be addressed in the site health and safety plan (HASP) and/or SAP.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for the sampling of ground-water monitoring wells for dissolved constituents. As part of the SOP for the sampling of ground-water monitoring wells, sample collection equipment and devices must be considered, and equipment decontamination and pre-sampling procedures (e.g., measuring water levels, sounding wells, and purging wells) must be implemented. Sampling objectives must be firmly established in the work plan before considering the above.

Valid water-chemistry data are integral to a hydrogeologic investigation that characterizes ground-water quality conditions. Water-quality data are used to evaluate both current and historic aquifer chemistry conditions, as well as to estimate future conditions (e.g., trends, migration pathways). Water-quality data can be used to construct ground-water quality maps to illustrate chemical conditions within the flow system, to generate water-quality plots to depict conditions with time and trends, and to perform statistical analyses to quantify data variability, trends, and cleanup levels.

2.0 EQUIPMENT AND MATERIALS

2.1 In order to sample ground water from monitoring wells, specific equipment and materials are required. The equipment and materials list may include, but not necessarily be limited to, the following:

a. Bailers (Teflon™ or stainless steel).

b. Pumps (centrifugal, peristaltic, bladder, electric submersible, bilge, hand-operated diaphragm, etc.).

c. Gas-displacement device(s).

d. Air-lift device(s).

e. Teflon™ tape, electrical tape.

f. Appropriate discharge hose.

g. Appropriate discharge tubing (e.g., polypropylene, teflon, etc.) if using a peristaltic pump.

h. Appropriate compressed gas if using bladder-type or gas-displacement device.

i. Portable generator and gasoline or alternate power supply if using an electric submersible pump.

j. Non-absorbent cord (e.g., polypropylene, etc.).

k. Plastic sheeting.

l. Tape measure (stainless steel, steel, fiberglass) with 0.01-foot measurement increments and chalk (blue carpenter's).

m. Electronic water-level indicators (e.g., m-scope, etc.) or electric water-level/product level indicators.

n. Non-phosphate, laboratory-grade detergent.

o. Distilled/Deionized water.

p. Potable water.

q. Paper towels, clean rags.

r. Roux Associates' field forms (e.g., daily log, well inspection checklist, sampling, etc.) and field notebook.

s. Well location and site map.

t. Well keys.

u. Stop watch, digital watch with second increments, or watch with a second hand.

v. Water Well Handbook.

w. Calculator.

x. Black pen and water-proof marker.

y. Tools (e.g., pipe wrenches, screwdrivers, hammer, pliers, flashlight, pen knife, etc.).

z. Appropriate health and safety equipment, as specified in the site health and safety plan (HASP).

aa. pH meter(s) and buffers.

bb. Conductivity meter(s) and standards.

cc. Thermometer(s).

dd. Extra batteries (meters, thermometers, flashlight).

ee. Filtration apparatus, filters, pre-filters.

ff. Plasticware (e.g., premeasured buckets, beakers, flasks, funnels).

gg. Disposable gloves.

hh. Water jugs.

ii. Laboratory-supplied sample containers with labels.

jj. Cooler(s).

kk. Ice (wet, blue packs).

ll. Masking, duct, and packing tape.

mm. Chain-of-custody form(s) and custody seal(s).

nn. Site sampling and analysis plan (SAP).

oo. Site health and safety plan (HASP).

pp. Packing material (e.g., bubble wrap)

qq. "Zip-lock" plastic bags.

rr. Overnight (express) mail forms.

3.0 DECONTAMINATION

3.1 Make sure all equipment is decontaminated and cleaned before use (refer to the SOP for Decontamination of Field Equipment for detailed decontamination methods, summaries for bailers and pumps are provided below). Use new, clean materials when decontamination is not appropriate (e.g., non-absorbent cord, disposable gloves). Document, and initial and date the decontamination procedures on the appropriate field form and in the field notebook.

a. Decontaminate a bailer by: 1) wearing disposable gloves, 2) disassembling (if appropriate) and scrubbing in a non-phosphate, laboratory-grade detergent and distilled/deionized water solution, and 3) rinsing first with potable water and then distilled/deionized water.

b. Decontaminate a pump by: 1) wearing disposable gloves, 2) flushing the pump and discharge hose (if not disposable) first with a non-phosphate, laboratory-grade detergent and potable water solution in an appropriate container (clean bucket, garbage can, or 55-gallon drum) and then with distilled/deionized water or potable water, and 3) wiping pump-related equipment (e.g., electrical lines, cables, discharge hose) first with a clean cloth and detergent solution and then rinsing or wiping with a clean cloth and distilled/deionized water or potable water.

3.2 Note that the decontamination procedures for bailers and pumps are the minimum that must be performed. Check the work plan to determine if chemicals specified by individual state regulatory agencies must also be used for decontamination procedures (e.g., hexane, nitric acid, acetone, isopropanol, etc.).

4.0 CALIBRATION OF FIELD ANALYSIS EQUIPMENT

Calibrate field analysis equipment before use (e.g., thermometers, pH and conductivity meters, etc.). Refer to the specific SOP for field analysis for each respective piece of equipment. Document, and initial and date the calibration procedures on the appropriate field form, in the field notebook, and in the calibration log book.

5.0 PROCEDURE

5.1 Document, and initial and date well identification, pre-sampling information, and problems encountered on the appropriate field form and in the field notebook as needed.

5.2 Inspect the protective casing of the well and the well casing, and note any items of concern such as a missing lock, or bent or damaged casing(s).

5.3 Place plastic sheeting around the well to protect sampling equipment from potential cross contamination.

5.4 Remove the well cap or plug and, if necessary, clean the top of the well off with a clean rag. Place the cap or plug on the plastic sheeting. If the well is not vented, allow several minutes for the water level in the well to equilibrate. If fumes or gases are present, then diagnose these with the proper safety equipment. Never inhale the vapors.

5.5 Measure the depth to water (DTW) from the measuring point (MP) on the well using a steel tape and chalk or an electronic sounding device (m-scope). Refer to the specific SOPs for details regarding the use of a steel tape or a m-scope for measuring water levels. Calculate the water-level elevation. Document, and initial and date the information on the appropriate field form and in the field notebook.

5.6 Measuring the total depth of the well from the MP with a weighted steel tape. Calculate and record the volume of standing water in the well casing on the appropriate field form and in the field notebook.

5.7 Decontaminate the equipment used to measure the water level and sound the well with a non-phosphate, laboratory-grade detergent solution followed by a distilled/deionized water rinse.

5.8 Purge the well prior to sampling (refer to the SOP for Purging a Well). The well should be pumped or bailed to remove the volume of water specified in the work plan. Usually three to five casing volumes are removed if the recharge rate is adequate to accomplish this within a reasonable amount of time.

If the formation cannot produce enough water to sustain purging, then one of two options must be followed. These include: 1) pumping or bailing the well dry, or 2) pumping or bailing the well to "near-dry" conditions (i.e., leaving some water in the well). The option employed must be specified in the work plan and be in accordance with regulatory requirements.

If the well is purged dry, then all the standing water has been removed and upon recovery the well is ready for sampling. However, depending on the rate of recovery and the time needed to complete the sampling round, one of the following procedures may have to be implemented: 1) the well may have to be sampled over a period of more than one day; 2) the well may not yield enough water to collect a complete suite of samples and only select (most important) samples will be collected; or 3) the well may not recover which will preclude sampling. Regardless of the option that must be followed, the sampling procedure must be fully documented. When preparing to conduct a sampling round, review drilling, development and previous sampling information (if available) to identify low-yielding wells in order to purge them first, and potentially allow time for the well to recover for sampling.

5.9 Record the physical appearance of the water (i.e., color, turbidity, odor, etc.) on the appropriate field form and in the field notebook, as it is purged. Note any changes that occur during purging.

5.10 If a bailer is used to collect the sample, then:

a. Flush the decontaminated bailer three times with distilled/deionized water.

b. Tie the non-absorbent cord (polypropylene) to the bailer with a secure knot and then tie the free end of the bailer cord to the protective casing or, if possible, some nearby structure to prevent losing the bailer and cord down the well.

c. Lower the bailer slowly down the well and into the water column to minimize disturbance of the water surface. If a bottom-filling bailer is used, then do not submerge the top of the bailer; however, if a top-filling bailer is used, then submerge the bailer several feet below the water surface.

d. Remove and properly discard one bailer volume from the well to rinse the bailer with well water before sampling. Again, lower the bailer slowly down the well to the appropriate depth depending on the bailer type (as discussed above in 5.11 c). When removing the bailer from the well, do not allow the bailer cord to rest on the ground but coil it on the protective plastic sheeting placed around the well. Certain regulatory agencies require that the first bailer volume collected be utilized for the samples.

5.11 If a pump is used to collect the sample, then use the same pump used to purge the well and, if need be, reduce the discharge rate to facilitate filling sample containers and to avoid problems that can occur while filling sample containers (as listed in Number 5.14, below). Alternately, the purge pump may be removed and a thoroughly decontaminated bailer can be used to collect the sample.

5.12 Remove each appropriate container's cap only when ready to fill each with the water sample, and then replace and secure the cap immediately.

5.13 Fill each appropriate, pre-labeled sample container carefully and cautiously to prevent: 1) agitating or creating turbulence; 2) breaking the container; 3) entry of, or contact with, any other medium; and 4) spilling/splashing the sample and exposing the sampling team to contaminated water. Immediately place the filled sample container in a ice-filled (wet ice or blue pack) cooler for storage. If wet ice is used it is recommended that it be repackaged in zip-lock bags to help keep the cooler dry and the sample labels secure. Check the work plan as to whether wet ice or blue packs are specified for cooling the samples because certain regulatory agencies may specify the use of one and not the other.

5.14 "Top-off" containers for volatile organic compounds (VOCs) and tightly seal with Teflon™-lined septums held in place by open-top screw caps to prevent volatilization. Ensure that there are no bubbles by turning the container upside down and tapping it gently.

5.15 Filter water samples (Procedure 4.6) collected for dissolved metals analysis prior to preservation to remove the suspended sediment from the sample. If water samples are to be collected for total metals analysis, then collect a second set of samples without field filtering.

In the event that the regulatory agency(ies) want unfiltered samples for metals analysis, a second set of filtered samples should also be collected. Because unfiltered samples are indications of total metals (dissolved and suspended) they are not representative of aquifer conditions because ground water does not transport sediment (except in some rare cases). Thus, the results for dissolved metals in ground water should be based on filtered samples even if both filtered and unfiltered sets are presented in a report.

5.16 Add any necessary preservative(s) to the appropriate container(s) prior to, or after (preferred), the collection of the sample, unless the appropriate preservative(s) have already been added by the laboratory before shipment.

5.17 Collect quality control (QC) samples as required in the work plan to monitor sampling and laboratory performance. Refer to the SOP for Collection of Quality Control Samples.

5.18 Conduct field analyses after sample collection is complete by measuring and recording the temperature, conductivity, pH, etc. (as called for in the work plan). Note and record the "final" physical appearance of the water (after purging and sampling) on an appropriate field form and in the field notebook.

5.19 Wipe the well cap with a clean rag, replace the well cap and protective cover (if present). Lock the protective cover.

5.20 Verify that each sample is placed in an individual "zip-lock" bag, wrapped with "bubble wrap," placed in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the analytical laboratory.

5.21 Decontaminate bailers, hoses, and pumps as discussed in the decontamination SOP. Wrap decontaminated equipment with a suitable material (e.g., clean plastic bag or aluminum foil). Discard cords, rags, gloves, etc. in a manner consistent with site conditions.

5.22 Complete all necessary field forms, field notebook entries, and the chain-of-custody forms. Retain one copy of each chain-of-custody form. Secure the cooler with sufficient packing tape and a custody seal.

5.23 Samples collected from Monday through Friday will be delivered within 24 hours of collection. If Saturday delivery is not available, samples collected on Friday must be delivered by Monday morning. Consult the work plan to determine if any of the analytes require a shorter delivery time.

END OF PROCUDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for measuring the thickness of floating separate-phase organic liquids in a well, tank or drum. Measuring the thickness of floating, separate-phase organic liquids requires special health and safety considerations, equipment, and procedures.

Separate-phase layers can either be “floaters” or “sinkers”. “Floaters” (non-aqueous phase liquids [NAPLs]) are separate-phase liquids that are less dense than water and float on the ground-water surface. “Sinkers” (dense non-aqueous phase liquids [DNAPLs]) are separate-phase liquids that are more dense than water and tend to migrate downward through aquifers due to gravitational forces until a low permeability layer is encountered (i.e., they accumulate at the bottom of the aquifer). For the purpose of this SOP, only measuring the thickness of floating separate-phase liquids will be addressed.

The objectives for measuring separate-phase organic liquids may include the following: 1) determination of the thickness of the free product in a well, tank or drum; 2) estimation of the volume of free product to be removed from a well before sampling, or from a tank or drum before removal; and 3) calculation of the “true” (non-free product depressed) elevation of the water table.

2.0 CONSIDERATIONS

The primary considerations when measuring the thickness of floating separate-phase liquids are health and safety, and proper equipment selection.

2.1 Health and Safety

All separate-phase products must be assumed to possess health and safety hazards equivalent to the most hazardous suspected on-site source. For example, if fuel oil is being measured in wells where polychlorinated biphenyls (PCBs) are known (or suspected) to be present, then the potential for PCBs to be present in the fuel oil must be considered. When measuring the thickness of flammable materials, it is imperative that all possible sources of ignition be eliminated. Minimum requirements include (NO EXCEPTIONS) no smoking or open flames, use of intrinsically safe downhole monitoring equipment, use of static free bailing cord (e.g., absorbent cord [cotton]), and use of properly vented and grounded product collection containers. When product collection containers will be stored onsite, the local fire code official must be consulted regarding product storage requirements (e.g. venting, grounding, labeling, permits, secondary containment, etc.). A detailed, comprehensive explanation of health and safety procedures must be outlined in the site health and safety plan (HASP).

2.2 Equipment Selection

There are several methods which may be employed to measure the thickness of separate-phase petroleum product in a monitoring well, tank or drum. The actual method to be utilized should be outlined in the work plan. Considerations in selecting a method shall include: the type and consistency of the product; the level of accuracy desired; the expected depth and thickness of the product; and the diameter of the well or port.

Measurements of floating separate-phase product thicknesses can be performed using 1) an electronic oil/water interface probe; 2) a graduated, clear acrylic bailer; or 3) a weighted steel measuring tape (or graduated "stick") in conjunction with oil and water paste.

An oil/water interface probe is capable of providing rapid and accurate (±0.01 foot) results under most field situations. However, viscous product or oil/water emulsions may interfere with performance by coating the probe and/or disguising the interface. In these situations, a clear, acrylic bailer may be used in wells, or oil and water paste in a tank or drum.

A clear, acrylic bailer may be used if simply the presence or absence of product or an approximate product thickness is desired. In certain situations (e.g., viscous product or product/water emulsions) a clear acrylic bailer may be the best available method. However, when product thicknesses are greater than approximately three feet, a bailer will be unable to provide approximate product thickness measurements. If the oil/water interface probe will not work, and the product thickness is too great to be measured by a bailer, then the best available technique may be oil and water paste.

A graduated "stick" or weighted steel tape in conjunction with oil and water paste may be appropriate for measuring residual water or product in a tank or drum. This method is not recommended for use in monitoring wells because of possible cross-contamination from the paste itself. In certain situations where no other method can provide the necessary data, oil and water paste may be used in monitoring wells containing product. This method is less accurate than an oil/water interface probe, but frequently more accurate than a clear, acrylic bailer.

It should be noted that erroneous data may be collected by all three methods when measurements are collected through the fill ports of tanks which are equipped with drop tubes. Whenever possible, product thickness measurements should be collected from ports with unobstructed access to the tank contents. When measurements must be collected from a fill port with a drop tube, it should be understood that there may be significant differences between the drop tube measurements and the actual thicknesses of the water and product in the tank.

3.0 CALIBRATION

3.1 Oil/Water Interface Probe

There is no specific calibration procedure for an oil/water interface probe. However, you should verify that the unit operates properly prior to taking it out in the field by testing it in a jar containing product and water. This jar should be stored in a flammable liquid cabinet and be dedicated to oil/water interface probe testing. Since most oil/water interface probes have a heavy probe assembly and a rigid graduated tape, kinking, stretching or twisting of the tape is not a significant concern. In order to ensure proper operation, the unit should be kept warm prior to use (e.g. hotel room or cab of truck).

3.2 Clear Acrylic Bailer

There is no specific calibration procedure for an acrylic bailer. However, since you only get one chance to measure the thickness correctly, you should verify that the check valve operates properly with distilled water. Based on previous data, if available, you should ensure that the length of the bailer is sufficient to measure the entire thickness of the product.

3.3 Oil/Water Paste

There is no specific calibration procedure for using oil and water paste. However, these pastes may not behave reliably if they are old or have been exposed to extreme temperatures. The pastes should be tested prior to taking them out in the field to confirm they work. The stick measure or weighted steel tape should be carefully examined to confirm that it is properly graduated and has not been damaged or modified.

4.0 DECONTAMINATION

4.1 Complete decontamination of a clear acrylic bailer which is dedicated to the measurement of separate-phase product thicknesses can be very difficult. Decontamination should involve removal of gross contamination before entering and exiting the site or moving to different areas of separate-phase product accumulation. Special care must be taken to make sure that a “product bailer” never enters a “clean” well which does not contain separate-phase product. This can be ensured by measuring separate-phase thickness in all wells before starting bailing operations. The oil/water interface probe must be thoroughly cleaned according to the field equipment decontamination SOP before entering each well. If historical data are available, then the order of measuring separate-phase thickness should be from the cleanest well to the dirtiest well to further reduce the potential for cross-contamination. If samples are also being collected for constituent or characterization analysis, then a disposable, dedicated bailer may be necessary for product collection.

5.0 EQUIPMENT AND MATERIALS

Depending on the method used to measure the thickness of separate-phase organic liquids, both method-specific and general equipment and materials are needed.

5.1 Regardless of the method used, general equipment and materials will include, but may not necessarily be limited to, the following:

a. Site Health and Safety Plan (HASP).

b. Appropriate health and safety equipment, as specified in the HASP.

c. Roux Associates' field forms and field notebook.

d. Non-phosphate, laboratory-grade detergent.

e. Distilled/deionized water.

f. Potable water.

g. Paper towels, clean rags.

h. Plastic sheeting.

i. Sorbent pads.

j. Well location and site map.

k. Well keys.

l. Disposable gloves.

m. Calculator.

n. Black pen and indelible marker.

o. Tools (e.g., pipe wrench, screw drivers, hammer, pliers, flashlight, pen knife, etc.).

p. Buckets for decontamination.

5.2 Clear Acrylic Bailer - the following will also be needed:

a. Clear acrylic bailer

b. Non-static cotton cord

c. Steel tape (10 foot)

5.3 Oil/Water Interface Probe - the following will also be needed:

a. Oil/water interface probe

5.4 Oil/Water Paste - the following will also be needed:

a. Oil paste

b. Water paste

c. Graduated stick or weighted steel tape

6.0 PROCEDURE

6.1 Oil/Water Interface Probe

6.1.1 Make sure the bottom five (5) feet of the probe and measuring tape have been decontaminated according to the field equipment decontamination SOP before entering each well.

6.1.2 Based on previous data, if any, ensure that non-product wells are measured prior to product wells to reduce the possibility of cross-contamination.

6.1.3 Remove the well cap or plug and clean the top of the well with a clean rag. Place the cap or plug on clean plastic on the ground to protect it from potential contamination.

6.1.4 Slowly lower the thoroughly decontaminated probe to the product surface. A distinct tone or beep will indicate the presence and level of product. The depth to product (DTP) from the measuring point will be recorded in the field notebook and on appropriate field forms. Continue lowering the probe until the tone or beep indicates the presence of water. The oil/water interface is best measured by lowering the probe about six inches into the water and then raising it to the interface. The depth to water (DTW) from the measuring point will be recorded in the field notebook and on appropriate field forms. The product thickness is the difference between the DTW and DTP.

6.1.5 Replace locking and/or protective caps on the well.

6.1.6 Thoroughly clean the probe and the portion of the tape which entered the product according to the field equipment decontamination SOP.

6.2 Clear Acrylic Bailer

6.2.1 Make sure all equipment is cleaned of gross contamination before entering and exiting the site or moving to different areas of product accumulation.

6.2.2 Remove the well cap or plug and clean the top of the well with a clean rag. Place the cap or plug on clean plastic on the ground to protect it from potential contamination.

6.2.3 Slowly lower a clear, decontaminated bottom-filling acrylic bailer into the well until the bottom of the bailer contacts the fluid surface.

6.2.4 Using a reference point on the bailer line, slowly lower the bailer into the fluid a distance less than the bailer length so that at its deepest point the top of the bailer remains above the air/fluid contact.

6.2.5 Slowly raise the bailer out of the well.

6.2.6 The thickness of the floating free product will be approximated by placing a tape measure along side the bailer. The data will be documented in the field notebook and on appropriate field forms.

6.2.7 Dispose of the product in an appropriate manner as specified in the work plan. This may include draining the product back into the well or tank, or containerization if the measurement is in conjunction with bailing for removal purposes.

6.2.8 Replace locking and/or protective caps on the well.

6.2.9 Thoroughly clean the bailer as described in Section 6.2.1. Discard the cotton cord in an appropriate manner. Wrap decontaminated bailer in a suitable material (e.g., clean plastic bag, aluminum foil).

6.2.10 If the free product is extensive or thicker than the height of the bailer, then an electronic interface probe should be used to measure product thickness.

6.3 Oil/Water Paste - (Generally not applicable for monitoring wells)

6.3.1 Make sure all equipment is decontaminated and cleaned before use according to the field equipment decontamination SOP.

6.3.2 Secure access to the tank or drum to be measured only after the contents are known and properly addressed in the HASP. Attempt to estimate the depth and thickness of product and the depth to water so the entire stick or weighted steel tape does not have to be coated with oil and water paste.

6.3.3 Coat one side of the stick or steel tape with oil paste and the other with water paste. Since these are typically different colors, confusion should not result. Depending upon information needs, lower the tape to just below the water interface or to the bottom of the tank or drum.

6.3.4 If only DTP and DTW data is required, then the top of the tape is held at an even-foot increment at the measuring point (MP). This is called the "held" value, and is recorded as such. If the depth to the bottom of the tank is also required, then the held value can't be specifically selected at an even-foot increment.

6.3.5 The steel tape or graduated stick is removed and the "water cut" and "product cut" levels are recorded. The difference between the "held" value and the "product cut" value is the DTP. The difference between the "held" value and the "water cut" is the DTW. The difference between the "product cut" and the "water cut" is the product thickness. If the diameter of a horizontal tank is desired, then the difference between the "held" value (to the bottom of the tank) and the depth of the fill pipe is required.

6.3.6 All pertinent data will be recorded in the field notebook and on appropriate field forms.

6.3.7 Make sure all equipment is decontaminated before use in the next tank or drum according to the field equipment decontamination SOP. All disposable materials must be discarded in a manner consistent with site conditions.

END OF PROCEDURE

STANDARD OPERATING PROCEDURE 4.8 FOR HAND BAILING WELLS CONTAINING SEPARATE-PHASE ORGANIC LIQUIDS

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for hand bailing wells containing immiscible, separate-phase organic liquids. The hand bailing of immiscible, separate-phase organic liquids requires special health and safety considerations, equipment, and procedures.

Separate-phase layers can either be “floaters” or “sinkers.” “Floaters” (non-aqueous phase liquids [NAPLs]) are separate-phase liquids that are less dense than water and float on the ground-water surface. “Sinkers” (dense non-aqueous phase liquids [DNAPLs]) are separate-phase liquids that are more dense than water and tend to migrate downward through aquifers due to gravitational forces until a low permeability layer is encountered (i.e., they accumulate at the bottom of the aquifer). For the purpose of this SOP, only the hand bailing of floating separate-phase liquids will be addressed.

The objectives for hand bailing wells containing floating separate-phase liquids (e.g., petroleum, petroleum products) may include the following: 1) removal of product before ground-water sampling; 2) remediation technique; 3) sampling product for constituent or characterization analysis; and 4) conducting product recharge tests to evaluate “true” versus “apparent” product thickness.

2.0 CONSIDERATIONS

The primary considerations when conducting hand bailing of wells are health and safety, and waste collection and disposal.

2.1 Health and Safety

All separate-phase products must be assumed to possess health and safety hazards equivalent to the most hazardous suspected on-site source. For example, if fuel oil is being removed from wells where polychlorinated biphenyls (PCBs) are known (or suspected) to be present, then the potential for PCBs to be present in the fuel oil must be considered. When bailing flammable materials, it is imperative that all possible sources of ignition be eliminated. Minimum requirements include (NO EXCEPTIONS) no smoking or open flames, use of intrinsically safe downhole monitoring equipment, use of static free bailing cord (e.g., absorbent cord [cotton]), and use of properly vented and grounded product collection containers. When product collection containers will be stored onsite, the local fire code official must be consulted regarding product storage requirements (e.g. venting, grounding, labeling, permits, secondary containment, etc.). A detailed, comprehensive explanation of health and safety procedures must be outlined in the site health and safety plan (HASP).

2.2 Waste Collection and Disposal

All product and product-contaminated waste materials must be properly stored, characterized, and disposed. A detailed, comprehensive explanation of waste (product) collection and disposal must be developed in accordance with regulatory agency requirements and must be outlined in the work plan/scope of work. Minimum requirements will include:

a. Collection of solid waste materials in a Department of Transportation (DOT) approved open-top drum (17C).

b. Collection of separate-phase product in a properly grounded and vented, DOT approved closed-top drum (17E).

c. Appropriate labeling of all drums with THIS SIDE UP, FLAMMABLE, and HAZARDOUS WASTE labels in accordance with Resource Conservation and Recovery Act (RCRA) and DOT requirements.

d. Collection and analysis of product sample for characterization prior to disposal, as required.

Any bailing operations which generate more than 100 kilograms per month (or approximately half of a 55 gallon drum) or that involve the storage of more than 1,000 kg of a RCRA hazardous waste must meet additional RCRA storage and disposal requirements (see 40CFR 261.5).

3.0 EQUIPMENT AND MATERIALS

The list of equipment and materials which may be needed for hand bailing floating separate-phase product from a well includes, but may not be limited to, the following:

a. Site HASP.

b. Appropriate health and safety equipment, as specified in the HASP.

c. A work plan which describes bailing requirements.

d. Oil/water interface probe.

e. Clear, acrylic product bailer (graduated).

f. Absorbent, nonstatic cord (e.g., cotton).

g. Sorbent pads.

h. Disposable PVC gloves.

i. Well construction log(s).

j. Two graduated buckets and funnels (dedicated to separate-phase product activities).

k. DOT approved product collection drum(s) (properly grounded).

l. DOT approved solid waste collection drum(s).

m. Roux Associates' field forms and field notebook.

n. Non-phosphate, laboratory-grade detergent.

o. Distilled/deionized water.

p. Potable water.

q. Paper towels, clean rags.

r. Calculator.

s. Black pen and indelible marker.

t. Well location and site map.

u. Tools (e.g., pipe wrench, screwdrivers, hammer, pliers, flashlight, pen knife, etc.)

v. Extra batteries (probe, flashlight).

w. Steel tape measure with 0.01-foot measurement increments, graduated measurement stick.

x. Plastic sheeting.

y. Specific gravity instruments.

4.0 DECONTAMINATION

4.1 Complete decontamination of a clear acrylic bailer which is dedicated to the removal of separate-phase product can be very difficult. When the primary task is the removal of product as a remedial technique, then decontamination should involve removal of gross contamination before entering and exiting the site or moving to different areas of separate-phase product accumulation. Special care must be taken to make sure that a "product bailer" never enters a "clean" well which does not contain separate-phase product. This can be ensured by measuring separate-phase thickness in all wells before starting bailing operations. The oil/water interface probe must be thoroughly cleaned according to the field equipment decontamination SOP before entering each well. Based on historical data, the order of measuring separate-phase thickness should be from the cleanest well to the dirtiest well to further reduce the potential for cross-contamination. If bailing is being conducted for product samples, it may be necessary to utilize a dedicated, disposable bailer as defined in the work plan.

5.0 PROCEDURE

5.1 Document, and initial and date the monitoring well identification and any problems encountered on the appropriate field form and in the field notebook.

5.2 Inspect the product collection drum or tank, and note any items of concern such as dents, holes, leaks, deformation, unauthorized access, etc. Document, and initial and date findings on an appropriate field form and in the field notebook.

5.3 Ensure that all equipment is properly decontaminated and cleaned.

5.4 Place plastic sheeting adjacent to the well to protect decontaminated equipment.

5.5 Remove the well cap and clean it off with a clean rag. Place the cap on the plastic sheeting. If fumes or gases are present, then diagnose these with the proper safety equipment. Never inhale the vapors.

Refer to Section 2.1 for the minimum health and safety considerations to prevent fire or explosion. Additional health and safety precautions based on site specific considerations must be outlined in the site HASP.

5.6 Place sorbent pads around the well to be bailed to prevent any loss of product in the event of spillage.

5.7 Determine the depth to product (DTP), depth to water (DTW), and product thickness within the well using an oil/water interface probe. Refer to the SOP for Measuring the Thickness of Floating Separate-phase Layers for the procedure to measure product thickness.

5.8 Lower the bailer into the product zone using absorbent, nonstatic cord (e.g., cotton). Refer to the work plan/scope of work to determine the method for draining off any excess water collected in the bailer (i.e., into the well or in a bucket). Drain off the water by slightly dislodging the capture ball (check valve) from the bailer seat with your finger; PVC gloves must be worn. Drain the product only into a separate, dedicated bucket.

5.9 Continue bailing until product thickness as observed in the bailer is reduced to less than ¼ inch (0.02 feet). If possible, then bail until no product is evidenced in the well (i.e., no more product is entering the well). Verify thickness measurements in the well using an oil/water interface probe. When bailing is completed, dispose of any excess water collected according to the specifications in the work plan/scope of work.

5.10 Wipe the well cap with a clean rag, replace the well cap and protective cover (if present). Lock the protective cover.

5.11 If required in the work plan, collect specific gravity measurements on representative samples of the product collected.

5.12 Transfer the product collected in the bucket to an on-site storage vessel. Record the volume of product collected and confirm by measuring the on-site storage vessel contents with an oil/water interface probe both before and after transferring the product from the bucket.

5.13 Place all contaminated sorbent pads, cord, and other solid waste materials into the open top drum and secure the lid.

5.14 Report any significant problems or deviations in product thickness measurements immediately (e.g., significant increase in product thickness or a substantial change in appearance).

5.15 Document all data (e.g., MP, DTP, DTW, product thickness, volume of product removed and disposed) on an appropriate field form and in the field notebook, and initial and date entries.

5.16 Secure storage containers and verify integrity.

5.17 Decontaminate all equipment as discussed in the decontamination section (4.0). Wrap decontaminated equipment with a suitable material (e.g., clean plastic bag or aluminum foil). Discard cords, rags, gloves, etc. in a manner consistent with accepted procedures.

END OF PROCEDURE

STANDARD OPERATING PROCEDURE 5.4
FOR SCREENING SOIL SAMPLES FOR VOLATILE ORGANIC VAPORS USING A PORTABLE PHOTOIONIZATION DETECTOR

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish guidelines for screening soil samples for volatile organic vapors using a portable photoionization detector (PID). This SOP is applicable to soil samples collected from split-spoon samplers during drilling, hand auger samples, and grab samples from stockpiled soils.

2.0 CONSIDERATIONS

The primary objective of photoionization screening of soil samples is to obtain a qualitative understanding of the distribution of volatile organic compounds (VOCs) in soil. The proper design of an organic vapor screening program requires an understanding of site hydrogeology, potential source areas, and potential constituents of concern. Sample locations and frequency must be fully defined in the work plan. The work plan should outline the type of lamp to be utilized in the PID based on the ionization potentials and response factors of the constituents of concern. The work plan must also clearly describe the heating or equilibration procedures to be employed if they differ from those described in this SOP. Regardless of the specific equilibration procedure employed, it is imperative that each sample be treated identically to allow the photoionization results from different locations to be compared. Observations such as water, clay, and organic content should be noted to facilitate interpretation of the data. Every effort should be made to collect a representative portion of soil from the sampling device.

3.0 MATERIALS/EQUIPMENT

a. A work plan which outlines photoionization screening requirements.

b. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, brushes, potable water, distilled water, regulatory-required reagents [e.g., acetone, nitric acid, hexane, etc.], aluminum foil, plastic sheeting, etc.).

c. Field notebook, field form(s), maps, chain-of-custody forms.

d. Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.).

e. Stainless steel spoons or spatulas.

f. Disposable plastic spoons.

g. Plastic sheeting.

h. Aluminum foil.

i. Mason jars or driller's jars.

j. Water bath (hot plate, extension cord, water tray, thermometer).

k. Photoionization detector with charging unit.

l. Calibration gases with regulator.

m. Indelible marker.

n. Masking tape.

o. Disposable sampling gloves.

4.0 DECONTAMINATION

Where possible, thoroughly pre-cleaned and wrapped sampling equipment must be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and sample jars will be changed after each use and discarded in an appropriate manner. If only photoionization results are to be obtained, then split-spoon samples and hand augers may be cleaned with a soap and water wash and potable water rinse or steam cleaning, and a final distilled water rinse. However, if samples are to be collected concurrently for laboratory analytical results, then all reusable sampling equipment must be thoroughly decontaminated according to the SOP for decontamination of field equipment.

5.0 CALIBRATION

The PID must be calibrated according to the manufacturer's specifications at a minimum frequency of once per day prior to collecting photoionization readings. In addition, periodic checks (e.g., every 2 hours or every ten samples) with the standard gas will be conducted to confirm that the calibration has not drifted. The time, date, and calibration procedure must be clearly documented in the field notebook and the calibration log. If at any time the photoionization results appear erratic or inconsistent with field observations, then the unit must be recalibrated. If calibration is difficult to achieve, then the unit's lamp should be checked for dirt or moisture and cleaned, as necessary. During humid or wet conditions, the unit should be calibrated on a more frequent basis as determined by field personnel.

6.0 PROCEDURE

6.1 Extract the soil sample from the sampler, quickly measure the recovery, and separate the wash from the true sample by using a dedicated, stainless steel spatula. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

6.2 Place the sample in a pre-cleaned glass jar (as quickly as possible to avoid loss of VOCs) filling the jar half full. Place an aluminum foil seal between the glass and metal cap and screw tight.

6.3 Label jars with the boring number, depth of sample, date of collection and blow counts. In addition, the field personnel will ensure the following: samples are taken at appropriate depths; unrepresentative portions of the sample are discarded properly; that the sampler is decontaminated properly between use; and the driller uses proper methods during sample collection and does not use oil or grease on tools entering the borehole.

6.4 Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, and layering).

6.5 After the sample has been collected, heat the sample under controlled conditions in a water bath for a 2 minute period.

6.6 Ensure that the PID has been calibrated and that the calibration information is documented in the field book. Pierce the aluminum foil seal with the probe from the PID and measure the relative concentration of VOCs in the headspace of the soil sample. The initial (peak) reading must be recorded.

6.7 Record the PID reading in the field notebook, on an appropriate field form, and on the base map, if appropriate.

6.8 Place any material not representative of the interval sampled in a pile with the other cuttings from the borehole.

6.9 If only photoionization results are to be obtained, then reusable sampling devices may be cleaned with a soap and water wash and a potable water rinse. The sampler will then be rinsed with distilled water, assembled and placed on plastic sheeting for reuse. A more rigorous decontamination procedure is required when samples are also being collected for laboratory analysis. Refer to the SOP for collection of soil samples for laboratory analysis for additional information.

END OF PROCEDURE

Date: May 5, 2000

1.0 PURPOSE

The purpose for this standard operating procedure (SOP) is to establish the guidelines for decontamination of all field equipment potentially exposed to contamination during drilling, and soil and water sampling. The objective of decontamination is to ensure that all drilling, and soil-sampling and water-sampling equipment is decontaminated (free of potential contaminants): 1) prior to being brought onsite to avoid the introduction of potential contaminants to the site; 2) between drilling and sampling events/activities onsite to eliminate the potential for cross-contamination between boreholes and/or wells; and 3) prior to the removal of equipment from the site to prevent the transportation of potentially contaminated equipment offsite.

In considering decontamination procedures, state and federal regulatory agency requirements must be considered because of potential variability between state and federal requirements and because of variability in the requirements of individual states. Decontamination procedures must be in compliance with state and/or federal protocols in order that regulatory agency(ies) scrutiny of the procedures and data collected do not result in non acceptance (invalidation) of the work undertaken and data collected.

2.0 PROCEDURE FOR DRILLING EQUIPMENT

The following is a minimum decontamination procedure for drilling equipment. Drilling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

2.1 The rig and all associated equipment should be properly decontaminated by the contractor before arriving at the test site.

2.2 The augers, drilling casings, rods, samplers, tools, rig, and any piece of equipment that can come in contact (directly or indirectly) with the soil, will be steam cleaned onsite prior to set up for drilling to ensure proper decontamination.

2.3 The same steam cleaning procedures will be followed between boreholes (at a fixed on-site location[s], if appropriate) and before leaving the site at the end of the study.

2.4 All on-site steam cleaning (decontamination) activities will be monitored and documented by a member(s) of the staff of Roux Associates, Inc.

2.5 If drilling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat drilling equipment, then special decontamination procedures may have to be utilized before steam cleaning (e.g., hexane scrub and wash).

2.6 Containment of decontamination fluids may be necessary (e.g., rinseate from steam cleaning) or will be required (e.g., hexane), and disposal must be in accordance with state and/or federal procedures.

3.0 PROCEDURE FOR SOIL-SAMPLING EQUIPMENT

The following is a minimum decontamination procedure for soil-sampling equipment (e.g., split spoons, stainless-steel spatulas). Soil-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

3.1 Wear disposable gloves while cleaning equipment to avoid cross-contamination and change gloves as needed.

3.2 Steam clean the sampler or rinse with potable water. If soil-sampling activities are conducted in the presence of thick, sticky oils (e.g., PCBs) which coat sampling equipment, then special decontamination procedures may have to be utilized before steam cleaning and washing in detergent solution (e.g., hexane scrub and wash).

3.3 Prepare a non-phosphate, laboratory-grade detergent solution and distilled or potable water in a clean bucket.

3.4 Disassemble the sampler, as necessary and immerse all parts and other sampling equipment in the solution.

3.5 Scrub all equipment in the bucket with a brush to remove any adhering particles.

3.6 Rinse all equipment with copious amounts of potable water followed by distilled or deionized water.

3.7 Place clean equipment on a clean plastic sheet (e.g., polyethylene)

3.8 Reassemble the cleaned sampler, as necessary.

3.9 Transfer the sampler to the driller (or helper) making sure that this individual is also wearing clean gloves, or wrap the equipment with a suitable material (e.g., plastic bag, aluminum foil.

As part of the decontamination procedure for soil-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

4.0 PROCEDURE FOR WATER-SAMPLING EQUIPMENT

The following is a decontamination procedure for water-sampling equipment (e.g., bailers, pumps). Water-sampling equipment decontamination procedures, especially any variation from the method itemized below, will be documented on an appropriate field form or in the field notebook.

4.1 Decontamination procedures for bailers follow:

   a. Wear disposable gloves while cleaning bailer to avoid cross-contamination and change gloves as needed.

   b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a bucket.

   c. Disassemble bailer (if applicable) and discard cord in an appropriate manner, and scrub each part of the bailer with a brush and solution.

   d. Rinse with potable water and reassemble bailer.

   e. Rinse with copious amounts of distilled or deionized water.

   f. Air dry.

   g. Wrap equipment with a suitable material (e.g., clean plastic bag, aluminum foil).

   h. Rinse bailer at least three times with distilled or deionized water before use.

4.2 Decontamination procedures for pumps follow:

   a. Wear disposable gloves while cleaning pump to avoid cross-contamination and change gloves as needed.

   b. Prepare a non-phosphate, laboratory-grade detergent solution and potable water in a clean bucket, clean garbage can, or clean 55-gallon drum.

   c. Flush the pump and discharge hose (if not disposable) with the detergent solution, and discard disposable tubing and/or cord in an appropriate manner.

   d. Flush the pump and discharge hose (if not disposable) with potable water.

   e. Place the pump on clear plastic sheeting.

   f. Wipe any pump-related equipment (e.g., electrical lines, cables, discharge hose) that entered the well with a clean cloth and detergent solution, and rinse or wipe with a clean cloth and potable water.

   g. Air dry.

   h. Wrap equipment with a suitable material (e.g., clean plastic bag).

As part of the decontamination procedure for water-sampling equipment, state and/or federal protocols must be considered. These may require procedures above those specified as minimum for Roux Associates, Inc., such as the use of nitric acid, acetone, etc. Furthermore, the containment and proper disposal of decontamination fluids must be considered with respect to regulatory agency(ies) requirements.

STANDARD OPERATING PROCEDURE 10.3 FOR SOIL BORING AND/OR MONITORING OR OBSERVATION WELL DRILLING, FORMATION SAMPLING AND BOREHOLE ABANDONMENT IN UNCONSOLIDATED FORMATIONS

Date: May 5, 2000

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the considerations and procedures, and to establish the guidelines for drilling (soil borings, wells, or piezometers) and formation sampling activities in unconsolidated formations. There are several drilling techniques available which include hollow-stem auger, cable tool, hydraulic rotary, cased-hole rotary, and air rotary. Formation (sediment/soil) sample collection include disturbed (drill cuttings), intact (split-spoon), and undisturbed (Shelby-tube or Denison-core). Borehole abandonment (closure) procedures will also be addressed in this SOP.

The objective of drilling is to collect accurate subsurface information and to prepare a borehole for potential completion as a well or piezometer. Consequently, the lithologic data is the all important, most essential information that can be collected. The lithologic data characterizes subsurface conditions, describes hydrogeologic coefficients qualitatively and/or quantitatively, and identifies optimum locations for screen zones if wells are constructed.

Data can be obtained through the physical examination and testing of formation samples, as well as knowledge regarding ground-water levels. Thus, drill fluid mix, fluid loss, rate of drilling, lengths of split-spoon and Shelby-tube/Denison-core recovery, etc. must be monitored by the on-site hydrogeologist or geologist.

2.0 DRILLING TECHNIQUE-SELECTION

Verify that the drilling technique is the one specified in the investigation work plan, and that the drilling equipment mobilized by the driller is in good condition and proper working order. Do not permit the driller to use a drilling rig that appears to be substandard, in disrepair, etc., and/or is questionable as to whether or not the rig has the capabilities to accomplish the goals of the drilling program. The drilling rig must be capable of:

a. Penetration of all anticipated subsurface materials and formations at a desired rate, and construction of a borehole of desired diameter (for the anticipated well, if applicable, including the placement of a gravel or sand pack through a tremie pipe and necessary formation sealing material such as bentonite or cement).

b. Identification of lithology for development of a geologic log of all unconsolidated formations and materials penetrated, including physical characteristics and visual description of color, grain sizes, sorting and mineralogy.

c. Collection of samples of aquifer fluids during the drilling process and prior to well construction, while at the same time minimizing potential for cross-contamination. The method used should prevent cross-contamination between surface soils and ground water or between different hydrogeologic units.

d. Collection of intact and/or undisturbed soil samples from the center line or sidewall of the borehole. This objective requires the drilling to be halted while soil samples are taken from the bottom or side of the incomplete borehole.

e. Completion of the borehole into a well (monitoring or observation) or piezometer during the initial construction process (i.e., constructing a well or piezometer as the borehole is drilled, or constructing a well or piezometer in the borehole immediately after the drilling tools are removed).

f. Implementation of borehole geophysical logging (when applicable and possible) to enable more accurate vertical and horizontal extrapolation of borehole data to the lithology of the hydrogeologic system.

g. Completion of a well or piezometer, if applicable, in the borehole following a time lapse for interpretation of geologic or geophysical data from the borehole.

3.0 DRILLING TECHNIQUE - DESCRIPTION

3.1 Hollow-Stem Auger - This drilling method is rapid and extremely effective in most cohesive sediments but less so in loose sandy material. Penetration may be up to 150 feet below land surface (bls) depending on the size of the rig, drilling conditions, and the diameter of the auger flight; however, depths up to 250 feet bls have been achieved under compatible conditions. A major advantage of this technique is that normally no fluids are introduced into the formation. If the auger flights can be removed and the integrity of the borehole maintained, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If the auger flights must remain in the borehole, then only radiation geophysical logs can be run. Casing, screen, and sampling devices can then be lowered through the hollow stem by removing the removable plug at the bottom of the auger flights, and gravel packing and cementing can be accomplished within the hollow stem. However, this can be difficult especially below the water table. Auger flight outside diameters (OD) range from 5 inches (in.) to 12 in. The diameter of a well that can be constructed inside the hollow stem is limited, however, to about 4 in.

3.2 Cable Tool (Percussion) - This drilling method is slow because the borehole is advanced by lifting and dropping a heavy string of drilling tools. Cuttings accumulate in the drill casing and are removed by a sand bailer. A steel casing is driven in as the hole is deepened. Cable-tool rigs can be used in unconsolidated sediment and bedrock to depths of hundreds or thousands of feet and often employ telescoping techniques for drilling deep boreholes. Electrical geophysical logs cannot be run through the steel cased borehole, but radiation logs (e.g., gamma, neutron, etc.) can be run. Well casing and screen can be installed within the cased hole after which the outer casing is pulled back (removed). Because the boring is cased as it is being drilled, cross-contamination between various depths is practically eliminated. The method provides an excellent means to collect good, representative formation samples.

3.3 Hydraulic Rotary - This drilling method uses a rotating bit to drill (advance) the borehole. Drill cuttings are removed using a recirculating drilling fluid (mud or water). Although setting up the drilling equipment is slow, the drilling process is reasonably fast. In the mud-rotary method, drilling mud forms a cake on the borehole wall which prevents excessive loss of fluid to the formation being drilled. The hydrostatic pressure combined with the weight and density of the mud slurry keeps the hole open. This allows the drill rods to be removed from the borehole and geophysical logs (electric and radiation) to be run in the open borehole.

In reverse hydraulic rotary drilling, the drilling fluid moves downward through annular space and then upward inside the drill pipe. If the drilling fluid does not contain mud, then sufficient water flow is required as make-up water because the borehole wall is not sealed; therefore, significant water loss can occur to the formation being drilled. The borehole is held open by hydrostatic pressure only. A serious obstacle to this drilling method occurs when the static water level is less than 15 feet below land surface because of insufficient hydrostatic head difference between the borehole and the water table. However, the problems of excessive water loss and shallow depths to water may be overcome by using mud as the drilling fluid.

In mud-rotary drilling, the drilling fluid (mud) moves downward through the drill pipe and then upward through the annular space. Therefore, the borehole is held open by hydrostatic pressure and the mud cake lining the wall of the borehole. The mud-rotary method can be used to construct moderate to deep wells in unconsolidated (and consolidated material), while the reverse rotary technique can be used to construct moderate to deep wells in unconsolidated materials. The principal disadvantage may be the difficulty in removing mud cake from the formation at the screened zone. Extensive well development may be required to remove the mud cake.

3.4 Cased-Hole Rotary - Several new rotary drilling techniques have been developed in which a steel casing is advanced with an air-rotary or mud-rotary drill. This technique is highly desirable for use in exploratory drilling at monitoring sites because water and soil samples may be collected under conditions which preclude contamination from shallower depths. Furthermore, this technique is extremely effective in boulder or cavernous zones which would inhibit or preclude drilling using other techniques. Drilling results are comparable to cable-tool drilling but with greatly enhanced speeds. In all the cased-hole techniques, the main benefit is that the only portion of the borehole which is open, is at the bottom of the drill casing; thus, no soil or water from shallower depths can move down and impact the depth drilled and/or sampled. Electrical geophysical logs cannot be run through the steel-cased borehole, however, radiation logs (e.g., gamma, neutron, etc.) can be run.

Presently, there are three cased-hole rotary techniques which include:

a. The drill-thru casing hammer technique in which the casing is advanced by percussion with a casing hammer or vibratory driver similar to the method used in a borehole drilled by the air-rotary method. The casing hammer can also pull out the casing (air drilling only).

b. The Odex™ Drilling System (European system) which “pulls” the casing using a fixture attached to an air-hammer type drill bit (air drilling only).

c. The Barber™ Drilling System in which drilling is done with a top-head drive and a rotary table that spins casing into the ground. Casing can be fitted with a carbide “shoe” to cut boulders and an air hammer can be used above the bit. Air or mud rotary can be used to lift cuttings.

Two potential problems may be encountered using the cased-hole rotary technique which include: 1) “sand heave” when drilling stops (which can be quickly drilled or bailed out) and 2) possible aeration of water in the cased borehole if volatiles are being tested (which can be overcome by pumping or bailing the standing water out before sampling). The minimum drill casing diameter is 6 inches and depth is limited to approximately 450 feet.

3.5 Air Rotary - This drilling method uses a rotating bit to drill, and high-velocity compressed air to remove cuttings from the borehole. A pneumatic down-hole hammer is often used to add percussion to the rotary drilling action. This drilling method is very fast and, although it is most suitable for penetrating hard bedrock, it can be used in unconsolidated formations. The borehole may be cased or uncased depending on geologic conditions. If an open borehole is drilled, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. If a cased borehole is drilled, then only radiation geophysical logs can be run.

Four potential problems may be encountered when using the air-rotary technique:

a. When a prolific aquifer is tapped, the compressed air may not be able to lift the water to the surface.

b. Aeration of water in the borehole (and finished well) immediately prior to sampling can interfere with a number of inorganic and organic water-quality parameters.

c. Low yield water entry zones may not be identified because the air pressure prevents water from entering the borehole. Care should be taken to prevent overdrilling of the borehole.

d. Air rotary drilling can induce the migration of volatile organics to the surface or adjacent structures causing potential aesthetic or health and safety concerns.

If the air-rotary technique is used then the following special procedures will be implemented:

a. The type of air compressor and lubricating oil will be documented on an appropriate field form and in the field notebook and a 1-pint sample of the oil will be retained for characterization in the event organic compounds are detected in a well sample.

b. An air line oil filter will be required and changed per manufacturer's recommendations during operation with documentation of this maintenance on an appropriate field form and in the field notebook. More frequent oil filter changes will be made if oil is visibly detected in the filtered air.

c. The use of any additive will be prohibited, except approved water (e.g., potable water) for dust control and cuttings removal.

4.0 DECONTAMINATION

Drilling equipment decontamination procedures are outlined in the field equipment decontamination SOP. Proper decontamination in accordance with regulatory guidelines must be clearly documented in the field notebook.

5.0 PROCEDURE FOR DRILLING

5.1 Document all drilling-related activities (e.g., starting, stopping, footage, problems, decontamination, etc.) on the daily log form and in the field notebook. Record dates and times of activities, and names of Roux Associates personnel providing oversight.

5.2 Monitor and record drill fluid mix, speed of rotation, pressure on the drill fluid, rate of drilling, and length of drill rods or casing in the borehole.

5.3 Confirm that the drill rods and core barrel are straight, or discontinue drilling.

5.4 Pay particular attention to the advancement of the boring because differences in the rate of drilling may be indicative of differences in subsurface geologic conditions (e.g., sand and gravel versus clay).

5.5 Maintain a continuous dialogue with the driller to track and keep informed of all drilling activities (e.g., the speed of the drill and drilling pressure, difficult and easy drilling conditions, etc.).

5.6 Collect formation samples as described below in Section 6.0. Sample jars must be labeled appropriately (e.g., project number and name, site location, boring number, date, sample interval, blow counts, and initials of Roux Associates personnel collecting sample).

5.7 Record geologic information in the geologic log form and in the field notebook.

5.8 Handle and ship split-spoon sample jars carefully to avoid breakage and handle and ship tubes or cores carefully to prevent disturbance.

6.0 PROCEDURE FOR FORMATION SAMPLING

6.1 Intact formation sampling will be implemented using split-spoon samplers (which are driven), Shelby-tube samplers (which are pushed), or Denison-core samplers (which are rotated) depending on the drilling technique employed. Formation samples will be retained in suitable size (e.g., 1-pint or 0.5-pint) jars for physical descriptions and potential physical and chemical analysis. The appropriately labeled jars and tubes will be stored in a safe place to avoid breakage, agitation, and freezing. Intact formation samples will be collected as described in the work plan at specified intervals (e.g., at 5-foot increments below land surface) and at each major change in subsurface materials. Hydrogeologic information will be recorded on a geologic log form and in the field notebook. Detailed descriptions of the type(s) of intact sample(s) collected, sampling intervals and conditions, and objective(s) of the sample collection will be provided in the work plan.

6.2 Disturbed formation samples (drill cuttings) will be examined continuously throughout the entire depth of the borehole. If applicable to the study and/or stated in the work plan, borehole cuttings will be collected from the circulating auger flights which lift cuttings to land surface (hollow-stem auger technique), from the sand bailer (cable-tool technique), from the recirculating drilling fluid (mudflume) which transports cuttings to land surface (mud-rotary and related techniques), or from the compressed air used to carry cuttings to land surface (air-rotary and related techniques). Formation samples will be retained in appropriate size (e.g., 1-pint or 0.5-pint), properly labeled jars and stored in a safe place to avoid breakage, agitation, and freezing. Hydrogeologic data will be recorded on a geologic log form and in the field notebook.

6.3 The soil cores from the wells drilled at the site are used for lithologic identification. The first 18 inches of soil for each borehole will be collected intact using a split-spoon sample, Shelby-tube sampler, or Denison-core sampler. Split-spoon samples may be collected continuously from boreholes for cluster wells; single well and/or piezometer boreholes may be split-spooned throughout drilling or at specified intervals or changes in lithology. The conditions for sampling will be specified in the work plan.

6.4 Before collecting and retaining soil and/or sediments collected with the split-spoon sampler, the top several inches will be removed from the sampler and discarded to eliminate any sediment that may have caved into the bottom of the borehole.

6.5 Sediment sampling equipment such as split-spoon samplers, spatulas, etc. (but not including Shelby-tube or Denison-core samplers, which area not re-usable) will be decontaminated by steam cleaning and/or a non-phosphate, laboratory-grade and distilled/deionized wash followed by a distilled/deionized water rinse. (Refer to the SOP for Decontamination of Field Equipment for a detailed description of minimum and special decontamination procedures.) Decontamination of sediment sampling equipment will take place prior to the collection of the first sample and following the collection of each subsequent sample.

7.0 BOREHOLE ABANDONMENT OR CLOSURE

7.1 Upon the completion of the investigation, a determination will be made as whether to maintain the borehole (for a well or piezometer) or to close it (i.e., abandon and seal it). If the client and Roux Associates agree to abandon the borehole, then the state will be notified and a request will be presented for borehole abandonment. Upon state approval to seal the borehole, appropriate state borehole abandonment forms will be completed, if required. Following state approval, the abandonment of any borehole (or boring) will be in accordance with local, state and/or Federal regulations.

7.2 For each abandoned borehole, the procedure will be documented on an appropriate field form or in the study notebook. Documentation may include, where appropriate, the following:

a. Borehole designation.

b. Location with respect to the replacement borehole, if replaced (e.g., 30 ft north and 40 ft west of Borehole B-1). A location sketch should be prepared.

c. Open depth prior to grouting and any other relevant circumstances (e.g., formation collapse).

d. Drill casing left in the borehole by depth, size, and composition.

e. A copy of the geologic log.

f. A revised diagram of the abandoned borehole using a supplemental geologic log form.

g. Additional items left in hole by depth, description, and composition (e.g., lost tools, bailers, etc.).

h. A description and daily quantities of grout used to compensate for settlement.

i. The date of grouting.

j. The level of water or mud prior to grouting and the date and time measured.

k. Any other state or local well abandonment reporting requirements.

END OF PROCEDURE

Attachment 2

Chain of Custody Form

ROUX

CHAIN OF CUSTODY

Nº 12006 Y

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

209 SHAFTER STREET
ISLANDIA, NEW YORK 11749-5074
(631) 232-2600 FAX: (631) 232-9898

ANALYSES

PAGE OF

PROJECT NAME

PROJECT NUMBER

PROJECT LOCATION

PROJECT MANAGER

SAMPLER(S)

SAMPLE DESIGNATION / LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX					TOTAL BOTTLES	NOTES

RELINQUISHED BY: (SIGNATURE)	FOR	DATE	TIME	SEAL INTACT Y OR N	RECEIVED BY: (SIGNATURE) FOR	DATE	TIME	SEAL INTACT Y OR N
RELINQUISHED BY: (SIGNATURE)	FOR	DATE	TIME	SEAL INTACT Y OR N	RECEIVED BY: (SIGNATURE) FOR	DATE	TIME	SEAL INTACT Y OR N

DELIVERY METHOD

ANALYTICAL LABORATORY

COMMENTS

Attachment 3

USEPA Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

LOW STRESS (low flow) PURGING AND SAMPLING PROCEDURE FOR THE COLLECTION OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Quality Assurance Unit
U.S. Environmental Protection Agency – Region 1
11 Technology Drive
North Chelmsford, MA 01863

Prepared by: Charles Porfert 1/19/10
(Charles Porfert, Quality Assurance Unit) Date

Approved by: Gerard Sotolongo 1-19-10
(Gerard Sotolongo, Quality Assurance Unit) Date

Revision Page

Date	Rev #	Summary of changes	Sections
7/30/96	2	Finalized	
01/19/10	3	Updated	All sections

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USE OF TERMS

Equipment blank: The equipment blank shall include the pump and the pump's tubing. If tubing is dedicated to the well, the equipment blank needs only to include the pump in subsequent sampling rounds. If the pump and tubing are dedicated to the well, the equipment blank is collected prior to its placement in the well. If the pump and tubing will be used to sample multiple wells, the equipment blank is normally collected after sampling from contaminated wells and not after background wells.

Field duplicates: Field duplicates are collected to determine precision of the sampling procedure. For this procedure, collect duplicate for each analyte group in consecutive order (VOC original, VOC duplicate, SVOC original, SVOC duplicate, etc.).

Indicator field parameters: This SOP uses field measurements of turbidity, dissolved oxygen, specific conductance, temperature, pH, and oxidation/reduction potential (ORP) as indicators of when purging operations are sufficient and sample collection may begin.

Matrix Spike/Matrix Spike Duplicates: Used by the laboratory in its quality assurance program. Consult the laboratory for the sample volume to be collected.

Poteniometric Surface: The level to which water rises in a tightly cased well constructed in a confined aquifer. In an unconfined aquifer, the potentiometric surface is the water table.

QAPP: Quality Assurance Project Plan

SAP: Sampling and Analysis Plan

SOP: Standard operating procedure

Stabilization: A condition that is achieved when all indicator field parameter measurements are sufficiently stable (as described in the "Monitoring Indicator Field Parameters" section) to allow sample collection to begin.

Temperature blank: A temperature blank is added to each sample cooler. The blank is measured upon receipt at the laboratory to assess whether the samples were properly cooled during transit.

Trip blank (VOCs): Trip blank is a sample of analyte-free water taken to the sampling site and returned to the laboratory. The trip blanks (one pair) are added to each sample cooler that contains VOC samples.

SCOPE & APPLICATION

The goal of this groundwater sampling procedure is to collect water samples that reflect the total mobile organic and inorganic loads (dissolved and colloidal sized fractions) transported through the subsurface under ambient flow conditions, with minimal physical and chemical alterations from sampling operations. This standard operating procedure (SOP) for collecting groundwater samples will help ensure that the project's data quality objectives (DQOs) are met under certain low-flow conditions.

The SOP emphasizes the need to minimize hydraulic stress at the well-aquifer interface by maintaining low water-level drawdowns, and by using low pumping rates during purging and sampling operations. Indicator field parameters (e.g., dissolved oxygen, pH, etc.) are monitored during purging in order to determine when sample collection may begin. Samples properly collected using this SOP are suitable for analysis of groundwater contaminants (volatile and semi-volatile organic analytes, dissolved gases, pesticides, PCBs, metals and other inorganics), or naturally occurring analytes. This SOP is based on Puls, and Barcelona (1996).

This procedure is designed for monitoring wells with an inside diameter (1.5-inches or greater) that can accommodate a positive lift pump with a screen length or open interval ten feet or less and with a water level above the top of the screen or open interval (Hereafter, the "screen or open interval" will be referred to only as "screen interval"). This SOP is not applicable to other well-sampling conditions.

While the use of dedicated sampling equipment is not mandatory, dedicated pumps and tubing can reduce sampling costs significantly by streamlining sampling activities and thereby reducing the overall field costs.

The goal of this procedure is to emphasize the need for consistency in deploying and operating equipment while purging and sampling monitoring wells during each sampling event. This will help to minimize sampling variability.

This procedure describes a general framework for groundwater sampling. Other site specific information (hydrogeological context, conceptual site model (CSM), DQOs, etc.) coupled with systematic planning must be added to the procedure in order to develop an appropriate site specific SAP/QAPP. In addition, the site specific SAP/QAPP must identify the specific equipment that will be used to collect the groundwater samples.

This procedure does not address the collection of water or free product samples from wells containing free phase LNAPLs and/or DNAPLs (light or dense non-aqueous phase liquids). For this type of situation, the reader may wish to check: Cohen, and Mercer (1993) or other pertinent documents.

This SOP is to be used when collecting groundwater samples from monitoring wells at all Superfund, Federal Facility and RCRA sites in Region 1 under the conditions described herein. Request for modification of this SOP, in order to better address specific situations at individual wells, must include adequate technical justification for proposed changes. <u>All changes and modifications must be approved and included in a revised SAP/QAPP before implementation in field.</u>

BACKGROUND FOR IMPLEMENTATION

It is expected that the monitoring well screen has been properly located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant migration. Problems with inappropriate monitoring well placement or faulty/improper well installation cannot be overcome by even the best water sampling procedures. This SOP presumes that the analytes of interest are moving (or will potentially move) primarily through the more permeable zones intercepted by the screen interval.

Proper well construction, development, and operation and maintenance cannot be overemphasized. The use of installation techniques that are appropriate to the hydrogeologic setting of the site often prevent "problem well" situations from occurring. During well development, or redevelopment, tests should be conducted to determine the hydraulic characteristics of the monitoring well. The data can then be used to set the purging/sampling rate, and provide a baseline for evaluating changes in well performance and the potential need for well rehabilitation. Note: if this installation data or well history (construction and sampling) is not available or discoverable, for all wells to be sampled, efforts to build a sampling history should commence with the next sampling event.

The pump intake should be located within the screen interval and at a depth that will remain under water at all times. It is recommended that the intake depth and pumping rate remain the same for all sampling events. The mid-point or the lowest historical midpoint of the saturated screen length is often used as the location of the pump intake. For new wells, or for wells without pump intake depth information, the site's SAP/QAPP must provide clear reasons and instructions on how the pump intake depth(s) will be selected, and reason(s) for the depth(s) selected. If the depths to top and bottom of the well screen are not known, the SAP/QAPP will need to describe how the sampling depth will be determined and how the data can be used.

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection may still take place provided the indicator field parameter criteria in this procedure are met. If after 2 hours of purging indicator field parameters have not stabilized, one of three optional courses of action may be taken: a) continue purging until stabilization is achieved, b) discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization), c) discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may reflect a sampling bias and therefore, the data may not meet the data quality objectives of the sampling event).

It is recommended that low-flow sampling be conducted when the air temperature is above 32°F (0°C). If the procedure is used below 32°F, special precautions will need to be taken to prevent the groundwater from freezing in the equipment. Because sampling during freezing temperatures may adversely impact the data quality objectives, the need for water sample collection during months when these conditions are likely to occur should be evaluated during site planning and special sampling measures may need to be developed. Ice formation in the flow-through-cell will cause the monitoring probes to act erratically. A transparent flow-through-cell needs to be used to observe if ice is forming in the cell. If ice starts to form on the other pieces of the sampling equipment, additional problems may occur.

HEALTH & SAFETY

When working on-site, comply with all applicable OSHA requirements and the site's health/safety procedures. All proper personal protection clothing and equipment are to be worn. Some samples may contain biological and chemical hazards. These samples should be handled with suitable protection to skin, eyes, etc.

CAUTIONS

The following cautions need to be considered when planning to collect groundwater samples when the below conditions occur.

If the groundwater degasses during purging of the monitoring well, dissolved gases and VOCs will be lost. When this happens, the groundwater data for dissolved gases (e.g., methane, ethene, ethane, dissolved oxygen, etc.) and VOCs will need to be qualified. Some conditions that can promote degassing are the use of a vacuum pump (e.g., peristaltic pumps), changes in aperture along the sampling tubing, and squeezing/pinching the pump's tubing which results in a pressure change.

When collecting the samples for dissolved gases and VOCs analyses, avoid aerating the groundwater in the pump's tubing. This can cause loss of the dissolved gases and VOCs in the groundwater. Having the pump's tubing completely filled prior to sampling will avoid this problem when using a centrifugal pump or peristaltic pump.

Direct sun light and hot ambient air temperatures may cause the groundwater in the tubing and flow-through-cell to heat up. This may cause the groundwater to degas which will result in loss of VOCs and dissolved gases. When sampling under these conditions, the sampler will need to shade the equipment from the sunlight (e.g., umbrella, tent, etc.). If possible, sampling on hot days, or during the hottest time of the day, should be avoided. The tubing exiting the monitoring well should be kept as short as possible to avoid the sun light or ambient air from heating up the groundwater.

Thermal currents in the monitoring well may cause vertical mixing of water in the well bore. When the air temperature is colder than the groundwater temperature, it can cool the top of the water column. Colder water which is denser than warm water sinks to the bottom of the well and the warmer water at the bottom of the well rises, setting up a convention cell. "During low-flow sampling, the pumped water may be a mixture of convecting water from within the well casing and aquifer water moving inward through the screen. This mixing of water during low-flow sampling can substantially increase equilibration times, can cause false stabilization of indicator parameters, can give false indication of redox state, and can provide biological data that are not representative of the aquifer conditions" (Vroblesky 2007).

Failure to calibrate or perform proper maintenance on the sampling equipment and measurement instruments (e.g., dissolved oxygen meter, etc.) can result in faulty data being collected.

Interferences may result from using contaminated equipment, cleaning materials, sample containers, or uncontrolled ambient/surrounding air conditions (e.g., truck/vehicle exhaust nearby).

Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment and/or proper planning to avoid ambient air interferences. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

Clean and decontaminate all sampling equipment prior to use. All sampling equipment needs to be routinely checked to be free from contaminants and equipment blanks collected to ensure that the equipment is free of contaminants. Check the previous equipment blank data for the site (if they exist) to determine if the previous cleaning procedure removed the contaminants. If contaminants were detected and they are a concern, then a more vigorous cleaning procedure will be needed.

PERSONNEL QUALIFICATIONS

All field samplers working at sites containing hazardous waste must meet the requirements of the OSHA regulations. OSHA regulations may require the sampler to take the 40 hour OSHA health and safety training course and a refresher course prior to engaging in any field activities, depending upon the site and field conditions.

The field samplers must be trained prior to the use of the sampling equipment, field instruments, and procedures. Training is to be conducted by an experienced sampler before initiating any sampling procedure.

The entire sampling team needs to read, and be familiar with, the site Health and Safety Plan, all relevant SOPs, and SAP/QAPP (and the most recent amendments) before going onsite for the sampling event. It is recommended that the field sampling leader attest to the understanding of these site documents and that it is recorded.

EQUIPMENT AND SUPPLIES

A. Informational materials for sampling event

A copy of the current Health and Safety Plan, SAP/QAPP, monitoring well construction data, location map(s), field data from last sampling event, manuals for sampling, and the monitoring instruments' operation, maintenance, and calibration manuals should be brought to the site.

B. Well keys.

C. Extraction device

Adjustable rate, submersible pumps (e.g., centrifugal, bladder, etc.) which are constructed of stainless steel or Teflon are preferred. Note: if extraction devices constructed of other materials are to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

If bladder pumps are selected for the collection of VOCs and dissolved gases, the pump setting should be set so that one pulse will deliver a water volume that is sufficient to fill a 40 mL VOC vial. This is not mandatory, but is considered a "best practice". For the proper operation, the bladder pump will need a minimum amount of water above the pump; consult the manufacturer for the recommended submergence. The pump's recommended submergence value should be determined during the planning stage, since it may influence well construction and placement of dedicated pumps where water-level fluctuations are significant.

Adjustable rate, peristaltic pumps (suction) are to be used with caution when collecting samples for VOCs and dissolved gases (e.g., methane, carbon dioxide, etc.) analyses. Additional information on the use of peristaltic pumps can be found in Appendix A. If peristaltic pumps are used, the inside diameter of the rotor head tubing needs to match the inside diameter of the tubing installed in the monitoring well.

Inertial pumping devices (motor driven or manual) are not recommended. These devices frequently cause greater disturbance during purging and sampling, and are less easily controlled than submersible pumps (potentially increasing turbidity and sampling variability, etc.). This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.

D. Tubing

Teflon or Teflon-lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics. Note: if tubing constructed of other materials is to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

PVC, polypropylene or polyethylene tubing may be used when collecting samples for metal and other inorganics analyses.

The use of 1/4 inch or 3/8 inch (inside diameter) tubing is recommended. This will help ensure that the tubing remains liquid filled when operating at very low pumping rates when using centrifugal and peristaltic pumps.

Silastic tubing should be used for the section around the rotor head of a peristaltic pump. It should be less than a foot in length. The inside diameter of the tubing used at the pump rotor head must be the same as the inside diameter of tubing placed in the well. A tubing connector is used to connect the pump rotor head tubing to the well tubing. Alternatively, the two pieces of tubing can be connected to each other by placing the one end of the tubing inside the end of the other tubing. The tubing must not be reused.

E. The water level measuring device

Electronic "tape", pressure transducer, water level sounder/level indicator, etc. should be capable of measuring to 0.01 foot accuracy. Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level "tape" at the start and end of each sampling event.

F. Flow measurement supplies

Graduated cylinder (size according to flow rate) and stopwatch usually will suffice.

Large graduated bucket used to record total water purged from the well.

G. Interface probe

To be used to check on the presence of free phase liquids (LNAPL, or DNAPL) before purging begins (as needed).

H. Power source (generator, nitrogen tank, battery, etc.)

When a gasoline generator is used, locate it downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate samples.

I. Indicator field parameter monitoring instruments

Use of a multi-parameter instrument capable of measuring pH, oxidation/reduction potential (ORP), dissolved oxygen (DO), specific conductance, temperature, and coupled with a flow-through-cell is required when measuring all indicator field parameters, except turbidity. Turbidity is collected using a separate instrument. Record equipment/instrument identification (manufacturer, and model number).

Transparent, small volume flow-through-cells (e.g., 250 mLs or less) are preferred. This allows observation of air bubbles and sediment buildup in the cell, which can interfere with the operation of the monitoring instrument probes, to be easily detected. A small volume cell facilitates rapid turnover of water in the cell between measurements of the indicator field parameters.

It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-through-cell.

Turbidity samples are collected before the flow-through-cell. A "T" connector coupled with a valve is connected between the pump's tubing and flow-through-cell. When a turbidity measurement is required, the valve is opened to allow the groundwater to flow into a container. The valve is closed and the container sample is then placed in the turbidimeter.

Standards are necessary to perform field calibration of instruments. A minimum of two standards are needed to bracket the instrument measurement range for all parameters except ORP which use a Zobell solution as a standard. For dissolved oxygen, a wet sponge used for the 100% saturation and a zero dissolved oxygen solution are used for the calibration.

Barometer (used in the calibration of the Dissolved Oxygen probe) and the conversion formula to convert the barometric pressure into the units of measure used by the Dissolved Oxygen meter are needed.

J. Decontamination supplies

Includes (for example) non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.

K. Record keeping supplies

Logbook(s), well purging forms, chain-of-custody forms, field instrument calibration forms, etc.

L. Sample bottles

M. Sample preservation supplies (as required by the analytical methods)

N. Sample tags or labels

O. PID or FID instrument

If appropriate, to detect VOCs for health and safety purposes, and provide qualitative field evaluations.

P. Miscellaneous Equipment

Equipment to keep the sampling apparatus shaded in the summer (e.g., umbrella) and from freezing in the winter. If the pump's tubing is allowed to heat up in the warm weather, the cold groundwater may degas as it is warmed in the tubing.

EQUIPMENT/INSTRUMENT CALIBRATION

Prior to the sampling event, perform maintenance checks on the equipment and instruments according to the manufacturer's manual and/or applicable SOP. This will ensure that the equipment/instruments are working properly before they are used in the field.

Prior to sampling, the monitoring instruments must be calibrated and the calibration documented. The instruments are calibrated using U.S Environmental Protection Agency Region 1 *Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity),* January 19, 2010, or latest version or from one of the methods listed in 40CFR136, 40CFR141 and SW-846.

The instruments shall be calibrated at the beginning of each day. If the field measurement falls outside the calibration range, the instrument must be re-calibrated so that all measurements fall within the calibration range. At the end of each day, a calibration check is performed to verify that instruments remained in calibration throughout the day. This check is performed while the instrument is in measurement mode, not calibration mode. If the field instruments are being used to monitor the natural attenuation parameters, then a calibration check at mid-day is highly recommended to ensure that the instruments did not drift out of calibration. Note: during the day if the instrument reads zero or a negative number for dissolved oxygen, pH, specific conductance, or turbidity (negative value only), this indicates that the instrument drifted out of calibration or the instrument is malfunctioning. If this situation occurs the data from this instrument will need to be qualified or rejected.

PRELIMINARY SITE ACTIVITIES (as applicable)

Check the well for security (damage, evidence of tampering, missing lock, etc.) and record pertinent observations (include photograph as warranted).

If needed lay out sheet of clean polyethylene for monitoring and sampling equipment, unless equipment is elevated above the ground (e.g., on a table, etc.).

Remove well cap and if appropriate measure VOCs at the rim of the well with a PID or FID instrument and record reading in field logbook or on the well purge form.

If the well casing does not have an established reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the logbook (consider a photographic record as well). All water level measurements must be recorded relative to this reference point (and the altitude of this point should be determined using techniques that are appropriate to site's DQOs.

If water-table or potentiometric surface map(s) are to be constructed for the sampling event, perform synoptic water level measurement round (in the shortest possible time) before any purging and sampling activities begin. If possible, measure water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) the day before sampling begins, in order to allow for re-settlement of any particulates in the water column. This is especially important for those wells that have not been recently sampled because sediment buildup in the well may require the well to be redeveloped. If measurement of total well depth is not made the day before, it should be measured after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.

Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe may not be necessary unless analytical data or field analysis signal a worsening situation. This SOP cannot be used in the presence of LNAPLs or DNAPLs. If NAPLs are present, the project team must decide upon an alternate sampling method. All project modifications must be approved and documented prior to implementation.

If available check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). If changes are made in the intake depth or extraction rate(s) used during previous sampling event(s), for either portable or dedicated extraction devices, record new values, and explain reasons for the changes in the field logbook.

PURGING AND SAMPLING PROCEDURE

Purging and sampling wells in order of increasing chemical concentrations (known or anticipated) are preferred.

The use of dedicated pumps is recommended to minimize artificial mobilization and entrainment of particulates each time the well is sampled. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.

A. Initial Water Level

Measure the water level in the well before installing the pump if a non-dedicated pump is being used. The initial water level is recorded on the purge form or in the field logbook.

B. Install Pump

Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the appropriate depth (may not be the mid-point of the screen/open interval). The Sampling and Analysis Plan/Quality Assurance Project Plan should specify the sampling depth (used previously), or provide criteria for selection of intake depth for each new well. If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.

Pump tubing lengths, above the top of well casing should be kept as short as possible to minimize heating the groundwater in the tubing by exposure to sun light and ambient air temperatures. Heating may cause the groundwater to degas, which is unacceptable for the collection of samples for VOC and dissolved gases analyses.

C. Measure Water Level

Before starting pump, measure water level. Install recording pressure transducer, if used to track drawdowns, to initialize starting condition.

D. Purge Well

From the time the pump starts purging and until the time the samples are collected, the purged water is discharged into a graduated bucket to determine the total volume of groundwater purged. This information is recorded on the purge form or in the field logbook.

Start the pump at low speed and slowly increase the speed until discharge occurs. Check water level. Check equipment for water leaks and if present fix or replace the affected equipment. Try to match pumping rate used during previous sampling event(s). Otherwise, adjust pump speed until there is little or no water level drawdown. If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging.

Monitor and record the water level and pumping rate every five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Adjustments are best made in the first fifteen minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" somewhat as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. If the initial water level is above the top of the screen do not allow the water level to fall into the well screen. The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected.

Avoid the use of constriction devices on the tubing to decrease the flow rate because the constrictor will cause a pressure difference in the water column. This will cause the groundwater to degas and result in a loss of VOCs and dissolved gasses in the groundwater samples.

Note: the flow rate used to achieve a stable pumping level should remain constant while monitoring the indicator parameters for stabilization and while collecting the samples.

Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (e.g., bladder, peristaltic), and/or the use of dedicated equipment. For new monitoring wells, or wells where the following situation has not occurred before, if the recovery rate to the well is less than 50 mL/min., or the well is being essentially dewatered during purging, the well should be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. The project manager or field team leader will need to make the decision when samples should be collected, how the sample is to be collected, and the reasons recorded on the purge form or in the field logbook. A water level measurement needs to be performed and recorded before samples are collected. If the project manager decides to collect the samples using the pump, it is best during this recovery period that the pump intake tubing not be removed, since this will aggravate any turbidity problems. Samples in this specific situation may be collected without stabilization of indicator field parameters. Note that field conditions and efforts to overcome problematic situations must be recorded in order to support field decisions to deviate from normal procedures described in this SOP. If this type of problematic situation persists in a well, then water sample collection should be changed to a passive or no-purge method, if consistent with the site's DQOs, or have a new well installed.

E. Monitor Indicator Field Parameters

After the water level has stabilized, connect the "T" connector with a valve and the flow-through-cell to monitor the indicator field parameters. If excessive turbidity is anticipated or encountered with the pump startup, the well may be purged for a while without connecting up the flow-through-cell, in order to minimize particulate buildup in the cell (This is a judgment call made by the sampler). Water level drawdown measurements should be made as usual. If possible, the pump may be installed the day before purging to allow particulates that were disturbed during pump insertion to settle.

During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, ORP, DO) at a frequency of five minute intervals or greater. The pump's flow rate must be able to "turn over" at least one flow-through-cell volume between measurements (for a 250 mL flow-through-cell with a flow rate of 50 mLs/min., the monitoring frequency would be every five minutes; for a 500 mL flow-through-cell it would be every ten minutes). If the cell volume cannot be replaced in the five minute interval, then the time between measurements must be increased accordingly. Note: during the early phase of purging emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments followed by stabilization of indicator parameters. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings are within the following limits:

Turbidity (10% for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),
Dissolved Oxygen (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),
Specific Conductance (3%),
Temperature (3%),
pH (± 0.1 unit),
Oxidation/Reduction Potential (±10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Samples for turbidity measurements are obtained before water enters the flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. Record start and stop times and give a brief description of cleaning activities.

The flow-through-cell must be designed in a way that prevents gas bubble entrapment in the cell. Placing the flow-through-cell at a 45 degree angle with the port facing upward can help remove bubbles from the flow-through-cell (see Appendix B Low-Flow Setup Diagram). All during the measurement process, the flow-through-cell must remain free of any gas bubbles. Otherwise, the monitoring probes may act erratically. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must remain submerged in water at all times.

F. Collect Water Samples

When samples are collected for laboratory analyses, the pump's tubing is disconnected from the "T" connector with a valve and the flow-through-cell. The samples are collected directly from the pump's tubing. Samples must not be collected from the flow-through-cell or from the "T" connector with a valve.

VOC samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

If the pump's flow rate is too high to collect the VOC/dissolved gases samples, collect the other samples first. Lower the pump's flow rate to a reasonable rate and collect the VOC/dissolved gases samples and record the new flow rate.

During purging and sampling, the centrifugal/peristaltic pump tubing must remain filled with water to avoid aeration of the groundwater. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help insure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use the following procedure to collect samples: collect non-VOC/dissolved gases samples first, then increase flow rate slightly until the water completely fills the tubing, collect the VOC/dissolved gases samples, and record new drawdown depth and flow rate.

For bladder pumps that will be used to collect VOC or dissolved gas samples, it is recommended that the pump be set to deliver long pulses of water so that one pulse will fill a 40 mL VOC vial.

Use pre-preserved sample containers or add preservative, as required by analytical methods, to the samples immediately after they are collected. Check the analytical methods (e.g. EPA SW-846, 40 CFR 136, water supply, etc.) for additional information on preservation.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter (transparent housing preferred) is required, and the filter size (0.45 μm is commonly used) should be based on the sampling objective. Pre-rinse the filter with groundwater prior to sample collection. Make sure the filter is free of air bubbles before samples are collected. Preserve the filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in groundwater for human health or ecological risk calculations.

Label each sample as collected. Samples requiring cooling will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

G. Post Sampling Activities

If a recording pressure transducer is used to track drawdown, re-measure water level with tape.

After collection of samples, the pump tubing may be dedicated to the well for re-sampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth annually is usually sufficient after the initial low stress sampling event. However, a greater frequency may be needed if the well has a "silting" problem or if confirmation of well identity is needed.

Secure the well.

DECONTAMINATION

Decontaminate sampling equipment prior to use in the first well and then following sampling of each well. Pumps should not be removed between purging and sampling operations. The pump, tubing, support cable and electrical wires which were in contact with the well should be decontaminated by one of the procedures listed below.

The use of dedicated pumps and tubing will reduce the amount of time spent on decontamination of the equipment. If dedicated pumps and tubing are used, only the initial sampling event will require decontamination of the pump and tubing.

Note if the previous equipment blank data showed that contaminant(s) were present after using the below procedure or the one described in the SAP/QAPP, a more vigorous procedure may be needed.

Procedure 1

Decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump and tubing. The pump may be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.

Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.

Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.

Optional - flush with isopropyl alcohol (pesticide grade; must be free of ketones {e.g., acetone}) or with methanol. This step may be required if the well is highly contaminated or if the equipment blank data from the previous sampling event show that the level of contaminants is significant.

Flush with distilled/deionized water. This step must remove all traces of alcohol (if used) from the equipment. The final water rinse must not be recycled.

Procedure 2

Steam clean the outside of the submersible pump.

Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.

Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.

Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.

Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

FIELD QUALITY CONTROL

Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the groundwater samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. Quality control samples include field duplicates, equipment blanks, matrix spike/matrix spike duplicates, trip blanks (VOCs), and temperature blanks.

FIELD LOGBOOK

A field log shall be kept to document all groundwater field monitoring activities (see Appendix C, example table), and record the following for each well:

Site name, municipality, state.

Well identifier, latitude-longitude or state grid coordinates.

Measuring point description (e.g., north side of PVC pipe).

Well depth, and measurement technique.

Well screen length.

Pump depth.

Static water level depth, date, time and measurement technique.

Presence and thickness of immiscible liquid (NAPL) layers and detection method.

Pumping rate, drawdown, indicator parameters values, calculated or measured total volume pumped, and clock time of each set of measurements.

Type of tubing used and its length.

Type of pump used.

Clock time of start and end of purging and sampling activity.

Types of sample bottles used and sample identification numbers.

Preservatives used.

Parameters requested for analyses.

Field observations during sampling event.

Name of sample collector(s).

Weather conditions, including approximate ambient air temperature.

QA/QC data for field instruments.

Any problems encountered should be highlighted.

Description of all sampling/monitoring equipment used, including trade names, model number, instrument identification number, diameters, material composition, etc.

DATA REPORT

Data reports are to include laboratory analytical results, QA/QC information, field indicator parameters measured during purging, field instrument calibration information, and whatever other field logbook information is needed to allow for a full evaluation of data usability.

Note: the use of trade, product, or firm names in this sampling procedure is for descriptive purposes only and does not constitute endorsement by the U.S. EPA.

REFERENCES

Cohen, R.M. and J.W. Mercer, 1993, *DNAPL Site Evaluation*; C.K. Smoley (CRC Press), Boca Raton, Florida.

Robert W. Puls and Michael J. Barcelona, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, April 1996 (EPA/540/S-95/504).

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Vroblesky, Don A., Clifton C. Casey, and Mark A. Lowery, Summer 2007, Influence of Dissolved Oxygen Convection on Well Sampling, *Ground Water Monitoring & Remediation* 27, no. 3: 49-58.

APPENDIX A
PERISTALTIC PUMPS

Before selecting a peristaltic pump to collect groundwater samples for VOCs and/or dissolved gases (e.g., methane, carbon dioxide, etc.) consideration should be given to the following:

- The decision of whether or not to use a peristaltic pump is dependent on the intended use of the data.
- If the additional sampling error that may be introduced by this device is NOT of concern for the VOC/dissolved gases data's intended use, then this device may be acceptable.
- If minor differences in the groundwater concentrations could effect the decision, such as to continue or terminate groundwater cleanup or whether the cleanup goals have been reached, then this device should NOT be used for VOC/dissolved gases sampling. In these cases, centrifugal or bladder pumps are a better choice for more accurate results.

EPA and USGS have documented their concerns with the use of the peristaltic pumps to collect water sample in the below documents.

- "Suction Pumps are not recommended because they may cause degassing, pH modification, and loss of volatile compounds" *A Compendium of Superfund Field Operations Methods*, EPA/540/P-87/001, December 1987.
- "The agency does not recommend the use of peristaltic pumps to sample ground water particularly for volatile organic analytes" *RCRA Ground-Water Monitoring Draft Technical Guidance*, EPA Office of Solid Waste, November 1992.
- "The peristaltic pump is limited to shallow applications and can cause degassing resulting in alteration of pH, alkalinity, and volatiles loss", *Low-flow (Minimal drawdown) Ground-Water Sampling Procedures*, by Robert Puls & Michael Barcelona, April 1996, EPA/540/S-95/504.
- "Suction-lift pumps, such as peristaltic pumps, can operate at a very low pumping rate; however, using negative pressure to lift the sample can result in the loss of volatile analytes", USGS Book 9 Techniques of Water-Resources Investigation, Chapter A4. (Version 2.0, 9/2006).

APPENDIX B

SUMMARY OF SAMPLING INSTRUCTIONS

These instructions are for using an adjustable rate, submersible pump or a peristaltic pump with the pump's intake placed at the midpoint of a 10 foot or less well screen or an open interval. The water level in the monitoring well is above the top of the well screen or open interval, the ambient temperature is above 32°F, and the equipment is not dedicated. Field instruments are already calibrated. The equipment is setup according to the diagram at the end of these instructions.

1. Review well installation information. Record well depth, length of screen or open interval, and depth to top of the well screen. Determine the pump's intake depth (e.g., mid-point of screen/open interval).

2. On the day of sampling, check security of the well casing, perform any safety checks needed for the site, lay out a sheet of polyethylene around the well (if necessary), and setup the equipment. If necessary a canopy or an equivalent item can be setup to shade the pump's tubing and flow-through-cell from the sun light to prevent the sun light from heating the groundwater.

3. Check well casing for a reference mark. If missing, make a reference mark. Measure the water level (initial) to 0.01 ft. and record this information.

4. Install the pump's intake to the appropriate depth (e.g., midpoint) of the well screen or open interval. Do not turn-on the pump at this time.

5. Measure water level and record this information.

6. Turn-on the pump and discharge the groundwater into a graduated waste bucket. Slowly increase the flow rate until the water level starts to drop. Reduce the flow rate slightly so the water level stabilizes. Record the pump's settings. Calculate the flow rate using a graduated container and a stop watch. Record the flow rate. Do not let the water level drop below the top of the well screen.

If the groundwater is highly turbid or colored, continue to discharge the water into the bucket until the water clears (visual observation); this usually takes a few minutes. The turbid or colored water is usually from the well being disturbed during the pump installation. If the water does not clear, then you need to make a choice whether to continue purging the well (hoping that it will clear after a reasonable time) or continue to the next step. Note, it is sometimes helpful to install the pump the day before the sampling event so that the disturbed materials in the well can settle out.

If the water level drops to the top of the well screen during the purging of the well, stop purging the well, and do the following:

> Wait for the well to recharge to a sufficient volume so samples can be collected. This may take awhile (pump maybe removed from well, if turbidity is not a problem). The project manager will need to make the decision when samples should be collected and the reasons recorded in the site's log book. A water level measurement needs to be performed and recorded before samples are collected. When samples are being collected, the water level must not drop below the top of the screen or open interval. Collect the samples from the pump's tubing. Always collect the VOCs and dissolved gases samples first. Normally, the samples requiring a small volume are collected before the large volume samples are collected just in case there is not sufficient water in the well to fill all the sample containers. All samples must be collected, preserved, and stored according to the analytical method. Remove the pump from the well and decontaminate the sampling equipment.

If the water level has dropped 0.3 feet or less from the initial water level (water level measure before the pump was installed); proceed to Step 7. If the water level has dropped more than 0.3 feet, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are be collected.

7. Attach the pump's tubing to the "T" connector with a valve (or a three-way stop cock). The pump's tubing from the well casing to the "T" connector must be as short as possible to prevent the groundwater in the tubing from heating up from the sun light or from the ambient air. Attach a short piece of tubing to the other end of the end of the "T" connector to serve as a sampling port for the turbidity samples. Attach the remaining end of the "T" connector to a short piece of tubing and connect the tubing to the flow-through-cell bottom port. To the top port, attach a small piece of tubing to direct the water into a calibrated waste bucket. Fill the cell with the groundwater and remove all gas bubbles from the cell. Position the flow-through-cell in such a way that if gas bubbles enter the cell they can easily exit the cell. If the ports are on the same side of the cell and the cell is cylindrical shape, the cell can be placed at a 45-degree angle with the ports facing upwards; this position should keep any gas bubbles entering the cell away from the monitoring probes and allow the gas bubbles to exit the cell easily (see Low-Flow Setup Diagram). Note,

make sure there are no gas bubbles caught in the probes' protective guard; you may need to shake the cell to remove these bubbles.

8. Turn-on the monitoring probes and turbidity meter.

9. Record the temperature, pH, dissolved oxygen, specific conductance, and oxidation/reduction potential measurements. Open the valve on the "T" connector to collect a sample for the turbidity measurement, close the valve, do the measurement, and record this measurement. Calculate the pump's flow rate from the water exiting the flow-through-cell using a graduated container and a stop watch, and record the measurement. Measure and record the water level. Check flow-through-cell for gas bubbles and sediment; if present, remove them.

10. Repeat Step 9 every 5 minutes or as appropriate until monitoring parameters stabilized. Note at least one flow-through-cell volume must be exchanged between readings. If not, the time interval between readings will need to be increased. Stabilization is achieved when three consecutive measurements are within the following limits:

> **Turbidity** (10% for values greater than 5 NTUs; if three Turbidity values are less than 5 NTUs, consider the values as stabilized),
> **Dissolved Oxygen** (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),
> **Specific Conductance** (3%),
> **Temperature** (3%),
> **pH** (± 0.1 unit),
> **Oxidation/Reduction Potential** (±10 millivolts).

If these stabilization requirements do not stabilize in a reasonable time, the probes may have been coated from the materials in the groundwater, from a buildup of sediment in the flow-through-cell, or a gas bubble is lodged in the probe. The cell and the probes will need to be cleaned. Turn-off the probes (not the pump), disconnect the cell from the "T" connector and continue to purge the well. Disassemble the cell, remove the sediment, and clean the probes according to the manufacturer's instructions. Reassemble the cell and connect the cell to the "T" connector. Remove all gas bubbles from the cell, turn-on the probes, and continue the measurements. Record that the time the cell was cleaned.

11. When it is time to collect the groundwater samples, turn-off the monitoring probes, and disconnect the pump's tubing from the "T" connector. If you are using a centrifugal or peristaltic pump check the pump's tubing to determine if the tubing is completely filled with water (no air space).

All samples must be collected and preserved according to the analytical method. VOCs and dissolved gases samples are normally collected first and directly into pre-preserved sample containers. However, this may not be the case for all sampling locations; the SAP/QAPP should list the order in which the samples are to be collected based on the project's objective(s). Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

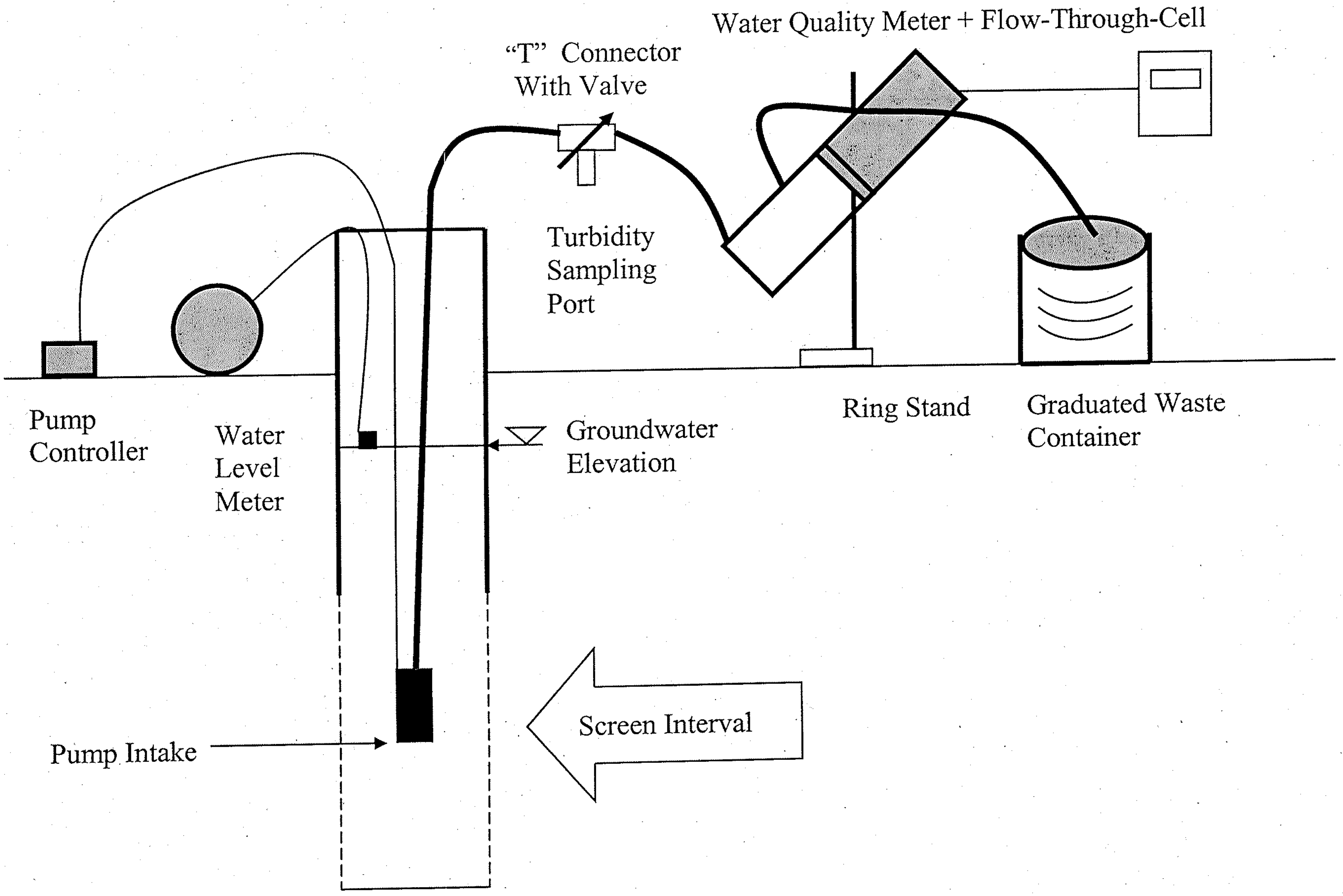
If the pump's tubing is not completely filled with water and the samples are being collected for VOCs and/or dissolved gases analyses using a centrifugal or peristaltic pump, do the following:

> All samples must be collected and preserved according to the analytical method. The VOCs and the dissolved gases (e.g., methane, ethane, ethene, and carbon dioxide) samples are collected last. When it becomes time to collect these samples increase the pump's flow rate until the tubing is completely filled. Collect the samples and record the new flow rate.

12. Store the samples according to the analytical method.

13. Record the total purged volume (graduated waste bucket). Remove the pump from the well and decontaminate the sampling equipment.

Low-Flow Setup Diagram



APPENDIX C
EXAMPLE (Minimum Requirements)
WELL PURGING-FIELD WATER QUALITY MEASUREMENTS FORM

Location (Site/Facility Name)____________________
Well Number____________ Date____________
Field Personnel____________________
Sampling Organization____________________
Identify MP____________________

Depth to _______/_______ of screen
(below MP) top bottom
Pump Intake at (ft. below MP)_________
Purging Device; (pump type)_________
Total Volume Purged _________

Clock Time 24 HR	Water Depth below MP ft	Pump Dial[1]	Purge Rate ml/min	Cum. Volume Purged liters	Temp. °C	Spec. Cond.[2] µS/cm	pH	ORP[3] mv	DO mg/L	Turb-idity NTU	Comments
Stabilization Criteria					3%	3%	±0.1	± 10 mv	10%	10%	

1. Pump dial setting (for example: hertz, cycles/min, etc).
2. µSiemens per cm(same as µmhos/cm)at 25°C.
3. Oxidation reduction potential (ORP)

APPENDIX C

Quality Assurance Project Plan

February 7, 2013

QUALITY ASSURANCE PROJECT PLAN

Former Paragon Paint and Varnish Company
Manufacturing Facility
BCP Site Number C241108
5-43 to 5-49 46th Avenue and
45-38 Vernon Boulevard to
45-40 Vernon Boulevard
Long Island City, New York

Prepared for

VERNON 4540 REALTY, LLC
45 Carleon Avenue
Larchmont, New York 10538

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

ROUX

209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared to describe the measures that will be taken to ensure that the data generated during performance of the Remedial Investigation (RI) at the property identified as the former Paragon Paint manufacturing facility located at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, in Long Island City (Site) are of sufficient quality to meet project-specific data quality objectives (DQOs). The QAPP was prepared in accordance with the guidance provided in New York State Department of Environmental Conservation (NYSDEC) Technical Guidance DER-10 (Technical Guidance for Site Investigation and Remediation), the Brownfield Cleanup Program Guide and the United States Environmental Protection Agency's (USEPA's) Guidance for the Data Quality Objectives Process (EPA QA/G-4).

2.0 PROJECT OBJECTIVES, AND SCOPE

As described in the RI Work Plan, the objectives of the RI are to further characterize the nature and extent of the light non-aqueous phase liquid (LNAPL), and soil and groundwater impacts. In order to achieve project objectives, Roux Associates has developed a scope of work that includes sampling of soil and groundwater. A brief overview of each element of the RI scope of work is provided below. RI sampling locations are shown in Figure 3 of the RI Work Plan.

2.1 Soil

Samples of soil will be collected and analyzed at a minimum of 37 locations for the following analytes:

- Target Compound List (TCL) volatile organic compounds (VOCs) with a library search (VOCs+10) using United States Environmental Protection Agency (USEPA) Method 8260;
- TCL semivolatile organic compounds (SVOCs) with a library search (SVOCs+20) using USEPA Method 8270;
- Target Analyte List (TAL) metals using USEPA Method 6010; and
- Provided the historic data is verified as described in Section 3.2.1 of the RIWP, a portion (25%) of all soil samples collected will also be analyzed for TCL pesticides (USEPA Method 8081) and TCL polychlorinated biphenyls (PCBs) (USEPA Method 8082) (all samples will be analyzed for PCBs and pesticides in the event the historic data could not be verified).

2.2 Groundwater

There are 13 existing monitoring wells at the Site, over the course of the RI, nine additional monitoring wells will be installed (four existing wells will also be replaced). All monitoring wells will be gauged using an electronic interface probe capable of detecting light non-aqueous phase liquid (LNAPL) with an accuracy of +/- 0.01 feet. Groundwater samples will be collected from those wells that do not exhibit any LNAPL at the time of gauging.

To ensure groundwater samples collected are representative of the conditions in the surrounding aquifer, monitoring wells will be purged prior to sample collection using low flow sampling procedures as outlined in USEPA document titled “Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples From Monitoring Wells” (USEPA, 1996).

Samples will be analyzed for TCL VOCs with a library search (VOC+10) (USEPA Method 8260) TCL SVOCs with a library search (SVOC+20) (USEPA Method 8270) and TAL metals (USEPA Method 6010). Additionally, provided the historic data is verified as described in Section 3.2.1 of the RIWP a portion (25%) of the groundwater samples collected will also be analyzed for TCL pesticides (USEPA Method 8081) and TCL PCBs (USEPA Method 8082). In the event that the historic data is not verified all samples will be analyzed for PCBs and pesticides. Field parameters, including temperature, pH, conductivity, redox potential, dissolved oxygen, and turbidity will also be measured.

2.3 Light Non-aqueous Phase Liquid

LNAPL samples will be collected from a all USTs and monitoring wells to be analyzed by a laboratory for fingerprinting to determine the type and characteristics of the LNAPL. This sampling may consist of viscosity, density, corrosivity, solubility and fingerprinting among others. This information will be used to develop the RAWP, and will assist in the designing of a LNAPL recovery system.

3.0 PROJECT ORGANIZATION

The overall management structure and a general summary of the responsibilities of project team members are presented below. Professional profiles are included in Appendix A.

Project Manager

Joseph D. Dumunico of Roux Associates will serve as Project Manager. The Project Manager is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the investigation. This individual will provide overall management for the implementation of the scope of work and will coordinate all field activities. The Project Manager is also responsible for data review/interpretation and report preparation. Activities of the Project Manager are supported by the Project Quality Assurance Officer.

Field Team Leader

Richard Maxwell of Roux Associates will serve as the Field Team Leader. The Field Team Leader bears the responsibility for the successful execution of the field program, as scoped in the RI Work Plan and the Field Sampling Plan (FSP). The Field Team Leader will direct the activities of all technical staff in the field as well all subcontractors. The Field Team Leader will also assist in the interpretation of data and in report preparation. The Field Team Leader reports to the Project Manager.

Laboratory Project Manager

The laboratory Project Manager is responsible for sample container preparation, sample custody in the laboratory, and completion of the required analysis through oversight of the laboratory staff. The Laboratory Project Manager will ensure that quality assurance procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Project Manager reports to the Project Manager or the Field Team Leader.

Quality Assurance Officer

Wai Kwan, PhD. of Roux Associates will serve as the Quality Assurance Officer (QAO) for this project. The QAO is responsible for conducting reviews, inspections, and audits to ensure that the data collection is conducted in accordance with the FSP and QAPP. The QAO's responsibilities range from ensuring effective field equipment decontamination procedures and proper sample collection to the review of all laboratory analytical data for completeness and usefulness. The QAO reports to the Project Manager and makes independent recommendations to the Field Team Leader.

Field Technical Staff

Field technical staff consists of scientists, engineers, Geoprobe operators and technicians who will perform sampling activities. The field technical staff will also be responsible for the preparation of any required field documentation. The field technical staff reports to the Field Team Leader.

4.0 SAMPLING PROCEDURES

Detailed discussions of sampling, decontamination, and sample handling procedures are provided in the FSP (Appendix B of the RI Work Plan).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The primary intended use for the RI data is to characterize Site conditions and determine if remediation needs to be undertaken at the Site. The primary DQO of the soil, groundwater, sampling programs, therefore, is that data be accurate and precise, and hence representative of the actual Site conditions. Accuracy refers to the ability of the laboratory to obtain a true value (i.e., compared to a standard) and is assessed through the use of laboratory quality control (QC) samples, including laboratory control samples and matrix spike samples, as well as through the use of surrogates, which are compounds not typically found in the environment that are injected into the samples prior to analysis. Precision refers to the ability to replicate a value, and is assessed through both field and laboratory duplicates samples.

Sensitivity is also a critical issue in generating representative data. Laboratory equipment must be of sufficient sensitivity to detect target compounds and analytes at levels below NYSDEC standards and guidelines whenever possible. Equipment sensitivity can be decreased by field or laboratory contamination of samples, and by sample matrix effects. Assessment of instrument sensitivity is performed through the analysis of reagent blanks, near-detection-limit standards, and response factors. Potential field and/or laboratory contamination is assessed through use of trip blanks, method blanks, and equipment rinse blanks (also called “field blanks”).

Table 1 lists the field and laboratory QC samples that will be analyzed to assess data accuracy and precision, as well as to determine if equipment sensitivity has been compromised.

All RI “assessment” analyses (i.e., TCL VOCs, SVOCs, pesticides/PCBs; and TAL metals) will be performed in accordance with the NYSDEC Analytical Services Protocol (ASP), using USEPA SW-846 methods. The laboratory selected to analyze the field samples (soil and groundwater) collected during the RI shall maintain a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) Contract Laboratory Protocol (CLP) certification for each of the “assessment” analyses listed in Section 2.0.

All laboratory data generated for soil and groundwater samples are to be reported in NYSDEC ASP Category B deliverables and will be delivered to NYSDEC in electronic data deliverable (EDD) format as described on NYSDEC’s website (http://www.dec.ny.gov/chemical/62440.html). A Data Usability Report will be prepared by an independent party meeting the requirements in Section 2.2(a)1.ii and Appendix 2B of DER-10 for all data packages generated for the RI.

Table 1. Field and Laboratory QC Summary, Quality Assurance Project Plan
Revised Remedial Investigation Work Plan
Former Paragon Paint Manufacturing Facility, Long Island City, NY

QC Check Type	Minimum Frequency	Use
Field QC		
Duplicate	1 per matrix per SDG*	Precision
Trip Blank	1 per VOC cooler	Sensitivity
Equipment Rinse Blank	1 per day	Sensitivity
Laboratory QC		
Laboratory Control Sample	1 per matrix per SDG	Accuracy
Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate**	1 per matrix per SDG	Accuracy/Precision
Surrogate Spike	All organics samples	Accuracy
Laboratory Duplicate	1 per matrix per SDG	Precision
Method Blank	1 per matrix per SDG	Sensitivity

Notes:

* SDG - Sample Delivery Group - Assumes a single extraction or preparation

** Provided to lab by field sampling personnel

APPENDIX A

Professional Profiles

Joseph D. Duminuco
Vice President/Principal Hydrogeologist

Specialties:
Providing environmental consulting services and strategic planning to the real estate industry focused on Brownfield Redevelopment projects. As Brownfields/Real Estate Services Practice Area Leader at Roux, responsibilities include recruiting, mentoring, coordination between sales and technical forces, development of marketing materials and developing strategic plan for the firm. Performed hundreds of investigations and remediations of soil, groundwater, and soil vapor at commercial and industrial sites. Significant experience (over 100 sites) in the railroad and transit field.

Experience Summary:
Twenty six years of experience: Brownfields/Real Estate Services Practice Area Leader, Vice President/National Client Manager, Office Manager, Principal, Senior and Project Hydrogeologist at Roux Associates; Staff Hydrogeologist at Geraghty & Miller; and Geologist at Mueser Rutledge Consulting Engineers.

Credentials:
M.S. in Geology, Wright State University, 1990
B.S. in Geology, Hofstra University, 1983

Key Projects:

- Principal-in-charge of a Brownfield redevelopment of a former MGP site into a Big Box retail site in Brooklyn, New York. Project consisted of negotiations with NYSDEC and Roux limited remediation to former gasholders filled with coal tar, soil hot spots with mobile coal tar and perimeter containment of coal tar. All the remaining soil at the site was impacted with MGP waste and most of the site was underlain by liquid coal tar. Roux negotiated use of institutional/engineering controls to allow significant contamination to remain in place. A sub slab depressurization system and vapor barrier was installed to address the mobile coal tar left below the retail building.

- Principal-in-Charge of a mixed-use (public school and residential) Brownfield redevelopment in lower Manhattan, New York. Project consisted of a Phase I and a Phase II ESA to satisfy NYCDEP requirements. Due to the presence of contaminated historic fill Roux performed *in situ* waste characterization to assist in the development of NYCDEP-required plans. In addition, Roux provided oversight of the waste removal, completion of waste manifests, and full-time CAMP during all soil moving activities. Roux provided support to excavation contractor when two previously unknown USTs were discovered during excavation activities.

- Principal-in-Charge of a multi-phased Brownfield investigation for the redevelopment of a former Defense Site to water front, upscale housing in Long Island, New York. This investigation included determining the nature and extent of soil, groundwater and vapor-phase contamination onsite and offsite. Utilized a risk assessment to argue the level of residual contamination allowed to remain onsite with an intended residential future use. Remedial alternatives were selected in accordance with future development plans and institutional/engineering controls were proposed to limit cleanup costs. Successfully argued the technical impracticability of remediation of the heavily contaminated deeper aquifer beneath the site and offsite.

- Principal-in-Charge of an interior Brownfield Redevelopment of a PCB, metals, and hydrocarbon contaminated wire manufacturing facility in Westchester County, New York into use as a movie studio. Activities included delineation and characterization of building surfaces, design of a remediation program and interim cleanups to allow studio use as the project progressed.

- Principal-in-Charge of a Brownfield Redevelopment for a former 460 acres abandoned sand quarry on Long Island. The project involved an extensive investigation, UST and PCB remediation; removal and proper disposal of numerous tanks, drums, abandoned vehicles and transformers; and participation in contentious public meetings. The site was redeveloped into a golf course and a senior care facility.

- Principal-in-Charge of a retail/commercial redevelopment in the Bronx, New York. The site contained a NYCDEP E-Designation due to a previous onsite service station UST release. In addition, a previous Phase I and Phase II ESA identified a former dry cleaner with a chlorinated solvent release. Roux performed a focused Phase II ESA at the dry cleaner and determined the chlorinated solvent release was not a hazard. Roux obtained closure under the NYSDEC Spills group and the site was redeveloped with a restaurant, a pharmacy, and re-use of a former supermarket.

- Principal-in-Charge of an 80-acre mixed use redevelopment in Yonkers, New York. Work included Phase I and Phase II investigations, asbestos surveys and abatement support and response to a PCB transformer oil impact form an adjacent landowner. Coordinated with NYSDEC and responsible party to address contamination issue and not impact client’s construction schedule.

- Principal-in-Charge of a mixed-use (residential, retail, commercial) Brownfield redevelopment in the Bronx, New York. Project consisted of a Phase I and Phase II ESA to satisfy NYCDEP requirements. The media investigated included soil, groundwater, soil vapor, and building materials. During the Phase II ESA, Roux performed preliminary *in situ* waste characterization.

- Principal-in-Charge of multiple phases of Brownfield Project for construction of a cogeneration facility in Brooklyn, New York. Project consisted of: construction oversight; environmental compliance monitoring; asbestos and lead paint abatement oversight; data evaluation and report preparation; soil, offshore sediment, and sewer effluent sampling; PCB-contaminated material remediation; preparation of a waste handling and disposal plan; and permitting.

- Principal-in-Charge of numerous due diligence projects for owners, developers, managers, municipalities and lenders at commercial and industrial properties throughout the Northeast. Activities included performance of UST evaluations and closures, hot spot remediations, Phase I and Phase II Site Assessments, vapor intrusion studies and mitigation, lead based paint, asbestos and hazardous materials surveys, interaction with regulatory agencies on behalf of clients and development of remedial cost estimates for planning and negotiation.

- Principal-in-Charge of the redevelopment of a former paint factory in Queens, New York. The site is undergoing a RCRA interior and exterior closure as well as a Brownfield cleanup program investigation and remedy to address free product, soil, groundwater and vapor intrusion issues. The site will be redeveloped into commercial/residential mixed use. Site also sits on a waterway and extensive bulkhead remediation is required.

- Principal-in-Charge of the investigation and remediation of a self storage complex in Staten Island, New York through the NYCOER Brownfields Program. Activities include a remedial investigation, preparation of a remedial action plan and installation of a sub slab depressurization system.

- Principal-in-Charge for a property transfer support project at a heavily contaminated state-of-the-art distribution facility in the Bronx, New York. The site was a former MGP being handled under the VCP in central office, the site had an open spill under the regional spills group and the site was attempting to apply to the BCP through the regional office. Roux performed a Phase I for the buyer, a Phase II and remedial cost estimate for the owner and negotiated with the buyer’s consultant and NYSDEC to limit the scope of the investigation and cleanup.

- Principal-in-Charge of multiple retail developments in Harlem, New York. Work included Phase I and Phase II investigations to satisfy NYCDEP and lender requirements. Lead based paint and asbestos surveys were performed as part of due diligence. Extensive asbestos issues were identified in building materials and soil backfill. Worked with asbestos contractors to determine best abatement approaches for the redevelopments.

- Principal-in-Charge of a Brownfield Redevelopment under the Voluntary Cleanup Program at a commercial property in Queens, New York, where buyer was about to walk away from the deal since high

Joseph D. Duminuco
Vice President/Principal Hydrogeologist

concentrations of chlorinated solvents were detected in groundwater beneath the site. Based on data evaluation convinced NYSDEC to investigate adjacent property as likely source of groundwater contamination. NYSDEC agreed that no further action was warranted by our client and deal was completed.

- Principal-in-Charge of investigation and remediation of a catastrophic heating oil release for a commercial office building in Brooklyn, New York. All work was performed under the oversight of the NYSDEC Spills Group and time was of the essence for the initial response as the heating season was fast approaching. Roux performed free product delineation and remediation and indoor air monitoring at adjacent buildings. Site closure was obtained from NYSDEC.
- Principal-in-Charge of a fast-paced property transfer environmental assessment at an electronics manufacturing facility contaminated with metals and solvents in Bridgeport, Connecticut. Project consisted of the development and implementation of a detailed field sampling plan within a one-week time frame: indoor and outdoor soil sampling and monitoring well installation; groundwater and sewer effluent sampling; asbestos survey and asbestos sampling; and a tidal influence assessment. Data was evaluated and a summary report was prepared within one week and a remedial alternatives evaluation and cost estimate was prepared in less than one week.
- Principal-in-Charge of a multi-phase RI/FS at a PCB and diesel-fuel contaminated railroad yard in New York City. The Site is on the state superfund list because PCBs were detected in soil, groundwater, hydrocarbon plume, sewer water and sewer sediment. Responsibilities include: preparation of work plans; delineation of PCB hot spots with immunoassays; sewer investigation including pumpouts, monitoring, flow measurements and video surveys prior to abandonment; investigation and remediation of numerous USTs including gasoline, solvents and fuel oils; support of construction activities; report preparation; negotiations with the NYSDEC/NYSDOH; participation in public meetings; and implementation of interim remedial measures to mitigate the PCB-contaminated hydrocarbon plume; interim remedial measures to mitigate PCB, PAH and lead contaminated soil hot spots; and agency acceptance of alternate cleanup levels for site soils that resulted in savings of over $80 million.
- Project Coordinator of multi-year environmental consulting contracts with Amtrak and New Jersey Transit. Responsibilities include contract negotiations, workload/resource distribution, compliance with contract requirements including utilization of M/WBE contractors, client-staff liaison, adherence to budgets and schedules, and overall quality assurance.
- Principal-in-Charge of project to support the construction of a high speed rail program. Performed Phase I and II Environmental Site Assessments as part of due diligence at three major railyards. Prepared reports and presentations regarding environmental conditions to regulatory agencies and the design-build consortium. Performed pre-construction sampling and hot spot remediation programs. Also, prepared environmental contingency plans for construction contractors to follow.
- Principal-in-Charge of investigation, remediation and closure activities at dozens of railroad and transit sites in the northeast. Sites include PCB-containing transformer substations, regional bases, passenger stations, maintenance and layover yards, mainline tracks and bus maintenance facilities. Activities included soil, groundwater and free product sampling, report preparation, negotiation with regulators for no further action based on natural attenuation of groundwater, free-product removals, negotiation of site-specific soil cleanup levels, UST removals/abandonments, soil remediation, preconstruction sampling and waste disposal.
- Principal-in-Charge of an investigation at a PCB and solvent-contaminated transformer manufacturing/repair facility in North Carolina. Responsibilities include preparation of a work plan and oversight of the project which consists of soil borings and sampling, immunoassay testing, monitoring well installation, groundwater sampling, report preparation, and remedial alternatives evaluation.
- Principal-in-Charge of an NPL Superfund Site in Delaware. Responsibilities include: the on-going performance monitoring of a groundwater extraction system. The remedial system was installed to capture a chlorinated solvent plume emanating from a former PVC manufacturing facility. In addition, prepared and implemented an RI work plan for a USEPA-required off-site investigation of adjacent chemical manufacturing facilities and a large petroleum refinery. Also included DNAPL investigation and deep aquifer study.
- Principal-in-Charge of a NJDEP-ECRA/ISRA investigation and cleanup involving groundwater and soil contamination at a pesticide formulation and distribution facility in New Jersey. Responsibilities include: delineating the nature and extent of the off-site contaminant plume; determining groundwater flow patterns in a two-aquifer system; using a three-dimensional computer model to determine proper location for extraction and injection wells; and preparing work plans and summary reports for NJDEP-required additional delineation of the nature and extent of on-site soil contamination.
- Project Director of all UST investigative and remedial work performed at service station sites in New England for a major oil company. Responsibilities included: preparation and negotiation of work orders; coordination of monitoring and sampling; communication with client, regulator and site owner contacts; management of technical aspects of all projects; strategy evaluation with client; administration of all contracts and operation and maintenance of remediation systems to mitigate UST releases which included groundwater pump and treat, product recovery, and soil venting systems.
- Project Manager of an RI/FS at a former electronics manufacturing facility in an industrial area of Long Island. Metals and solvents (plating wastes) were detected in on-site leach pools and in soil and groundwater. Responsibilities include reviewing and revising the work plan and providing technical oversight of the project, including: Geoprobe® drilling; soil sampling; soil-gas surveys; leach pool sediment sampling; monitoring well installation; groundwater sampling; geophysical mapping; report preparation; and negotiations with NYSDEC. Convinced NYSDEC that groundwater remediation was inappropriate in an industrialized area. Focused remediation to a few soil hot spots only.
- Principal-in-Charge of a multi-year quarterly monitoring and reporting program at a municipal landfill complex on Long Island, New York. The complex consists of multiple landfills, leachate containment systems and leachate holding tanks. Project involves collection of water level and water-quality data from dozens of monitoring wells, sampling of leachate containment systems, coordination with contract laboratory, data validation, data evaluation and report preparation.
- Provided litigation support for an industrial property owner where a tenant's manufacturing operations had resulted in contamination of the building in addition to soil and groundwater. Without prior notification or consent from the owner, the tenant had conducted a Phase II investigation and remediation activities to address metals and VOCs. Reviewed technical reports and prepared a work plan to address areas for further investigation and perform confirmatory sampling in support of the owner of the property. Provided deposition testimony in connection with the case.

Richard Maxwell
Project Geologist

Technical Specialties:
Project Management and Field Management of Phase I and Phase II Environmental site assessments. Design, implementation, and management of subsurface Remedial Investigations. Project Management and oversight of remediation and construction activities.

Experience Summary:
Six years of experience: Project Geologist at Roux Associates and Project Hydrogeologist at Kleinfelder.

Credentials:
B.S. Geology, Environmental Geology Track; State University of New York at Stony Brook.
OSHA 40-hour HAZWOPER Training
OSHA 8-HOUR Refresher Training, Certificate Current
ExxonMobil Loss Prevention System (LPS) certified.
New Jersey Subsurface Evaluator License May 2009

Professional Affiliations:
Long Island Association of Professional Geologists

Key Projects

- Field Manager for abandonment of multiple USTs and remedial excavation at an active rail yard. Responsibilities included: community air monitoring program oversight, waste management and sampling, subcontractor management, endpoint sample collection, documentation and communicating with regulators and neighbors regarding onsite activities.
- Field Manager of a high vacuum dual phase extraction (DPVE) system feasibility study conducted over a one month period at a commercial rail way facility. DPVE technology was evaluated for its effectiveness at recovering Polychlorinated biphenyl (PCB)-contaminated separate-phase hydrocarbons.
- Field manager for the excavation, cleaning and removal of diesel USTs at an active rail yard.
- Field manager for an Environmental Site Assessment conducted at a former research and development facility of a major automobile manufacturer. Additional responsibilities included oversight of interior decontamination activities and selective interior demolition.
- Performed numerous Phase I Environmental Site Assessments according to ASTM E1527-00 and ASTM E1527-05 for due diligence of large retail shopping centers, industrial facilities, vacant lots and office buildings. Associated activities included agency contact, database management and interpretation, report preparation, and recommendations for additional work.
- Performed multiple Phase I and II Environmental Site Assessments as part of due diligence in support of divestiture of retail petroleum stations by major oil company.
- Conducted numerous environmental site assessments to identify areas of concern, such as underground storage tanks, soil contamination, air pollution activities, and hazardous materials concerns. Activities also included ISRA consultation such as site evaluation submissions, conducting site inspections, and negotiating data submittals with NJDEP.
- Field manager for divestment of multiple petroleum service facilities, which included decommissioning, cleaning and removal of UST's, oversight of remedial excavation, excavation and restoration of drywells.
- Provided oversight of UST removal on behalf of major insurance companies.
- Performed field duties including groundwater sample collection; soil sample logging and collection; drilling oversight; supervision of monitoring well construction; enhanced fluid recovery; excavation oversight; underground storage tank removal; soil vapor extraction air sparge pilot testing; remediation system construction oversight, operation and maintenance of remediation systems.
- Manage environmental liabilities for major petroleum companies and develop site-specific scope of work to address and remediate source impacts. The scopes of work entailed identifying potential sensitive receptors, preparing and implementing investigation work plans to delineate the full extent of source impacts and develop remedial strategies for source removal.
- Stewardship of projects involving hydrocarbon impacts at retail automotive service stations, which included project planning, scoping and execution; data analysis; modeling; forecasting; and financial management.
- Perform numerous subsurface investigation, sensitive receptor survey and exposure assessment as part of remedial strategies in conjunction with evaluation of historical site analytical data to acquire regulatory case closure for retail petroleum facilities.
- Perform AS/SVE feasibility study and 48-hour pump test to evaluate employing of the technology to remediate impacted Sites.
- Field Manager for the construction and installation of remedial AS/SVE systems, groundwater pump and treat systems, and petroleum service station upgrade.

Wai Kwan, Ph.D., E.I.T.

Senior Engineer

Technical Specialties:
Environmental chemistry, engineered natural systems, design of remediation systems utilizing traditional and innovative techniques.

Experience Summary:
Nine years of experience as a Senior and Project Engineer with Roux Associates, Inc.

Credentials:
Ph.D., Environmental Engineering, Massachusetts Institute of Technology, 2003.
M.S., Environmental Engineering, Massachusetts Institute of Technology, 1999.
B.S., Chemistry, California Institute of Technology, 1997.
B.S., Engineering & Applied Science, California Institute of Technology, 1997.
E.I.T. (Engineer-In-Training) Certification

Publications / Presentations / Abstracts:
Long-Term Performance of an Integrated CTW/Phyto Cap System. Kwan, W. P., and W. Eifert, 8th International Phytotechnology Society Conference, 2011.
Large-Scale Enhanced Reductive Dechlorination for the Remediation of Chlorinated Volatile Organic Compounds. Kwan, W. P., Senh, S., and G. Netuschil, Proceedings of The Seventh International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Paper F-036, 2010.
Predicting Oxidation Rates of Dissolved Contaminants During In Situ Remediation Using Fenton's Reaction. Kwan, W. P. and B. M. Voelker, Abstracts of Papers of the American Chemical Society, 228(352 ENVR), 2004.
Influence of Electrostatics on the Oxidation Rates of Organic Compounds in Heterogeneous Fenton Systems. Kwan, W. P. and B. M. Voelker, Environmental Science & Technology, 38(12), 2004.
Rates of Hydroxyl Radical Generation and Organic Compound Oxidation in Mineral-Catalyzed Fenton Like Systems. Kwan, W. P. and B. M. Voelker, Environmental Science & Technology, 37(6), 2003.
Decomposition of Hydrogen Peroxide and Organic Compounds in the Presence of Dissolved Iron and Ferrihydrite. Kwan, W. P. and B. M. Voelker, Environmental Science & Technology, 36(7), 2002.
Heterogeneous Fenton-Like Chain Reactions Initiated by Iron Oxides. Kwan, W. P. and B. M. Voelker, Abstracts of Papers of the American Chemical Society, 200(283 ENVR), 2000.

Professional Affiliations:
American Chemical Society

Key Projects:

Engineered Natural Systems (ENS)

- Project Manager and Engineer for the design of a full-scale natural media filtration (NMF) system consisting of two stormwater storage basins (0.4 MM and 1.8 MM gallons) and four NMF cells (two 114,000-gallon aboveground cells and 0.15- and 0.25-acre in-ground cells) at a 172-acre active aluminum manufacturing facility in Lafayette, Indiana. The NMF cells treat up to 1,500 GPM of stormwater runoff and process water impacted by polychlorinated biphenyls (PCBs), dissolved and particulate aluminum, and suspended solids. Researched the fate and transport of PCBs, and assessed the treatability of PCBs in wetlands. Evaluated a compost treatability bench-scale experiment. Designed and coordinated groundwater percolation tests. Used HydroCAD to model treatment capacity for multiple storm events.
- Project Engineer for the design of a passive stormwater management system for a 3,500-acre aluminum manufacturing facility in Point Comfort, Texas. The passive stormwater management system uses sedimentation trenches and swales to manage and convey bauxite-laden runoff. Completed a hydrologic analysis using USACE HEC-HMS modeling software. Prepared bid specifications and provided bid support.
- Evaluated the feasibility of using NMF technology to reduce PCBs to non-detect levels in stormwater at an aluminum extrusion facility in Cressona, Pennsylvania. A detailed analysis of the site's constituents and runoff volumes during dry weather was completed. Presented a conceptual NMF design that retrofits into the site's storm sewer system.
- Project Engineer for the design of a constructed treatment wetland (CTW) to manage stormwater runoff generated from a scrap metal recycling facility in Sayreville, New Jersey. The CTW was designed to handle and treat runoff with elevated levels of suspended solids prior to discharge to adjacent coastal and freshwater jurisdictional wetlands.
- Evaluated the feasibility of using CTW to treat 110 GPM of groundwater containing elevated levels of cyanide at an aluminum manufacturing facility in Hannibal, Ohio. The CTW was designed to address the site's constituents and winter environment, and was modularized to facilitate the expansion and incorporation of the pilot-scale CTW into the full-scale CTW.

Soil and Groundwater Investigation and Remediation

- Senior and Project Engineer for the remediation of a former petroleum refinery terminal in Buffalo, New York, under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program. Worked closely with geotechnical consultant and reviewed conceptual and final designs for stabilization of 1,400 linear feet of river embankment using tiered slopes, rip rap, and reinforced bioengineering. Critiqued scanning electron microscopy photographs and energy dispersive x-ray spectroscopy absorption spectra that were used to identify and support the conclusion that multiple, unrelated lead species are present within one operable unit. Evaluated bench scale studies of stabilization/solidification agents. Designed,

Wai Kwan, Ph.D., E.I.T.

Senior Engineer

supervised, and evaluated the performance of multiple options to treat petroleum impacted soils based on results generated from pilot scale field tests. Prepared Alternatives Analysis Report for different operable units to document analysis of engineering options and remedy recommendation. Prepared permit application, Remedial Design and Bid Document for implementation of remedy.

- Project Manager and Engineer for a soil vapor extraction (SVE) and air sparge (AS) system to treat groundwater contaminated with volatile organic compounds (VOCs) and chlorinated VOCs (CVOCs) at a 0.8-acre NYSDEC Voluntary Cleanup Site in Brooklyn, New York. Designed and performed two SVE/AS pilot studies. Designed the full-scale SVE/AS system. Provided oversight during installation of the full-scale SVE/AS system. Prepared the Final Engineering Report and the Site Management Plan. Managing daily operations of the SVE/AS system and groundwater gauging and sampling personnel. Responsible for communications with the NYSDEC and submitting quarterly progress reports.
- Designed and oversaw construction of full-scale *in situ* enhanced bioremediation treatment system for groundwater impacted with CVOCs at an 18-acre former electronics manufacturing facility in Taiwan. Evaluated the effectiveness of different substrates for *in situ* treatment from the results of two concurrent 6-month pilot studies, resulting in selection of enhanced bioremediation. The full-scale treatment system consists of 9,000 feet of piping and 189 molasses injection wells. The technology decreased tetrachloroethene (PCE) concentrations by 98%, trichloroethene (TCE) concentrations by 95%, and total CVOC concentrations by 88%.
- Project Manager and Senior Engineer for the performance of a Corrective Measures Study (CMS) at a 30-acre land parcel undergoing RCRA Corrective Action in Williamsburg, Virginia. The site is a former fibers manufacturing facility, and a RCRA regulated landfill is located within the parcel. The CMS was conducted to identify, evaluate, and recommend a final remedy to address zinc-impacted groundwater discharging to a tributary. Managed multi-person field crew who installed multiple monitoring wells, gauged and sampled groundwater, and conducted slug tests. Analyzed the CMS data to show more than 96 percent of the zinc loading is attributed to groundwater discharge along approximately 20 percent of the shoreline. Proposed a final remedy consisting of a 6.5-acre phytotechnology cover and 960 linear feet of compost reactive barrier, at a significantly lower cost compared to conventional treatment approaches.
- Project Manager and Senior Engineer for the performance of a soil and groundwater investigation at a NYSDEC Voluntary Cleanup Site in Brooklyn, New York. Prepared work plans and directed field staff in the collection of discrete soil and groundwater samples to delineate the extent of a groundwater CVOC plume and source area. Used membrane interface probe (MIP) technology to preliminary as a screening tool to focus investigation efforts.
- Field Engineer for the remediation of two 6.25-million gallon process lagoons at a former dye manufacturing facility in Rensselaer, New York. Supervised the excavation, staging, screening, and transport of riprap and soil contaminated with hazardous concentrations of arsenic. Interacted daily with the client and regulatory agency representatives during implementation of the remedial action.
- Project Engineer for a multi-element remedial design of a USEPA Superfund Site in Nassau, New York. Prepared response letters, technical drawings, and 95% and 100% remedial design documents in accordance with the Record of Decision and Consent Judgment.
- Field Engineer for the remediation of a NYSDEC Brownfield Site in Staten Island, New York. Supervised the removal of soil and groundwater contaminated with hazardous levels of PCE and TCE. Evaluated the performance of molasses injections to enhance *in situ* bioremediation of impacted groundwater. Prepared the Final Engineering Report to document the remedial action.
- Project Manager and Engineer for a feasibility study to mitigate land subsidence at a golf course in Northport, New York. Completed a data review of existing reports from USGS and local municipality, previous soil investigation, and current stormwater drainage design. Directed a field investigation to obtain data in support of the conceptual model for land movement. Concluded that existing stormwater management measures accelerated the rate of land movement. Evaluated potential engineering remedies.
- Evaluated laboratory data packages of post-excavation soil samples generated during the interim remediation of a former storage and loading area of a pharmaceutical company in Brooklyn, New York. Initial site investigations concluded site contamination was limited to petroleum-related compounds. Supplemental site investigations conducted a few years after the conclusion of the interim remediation showed a dissolved CVOC plume was present site-wide. Reviewed chromatograms and concluded that CVOCs were detected – but not reported since the reporting scope was limited to petroleum-related compounds – in many of the post-excavation soil samples, which would have provided earlier indications of the presence of the CVOC plume.

<u>Litigation Support</u>

- Senior Engineer for the analysis of expert reports and preparation of rebuttal for three superfund sites in New York and Massachusetts. The case involved assigning the percentage of PCBs released over time during the operation of the facilities at the three sites for the purpose of remedial costs allocation to various

Wai Kwan, Ph.D., E.I.T.

Senior Engineer

insurance carriers. Reviewed information submitted by opposing experts, conducted independent research to verify methodologies, and provided technical calculations indicating flaws in positions advocated by the opposing experts.

- Project Engineer for the preparation of an affidavit regarding a cesspool explosion on Long Island, New York. The affidavit was prepared for the defendant's counsel providing technical calculations and opining on the improbability that the defendant's use of a drain cleaner contributed to a flash fire that injured the plaintiff. Also prepared an expert rebuttal affidavit to demonstrate the fallacies in the plaintiff's expert's arguments. The judge dismissed the case after reviewing all admitted information.
- Senior Engineer for the evaluation of expected remedial costs for waste disposal sites as part of a large bankruptcy litigation. Reviewed over 70 site records to identify potential liabilities and appropriate statute of limitations. Developed present value of remedial investigation and action costs and apportionment ranging from $160,000 to $1,200,000.
- Senior Engineer for the evaluation of gas chromatograms from multiple retail gasoline stations in Puerto Rico as part of a class action lawsuit. Responsibilities included reviewing for indicators of methyl tert-butyl ether (MTBE) and determining MTBE concentrations from historic laboratory data packages.

Compliance

- Project Engineer for the evaluation of air emissions data from a steel mill melt shop in Sayreville, New Jersey. Prepared annual emissions statement in accordance with permit requirements using RADIUS software and emissions factors from AP-42 and CEMS data. Evaluated and summarized trends and anomalies observed in over one year's worth of air monitoring data on particulates and metals from monitors set up in the surrounding community.
- Project Engineer for the preparation of Title V emissions statement for two major hospitals in Nassau County, New York. Responsibilities included reviewing annual fuel usage data, calculating air emissions using emissions factors from AP-42, and preparing the emissions statement.
- Project Manager for the coordination, preparation, and submission of PCB TMDL reporting requirements for multiple sites in Virginia. Responsibilities included managing subcontractors, preparing submission forms in accordance with state guidelines, and preparing the first Pollutant Minimization Plan (PMP) in the state for PCBs.

APPENDIX D

Site Health and Safety Plan

February 7, 2013

SITE HEALTH AND SAFETY PLAN

Former Paragon Paint and Varnish Company Manufacturing Facility
BCP Site Number C241108
5-43 to 5-49 46th Avenue and
45-38 Vernon Boulevard to
45-40 Vernon Boulevard
Long Island City, New York

Prepared for

VERNON 4540 REALTY, LLC
45 Carleon Avenue
Larchmont, New York 10538

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

ROUX

209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

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APPROVALS

By their signature, the undersigned certify that this Health and Safety Plan (HASP) is approved and will be utilized at the project site located at 5-43 to 5-49 46th Avenue and 45-35 to 45-40 Vernon Boulevard in Long Island City, New York.

Joseph W. Gentile February 7, 2013
Joseph Gentile Date
Corporate Health and Safety Manager
Roux Associates, Inc.

R Maxwell February 7, 2013
Richard Maxwell Date
Site Health and Safety Officer
Roux Associates, Inc.

Joseph Dum February 7, 2013
Joseph D. Duminuco Date
Project Principal/
Vice President
Roux Associates, Inc.

1.0 INTRODUCTION

This Site-specific health and Safety Plan (HASP) has been prepared in accordance with 29 CFR 1910.120 Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) and Roux Associates, Inc. (Roux Associates) Standard Operating Procedures (SOPs). It addresses all activities to be performed during the implementation of Remedial Investigation (RI) activities, Interim Remedial Measures (IRM), and Remedial Actions (RA) at the property identified as the former Paragon Paint manufacturing facility and located at 5-43 to 5-49 46th Avenue and 45-35 to 45-40 Vernon Boulevard in Long Island City, New York (Site) (Figure 1). The HASP will be implemented by the designated Site Health and Safety Officer (SSO) during work at the Site. The HASP attempts to identify all potential hazards at the Site; however, Site conditions are dynamic and new hazards may appear constantly. Personnel must remain alert to existing and potential hazards as Site conditions change and protect themselves accordingly.

Compliance with this HASP is required of all persons and subcontractors who perform fieldwork or enter the Site. The contents of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed and approved by the Corporate Health and Safety Manager (CHSM), with the SSO implementing the changes to the HASP.

Upon entering the Site, all visitors are required to sign in. All visitors entering the Contamination Reduction Zone (CRZ) (defined in Section 8.1.2), the Contamination Reduction Corridor (CRC) (defined in Section 8.1.2), or the Exclusion Zone (EZ) (defined in Section 8.1.3) will be required to read and comply with the provisions of this HASP. Visitors will be required to comply with applicable OSHA requirements such as training, medical monitoring, and respiratory protection.

In the event that a visitor does not adhere to the provisions of this HASP, he or she will be required to leave the Site. Mobilization activities not requiring intrusive activities (e.g., survey, equipment staging, etc.) or exposure to potentially impacted areas may only be performed if supervised by a competent Roux Associates employee.

1.1 Scope of Work

The Scope of Work activities will include the implementation of RI activities.

The Scope of Work activities are as follows:

1. Obtain necessary permits and approvals.
2. Preparation and implementation of an approved Health and Safety Plan (HASP).
3. Implementation of RI activities, consisting of site inspection/reconnaissance, geophysical survey, drilling, soil boring and sampling, groundwater sampling, and soil vapor sampling.
4. Implementation of the approved Field Sampling Plan (FSP).
5. Mobilization and demobilization.
6. Maintain good site housekeeping at all times.
7. Identification, protection, and/or relocation of any utilities within the work area.
8. Construct a decontamination pad with proper containment and collection system, if necessary.

1.2 Emergency Numbers

1.2.1 Emergency Phone Numbers

Emergency Medical Service	911
Police: New York City Police Department (NYCPD)	911
Fire:	911
Hospital: Mt. Sinai Queens Hospital	718-267-4285
National Response Center	800-424-8802
Poison Control Center	800-222-1222
CHEMTREC	800-262-8200
Fire: New York City Fire Department	911
Center for Disease Control	800-311-3435
USEPA (Region II)	212-637-5000
NYSDEC Emergency Spill Response	800-457-7362

1.2.2 Project Management/Health and Safety Personnel

Title	Contact	Telephone/Cell
Roux Associates		
Project Director	Joseph Dumunico	631-232-2600 Cell – 631-921-6279
Site Health and Safety Officer	Richard Maxwell	631-232-2600 Cell – 631-927-9531
Corporate Health and Safety Manager	Joseph Gentile	856-423-8800 Cell – 610-844-6911

1.2.3 Other Important Phone Numbers

New York City Emergency Response Team 911

HealthSource Medical Services of Islandia 631-435-0110
(For non-emergency medical services)

1.2.4 Directions to Mt. Sinai Queens Hospital

See Figure 2 for street map.

- Head west on 46th Avenue toward 5th Street
- Turn left onto 5th Street
- Take first left onto 46th Road
- Take the third left onto 21st Street
- Turn right onto 30th Avenue
- Arrive at Mt. Sinai Queens Hospital on the right (total distance is 2.7 miles)

2.0 HEALTH AND SAFETY STAFF

This section briefly describes all Site personnel and their health and safety responsibilities for the RI work to be implemented at the Site. All personnel are responsible for ensuring compliance with the HASP.

2.1 Project Principal (PP) – Joseph D. Dumunico – Roux Associates

- Has the overall responsibility for the health and safety of Site personnel.
- Ensures that adequate resources are provided to the field health and safety staff to carry out their responsibilities as outlined below.

2.2 Corporate Health and Safety Manager (CHSM) – Joseph W. Gentile – Roux Associates

- Implements the HASP.
- Performs or oversees site-specific training and approves revised or new safety protocols or field operations.
- Coordinates revisions of this HASP with Project Principal.
- Responsible for the development of new task safety protocols and procedures and resolution of any outstanding safety issues which may arise during the performance of site work.
- Review and approve all health and safety training and medical surveillance records for personnel and subcontractors.

2.3 Site Safety and Health Officer (SSO) – Richard Maxwell – Roux Associates

- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment.
- Conducts initial onsite specific training prior to personnel and/or subcontractors commencing work.
- Conducts and documents periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Completes and maintains Accident Report and Investigation Forms.
- Notifies PP and CHSM of all accidents/incidents.

- Notifies PP of daily field operations and work progress, who will then communicate at the end of the day to the designated representative the following:
    1. End of day tasks completed
    2. Next day’s planned activities
    3. Third party issues
    4. Change of Plans – approvals
- Maintains contact with Contractors.
- Determines upgrade or downgrade of personal protective equipment (PPE) based on Site conditions and/or real time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as manufacturers suggested instructions determine.
- Submits and maintains health and safety field log books, daily safety logs, training logs, air monitoring result reports, weekly safety report.

2.4 Field Personnel and Subcontractors

- Report any unsafe or potentially hazardous conditions to the SSO.
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Comply with rules, regulations, and procedures as set forth in this HASP and any revisions, which are instituted.
- Prevent admittance to work Site by unauthorized personnel.

3.0 SITE LOCATION, DESCRIPTION, AND HISTORY

Descriptions of the Site and surrounding property usage are included in the following sections. The location of the Site is presented in Figure 1.

3.1 Property Location and Description

The Site is located at 5-43 46th Avenue to 5-49 46th Avenue and 45-38 Vernon Boulevard to 45-40 Vernon Boulevard in Long Island City, New York. The New York City Tax Map identified the Site as Block 26, Lot Number 4. The Site consists of an approximately 33,150-square foot lot improved by one four story former paint factory building, one three story former garage and office, one three story former warehouse, one 1-story shed and a concrete paved access road off 46th Avenue and a rear courtyard that fronts approximately 60 feet of Anable Basin. The buildings were reportedly constructed between 1923 and 1947.

The total area of the on-Site buildings is approximately 69,500 square feet. Floors two through four of the former paint factory building contain the bulk of the paint and varnish manufacturing equipment and bulk liquid mixing tanks including multiple (53) ASTs and a significant amount of piping that still may contain unknown liquids or residues. The one story shed, which is attached to the four story former paint factory building, contains a boiler room and a historical varnish cooking pot room that is currently empty. Seven underground varnish cooking pots in addition to two underground storage tanks (USTs) are reported to be located beneath the concrete slab of the shed. The three-story building known as the garage contains offices, a former small paint laboratory and storage space. Nine USTs are reported to be located beneath the concrete slab of the garage. The three-story building known as the warehouse stored raw materials and paint products; currently most of the building is empty.

The courtyard is concrete paved and is reported to contain nine USTs. Vehicular access is provided by a concrete paved access road off 46th Avenue, which is reported to contain two USTs.

4.0 WASTE DESCRIPTION/CHARACTERIZATION

4.1 General

The following information is presented in order to identify the types of materials that may be encountered at the Site. The detailed information on these materials was obtained from:

- Sax's Dangerous Properties of Industrial Materials – Lewis Eight Edition
- Chemical Hazards of the Workplace – Proctor/Hughes
- Condensed Chemical Dictionary – Hawley
- Rapid Guide to Hazardous Chemical in the Workplace – Lewis 1990
- NIOSH Pocket Guide to Chemical Hazards – 2005
- ACGIH TLV Values and Biological Exposure Indices
- OSHA 29 CFR 1910.1000

4.2 Chemical Data Sheets

Several chemicals that may potentially be present in soils and groundwater at the Site, based on previous soil, soil vapor and groundwater sampling results and historic operations conducted at the Site that have been identified. The Summary of Toxicological Data is found in Table 1 and is provided for review of chemicals that may be encountered. The Summary of Toxicological Data Sheets provides information such as the chemicals characteristics, health hazards, protection, and exposure limits.

4.2.1 Contaminants of Concern

Soil and groundwater contaminants that may be encountered during drilling and sampling activities include both organic and inorganic compounds. Prior investigations at the site have indicated detection of light non-aqueous phase liquid (LNAPL), Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs) and metals.

The toxicological, physical, and chemical properties of potential contaminants are presented in Table 1.

5.0 HAZARD ASSESSMENT

The potential to encounter chemical hazards is dependent upon the work activity performed (intrusive versus non-intrusive) and the duration and location of the work activity. Such hazards could include inhalation and/or skin contact with chemicals/gases that could cause: dermatitis, skin burns, being overcome by vapors or asphyxiation.

Physical hazards that may be encountered during Site work include: heat and cold stress, exposure to excessive noise, loss of limbs, being crushed, head injuries, punctures, cuts, falls, electrocution and bruises; structural integrity of buildings; asbestos and lead paint exposure; and other physical hazards due to motor vehicle operation, heavy equipment and power tools.

Biological hazards may exist during Site activities. These hazards include exposure to insect bites/stings, animals and animal wastes, mold and bloodborne pathogens.

Prior to the beginning of each new phase of work, an activity hazard analysis will be prepared by the SSO with assistance from the CHSM. The analysis will address the hazards for each activity performed in the phase and will present the procedures and safeguards necessary to eliminate the hazards or reduce the risk. The Activity Hazard Analysis Sheets are located in Appendix A.

5.1 Chemical Hazards

The potential for personnel and subcontractors to come in contact with chemical hazards may occur during the following tasks:

- Gauging, bailing/purging, and sampling monitoring wells;
- Drilling Activities; and
- Decontamination Activities.

For chronic and acute toxicity data, refer to Summary of Toxicological Data Sheets in Table 1 for further details on compound characteristics.

5.1.1 Exposure Pathways

Exposure to these compounds during ongoing activities may occur through inhalation of contaminated dust particles, inhalation of VOCs and SVOCs, dermal absorption, and accidental ingestion of the contaminant by either direct or indirect cross-contamination activities.

Inhalation of contaminated dust particles (VOCs, SVOCs, and inorganics) can occur during adverse weather conditions (high or changing wind directions) or during operations that may generate airborne dust such as excavation and loading of contaminated soils. Dust control measures such as applying water to roadways and excavations will be implemented where visible dust is generated. Where dust control measures are not feasible or effective, respiratory protection will be used when necessary (see Section 9.2.2 for monitoring procedures and action levels).

5.1.2 Operational Action Levels

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on atmospheric hazards is outlined in Table 2.

5.1.3 Additional Precautions

Dermal absorption or skin contact with chemical compounds is possible during intrusive activities and while gauging, purging or sampling a monitoring well at the Site. The use of PPE in accordance with Section 8.2 and strict adherence to proper decontamination procedures should significantly reduce the risk of skin contact.

The potential for accidental ingestion of potentially hazardous chemicals is expected to be remote, when good hygiene practices are used.

5.2 Physical Hazards

A variety of physical hazards may be present during Site activities. These hazards include typical construction activities: operation of motor vehicles and heavy equipment operation, the use of power and hand tools, the use of pressurized pumps for *in situ* injections, roping and rigging of steel sheeting, walking on objects, tripping over objects, working on surfaces which have the potential to promote falling, skin burns, crushing of fingers, toes, limbs, head injuries caused by falling objects, temporary loss of one's hearing and/or eyesight. The referenced hazards are not unique and are generally familiar to most hazardous waste site workers at construction sites. Task-specific safety requirements for each phase will be covered during safety briefings. Activity Hazard Analysis summaries are contained in Appendix A.

5.2.1 Noise

Noise is a potential hazard associated with operation of heavy equipment, power tools, pumps, and generators. High noise equipment operators will be evaluated at the discretion of the SSO. Employees with an 8-hour time weighted average exposure exceeding 85 dBA will be included in a hearing conservation program in accordance with 29 CFR 1910.95 and 1926.52.

It is mandated that employees working around heavy equipment or using power tools that produce noise levels exceeding 90 dBA are to wear hearing protection that shall consist of earplugs or protective earmuffs.

5.2.2 Heat Stress

Heat stress is a significant potential hazard, associated with the use of protective equipment in a hot weather environment. The human body is designed to function at a certain internal temperature. When metabolism or external sources (fire or hot summer day) cause the body temperature to rise, the body seeks to protect itself by triggering cooling mechanisms. The SSO will monitor the air temperature (as described later in this section) to determine potential adverse affects the weather can cause onsite personnel. Excess heat is dissipated by two means:

- Changes in blood flow to dissipate heat by convection, which can be seen as "flushing" or reddening of the skin in extreme cases.
- Perspiration, the release of water through skin and sweat glands. While working in hot environments, evaporation of perspiration is the primary cooling mechanism.

Protective clothing worn to guard against chemical contact effectively stops the evaporation of perspiration. Thus the use of protective clothing increases heat stress problems.

The major disorders due to heat stress are heat cramps, heat exhaustion, and heat stroke. Heat cramps are painful spasms, which occur in the skeletal muscles of workers who sweat profusely in the heat and drink large quantities of water, but fail to replace the bodies lost salts or electrolytes. Drinking water while continuing to lose salt tends to dilute the body's extracellular fluids.

Soon water seeps by osmosis into active muscles and causes pain. Muscles fatigued from work are usually most susceptible to cramps.

Extreme weakness or fatigue, dizziness, nausea, and headache characterize heat exhaustion. In serious cases, a person may vomit or lose consciousness. The skin is clammy and moist, complexion pale or flushed, and body temperature normal or slightly higher than normal. Treatment is rest in a cool place and replacement of body water lost by perspiration. Mild cases may recover spontaneously with this treatment; severe cases may require care for several days. There are no permanent effects. As first aid treatment, the person should be moved to a cool place. Body heat should be reduced artificially, but not too rapidly, by soaking the person's clothes in water and fanning them.

Heat stroke is considered a medical emergency and is caused by the breakdown of the body's regulating mechanisms. The skin is very dry and hot with red mottled or bluish appearance. Unconsciousness, mental confusion, or convulsions may occur. Without quick and adequate treatment, the result can be death or permanent brain damage.

Steps that can be taken to reduce heat stress are:

- Acclimate the body. Allow a period of adjustment to make further heat exposure endurable.
- Drink more liquids to replace the body water lost during sweating.
- Rest is necessary and should be conducted under the direction of the SSO.
- Wear personal cooling devices. These are two basic designs; units with pockets for holding frozen packets and units that circulate fluid from a reservoir through tubes to different parts of the body. Both designs can be in the form of a vest, jacket, or coverall. Some circulating units also have a cap for cooling the head.
- Wear long cotton underwear under chemical protective clothing. The cotton will absorb perspiration and will hold it close to the skin. This will provide the body with the maximum cooling available from the limited evaporation that takes place beneath chemical resistant clothing. It also allows for rapid cooling of the body when the protective clothing is removed.

Heat stress is a significant hazard associated with using protective equipment in hot weather environments. Local weather conditions may produce conditions, which will require restricted work schedules in order to protect employees.

Appendix B contains procedures for heat stress; these will be used as a guideline and to provide additional information.

5.2.3 Cold Stress

Cold temperatures are a significant potential hazard. Examples of cold temperature hazards are frostbite and hypothermia.

Frostbite is the most common injury resulting from exposure to cold. The extremities of the body are most often affected. The signs of frostbite are:

- The skin turns white or grayish-yellow.
- Pain is sometimes felt early but subsides later. Often there is no pain.
- The affected parts feel intensely cold and numb.

Hypothermia is characterized by shivering, numbness, drowsiness, muscular weakness, and a low internal body temperature when the body feels extremely warm. This can lead to unconsciousness and death. With both frostbite and hypothermia, the affected areas need to be warmed quickly. Immersion in warm water is an effective means of warming the affected areas quickly. In such cases, medical assistance will be sought.

To prevent these effects from occurring, persons working in the cold should wear adequate clothing and reduce the time spent in the cold area. The field SSO is responsible for determining appropriate time personnel should spend in adverse weather conditions and will monitor this.

Appendix B, which contains the Heat and Cold Stress Guidelines, provides additional information.

5.2.4 Asbestos

Asbestos is a widely used, mineral-based material that is resistant to heat and corrosive chemicals. Depending on the chemical composition, fibers may range from course to silky. The properties that make asbestos fibers valuable to industry are its high-tensile strength, flexibility, heat and chemical resistance and good frictional properties. Asbestos is a common naturally occurring group of fibrous minerals. Asbestos fibers have been used in a variety of building materials; generally, most asbestos is found in pipe insulation, doors, textures paints and plasters, structural fireproofing, and floor tiles. Friable asbestos (that is, material that contains more than 0.1% asbestos by weight and can be crumbled by hand) is a potential hazard because it can release fibers into the air if damaged. Roux Associates' personnel will not disturb any suspected asbestos material.

5.2.5 Structural Integrity

The structural integrity of a building and the safety of the individuals inside depend on meeting and maintaining national and local building codes. Structural integrity can range from minor defects such as loose floorboards and roof leaks to major defects such as floors and walls sagging and collapsed roofs. Numerous other structural defects can exist with or without consequence to the occupants. If Roux Associates personnel detect a problem, they should notify their supervisor, who in turn, should seek the opinion of a qualified structural engineer to offer an opinion regarding the integrity of the building. If in the opinion of the qualified engineer it is unsafe, no work can proceed until a solution to rectify the situation has been performed.

It is presently known that the majority of the onsite buildings have been unoccupied since approximately 1998. As such, personnel will take this into consideration during the initial site visits and communicate this potential hazard during the safety tailgate meetings to all workers entering the site.

5.2.6 Lockout/Tagout

Roux Associates and all Site contractors will develop a lockout/tagout plan in the event of the repair of electrical, pneumatic, hydraulic, mechanical systems, per OSHA requirements under 29 CFR 1910.147.

5.3 Biological Hazards

The biological hazards, which have the potential to cause adverse health effects, are from exposure to domestic flies, mosquitoes, insects, animals and animal wastes, mold and bloodborne pathogens. The Activity Hazard Analysis (Appendix A) suggests controls for various hazards to be potentially encountered onsite.

5.3.1 Insect Stings

Stings from insects are often painful, cause swelling and can be fatal if a severe allergic reaction such as anaphylactic shock occurs. If a sting occurs, the stinger should be scraped out of the skin, opposite of the sting direction. The area should be washed with soap and water followed by application of an ice pack.

If the victim has a history of allergic reaction, he should be taken to the nearest medical facility. If the victim has medication to reverse the effects of the sting, it should be taken immediately.

If the victim experiences a severe reaction, a constricting band should be placed between the sting and the heart. The bitten area should be kept below the heart if possible. A physician should be contacted immediately for further instructions.

5.3.2 Animals and Animal Wastes

Due to most of the onsite structures being unutilized for several years, there lies the potential for various wildlife to reside within the structures, including, but not limited to, pigeons, bats, mice, rats, squirrels, raccoons, and feral cats. Certain animals can represent significant sources (vectors) of disease transmission. Precautions to avoid or minimize potential contact with (biting) animals (such as some of the above listed) or animal waste and/or deceased animals should be considered prior to all field activities. Rats, squirrels, raccoons, feral cats, and other wild animals can inflict painful bites which can also cause disease (as in the case of rabid animals). Site personnel should avoid contact with any of the above.

If contact occurs, be sure to clean the area thoroughly with soap and water as soon as possible. If a bite occurs, the area should be cleaned thoroughly immediately with soap and water and medical attention should be sought.

5.3.3 Mold

Due to the unutilized state of the various structures onsite, leaking roofs and the collection of water may have gone unnoticed which may have led to the growth of mold within the buildings.

Although mold affects individuals differently and to different degrees, the following are some of the most common adverse health effects:

- Respiratory problems – wheezing, difficulty breathing;
- Nasal and sinus congestion;
- Eyes – burning, watery, reddened, blurry vision, light sensitivity;
- Dry, hacking cough;
- Sore throat;
- Nose and throat irritation;
- Shortness of breath and lung disease;
- Chronic fatigue;
- Skin irritation;
- Central nervous system (headaches, loss of memory, and mood changes);
- Aches and pains;
- Fever;
- Headaches;
- Diarrhea; and
- Immune suppression.

Decisions about removing individuals from an affected area must be based on the results of a medical evaluation, and will be made on a case-by-case basis.

Workers that discover the visible presence of mold in excess of 10 sq. feet need to notify the SSO for consultation. If a worker smells mold and feels that he/she is experiencing symptoms of exposure, he/she should leave the area and report the symptoms to the SSO.

5.3.4 Bloodborne Pathogens

The majority of the occupational tasks onsite will not involve a significant risk of exposure to blood, blood components, or body fluids. The highest risk of acquiring any bloodborne pathogen for employees onsite will be following an injury. When administering first aid care, there are potential hazards associated with bloodborne pathogens that cause diseases such as Human Immunodeficiency Virus (HIV), Hepatitis B (HBV), Hepatitis A (HAV), Hepatitis C (HCV), or the Herpes Simplex Virus (HSV). An employee who has not received the appropriate certification should never execute first aid and/or CPR.

In order to minimize any potential pathogen exposure, all employees should use the hand washing facilities on a regular basis. Additionally, the following universal precautions should be followed to prevent further potential risk:

- Direct skin or mucous membrane contact with blood should be avoided.
- Open skin cuts or sores should be covered to prevent contamination from infectious agents.
- Body parts should be washed immediately after contact with blood or body fluids that might contain blood, even when gloves or other barriers have been used.
- Gloves and disposable materials used to clean spilled blood shall be properly disposed of in an approved hazardous waste container.
- First aid responders shall wear latex or thin mil nitrile gloves when performing any procedure risking contact with blood or body substances.
- Safety glasses will be worn to protect the eyes from splashing or aerosolization of body fluids.
- A CPR mask will be worn when performing CPR to avoid mouth-to-mouth contact.
- Appropriate work gloves will be worn to minimize the risk of injury to the hands and fingers when working on all equipment with sharp or rough edges.
- Never pick up broken glass or possible contaminated material with your unprotected hands.
- Never handle wildlife (living or deceased) encountered onsite.

5.4 Hazard Assessment

Task	Hazards	Risk of Exposure
Gauging, purging and Sampling Monitoring Wells	Inhalation/Skin Contact	Moderate/High
	Heat Stress/Cold Stress	Moderate
	Physical Injury	Low/Moderate
	Noise	Low
Decontamination	Inhalation/Skin Contact	Moderate
	Heat Stress/Cold Stress	Moderate
	Physical Injury	Low/Moderate
	Noise	Low
Drilling/Sampling	Inhalation/Skin Contact	Moderate
	Heat Stress/Cold Stress	Moderate
	Noise	Moderate/High
	Physical Injury	Moderate

6.0 TRAINING

6.1 General Health and Safety Training

In accordance with Roux Associates’ corporate policies, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of the job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. As a minimum, the training shall have consisted of instruction in the topics outlined in the above reference. Personnel who have not met the requirements for initial training will not be allowed to work in any Site activities in which they may be exposed to hazards (chemical or physical).

Completion of a 40-hour Health and Safety Training Course for Hazardous Waste Operations or an approved equivalent will fulfill the requirements of this section.

In addition to the required initial training, each employee shall have received 3 days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

Roux Associates’ SSO has the responsibility of ensuring that personnel assigned to this project comply with these requirements.

6.2 Annual Eight-Hour Refresher Training

Current, annual 8-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The following topics will be reviewed; toxicology, respiratory protection, including air purifying devices and self-contained breathing apparatus (SCBA), medical surveillance, decontamination procedures, and personal protective clothing. In addition, topics deemed necessary by Roux Associates’ Health and Safety Director may be added to the above list.

6.3 Site-Specific Training

Site personnel will receive training that will specifically address the activities, procedures, monitoring and equipment for Site operations. It will include Site and facility layout, hazards, first aid equipment locations and emergency services at the Site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

6.4 Onsite Safety Meetings

Daily safety meetings will be presented each morning to discuss potential safety concerns for the upcoming activities.

The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety audits by Roux Associates or other involved parties.

6.5 First Aid and CPR

The SSO will identify those individuals having first aid and CPR training in order to ensure that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross Association and, as applicable, the American Heart Association. Certification and appropriate training documentation will be kept with the Site personnel records.

6.6 Additional Training

The CHSM may require additional or specialized training throughout the project. Such training shall be in the safe operation of heavy or power tool equipment or hazard communication training or other topic deemed Site appropriate.

6.7 Subcontractor Training

All subcontractor personnel working on the Site shall have completed the 40-hour training requirement and meet the medical surveillance requirements found in Section 7.1. Subcontractor training shall be performed in accordance with 29 CFR 1910.120 and HASP specifications. In certain unique situations (e.g., mechanical failure of equipment), the non-trained individual performing emergency repairs may be allowed, at the discretion of the SSO, to perform repairs when no intrusive activities are being performed and provisions have been made to mitigate potential exposure.

7.0 MEDICAL SURVEILLANCE PROCEDURES

7.1 General

A Medical Surveillance Program has been established as part of this plan and is included in Appendix C. Roux Associates and subcontractor personnel performing field work at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f). A physician's medical release for work will be confirmed by the SSO before an employee can begin Site activities. Such examinations shall include a statement as to the worker's present health status, the ability to work in a hazardous environment (including any required PPE, which may be used during temperature extremes), and the worker's ability to wear respiratory protection.

In the event that personal medical information is needed for emergency treatment, information will be made available to the treating health care professional through Roux Associates' Human Resources Department and the CHSM.

8.0 SITE CONTROL, PERSONAL PROTECTIVE EQUIPMENT, AND COMMUNICATIONS

A modified Site control approach may be utilized since activities will be limited to site inspection/geophysical survey, drilling and sampling only during this phase of work. If remedial work is necessary, the following four-zone approach will be used.

8.1 Site Control

Based on the Site history and operations, a potential for the presence of hazardous material does exist. During drilling and sampling work areas will be delineated with high visibility cones and/or caution tape. A dedicated decontamination area will be established to decontaminate all equipment used for sampling.

If remedial activities are necessary, a four-zone approach will be employed in order to prevent the spread of contamination from the disturbed areas onsite. The four zones include: the Exclusion Zone (EZ), the Contamination Reduction Zone (CRZ), Contamination Reduction Corridor (CRC) and the Support Zone (SZ). A stepped remedial approach will be managed and the zones modified as the work progresses. Each of the areas will be defined through the use of control barricades and/or construction/hazard fencing. A clearly marked delineation between the SZ and the remaining three zones, the CRZ, CRC and EZ, will be maintained. The preferred method will utilize high visibility orange fencing and hand-driven metal posts, or orange cones. Signage will be posted to further identify and delineate these areas.

8.1.1 Support Zone

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. Meteorological conditions will be observed and noted from this zone, as well as those factors pertinent to heat and cold stress.

8.1.2 Contamination Reduction Zone

A Contamination Reduction Zone (CRZ) is established between the exclusion zone and the support zone. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of personnel and equipment. The CRZ will be used for general Site entry and egress in addition to access for heavy equipment and emergency support services. Personnel are not allowed in the CRZ without:

- A buddy (co-worker);
- Appropriate PPE;
- Medical authorization;
- Training certification; and
- A need to be in the zone.

8.1.3 Exclusion Zone

The area where contamination exists is considered to be the Exclusion Zone (EZ). All areas where excavation and handling of contaminated materials take place are considered the EZ. This zone will be clearly delineated by orange high visibility fencing. Safety tape may be used as a secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- A buddy (co-worker);
- Appropriate PPE;
- Medical authorization;
- Training certification; and
- A need to be in the zone.

8.2 Personal Protective Equipment

8.2.1 General

The level of protection worn by field personnel will be enforced by the SSO. Levels of protection for general operations are provided below and are defined in this section. Levels of protection may be upgraded at the discretion of the SSO. All decisions on the level of protection will be based upon a conservative interpretation by the SSO of the information provided by air monitoring results, environmental results and other appropriate information. Any changes in the level of protection shall be recorded in the health and safety field logbook.

8.2.2 Personal Protective Equipment Specifications

The initial level of personal protective equipment is Level D. It is not anticipated that either Level B or Level C protection will be necessary.

Although not anticipated, any tasks requiring Level B personal protective equipment (PPE) will utilize the following equipment:

- Positive pressure, full facepiece, self-contained breathing apparatus (SCBA) or positive pressure, supplied air respirator with escape SCBA (NIOSH approved)
- Disposable coveralls (Tyvek, Poly-coated Tyvek, or Saranex)
- Gloves, inner: latex or nitrile
- Gloves, outer: cut-resistant
- Chemical resistant boots over the work boots
- Steel toe work boots
- Hard hat
- Hearing protection (as needed)
- Boot cover (as needed)

For tasks requiring Level C PPE, the following equipment may be used in any combination:

- Full-face, air purifying, canister-equipped respirators (NIOSH approved) utilizing Organic Vapor/Acid Gas and P-100 filters (half-face if approved by SSO)
- Disposable coveralls (Tyvek, Poly-coated Tyvek, or Saranex) as required
- Gloves, inner: latex or nitrile as required
- Gloves, outer: cut-resistant
- Chemical resistant boots over the work boots as required

- Steel toe work boots
- Hard hat
- Hearing protection (as needed)
- Safety glasses (if half-mask is utilized)
- Boot covers (as needed)

The Minimum level of PPE for entry onto the Site is Level D PPE. The following equipment shall be used:

- Work uniform (long pants, sleeved shirt)
- Hard hat
- Steel toe work boots
- Safety glasses
- Boot covers (as needed)
- Hearing protection (as needed)
- Reflective safety vest

Modified Level D PPE consists of the following:

- Regular Tyvek coveralls (Poly-coated Tyvek as required)
- Outer gloves: cut-resistant, leather, cotton (as required)
- Inner gloves: latex or nitrile (doubled) as required
- Chemical resistant boots over work boots (as required)
- Steel toe work boots
- Hard hat
- Safety glasses
- Hearing protection as needed
- Reflective safety vest

8.2.3 Initial Levels of Protection

Levels of protection for the proposed scope of work may be upgraded or downgraded depending on direct-reading instruments or personnel monitoring. The following are the initial levels of protection that shall be used for each planned field activity:

Activity	Initial level of PPE
Mobilization/Demobilization	D
Site Inspection/Geophysical Survey	D
Decontamination	D
Drilling	D
Monitoring Well Gauging, Purging and Sampling	D

8.3 Communications

If working in level C/B respiratory protection is required, personnel may find that communication becomes a more difficult task and process to accomplish. Distance and space further complicate this. In order to address this problem, electronic instruments, mechanical devices, or hand signals will be used as follows:

Telephones – Mobile telephones will be carried by designated personnel for communication with emergency support services/facilities.

Radios – Two-way radios will be utilized onsite for communications between field personnel in areas where visual contact cannot be maintained and where hand signals cannot be employed.

Air Horn – Available as posted in the Site trailer or support zone to alert field personnel to an emergency situation. The emergency signal will be three sharp blasts of the air horn.

Hand Signals – This communication method will be employed by members of the field team along with use of the buddy system. Signals become especially important when in the vicinity of heavy moving equipment and when using Level B respiratory equipment. The signals shall become familiar to the entire field team before Site operations commence, and will be reinforced and reviewed during site-specific training.

Signal	Meaning
Hand gripping throat	Out of air; can't breathe
Grip partner's wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm all right; I understand
Thumbs down	No; Unable to understand you, I'm not all right

9.0 MONITORING PROCEDURES

9.1 General

Monitoring will be performed to verify the adequacy of respiratory protection, to aid in Site layout, and to document worker exposure. If air monitoring in these areas indicates the presence of potentially hazardous materials, control measures will be implemented. All monitoring instruments shall be operated by qualified personnel only and will be calibrated daily prior to use or, more often, as necessary. General air monitoring will be performed in accordance with the Community Air Monitoring Plan included as Appendix E of the Revised Remedial Investigation Work Plan.

9.2 Exclusion Zone Monitoring

9.2.1 Instrumentation

The following monitoring instruments will be available for use during field operations as necessary. There will be a minimum of one of each piece of equipment on the Site at all times during intrusive activities:

- Photoionization Detector (PID) with 10.6 EV probe or Flame Ionization Detector (FID) or equivalent.
- Dust/Particulate Monitor (DM), MIE Miniram, or equivalent.

A PID will be used to monitor VOCs in active work areas during intrusive activities. VOCs shall also be measured upwind of the work areas to determine background concentrations.

A particulate monitor shall be used to measure concentrations of dust and particulate matter.

When deemed necessary, a CGI/O_2 meter shall be used to monitor for combustible gases and oxygen content during confined space entry or when the HSO deems necessary.

Calibration records shall be documented and recorded daily and included in the daily air monitoring report. This report will be specific to work area monitoring. All instruments shall be calibrated before and after each daily use in accordance with manufacturer's procedures (Appendix D).

9.2.2 Action Levels

Action levels for the upgrading of PPE requirements in the HASP will apply to all Site work during investigation and remediation activities at the Site. Action levels are for known contaminants using direct reading instruments in the Breathing Zone (BZ) for VOCs and particulates, and at the source for combustible gases. The BZ will be determined by the SSO, but is typically 4 to 5 feet above the work area surface or elevation. The action levels to be utilized for the Site are found in Table 2.

9.2.3 Monitoring During Field Activities

Intrusive Operations – Continuous Personnel Breathing Zone Air Monitoring will be performed by the SSO during drilling activities. Real-time monitoring for all onsite activities will be accomplished as follows:

- Monitoring of VOCs in and around the work zones.
- Monitoring for particulates in and around the work zones, when necessary.

The frequency of monitoring may be modified by the SSO, after consultation with the Project Principal. The rationale for any modification must be documented in the HASP.

10.0 SAFETY CONSIDERATIONS

10.1 General

In addition to the specific requirements of this HASP, common sense should be used at all times.

The following general safety rules and practices will be in effect at the site.

- All open holes, trenches, and obstacles will be properly barricaded in accordance with local Site needs and requirements. Proximity to traffic ways, both pedestrian and vehicular, and location of the open hole, trench, or obstacle will determine these needs.
- All excavation and other Site work will be planned and performed with consideration for underground lines.
- Smoking and ignition sources in the vicinity of potentially flammable or contaminated material are strictly prohibited.
- Drilling, boring, and use of cranes and drilling rigs, erection of towers, movement of vehicles and equipment, and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs; lights; canopies; buildings and other structures and construction; and natural features such as trees, boulders, bodies of water, and terrain.
- When working in areas where flammable vapors may be present, particular care shall be exercised with tools and equipment that may be sources of ignition. All tools and equipment provided must be properly bonded and/or grounded.
- Approved and appropriate safety equipment (as specified in this HASP), such as eye protection, hard hats, hand protection (nitrile, leather and/or cut resistant gloves as necessary), foot protection, and respirators, must be worn in areas where required. In addition, eye protection must be worn when sampling soil or water that may be contaminated.
- All site personnel may be called upon to use respiratory protection in some situations. Fit testing will be necessary for all persons using respirators. The criteria for facial hair will be determined by the SSO. In general, the guideline is that facial hair cannot impede the fit of the respirator.
- No smoking, eating, chewing tobacco, gum chewing or drinking will be allowed outside the SZ.
- Contaminated tools and hands must be kept away from the face.
- Personnel must use personal hygiene safe guards (washing up) at the end of the shift.
- Each sample must be treated and handled as though it were contaminated.
- Persons with long hair and/or loose-fitting clothing that could become entangled in power equipment must take adequate precautions.

- Horseplay is prohibited in the work area.
- Work while under the influence of intoxicants, narcotics, or controlled substances is strictly prohibited.

10.2 Traffic Control

Traffic control methods and barricades will be used when working on the sidewalk along 46th Avenue and when working on the driveway off of 46th Avenue. Since the site is fenced off and the areas of investigation are not in current use, outside vehicular and pedestrian traffic is not considered to be an issue when working in other areas of the Site.

10.3 Sample Handling

Personnel responsible for handling of samples will wear the prescribed level of protection. Samples are to be identified as to their hazard and packaged as to prevent spillage or breakage. Any unusual sample conditions shall be noted. Laboratory personnel and all field personnel shall be advised of sample hazard levels and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling in order to assure that the practices are appropriate for the suspected contaminants in the sample.

11.0 DECONTAMINATION AND DISPOSAL PROCEDURES

11.1 Contamination Prevention

Contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

Personnel

- Do not walk through areas of obvious or known contamination.
- Do not directly handle or touch contaminated materials.
- Make sure that there are no cuts or tears on PPE.
- Fasten all closures in suits; cover with tape, if necessary.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, cosmetics, gum, etc., into contaminated areas.

Sampling/Monitoring

- When required by the SSO, cover instruments with clear plastic, leaving openings for sampling ports.
- Bag sample containers prior to emplacement of sample material.

Heavy Equipment

- Care should be taken to limit the amount of contamination that comes in contact with heavy equipment (tires, contaminated augers).
- If contaminated tools are to be placed on non-contaminated equipment for transport to a decontamination area, plastic should be used to keep the equipment clean.
- Dust control measures including water misting will be used on roads inside the Site boundaries.

11.2 Personnel Decontamination

A field wash for equipment and PPE shall be set up and maintained for all persons exiting the EZ. The system will include a gross wash and rinse for all disposable clothing and boots worn in the EZ. As necessary, equipment and facilities will be available for personnel to wash their hands, arms, neck, and face.

11.3 Equipment Decontamination

All potentially contaminated equipment used at the Site will be decontaminated to prevent contaminants from leaving the Site. The decontamination area will provide for the containment of all wastewater from the decontamination process. Respirators and any other PPE that comes in contact with contaminated materials shall pass through a field wash in the decontamination area, and a thorough decontamination at the end of the day. All decontamination rinse water will be collected and managed in accordance with all applicable regulations.

11.4 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment are required, normal decontamination procedures may need to be abbreviated or omitted. The Site SSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances and/or medical personnel. Outer garments are then removed at the medical facility. Attempt to wash or rinse the victim if it is known that the individual has been contaminated with an extremely toxic or corrosive material, which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems (ambulatory) or injuries, the normal decontamination procedures will be followed. Note that heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing must be promptly removed. Less serious forms of heat stress also require prompt attention and removal of protective clothing immediately. Unless the victim is obviously contaminated, decontamination should be omitted or minimized, and treatment begun immediately.

11.5 Disposal Procedures

A system of segregating all waste will be developed by the SSO.

All discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left onsite. All potentially contaminated materials (e.g., clothing, gloves, etc.,) will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as domestic waste.

12.0 EMERGENCY PLAN

Should an emergency situation occur, the emergency plan, outlined in this section, shall be known by Roux Associates and all Subcontractors prior to the start of work. The emergency plan will be available for use at all times during Site work. The plan provides the phone numbers for the fire, police, ambulance, hospital, poison control centers, and directions to the hospital from the Site. This information is to be found in Section 1.2 of the HASP.

Various individual Site characteristics will determine preliminary actions taken to assure that this emergency plan is successfully implemented in the event of a Site emergency. Careful consideration must be given to the proximity of neighborhood housing or places of employment, and to the relative possibility of Site release of vapors, which could affect the surrounding community.

The emergency coordinator shall implement the contingency plan whenever conditions at the Site warrant such action. The coordinator will be responsible for coordination of the evacuation, emergency treatment, and transport of Site personnel as necessary, and notification of emergency response units and the appropriate management staff.

In cases where the project principal (manager is not mentioned in HASP?) is not available, the SSO shall serve as the alternate emergency coordinator.

The SSO during an emergency will perform air monitoring as needed, as well as lend assistance and provide health and safety information to responding emergency personnel.

Site Personnel will endeavor to keep non-essential personnel away from the incident until the appropriate emergency resources arrive. At that time the responders will take control of the Site. Site personnel may be asked to lend assistance to emergency personnel such as during evacuations, help with the injured, etc.

12.1 Evacuation

Evacuation procedures will be discussed prior to the start of work and periodically during safety meetings. In the event of an emergency situation, such as fire, or explosion, an air horn, automobile horn, or other appropriate device will be sounded for three (3) sharp blasts indicating the initiation of evacuation procedures. The emergency evacuation route shall be known by all site workers. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The SSO or project manager must ensure that access for emergency equipment is provided and that all combustion apparatuses have been shut down once the alarm has been sounded. All Site personnel will assemble in the designated nearest safe location. Once the safety of all personnel is established, the fire department and other emergency response groups will be notified by telephone of the emergency.

12.2 Personnel Injury

Emergency first aid shall be applied onsite as appropriate. If necessary, the individual shall be decontaminated and transported to the nearest hospital. The SSO will supply medical data sheets to medical personnel and complete the accident/incident reports in accordance with Section 13.4 of the HASP.

The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. However, since some situations may require transport of an injured party by other means, the injured person shall be escorted to the occupational health clinic or hospital. Maps to these facilities are shown in Figure 2.

12.3 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone: (Direct contact, no phone messages).

		Office:	**Cell:**
1. Project Director:	Joseph Duminuco	631-232-2600	631-921-6279
2. Office Health and Safety Manager:	Joe Gentile	856-423-8800	610-844-6911
3. Site Health and Safety Officer:	Richard Maxwell	631-232-2600	631-921-9531

4. The employer of any injured worker, if not a Roux Associates employee.

Written confirmation of verbal reports are to be submitted within 24 hours. The report form entitled "Accident Report and Investigation Form" (Appendix E) is to be used for this purpose. All representatives contacted by telephone are to receive a copy of this report. If the employee involved is not a Roux Associates employee, his employer shall receive a copy of the report. In addition to filling out the Accident Report and Investigation Form, if a Roux employee is involved in a motor vehicle accident, the employee must also complete the Acord form (Appendix F).

For reporting purposes, the term accident refers to fatalities, lost time injuries, spill or exposure to hazardous materials (radioactive materials, toxic materials, explosive or flammable materials), fire, explosion, property damage, or potential occurrence (i.e., near miss) of the above.

Any information released from the health care provider, which is not deemed confidential patient information, is to be attached to the appropriate form. Any medical information, which is released by patient consent, is to be filed in the individual's medical record and treated as confidential.

12.4 Personnel Exposure

Skin Contact:	Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination.
Inhalation:	Move to fresh air and/or, if necessary, decontaminate/transport to hospital.
Ingestion:	Decontamination and transport to emergency medical facility.
Puncture Wound or Laceration:	Decontamination and transport to emergency medical facility.

12.5 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO or project manager will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related conditions.

- Limited visibility.
- Electrical storm potential.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain, fog, high winds, and lightning. Observe daily weather reports and evacuate if necessary in case of inclement weather conditions.

13.0 LOGS, REPORTS AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping for this project.

13.1 Medical and Training Records

The employer keeps medical and training records. The subcontractor employer must provide verification of training and medical qualifications to the SSO. The SSO will keep a log of personnel meeting appropriate training and medical qualifications for Site work. The log will be kept in the project file. Roux Associates will maintain medical records in accordance with 29 CFR 1910.20.

13.2 Onsite Log

The SSO or project manager will keep a log of onsite personnel daily in the designated field book.

13.3 Exposure Records

Any personal monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be kept by Roux Associates in accordance with 29 CFR 1910.20.

13.4 Accident/Incident Reports

An accident/incident report must be completed following procedures given in Appendix E. The originals will be sent to Roux Associates for maintenance. Copies will be distributed as stated. A copy of the forms will be kept in the project file.

13.5 OSHA Form 300

An OSHA Form 300 (Log of Occupational Injuries and Illnesses) (Appendix G) will be kept at the Site. All reportable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to Roux Associates for maintenance. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form.

13.6 Daily Safety Logs

The Daily Safety Log form in Appendix D will be completed daily by the SSO and submitted to the project manager.

13.7 Weekly Safety Reports

The Weekly Safety Reports in Appendix H will be completed by the SSO and submitted to the designated Owner's representative, if requested.

13.8 Close-Out Safety Report

At the completion of the work, Roux Associates will submit a closeout Safety Report that will include all logs and reports generated during the project. The report will be signed and dated by the SSO and submitted to the Safety Manager and/or Owner's representative, if requested.

14.0 FIELD TEAM REVIEW

Each Roux Associates employee or subcontractor shall sign this section after site-specific training is completed and before being permitted to work at the Site.

> *I have read and reviewed the Site Health and Safety Plan prepared for this Site. I understand and will comply with the provisions contained therein.*

Site/Project: Former Paragon Paint Manufacturing Facility
5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard
Long Island City, New York

Date	**Name**	**Signature**	**Company**

SSO CERTIFICATION OF
OCCUPATIONAL HEALTH CLINIC AND HOSPITAL DIRECTIONS

Name of Roux Associates SSO: Richard Maxwell

Date: February 7, 2013

This is to certify that on February 1, 2013, I personally drove the route to Mt. Sinai Queens Hospital as listed in the HASP. The Map Routings and Directions were/were not as listed in the plan. Listed below were conditions that resulted in different directions.

R Maxwell

Roux Associates Site Health and Safety Officer

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,1,1-Trichloroethane	71-55-6	TWA 350 ppm STEL 440 ppm C 440 ppm	C 350 ppm (1900 mg/m^3) [15-minute]	TWA 350 ppm (1900 mg/m^3)	700 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias;	Eyes, skin, central nervous system, cardiovascular system, liver	Colorless liquid with a mild, chloroform-like odor. BP: 165°F UEL: 12.5% LEL: 7.5%
1,1,2-Trichloroethane	79-00-5	TWA 10 ppm	Ca TWA 10 ppm (45 mg/m^3) [skin]	TWA 10 ppm (45 mg/m^3) [skin]	Ca [100 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen]	Eyes, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, chloroform-like odor. BP: 237°F UEL: 15.5% LEL: 6%
1,1-Dichloroethane	75-34-3	TWA 100 ppm	TWA 100 ppm (400 mg/m^3)	TWA 100 ppm (400 mg/m^3)	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation skin; central nervous system depression; liver, kidney, lung damage	Skin, liver, kidneys, lungs, central nervous system	Colorless, oily liquid with a chloroform-like odor. BP: 135°F Fl.P: 2°F UEL: 11.4% LEL: 5.4%
1,1-Dichloroethene	75-35-4	TWA 5 ppm	Ca (lowest feasible concentration	TWA 1ppm	Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor. BP: 89°F Fl.P: -2°F UEL: 15.5% LEL: 6.5% Class IA Flammable Liquid
1,2,4-Trimethylbenzene	95-63-6	None established	TWA 25 ppm (125mg/m^3)	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 337°F FL.P: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable liquid
1,2,4-Trimethylbenzene	95-63-6	TWA 25 ppm (125 mg	TWA 25 ppm (125 mg/m^3)	None established	N.D.	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 337°F Fl.P: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable Liquid
1,2-Dichlorobenzene	95-50-1	TWA 25 ppm STEL 50 ppm	C 50 ppm (300 mg/m^3)	C 50 ppm (300 mg/m^3)	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; liver, kidney damage; skin blisters	Eyes, skin, respiratory system, liver, kidneys	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide] BP: 357°F Fl.P: 151°F UEL: 9.2% LEL: 2.2% Class IIIA Combustible Liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,2-Dichloroethane	107-06-2	TWA 10 ppm	Ca TWA 1 ppm (4 mg/m^3) STEL 2 ppm (8 mg/m^3)	TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]	Ca [50 ppm]	inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.] BP: 182°F Fl.P: 56°F UEL: 16% LEL: 6.2% Class IB Flammable Liquid
1,2-Dichloroethene (total)	540-59-0	TWA 200 ppm (790 m	TWA 200 ppm (790 mg/m^3)	TWA 200 ppm (790 mg/m^3)	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor BP: 118-140°F Fl.P: 36-39°F UEL: 12.8% LEL: 5.6% Class IB Flammable Liquid
1,3,5-Trimethylbenzene	108-67-8	None established	TWA 25 ppm (125mg/m^3)	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 329°F FL.P: 122°F Class II Flammable liquid
1,3,5-Trimethylbenzene	108-67-8	TWA 25 ppm (125 mg	TWA 25 ppm (125 mg/m^3)	None established	N.D	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 329°F Fl.P: 122°F Class II Flammable Liquid
1,4-Dichlorobenzene	106-46-7	TWA 10 ppm	Ca	TWA 75 ppm (450 mg/m^3)	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin	Colorless or white crystalline solid with a mothball-like odor. [insecticide] BP: 345°F Fl.P: 150°F LEL: 2.5% Combustible Solid
2,4-Dimethylphenol	105-67-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system, mouth, throat, stomach; dizziness, weakness, fatigue, nausea, headache; systemic damage; moderate to severe eye injury.	Skin, CVS, eyes, CNS	Clear, colorless liquid with a faint ether or chloroform-like odor BP: 178°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
2-Butanone (MEK)	78-93-3	TWA 200 ppm (590 mg/m^3) STEL 300 ppm (885 mg/m^3)	TWA 200 ppm (590 mg/m^3) STEL 300 ppm (885 mg/m^3)	TWA 200 ppm (590 mg/m^3)	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor. BP: 175°F Fl.P: 16°F UEL(200°F): 11.4% LEL(200°F): 1.4% Class IB Flammable Liquid
Acenaphthene	83-32-9	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system	Brown solid
Acetone	67-64-1	TWA 500 ppm STEL 50 ppm	TWA 250 ppm (590 mg/m^3)	TWA 1000 ppm (2400 mg/m^3)	2500 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, mint-like odor BP: 133°F Fl.P: 0°F UEL: 12.8% LEL: 2.5% Class IB Flammable Liquid
Anthracene	65996-93-2	TWA 0.2 mg/m^3	Ca TWA 0.1 mg/m^3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m^3 (benzene-soluble fraction)	Ca [80 mg/m^3]	inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids
Antimony	7440-36-0	TWA 0.5 mg/m^3	TWA 0.5 mg/m^3	TWA 0.5 mg/m^3	50 mg/m^3 (as Sb	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, cardiovascular system	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder. BP: 2975°F
Arsenic (inorganic)	7440-38-2 (metal)	TWA 0.01 mg/m3	Ca C 0.002 mg/m3 [15-min]	TWA 0.010 mg/m3	Ca [5 mg/m3 (as As)]	Inhalation; ingestion; skin absorption; skin and/or eye contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic sys	Metal: sliver-gray or tin-white, brittle, odorless solid BP: sublimes
Asbestos	1332-21-4	TWA 0.1 f/cc	Ca 100,000 fibers/m3	TWA 0.1 fiber/cm3	Ca [IDLH value has not been determined]	Inhalation; ingestion; skin and/or eye contact	Asbestosis (chronic exposure), dyspnea, interstitial fibrosis, restricted pulmonary function, finger clubbing, irritation eyes, [potential occupational carcinogen]	Respiratory system, eyes,	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite), fibrous, odorless solids. BP: decomposes
Asphalt fumes	8052-42-4	TWA 0.5 mg/m^3(fumes)	Ca C 5 mg/m3 [15 min]	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; skin and/or eye contact	Irritation eyes, resp sys	Eyes, respiratory system	Black or dark brown cement-like substance Combustible solid
Barium	7440-39-3	TWA 0.5 mg/m3	None established	TWA 0.5 mg/m3	None established	Inhalation, ingestion, skin contact	Irritation skin, respiratory system, (	Skin, eyes, respiratory system	Yellow white powder BP: 1640 C
Benzene	71-43-2	TWA 0.5 ppm STEL 2.5 ppm	Ca TWA 0.1 ppm STEL 1 ppm	TWA 1 ppm STEL 5 ppm	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, central nervous system, bone marrow	Colorless to light yellow liquid with an aromatic odor [Note: Solid below 42 °F] BP: 176°F Fl.Pt = 12°F LEL: 1.2% UEL: 7.8% Class B Flammable liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Benzo[a]anthracene	56-55-3	None established	None established	None established	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	Irritation eyes, skin, respiratory system, CNS	Skin	Pale Yellow crystal, solid BP: 438 C
Benzo[a]pyrene	50-32-8	None established	TWA 0.1 mg/m3	TWA 0.2 mg/m3	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	POISON. This material is an experimental carcinogen, mutagen, tumorigen, neoplastigen and teratogen. It is a probable carcinogen in humans and a known human mutagen. IARC Group 2A carcinogen. It is believed to cause bladder, skin and lung cancer. Exposure to it may damage the developing foetus. May cause reproductive damage. Skin, respiratory and eye irritant or burns.	Skin, eye, bladder, lung, reproductive	Yellow crystals or powder [found in cigarette smoke, coal tar, fuel exhaust gas and in many other sources] BP: 495 C
Benzo[b]fluoranthene	205-99-2	None established	TWA 0.1 mg/m3	TWA 0.2 mg/m3	None established	Inhalation; ingestion; skin and/or eye contact	No data were identified on the toxicity of benzo[b]fluoranthene to humans. Based on results of studies in animals, IARC concluded that benzo[b]fluoranthene is possibly carcinogenic to humans	Respiratory system, skin, bladder, kidneys	Off-white to tan powder
Benzo[k]fluoranthene	207-08-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory tract, gastrointestinal; fatal if swallowed, inhaled, absorbed through the skin; vomiting, nausea, diarrhea	Lungs, respiratory system	Yellow crystals BP: 480 C
Beryllium	7440-41-7 (metal)	TWA 0.002 mg/m^3	Ca C 0.0005 mg/m^3	TWA 0.002 mg/m^3 C 0.005 mg/m^3 (30 minutes) with a maximum peak of 0.025 mg/m^3	Ca [4 mg/m^3 (as Be)]	inhalation, skin and/or eye contact	Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]	Eyes, skin, respiratory system	Metal: A hard, brittle, gray-white solid. BP: 4532°F
Bis(2-ethylhexyl) phthalate	117-81-7	TWA 5 mg/m^3	TWA 5 mg/m^3 STEL 10 mg/m^3 (do not exceed during andy 15-minute work period)	TWA 5 mg/m^3	None established	inhalation, skin and/or eye contact	Irritation eyes, skin, nose, throat; affect the nervous system and liver; damage to male reproductive glands	Eyes, skin, nose, respiratory system, nervous system, reproductive system, liver	Colorless to light colored, thick liquid with slight odor
Butane	106-97-8	TWA 1000 ppm	TWA 800 ppm (1900 mg/m^3)	None established	None established	inhalation, skin and/or eye contact (liquid)	Drowsiness, narcosis, asphyxia; liquid: frostbite	central nervous system	Colorless gas with a gasoline-like or natural gas odor. BP: 31°F UEL: 8.4% LEL: 1.6% Flammable Gas

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Cadmium	7440-43-9 (metal)	TWA 0.01 mg/m^3	Ca	TWA 0.005 mg/m^3	Ca [9 mg/m^3 (as Cd)]	inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	respiratory system, kidneys, prostate, blood	Metal: Silver-white, blue-tinged lustrous, odorless solid. BP: 1409°F
Carbon Disulfide	75-15-0	TWA 1 ppm	TWA 1 ppm (3 mg/m^3) STEL 10 ppm (30 mg/m^3) [skin]	TWA 20 ppm C 30 ppm 100 ppm (30-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system	Colorless to faint-yellow liquid with a sweet ether-like odor. BP: 116°F Fl.P: -22°F UEL: 50.0% LEL: 1.3% Class IB Flammable Liquid
Chlorobenzene	108-90-7	TWA 10 ppm	None established	TWA 75 ppm (350 mg/m^3)	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eyes, skin, respiratory system, central nervous system, liver	Colorless liquid with an almond-like odor BP: 270°F Fl.P: 82°F UEL: 9.6% LEL: 1.3%
Chloroethane	75-00-3	TWA 100ppm	Handle with caution in the workplace	TWA 1000 ppm (2600 mg/m^3)	3800 ppm [10%LEL]	inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact	Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage	Liver, kidneys, respiratory system, cardiovascular system, central nervous system	Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. BP: 54°F Fl.P: NA (Gas) -58°F (Liquid) UEL: 15.4% LEL: 3.8%
Chloroform	67-66-3	TWA 10 ppm	Ca STEL 2 ppm (9.78 mg/m^3) [60-minute]	C 50 ppm (240 mg/m^3)	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Liver, kidneys, heart, eyes, skin, central nervous system	Colorless liquid with a pleasant odor BP: 143°F
Chromium	7440-47-3	TWA 0.5 mg/m^3 (metal and Cr III compounds) TWA 0.05 mg/m^3 (water-soluble Cr IV compounds) TWA 0.01 mg/m^3 (insoluble Cr IV compounds)	TWA 0.5 mg/m^3	TWA 1 mg/m^3	250 mg/m^3 (as Cr)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; lung fibrosis (histologic)	Eyes, skin, respiratory system	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid. BP: 4788°F
Chrysene; Phenanthrene; Pyrene; Coal tar pitch volatiles	65996-93-2	TWA 0.2 mg/m3	Ca TWA 0.1 mg/m^3 (cyclohexane-extractable fraction)	TWA 0.2 mg/m^3 (benzene-soluble fraction)	Ca [80 mg/m^3]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
cis-1,2-Dichloroethene	158-59-2	TWA 200 ppm	TWA 200 ppm	TWA 200 ppm	None established	inhalation, skin absorption, ingestion	Harmful if swallowed, inhaled, or absorbed through skin. Irritant. Narcotic. Suspected carcinogen	Skin	Colorless liquid BP: 60 C Fl.P: 4 C UEL: 12.8% LEL: 9.7 %
Copper	7440-50-8	TWA 0.2mg/m^3 (fume) 1 mg/m^3 (dusts and mists)	TWA 1 mg/m^3	TWA 1 mg/m^3	100 mg/m^3 (as Cu)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing	Eyes, skin, respiratory system, liver, kidneys (increase(d) risk with Wilson's disease)	Noncombustible Solid in bulk form, but powdered form may ignite. BP: 4703°F
Dibenzo[a,h]anthracene	53-70-3	None established	None established	None established	None established	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin	Eyes, skin; skin photosensitization.	Colorless crystalline powder BP: 524°C
Diesel Fuel #2	68476-34-6	None established	None established	Designated as an OSHA Select Carcinogen	None established	ingestion, skin and/or eye contact	Kidney damage; potential lung damage; suspected carcinogen; irritation of eyes, skin, respiratory tract; dizziness, headache, nausea; chemical pneumonitis (from aspiration of liquid); dry, red skin; irritant contact dermatitis; eye redness, pain.	Eyes, skin, kidneys	Clear yellow brown combustible liquid; floats on water; distinct diesel petroleum hydrocarbon odor. BP: 356-716°F Fl.P: 154.4-165.2°F LEL: 0.6% UEL: 7.0%
Ethylbenzene	100-41-4	TWA 100 ppm STEL 125 ppm	TWA 100 ppm (435 mg/m^3) STEL 125 ppm (545 mg/m^3)	TWA 100 ppm (435 mg/m^3)	800 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with an aromatic odor. BP: 277°F Fl.P: 55°F UEL: 6.7% LEL: 0.8% Class IB Flammable Liquid
Fluoranthene	206-44-0	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible burns; heart and liver injury, pulmonary edema, respiratory arrest, gastrointestinal disturbances.	Heart, liver, lungs.	Yellow needles.
Fluorene	86-73-7	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation skin, digestive tract	Skin	White crystals BP: 563°F
Fuel Oil #2	68476-30-2	TWA 100mg/m^3 (aerosol and vapor, as total hydrocarbons)	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS effects; nausea, vomiting, headache, cramping, dizziness, weakness, loss of coordination,, drowsiness; kidney, liver damage	Eyes, skin, CNS	Clear or yellow to red oily liquid, kerosene-like odor BP: 347 - 689 °F UEL:5-6% LEL: 0.7-1.0%
Gasoline	8006-61-9	TWA 300 ppm STEL 500 ppm	Carcinogen	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; ingestion; skin and/or eye contact	Eyes and skin irritation, mucous membrane; dermatitis; headache; listlessness, blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis; possible liver, kidney damage [Potential occupational carcinogen]	Eyes, skin, respiratory system, CNS, Liver, Kidneys	Clear liquid with a characteristic odor, aromatic Fl.Pt = -45°F LEL = 1.4% UEL = 7.6% Classs 1B Flammable Liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Hexachlorobutadiene	87-68-3	TWA 0.02 ppm	Ca TWA 0.02 ppm (0.24 mg/m^3) [skin]	None established	Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	In animals: irritation eyes, skin, respiratory system; kidney damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, kidneys	Clear, colorless liquid with a mild, turpentine-like odor. BP: 419°F
Hydrogen Sulfide	7783-06-4	TWA (10 ppm) STEL (15 ppm) (adopted values for which changes are proposed in the NIC)	C 10 ppm (15 mg/m^3) [10-minute]	C 20 ppm 50 ppm [10-minute maximum peak]	100 ppm	inhalation, skin and/or eye contact	Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite	Eyes, respiratory system, central nervous system	Colorless gas with a strong odor of rotten eggs. BP: -77°F UEL: 44.0% LEL: 4.0% Flammable Gas
Indeno[1,2,3-cd]pyrene	193-39-5	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible human carcinogen (skin); weakness; affect liver, lung tissue, renal tissue; impariment of blood forming tissue	Skin	Fluorescent green-yellow crystalline solid BP: 536 C
Indeno[1,2,3-cd]pyrene	193-39-5	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible human carcinogen (skin); weakness; affect liver, lung tissue, renal tissue; impariment of blood forming tissue	Skin	Yellowish crystal solid BP: 536 C
Isopropylbenzene	98-82-8	TWA 50 ppm	TWA 50 ppm (245 mg/m^3) [skin]	TWA 50 ppm (245 mg/m^3) [skin]	900 ppm [10%LEL]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sharp, penetrating, aromatic odor. BP: 306°F Fl.P: 96°F UEL: 6.5% LEL: 0.9%
Kerosene	8008-20-6	TWA 200 mg/m^3	TWA 100 mg/m^3	None established	IDLH value has not been determined	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system	Colorless to yellowish, oily liquid with a strong, characteristic odor. BP: 347-617°F Fl.P: 100-162°F UEL: 5% LEL: 0.7% Class II Combustible Liquid
Lead	7439-92-1	TWA 0.05 mg/m^3	TWA (8-hour) 0.050 mg/m^3	TWA 0.050 mg/m^3	100 mg/m^3 (as Pb)	inhalation, ingestion, skin and/or eye contact	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; hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. BP: 3164°F Noncombustible Solid in bulk form

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Manganese	7439-96-5 (metal)	TWA 0.2 mg/m^3	TWA 1 mg/m^3 STEL 3 mg/m^3	C 5 mg/m^3	500 mg/m^3 (as Mn)	inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	respiratory system, central nervous system, blood, kidneys	A lustrous, brittle, silvery solid. BP: 3564°F
Mercury (organo) alkyl compounds (as Hg)	7439-97-6	TWA 0.01 mg/m^3 STEL 0.03 mg/m^3 [skin]	TWA 0.01 mg/m^3 STEL 0.03 mg/m^3 [skin]	TWA 0.01 mg/m^3 C 0.04 mg/m^3	2 mg/m^3 (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spasticity, jerking limbs; dizziness; salivation; lacrimation (discharge of tears); nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic effects	Eyes, skin, central nervous system, peripheral nervous system, kidneys	Appearance and odor vary depending upon the specific (organo) alkyl mercury compound
Mercury compounds [except (organo) alkyls] (as Hg) Mercury	7439-97-6	TWA 0.025 mg/m^3 (elemental and inorganic forms)	Hg Vapor: TWA 0.05 mg/m^3 [skin] Other: C 0.1 mg/m3 [skin]	TWA 0.1 mg/m^3	10 mg/m^3 (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	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	Eyes, skin, respiratory system, central nervous system, kidneys	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.] BP: 674°F
Methyl tert-butyl ether (MTBE)	1634-04-4	TWA 50 ppm	No established REL	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, mucous membrane, respiratory; dizziness, nausea, headache, intoxication	Eyes, skin, mucous membrane, respiratory system, central nervous system	Colorless liquid BP: 55.2 C
Methylene Chloride	75-09-2	TWA 50 ppm, A3 - suspected human carcinogen	Ca	TWA 25 ppm STEL 125 ppm	Ca [2300 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]	Eyes, skin, cardiovascular system, central nervous system	Colorless liquid with a chloroform-like odor BP: 104°F UEL: 23% LEL: 13%
Naphtha (coal tar)	8030-30-6	None established	TWA 100 ppm (400 mg/m^3)	TWA 100 ppm (400 mg/m^3)	1000 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; dizziness, drowsiness; dermatitis; in animals: liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Reddish-brown, mobile liquid with an aromatic odor BP: 320-428°F Fl.P: 100-109°F Class II Combustible Liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Naphthalene	91-20-3	TWA 10 ppm STEL 15 ppm	TWA 10 ppm (50 mg/m^3) STEL 15 ppm (75 mg/m^3)	TWA 10 ppm (50 mg/m^3)	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	Colorless to brown solid with an odor of mothballs. BP: 424°F Fl.P: 174°F UEL: 5.9% LEL: 0.9%
n-Butylbenzene	104-51-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS depression, lung damage; nausea, vomiting, headache, dizziness, weakness, loss of coordination, blured vision, drowsiness, confusion, disorientation	Eyes, skin,repiratory system, central nervous system	Colorless liquid with a sweet odor BP: 183 C Fl.P: 59 C UEL: 5.8% LEL: 0.8%
Nickel	7440-02-0 (Metal)	TWA 1.5 mg/m^3 (elemental) TWA 0.1 mg/m^3 (soluble inorganic compounds) TWA 0.2 mg/m^3 (insoluble inorganic compounds) TWA 0.1 mg/m^3 (Nickle subsulfide)	Ca TWA 0.015 mg/m^3	TWA 1 mg/m^3	Ca [10 mg/m^3 (as Ni)]	inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin	Metal: Lustrous, silvery, odorless solid. BP: 5139°F
Nitrobenzene	98-95-3	TWA 1 ppm	TWA 1 ppm (5 mg/m^3) [skin]	TWA 1 ppm (5 mg/m^3) [skin]	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; anoxia; dermatitis; anemia; methemoglobinemia; in animals: liver, kidney damage; testicular effects	Eyes, skin, blood, liver, kidneys, cardiovascular system, reproductive system	Yellow, oily liquid with a pungent odor like paste shoe polish. BP: 411°F Fl.P: 190°F LEL(200°F): 1.8%
n-Propylbenzene	103-65-1	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Harmful if swallowed, Irritation eyes, skin, digestive tract, respiratory tract, central nervous system	Eyes, skin, central nervous system, respiratory system	colorless or light yellow liquid BP: 159 C Fl.P: 47 C UEL: 6% LEL: 0.8%
Petroleum hydrocarbons(Petroleum distillates)	8002-05-9	None established	TWA 350 mg/m^3 C 1800 mg/m^3 [15 min]	TWA 500 ppm (2000 mg/m^3)	1,100 [10% LEL]	Inhalation; ingestion; skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, drowsiness, headache, nausea; dried/cracked skin; chemical pneumonitis	CNS, eyes, respiratory system, skin	Colorless liquid with a gasoline or kerosene-like odor BP: 86-460°F Fl. Pt = -40 to -86°F UEL: 5.9% LEL: 1.1% Flammable liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Phenol	108-95-2	TWA 5 ppm	TWA 5 ppm (19 mg/m^3) C 15.6 ppm (60 mg/m^3) [15-minute] [skin]	TWA 5 ppm (19 mg/m^3) [skin]	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching	Eyes, skin, respiratory system, liver, kidneys	Colorless to light-pink, crystalline solid with a sweet, acrid odor. BP: 359°F UEL: 8.6% LEL: 1.8%
p-Isopropyltoluene	99-87-6	None established	None established	None established	None established	inhalation, skin absorption, eye contact	Irritation skin	CNS, skin	Colorless, clear liquid, sweetish aromatic odor BP: 350.8°F Class III Flammable liquid
sec-Butylbenzene	135-98-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, upper airway; central nervous system, headache, dizziness; gastrointestinal disturbance	Respiratory system, central nervous system, eyes, skin;	Colorless liquid BP: 344°F Fl.P: 126 °F UEL: 6.9% LEL: 0.8% Combustible liquid
Selenium	7782-49-2	TWA 0.2 mg/m^3	TWA 0.2 mg/m^3	TWA 0.2 mg/m^3	1 mg/m^3 (as Se)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eyes, skin, respiratory system, liver, kidneys, blood, spleen	Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.] BP: 1265°F
Silver	7440-22-4 (metal)	TWA 0.1 mg/m^3 (metal, dust, fumes) TWA 0.01 mg/m^3 (Soluble compounds, as Ag)	TWA 0.01 mg/m^3	TWA 0.01 mg/m^3	10 mg/m^3 (as Ag)	inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Nasal septum, skin, eyes	Metal: White, lustrous solid BP: 3632°F
Slop Oil	69029-75-0	None established	None established	None established	None established	Inhalation; ingestion	Irritation eyes, skin, gastrointestinal tract	Eyes, skin, gastrointestinal tract	Clear light to dark amber liquid, with mild hydrocarbon odor. BP: >500°F Fl.P : 250°F
Sulfuric Acid	7664-93-9	TWA 0.2 mg/m^3	TWA 1 mg/m^3	TWA 1 mg/m^3	15 mg/m^3	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis	Eyes, skin, respiratory system, teeth	Colorless to dark-brown, oily, odorless liquid. BP: 554°F Noncombustible Liquid
tert-Butylbenzene	98-06-6	None established	None established	None established	None established	inhalation, skin absorption, ingestion,	Eye and respiratory irritant; CNS depression; liver or kidney damage	Respiratory system, central nervous system, eyes, liver, kidney	Colorless liquid with an aromatic odor BP: 168 - 169 C Fl.P: 34 C UEL:5.6 % LEL: 0.8 %

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 5-43 to 5-49 46th Avenue and 45-38 to 45-40 Vernon Boulevard, Long Island City, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Tetrachloroethene	127-18-4	TWA 25 ppm STEL 100 ppm (STEL) listed as A3, animal carcinogen	Ca Minimize workplace exposure concentrations	TWA 100 ppm C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Colorless liquid with a mild, chloroform-like odor. BP: 250°F Noncombustible Liquid
Toluene	108-88-3	TWA 20 ppm	TWA 100 ppm (375 mg/m^3) STEL 150 ppm (560 mg/m^3)	TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, pungent, benzene-like odor. BP: 232°F Fl.P: 40°F UEL: 7.1% LEL: 1.1% Class IB Flammable Liquid
trans-1,2-Dichloroethene	156-60-5	TWA 200 ppm	None established	TWA 200 ppm STEL 250 ppm (skin)	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Narcotic. Irritation eyes, skin, respiratory tract, mucous membrane; CNS depression.	Respiratory tract, mucous membrane, eyes, skin, CNS	Colorless liquid with a fruity pleasant odor BP: 48°C Fl.P 6C UEL: 12.8% LEL: 9.7%
Trichloroethene	79-01-6	TWA 10 ppm STEL 25 ppm	Ca	TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)	Ca [1000 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid (unless dyed blue) with a chloroform-like odor. BP: 189°F UEL(77°F): 10.5% LEL(77°F): 8%
Vinyl Chloride	75-01-4	TWA 1 ppm	Carcinogen	TWA 1 ppm C 5 ppm [15-minute]	Ca [IDLH value has not been determined]	inhalation, skin, and/or eye contact (liquid)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Liver, central nervous system, blood, respiratory system, lymphatic system	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. BP: 7°F UEL: 33.0% LEL: 3.6% Flammable Gas
Xylene (m, o & p isomers)	108-38-3, 95-47-6, 106-42-3	TWA 100 ppm (435 mg/m^3) STEL 150 ppm	TWA 100 ppm (435 mg/m^3)	TWA 100 ppm (435 mg/m^3)	900 ppm	Skin absorption, inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Colorless liquid with an aromatic odor BP: 282°F, 292°F, 281°F Fl. Pt. 82°F, 90°F, 81°F LEL: 1.1%, 0.9%, 1.1% UEL: 7.0%, 6.7%, 7.0% Classs C Flammable Liquid
Zinc	7440-66-6	TWA 10 mg/m3 (Inhalable fraction)	None established	TWA 10 mg/m3 (for zinc oxide fume)	None established	skin and/or eye contact, inhalation, ingestion	Irritation eyes, skin, respiratory tract; gastrointestinal disturbances	Eyes, skin, respiratory system	Bluish gray solid BP: 1664.6°F Flammable

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 900 Old Country Road, Garden City, New York

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Abbreviations:
ACGIH – American Conference of Governmental Industrial Hygienists.
BP – boiling point at 1 atmosphere, °F
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.
Ca - considered by NIOSH to be a potential occupational carcinogen
CAS# Chemical Abstracts Service registry number which is unique for each chemical.
Fl. Pt. – Flash point
IDLH - Immediately Dangerous to Life and Health concentrations represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)
mg/m^3 – Milligrams of substance per cubic meter of air
NIOSH -National Institute for Occupational Safety and Health.
OSHA – Occupational Safety and Health Administration
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.
ppm – parts per million
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week
STEL – Short-term exposure limit
TLV -ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).
TWA – 8-hour, time-weighted average
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)

TABLE 2

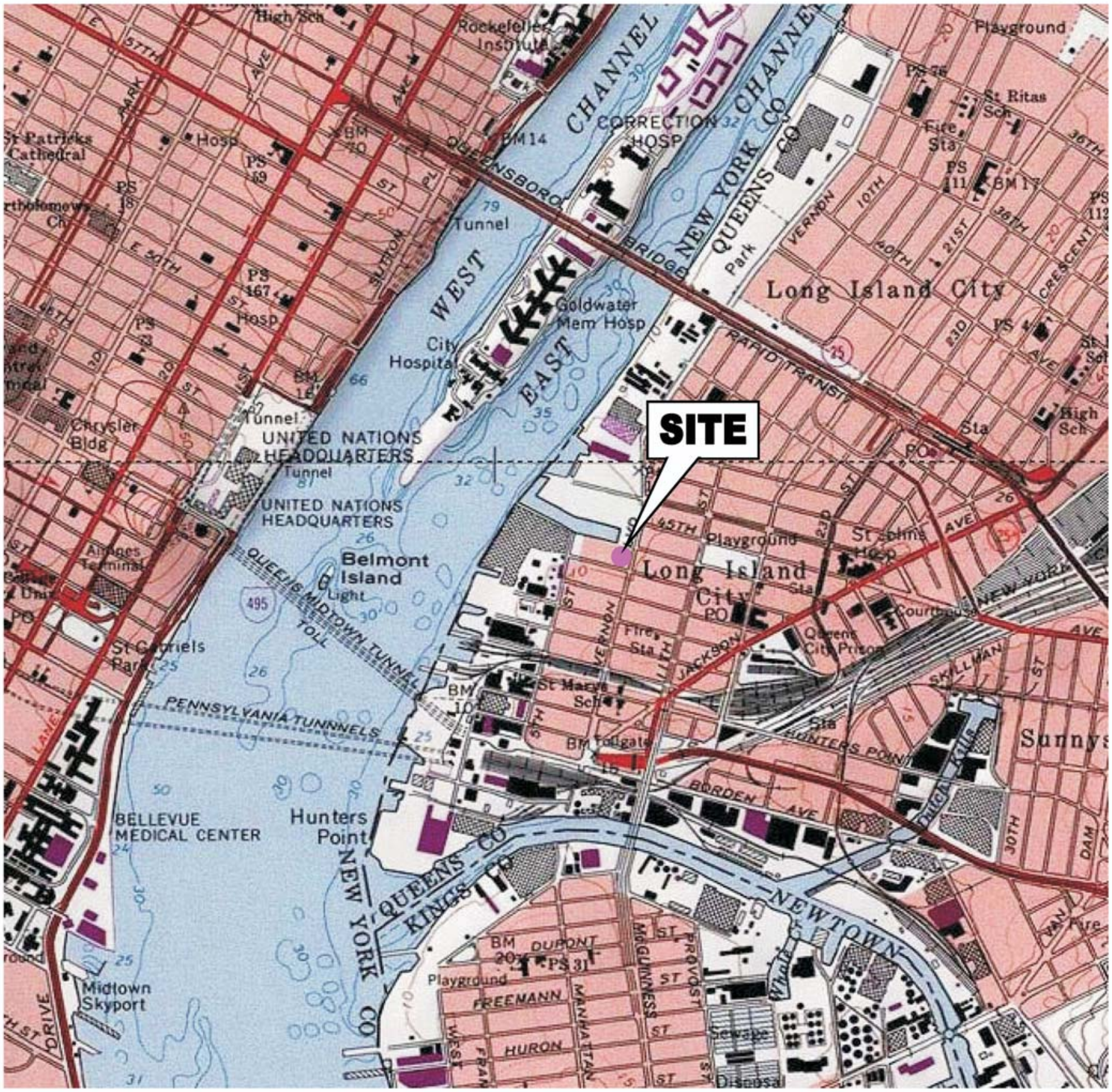
ACTION LEVELS FOR WORKER BREATHING ZONE

Instrument	**Action Level ***	**Level of Respiratory Protection/Action**
PID	0 to <5 ppm (one minute sustained)	Level D *
PID	>5 to <50 ppm (one minute sustained)	Utilize APR (Level C)
PID	>50 to <100 ppm (one minute sustained)	Level B
PID	>100ppm	Stop work** (ventilate, apply foam)
CGI/H_2S Meter	<5%	Level D
CGI/H_2S Meter	>5% to <25%	Level B
CGI/H_2S Meter	>25%	Stop work**
CGI/CO Meter	>25%	Level B
CGI/CO Meter	>50%	Stop work** (ventilate area)
CGI/O_2 Meter	<10% LEL, in excavation	Level D
	19.5% oxygen – 23.5%	Level D
CGI/O_2 Meter	>10% LEL, in excavation	Allow to vent, apply foam**
	>23.5% oxygen	Stop work, Oxygen Enriched ATM**
Dust Monitor	0 – 1.0 mg/m^3, 5-minutes average	Level D
Dust Monitor	>1.0 to 5.0 mg/m^3, 5-minutes average	Level D – Institute dust suppression measures
Dust Monitor	5.0 to >50 mg/m^3, 5-minute average	Level C – Institute dust suppression measures

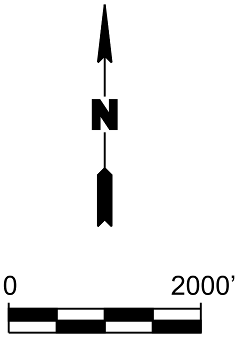
Note: Action levels are based on above background levels.

* Instrument readings will be taken in the breathing zone (BZ) of the workers, unless otherwise indicated.

** Suspend work in immediate area. Conduct air monitoring periodically to determine when work can continue. Implement mitigative measures.



QUADRANGLE LOCATION



SOURCE:
USGS; 1995, Central Park & Brooklyn
7.5 Minute Topographic Quadrangle

Title:

SITE LOCATION MAP

FORMER PARAGON PAINT AND VARNISH
COMPANY MANUFACTURING FACILITY
5-49 46TH AVENUE & 45-40 VERNON BOULEVARD
LONG ISLAND CITY, NEW YORK

Prepared for:

VERNON 4540 REALTY LLC

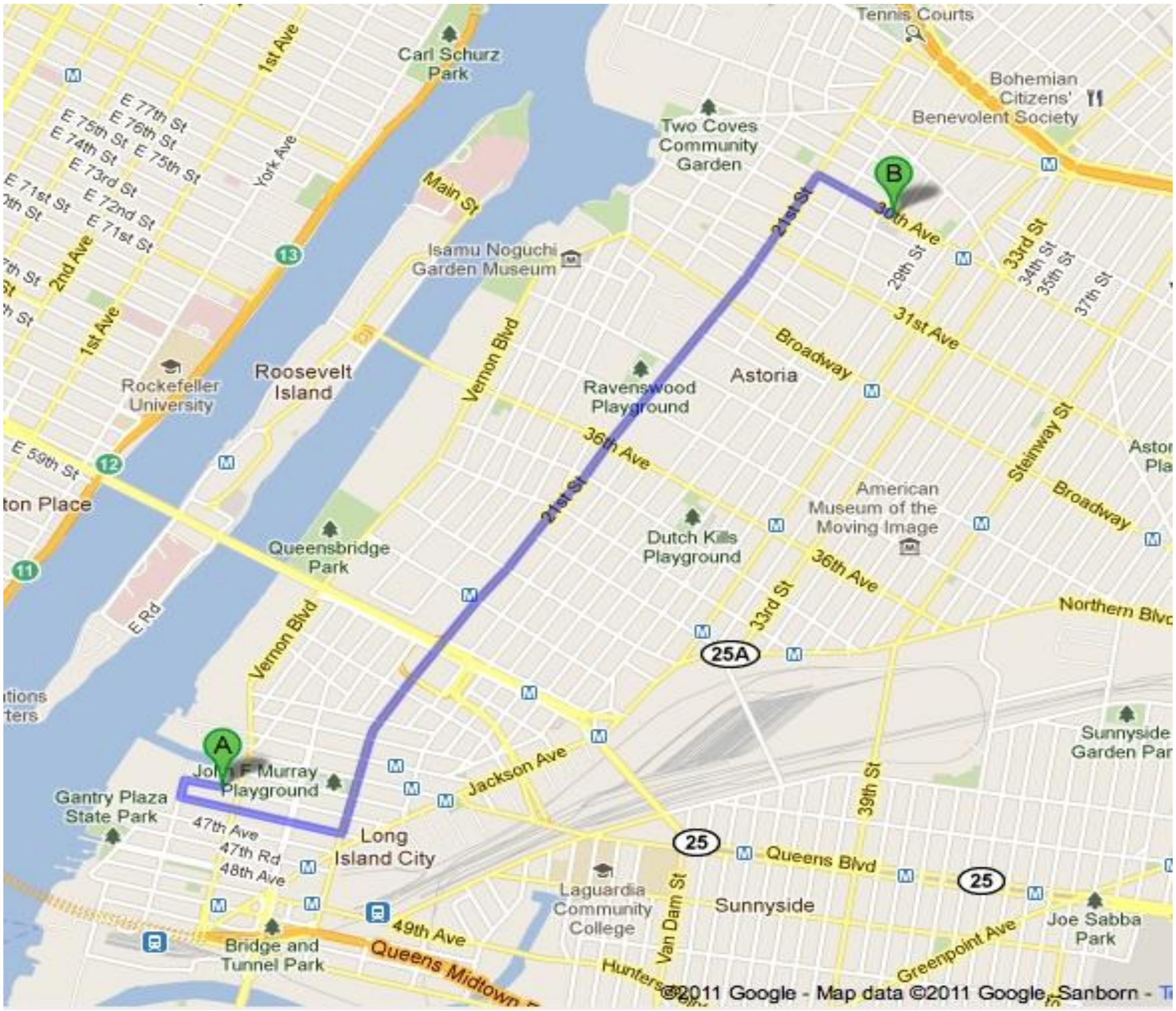
ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.M.	Date: 11OCT11	FIGURE
Prepared by: J.A.D.	Scale: AS SHOWN	1
Project Mgr.: R.M.	Project No.: 2051.0001Y000	
File: 2051.0001Y105.01.CDR		

V:\CAD\PROJECTS\2051Y\0001Y\105\2051.0001Y105.01.CDR

FIGURE 2

Directions to Mt. Sinai Queens Hospital – 25-10 30th Avenue, Long Island City, New York



- Head west on 46th Avenue toward 5th Street
- Turn left onto 46th Road
- Take the third left onto 21st Street
- Turn right onto 30th Avenue
- Arrive at Mt. Sinai Queens Hospital on your right

APPENDIX A

Activity Hazard Analysis and Material Safety Data Sheets

ACTIVITY HAZARD ANALYSIS

ACTIVITY: Mobilization/Demobilization **Analyzed by / Date:**________________________

Principal Steps	**Potential Hazards**	**Recommended Controls**
Temporary Facilities Set Up (Support and CRZ zones)	Noise	Ear plugs, ear muffs.
	Eyes	Safety glasses with side shields, safety visor or shield.
	Slips-Trips-Falls	Be sure footing is in a clear area free of loose material.
	Power Tools	Hard hats, work gloves.
	Heat Stress/Cold Stress	Follow heat stress/cold stress guidelines in HASP appendices.
	Cuts and Abrasions	Wear work gloves.
	Punctures	Wear puncture resistant steel toed boots, long sleeve shirts, work shirts or coveralls.
	Electrocution	Ground fault circuit interrupters, inspect power supply cords of equipment prior to use.
	Traffic Hazards	Wear orange safety vests and/or high visibility clothing.
	Insect Bites/Wildlife	Use insect repellent. Avoid contact with all wildlife.
	Sun exposure	Use sunscreen as needed, take breaks in shaded areas, drink ample fluids.

Equipment to be Used	**Inspection Requirements**	**Training Requirements**
Power Tools (e.g., Drills, Saws) Hand Tools (e.g., Hammer, Shovel, Pry Bars) Trailers, Vehicles, Low Boy, Heavy Equipment	Daily inspections to insure personnel wear appropriate PPE during mobilization and demobilization and survey work. Inspect equipment for wear or damage, test emergency shut-off switches. Ensure all equipment on wheels is chocked per Wheel Chocking Policy.	Tool box safety meetings. Review heavy equipment safety guidelines. Review Wheel Chocking Policy.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Contaminated Soil Excavation **Analyzed by / Date:**_________________________

Principal Steps	Potential Hazards	Recommended Controls
Work Zone Delineations Decon Area Layout Personal/Perimeter Air Monitoring Removal of Contaminated Soil Verification of Soil Removal Loading Contaminated Soil for Disposal Decon/Demobilization	Noise	Ear plugs, ear muffs.
	Eyes	Safety glasses with side shields or upgrade to Level C full-face respirators.
	Electrocution	Inspect area for overhead and/or subsurface electrical lines. Follow Lock out/Tag out Procedures.
	Puncture	Steel toe/steel shank boots. Avoid direct handling of soil – use shovels, rakes or squeegees.
	Wildlife	Avoid contact with all animals.
	Hose Connections	Make sure all vacuum line connections are clamped and secured.
	Traffic – Vehicle	Cones and flagging to be used for vehicles parked on streets – if a lane is to be taken, flagmen to be used.
	Traffic – Pedestrian	All work zones to be delineated by SSO to be able to control area from curious onlookers.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Contaminated Soil Excavation **Analyzed by / Date:**________________________

Equipment to be Used	**Inspection Requirements**	**Training Requirements**
Dump Truck(s) Rubber Tire Backhoe Miscellaneous Hand Tools Level D and Level C PPE Excavator	Prior to start of work daily - area for security - barriers in place - equipment inspection/proper wheel chocking PPE Inspections - before donning - buddy system to continually observe - upon de-suiting During Operations – that area remains secure Atmosphere - prior to entering confined space - continually during operations	40-Hour HAZWOPER 8-Hour Refresher Site Specific Training and Orientation Daily Safety Meetings

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Drilling Activities **Analyzed by / Date:________________________**

Principal Steps	Potential Hazards	Recommended Controls
Work Zone Delineations Decon Area Layout Personal Air Monitoring Installation of Soil Borings Installation of Monitoring Wells Installation of Soil Vapor Sampling Points Decon/Demobilization	Noise	Ear plugs, ear muffs.
	Eyes	Safety glasses with side shields or upgrade to Level C full-face respirators.
	Electrocution	Inspect area for overhead and/or subsurface electrical lines. Follow Lock out/Tag out Procedures.
	Puncture	Steel toe/steel shank boots. Avoid direct handling of soil – use shovels, rakes or squeegees. Leather and/or cut resistant work gloves as appropriate to protect hands.
	Wildlife/Insect Bites	Avoid contact with all animals, use insect repellent.
	Hose Connections	Make sure all vacuum line connections are clamped and secured.
	Traffic – Vehicle	Cones and flagging to be used for vehicles parked on streets – if a lane is to be taken, flagmen to be used.
	Traffic – Pedestrian	All work zones to be delineated by SSO to be able to control area from curious onlookers.
	Hands	Employ a “Show Hands Policy” between drillers and helpers.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Drilling Activities	**Analyzed by / Date:________________________**	
Equipment to be Used	**Inspection Requirements**	**Training Requirements**
Drill Rig Support Truck Miscellaneous Hand Tools Level D and Level C PPE	Prior to start of work daily - area for security - barriers in place - equipment inspection, including emergency shut-off switch testing PPE Inspections - before donning - buddy system to continually observe - upon de-suiting During Operations - that area remains secure Atmosphere - prior to entering confined space - continually during operations	40-Hour HAZWOPER 8-Hour Refresher Site Specific Training and Orientation Daily Safety Meetings

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Miscellaneous Fill Placement **Analyzed by / Date:**________________________

Principal Steps	Potential Hazards	Recommended Controls
Grading Placement of Fill	Abrasions; heat stress; cold stress; cuts; slips; trips; falls; insects; rodents and stray animals; hazardous noise; puncture; struck by moving heavy equipment; loading and unloading of heavy equipment; crushed or pinned between machinery; and nuisance dust.	Hard hats; safety glasses/goggles; work gloves; puncture resistant steel toed, steel shank work boots; reflective vest and/or high visibility clothing. Hearing protection (muffs/plugs). Personnel should stand at least 10 feet from moving or swing radius of equipment. Personal protective equipment.
Equipment to be Used	**Inspection Requirements**	**Training Requirements**
Bull dozer Grader Dump Trucks Water Truck Hand Tools (Shovels, etc.)	Periodic inspections to ensure site personnel wear the appropriate PPE. Daily site safety inspection check list. Heavy equipment/machinery must be inspected by SSHO & Operator, test emergency shutoff switches.	Tool box safety meetings. Review working around or near heavy equipment and review heavy equipment safety guidelines.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Sheeting/Pile Installation **Analyzed by / Date:________________________**

Principal Steps	Potential Hazards	Recommended Controls
Mobilization Equipment Set Up Unloading of Equipment Installation of Shoring/Sheeting Removal of Shoring Loading of Equipment Demobilization	Buried utilities and underground structures Truck traffic Slip / trip / fall Rigging to unload and handle materials Overhead hazards Workmen in the area Site control Equipment operation Sheeting installation and removal Demobilization of equipment Cold / heat stress Biological hazards Hearing protection / eye protection Hand protection Untrained personnel Electric powered hand tools Cutting torches	All trucks to be equipped with backup alarms – pedestrian traffic to have orange protective vests and/or high visibility clothing for visibility. All personnel are to be aware that the potential for slipping / tripping / falling exists at all times due to uneven terrain. Equipment being laid out and staged. Any person working at a height of greater than 6 feet must have a safety harness and shock absorbing lanyard. Sheeting being delivered to the site will have to be unloaded prior to this activity – all grips, slings, chains, clevises or grab hooks and any other lifting devices shall be inspected. A regular inspection of these items shall be made prior to their use for any lifting. Any equipment with frayed or broken components will be set aside and tagged and shall not be used until the appropriate repairs are made. Prior to the start of any activity, the area shall be checked for overhead hazards. Operators and spotters are to be aware of the potential for personnel and/or equipment to be in the work zone. No lifting and rigging shall go over a person or vehicle. During all phases of operations, the minimum personal protection will consist of hard hat, steel-toed and steel-shanked work boots, safety glasses. When handling wire rope, slings, chains, etc., appropriate hand protection will be used (leather or cut resistant work gloves). When working

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Sheeting/Pile Installation		**Analyzed by / Date:________________________**
Principal Steps	**Potential Hazards**	**Recommended Controls**
		around equipment, hearing protection shall be used. Extra care shall be taken to make sure no one's hands or feet are caught under or between metal objects when lifting or setting sheeting. Employ hand signals to give "all clear" approval. All personnel shall be trained and qualified to perform the task assigned them. Equipment operators are responsible to make sure their swing radius and work areas are clear. Operators are to be trained and competent with their equipment. During operations, a zone will be established outside of the swing radius and/or fall radius of the equipment and sheeting where control of persons entering and exiting can be safety maintained. The same type of control for vehicles will be maintained. Equipment will be in good working order, equipped with current protective devices and travel alarms, and chocked when not in use. A competent person shall have designed the sheeting/pile plan to meet the stress loads of the environment. This plan shall include all bracing, cross bracing, installation depths.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Sheeting/Pile Installation **Analyzed by / Date:**________________________

Principal Steps	Potential Hazards	Recommended Controls
		Hydraulic and/or airlines used to power the vibratory sheeting drive/extractor shall be checked twice daily. Operators and spotters will have a clear plan of communications. All hand signals will be predetermined. There will only be one person spotting for the operator that gives directions. If two-way communications are to be used, the channel will remain undisturbed during lifting and setting operations by company personnel. Tag lines as appropriate will be used to erect and disassemble the sheeting. When loading shoring up to demobilize, there shall not be any lifts over a person or equipment. Potential exists for cold / heat stress. Follow the guidelines for cold / heat stress in the HASP. Replenish fluids and take breaks, as necessary. If there is a need to utilize electric power tools, all cords will be inspected. Ground Fault Interrupter (GFI) outlets will be used. No guards shall have been removed and no triggers will be wired open. If cutting torches are utilized, all lines, gauges, regulators and torches shall be inspected prior to use. Tanks will have current inspection and be inspected upon receipt at the site prior to their use. A 30-minute fire watch will be maintained after burning activity has stopped for the day.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: Sheeting/Pile Installation **Analyzed by / Date:**_________________________

Equipment to be Used	Inspection Requirements	Training Requirements
Tractor Trailers Hydraulic Excavators and/or Cranes Interlocking Steel Sheeting/Shoring/Bracing Materials Miscellaneous Slings, Grips, chains, hooks, Clevises Miscellaneous Electric Power Tools Oxygen and Acetylene Torches Pile Drivers	Daily inspection of equipment as recommended by manufacturer. Inspection of work area and perimeters prior to start and during works operations. Twice daily inspection of cables, slings, etc., electric equipment, torches, regulators, gauges.	Current CDL license for tractor trailer operators. Competent person to develop shoring plan. Site specific HASP. Trained operations/laborers. Daily safety meetings.

ACTIVITY HAZARD ANALYSIS

(Continued)

ACTIVITY: In-situ Chemical Injections **Analyzed by / Date:________________________**

Principal Steps	Potential Hazards	Recommended Controls
Work Zone Delineations Decon Area Layout Personal Air Monitoring Mixing of Chemicals to be Injected Injection of Chemicals Decon/Demobilization	Noise	Ear plugs, ear muffs.
	Eyes	Safety glasses with side shields, safety visor or shield.
	Skin Contact/Irritation	Wear long sleeved shirts, have ample clean water supply in immediate vicinity of work zone to flush skin if needed.
	Slips-Trips-Falls	Be sure footing is in a clear area free of loose material.
	Power Tools	Hard hats, work gloves.
	Heat Stress/Cold Stress	Follow heat stress/cold stress guidelines in HASP appendices.
	Cuts and Abrasions	Wear work gloves.
	Punctures	Wear puncture resistant steel toed boots, long sleeve shirts, work shirts or cover alls.
	Electrocution	Ground fault circuit interrupters, inspect power supply cords of equipment prior to use.
	Traffic Hazards	Wear reflective safety vests and/or high visibility clothing.
	Insect Bites/Wildlife	Use insect repellent. Avoid contact with all wildlife.
	Sun exposure	Use sunscreen as needed, take breaks in shaded areas, drink ample fluids.

ACTIVITY HAZARD ANALYSIS

(Continued)

Equipment to be Used	Inspection Requirements	Training Requirements
Geoprobe [See Drilling Activity Hazard Analysis (AHA)]	Inspect drill rig for wear and tear and/or damage to rig or any pieces of the drill string or assembly. Test emergency shut offs. Ensure that drill rig is level and stable for injections to proceed. See Drilling AHA.	Competent drill rig operator. Identify subsurface utility lines prior to any drilling activities. (verify location with Site supervisor) Tool box safety meeting to review potential hazards.
Chemicals to be injected [Regenox Parts A and B; Metals Remediation Compound (MRC); Oxygen Releasing Compounds (ORC), etc.]	Store each chemical in the manner directed by manufacturer and per MSDS.	Review MSDS and manufacturer specifications and application procedures. Only required personnel should be near the chemicals, maintain distance from mixing and injection activities when possible.
Power Tools (e.g., Drills, Saws, Injection Pumps) Hand Tools (e.g., Hammer, Shovel, Pry Bars)	Daily inspections to insure personnel wear appropriate PPE during mobilization and demobilization and survey work. Inspect equipment for wear or damage, test emergency shut-off switches.	Tool box safety meetings.
Trailers, Vehicles, Low Boy, Heavy Equipment	Ensure all equipment on wheels is chocked per Wheel Chocking Policy.	Review heavy equipment safety guidelines. Review Wheel Chocking Policy.

APPENDIX B

Heat and Cold Stress Guidelines

Heat Stress

Heat stress is a significant potential hazard and can be associated with heavy physical activity and/or the use of personal protective equipment (PPE) in hot weather environments.

Heat cramps are brought on by prolonged exposure to heat. As an individual sweats, water and salts are lost by the body resulting in painful muscle cramps. The signs and symptoms of heat cramps are as follows:

- severe muscle cramps, usually in the legs and abdomen;
- exhaustion, often to the point of collapse; and
- dizziness or periods of faintness.

First aid treatment includes moving to a shaded area, rest, and fluid intake. Normally, the individual should recover within one-half hour. If the individual has not recovered within 30 minutes and the temperature has not decreased, the individual should be transported to a hospital for medical attention.

Heat exhaustion may occur in a healthy individual who has been exposed to excessive heat. The circulatory system of the individual fails as blood collects near the skin in an effort to rid the body of excess heat. The signs and symptoms of heat exhaustion are as follows:

- rapid and shallow breathing;
- weak pulse;
- cold and clammy skin with heavy perspiration;
- skin appears pale;
- fatigue and weakness;
- dizziness; and
- elevated body temperature.

First aid treatment includes cooling the victim, elevating the feet, and replacing fluids and electrolytes. If the individual has not recovered within 30 minutes and the temperature has not decreased, the individual should be transported to the hospital for medical attention.

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a **MEDICAL EMERGENCY**, requiring immediate cooling of the victim and transport to a medical facility. The signs and symptoms of heat stroke are as follows:

- dry, hot, red skin;
- body temperature approaching or above 105°F;
- large (dilated) pupils; and
- loss of consciousness – the individual may go into a coma.

First aid treatment requires immediate cooling and transportation to a medical facility.

Heat stress (heat cramps, heat exhaustion, and heat stroke) is a significant hazard if any type of protective equipment (semi-permeable or impermeable) which prevents evaporative cooling is worn in hot weather environments. Local weather conditions may require restricted work schedules in order to adequately protect personnel. The use of work/rest cycles (including working in the cooler periods of the day or evening) and training on the signs and symptoms of heat stress should help prevent heat-related illnesses from occurring. Work/rest cycles will depend on the work load required to perform each task, type of protective equipment, temperature, and humidity. In general, when the temperature exceeds 88°F, a 15 minute rest cycle will be initiated once every two hours. In addition, potable water and fluids containing electrolytes (e.g., Gatorade) will be available to replace lost body fluids.

Cold Stress

Cold stress is a danger at low temperatures and when the wind-chill factor is low. Prevention of cold-related illnesses is a function of whole-body protection. Adequate insulating clothing must be used when the air temperature is below 40°F. In addition, reduced work periods followed by rest in a warm area may be necessary in extreme conditions. Training on the signs and symptoms of cold stress should prevent cold-related illnesses from occurring. The signs and symptoms of cold stress include the following:

- severe shivering;
- abnormal behavior;

- slowing of body movement;
- confusion;
- weakness;
- stumbling or repeated falling;
- inability to walk;
- collapse; and/or
- unconsciousness.

First aid requires removing the victim from the cold environment and seeking medical attention immediately. Also, prevent further body heat loss by covering the victim lightly with blankets. Do not cover the victim's face. If the victim is still conscious, administer hot drinks, and encourage activity, such as walking wrapped in a blanket.

APPENDIX C

Medical Data Form

MEDICAL DATA SHEET

This form must be completed by all onsite personnel prior to the commencement of activities, and shall be kept by the Site Health and Safety Officer during site activities. This form must be delivered to any attending physician when medical assistance is needed.

(This form should be typed or printed legibly.)

Site: ____

Name: ____________________________ Home Telephone:________________
(Area Code/Telephone Number)

Address: ____

Date of Birth: ________________ Height:______________ Weight:____________

Emergency Contact: __________________________ Telephone:________________
(Area Code/Telephone Number)

Drug Allergies or Other Allergies: ____________________________

____

Previous Illnesses or Exposures to Hazardous Substances: ____________________

____

____

Current Medication (Prescription and Non-Prescription): ____________________

____

____

Medical Restrictions: ______________________________

____

Name, Address and Telephone Number of Person Physician: ____________________

____

APPENDIX D

Health and Safety
Briefing/Tailgate Meeting Form

HEALTH & SAFETY BRIEFING / TAILGATE MEETING FORM

Site Name / Location ______________________________

Date: ____________________ Weather Forecast: ____________________

Names of Personnel Attending Briefing

Planned Work

____

____

____

Instrument Calibration: Instrument/Time/Cal. Gas/Cal. Concentration/Actual Concentration

____

____

____

Items Discussed

____

____

____

____

____

Work Permit Type and Applicable Restrictions

____

____

____

Signatures of Attending Personnel

APPENDIX E

Accident Report and Investigation Form

☐ Roux Associates, Inc. ☐ Remedial Engineering, P.C.
(Check applicable company name)

ACCIDENT REPORT

Joe Gentile, Corporate Health and Safety Manager
Cell: (610) 844-6911; Office: (856) 423-8800; Office FAX: (856) 423-3220; Home: (484) 373-0953

PART 1: ADMINISTRATIVE INFORMATION

Project #: ______________________________
Project Name: ______________________________
Project Location (street address/city/state)**:**
____
____

Client Corporate Name / Contact / Address / Phone #:
____
____
____
____
____

Immediate Verbal Notifications Given To:

Corporate Health & Safety	☐Yes	☐No
Office Health & Safety	☐Yes	☐No
Office Manager	☐Yes	☐No
Project Principal	☐Yes	☐No
Project Manager	☐Yes	☐No
Client Contact	☐Yes	☐No

REPORT STATUS (time due):

☐ Initial (24 hr) ☐ Final (5-10 days)
Date: ___________ Date: ___________

Accident Report Delivered To:

Corporate Health & Safety	☐Yes	☐No
Office Health & Safety	☐Yes	☐No
Office Manager	☐Yes	☐No
Project Principal	☐Yes	☐No
Project Manager	☐Yes	☐No

REPORT TYPE: ☐ Loss ☐ Near Loss Estimated Costs: $ _______

OSHA CASE # Assigned by Corporate Health & Safety if Applicable: ______________________

Corporate Health & Safety Confirmed Final Accident Report
☐Yes ☐No

DATE OF INCIDENT: ________________

TIME INCIDENT OCCURRED: ____________ ☐AM ☐PM

INCIDENT LOCATION – City, State, and Country (If outside U.S.A.)
____

INCIDENT TYPES: (Select most appropriate if Loss occurred.)
From lists below, please select the option that best categories the incident. When selecting an injury or illness, also indicate the severity level.

☐**INJURY** ☐**ILLNESS**

------------------------**Severity Level**---------------------------

☐Fatality
☐Restricted Work
☐First Aid
☐Lost Time
☐Medical Treatment

OTHER INCIDENT TYPES

☐Spill / Release
Material involved:_______________
Quantity (U.S. Gallons): ____________
☐Misdirected Waste
☐Property Damage
☐Motor Vehicle
☐Consent Order
☐Exceedance
☐Fine / Penalty
☐NOV

ACTIVITY TYPE (Check most appropriate one.)

☐Decommissioning
☐Demolition
☐Dewatering
☐Drilling
☐Excavation
☐Gauging
☐Geoprobe
☐Motor Vehicle
☐Operations/ Maintenance
☐Pump/Pilot Test
☐Rigging/Lifting
☐Sampling
☐System Start-up
☐Trenching
☐AST/UST Removal
☐Other__________

INJURY TYPE (Check all applicable.)

☐Abrasion
☐Amputation
☐Burn
☐Cold/Heat Stress
☐Inflammation
☐Laceration
☐Occupational Illness
☐Puncture
☐Rash
☐Repetitive Motion
☐Sprain/Strain
☐Other__________

BODY PART AFFECTED (Check all applicable.)

☐Respiratory
☐Neck
☐Chest
☐Abdomen
☐Groin
☐Back
☐Shoulder
☐Arm
☐Wrist
☐Hand/Fingers
☐Eye
☐Head
☐Face
☐Leg
☐Knee
☐Ankle
☐Foot/Toes
☐Other______

I. PERSON(S) DIRECTLY / INDIRECTLY INVOLVED IN INCIDENT (Attach additional information as necessary/applicable.)

Name/Phone # of Each Person Directly/Indirectly Involved in Incident:	Designate: Roux/Remedial Employee Roux/Remedial Subcontractor Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:
1)				
2)				

II. PERSONS INJURED IN INCIDENT (Attach additional information as necessary/applicable.)

Name/Phone # of Each Person Injured in Incident:	Designate: Roux/Remedial Employee Roux/Remedial Subcontractor Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:	Description of Injury:
1)					
2)					

III. PROPERTY DAMAGED IN INCIDENT (Attach additional information as necessary/applicable.)

Property Damaged:	Property Location:	Owner Name, Address & Phone #:	Description of Damage:	Estimated Cost:
1)				$

2)				$

IV. WITNESSES TO INCIDENT (Attach additional information as necessary/applicable.)

Witness Name:	Address:	Phone #:
1)		
2)		

PART 2: WHAT HAPPENED AND INCIDENT DETAILS

PROVIDE FACTUAL DESCRIPTION OF INCIDENT (e.g., describe loss/near loss, injury, response / treatment).

I. AUTHORITIES/GOVERNMENTAL AGENCIES NOTIFIED (Attach additional information as necessary/applicable.)

Authority/Agency Notified:	Name/Phone #/Fax # of Person Notified:	Address of Person Notified:	Date & Time of Notification:	Exact Information Reported/Provided:

II. PUBLIC RESPONSES TO INCIDENT (if applicable)

Response/Inquiry By: (check one)	Entity Name:	Name/Phone # of Respondent/ Inquirer:	Address of Entity/Person:	Date & Time of Response/Inquiry:
☐Newspaper ☐Television ☐Community Group ☐Neighbors ☐Other ___________________				

Describe Response/Inquiry:

Roux/Remedial Response:

(Check all that apply.) (Attach photos, drawings, etc. to help illustrate the incident.)
ATTACHED INFORMATION: ☐Photo ☐Sketches ☐Vehicle Acord Form ☐Police Report ☐Other

Name(s) of person(s) who prepared Initial and Final Report:	**Title(s):**	**Phone number(s):**

PART 3: INVESTIGATION TEAM ANALYSIS

CONCLUSION: WHY IT HAPPENED (LIST CAUSAL FACTORS AND CORRESPONDING ROOT CAUSES)

(Root Causes: Lack of knowledge or skill, Doing the task according to procedures or acceptable practices takes more time or effort, Short-cuts or not following acceptable practices is reinforced or tolerated, Not following procedures or acceptable practices did not result in an accident, Lack of or inadequate procedures, Inadequate communications of expectations regarding procedures or acceptable practices, Inadequate tools or equipment, External Factors)

ROOT CAUSE(S) AND SOLUTION(S): HOW TO PREVENT INCIDENT FROM RECURRING

CAUSAL FACTOR	ROOT CAUSE		SOLUTION(S) [Must Match Root Cause(s)]		PERSON RESPONSIBLE	AGREED DUE DATE	ACTUAL COMPLETION DATE
			#	Solution(s)			
			1				
			2				
			3				

INVESTIGATION TEAM:

PRINT NAME	JOB POSITION	DATE	SIGNATURE

APPENDIX F

Acord Form

ACORD™ AUTOMOBILE LOSS NOTICE

DATE

PRODUCER **PHONE (A/C, No, Ext):** 516-678-2626

James C. Herrmann & Associates LTD
265 Sunrise Highway, Suite #20
Rockville Centre, NY 11570

CODE: **SUB CODE:**
AGENCY CUSTOMER ID:

COMPANY **NAIC CODE:** 19410
Commerce & Industry

MISCELLANEOUS INFO (Site & location code)

POLICY NUMBER CA-3777920

REFERENCE NUMBER **CAT #**

EFFECTIVE DATE	EXPIRATION DATE	DATE OF ACCIDENT AND TIME		PREVIOUSLY REPORTED
06/01/10	06/01/11		☐ AM ☐ PM	☐ YES ☐ NO

INSURED

NAME AND ADDRESS **SOC SEC # OR FEIN:** 11-2579482

Roux Associates, Inc.
209 Shafter Street
Islandia, NY 11749

RESIDENCE PHONE (A/C, No) NA
BUSINESS PHONE (A/C, No, Ext) 631-232-2600

CONTACT

☐ CONTACT INSURED

NAME AND ADDRESS

Susan Sullivan, General Counsel
Roux Associates, Inc.
209 Shafter Street
Islandia, NY 11749

RESIDENCE PHONE (A/C, No)
BUSINESS PHONE (A/C, No, Ext) 631-232-2600

WHERE TO CONTACT
Fax Notice:
631-232-1525

WHEN TO CONTACT

LOSS

LOCATION OF ACCIDENT (Include city & state)
AUTHORITY CONTACTED:
REPORT #:
VIOLATIONS/CITATIONS
DESCRIPTION OF ACCIDENT (Use separate sheet, if necessary)

POLICY INFORMATION

BODILY INJURY (Per Person)	BODILY INJURY (Per Accident)	PROPERTY DAMAGE	SINGLE LIMIT	MEDICAL PAYMENT	OTC DEDUCTIBLE	OTHER COVERAGE & DEDUCTIBLES (UM, no-fault, towing, etc)

LOSS PAYEE
COLLISION DED

UMBRELLA/ EXCESS ☐ UMBRELLA ☐ EXCESS **CARRIER:** **LIMITS:** AGGR PER CLAIM/OCC SIR/ DED

INSURED VEHICLE

VEH # **YEAR** **MAKE:** **BODY TYPE:** **PLATE NUMBER** **STATE**
MODEL: **V.I.N.:**

OWNER'S NAME & ADDRESS
RESIDENCE PHONE (A/C, No):
BUSINESS PHONE (A/C, No, Ext):

DRIVER'S NAME & ADDRESS ☐ (Check if same as owner)
RESIDENCE PHONE (A/C, No):
BUSINESS PHONE (A/C, No, Ext):

RELATION TO INSURED (Employee, family, etc.) Employee
DATE OF BIRTH
DRIVER'S LICENSE NUMBER
STATE
PURPOSE OF USE
USED WITH PERMISSION? ☐ YES ☐ NO

DESCRIBE DAMAGE
ESTIMATE AMOUNT
WHERE CAN VEHICLE BE SEEN?
WHEN CAN VEH BE SEEN?
OTHER INSURANCE ON VEHICLE

PROPERTY DAMAGED

DESCRIBE PROPERTY (If auto, year, make, model, plate #)
OTHER VEH/PROP INS? ☐ YES ☐ NO
COMPANY OR AGENCY NAME:
POLICY #:

OWNER'S NAME & ADDRESS
RESIDENCE PHONE (A/C, No):
BUSINESS PHONE (A/C, No, Ext):

OTHER DRIVER'S NAME & ADDRESS ☐ (Check if same as owner)
RESIDENCE PHONE (A/C, No):
BUSINESS PHONE (A/C, No, Ext):

DESCRIBE DAMAGE
ESTIMATE AMOUNT
WHERE CAN DAMAGE BE SEEN?

INJURED

NAME & ADDRESS	PHONE (A/C, No)	PED	INS VEH	OTH VEH	AGE	EXTENT OF INJURY

WITNESSES OR PASSENGERS

NAME & ADDRESS	PHONE (A/C, No)	INS VEH	OTH VEH	OTHER (Specify)

REMARKS (Include adjuster assigned)

REPORTED BY	REPORTED TO	SIGNATURE OF INSURED	SIGNATURE OF PRODUCER

ACORD 2 (2000/01) **NOTE: IMPORTANT STATE INFORMATION ON REVERSE SIDE**

Applicable in Arizona

For your protection, Arizona law requires the following statement to appear on this form. Any person who knowingly presents a false or fraudulent claim for payment of a loss is subject to criminal and civil penalties.

Applicable in Arkansas, District of Columbia, Kentucky, Louisiana, Maine, Michigan, New Jersey, New Mexico, Pennsylvania and Virginia

Any person who knowingly and with intent to defraud any insurance company or another person, files a statement of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact, material thereto, commits a fraudulent insurance act, which is a crime, subject to criminal prosecution and civil penalties. In D.C., LA, ME and VA insurance benefits may also be denied.

Applicable in California

Any person who knowingly files a statement of claim containing any false or misleading information is subject to criminal and civil penalties.

Applicable in Colorado

It is unlawful to knowingly provide false, incomplete, or misleading facts or information to an insurance company for the purpose of defrauding or attempting to defraud the company. Penalties may include imprisonment, fines, denial of insurance, and civil damages. Any insurance company or agent of an insurance company who knowingly provides false, incomplete, or misleading facts or information to a policy holder or claimant for the purpose of defrauding or attempting to defraud the policy holder or claimant with regard to a settlement or award payable from insurance proceeds shall be reported to the Colorado Division of Insurance within the Department of Regulatory Agencies.

Applicable in Florida and Idaho

Any person who knowingly and with the intent to injure, Defraud, or Deceive any Insurance Company Files a Statement of Claim Containing any False, Incomplete or Misleading information is Guilty of a Felony.*

* In Florida - Third Degree Felony

Applicable in Hawaii

For your protection, Hawaii law requires you to be informed that presenting a fraudulanet claim for payment of a loss or benefit is a crime punishable by fines or imprisonment , or both.

Applicable in Indiana

A person who knowingly and with intent to defraud an insurer files a statement of claim containing any false, incomplete, or misleading information commits a felony.

Applicable in Minnesota

A person who files a claim with intent to defraud or helps commit a fraud against an insurer is guilty of a crime.

Applicable in Nevada

Pursuant to NRS 686A.291, any person who knowingly and willfully files a statement of claim that contains any false, incomplete or misleading information concerning a material fact is guilty of a felony.

Applicable in New Hampshire

Any person who, with purpose to injure, defraud or deceive any insurance company, files a statement of claim containing any false, incomplete or misleading information is subject to prosecution and punishment for insurance fraud, as provided in RSA 638:20.

Applicable in New York

Any person who knowingly makes or knowingly assists, abets, solicits or conspires with another to make a false report of the theft, destruction, damage or conversion of any motor vehicle to a law enforcement agency, the Department of Motor Vehicles or an insurance company, commits a fraudulent insurance act, which is a crime, and shall also be subject to a civil penalty not to exceed five thousand dollars and the value of the subject motor vehicle or stated claim for each violation.

Applicable in Ohio

Any person who, with intent to defraud or knowing that he/she is facilitating a fraud against an insurer, submits an application or files a claim containing a false or deceptive statement is guilty of insurance fraud.

Applicable in Oklahoma

WARNING: Any person who knowingly and with intent to injure, defraud or deceive any insurer, makes any claim for the proceeds of an insurance policy containing any false, incomplete or misleading information is guilty of a felony.

APPENDIX G

OSHA 300

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year _______

U.S. Department of Labor
Occupational Safety and Health Administration

You must record information about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an injury and illness incident report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Form approved OMB no. 1218-0176

Establishment name ____________________

City ________________ State __________

Identify the person			Describe the case			Classify the case											
(A) Case No.	(B) Employee's Name	(C) Job Title (e.g., Welder)	(D) Date of injury or onset of illness (mo./day)	(E) Where the event occurred (e.g. Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g. Second degree burns on right forearm from acetylene torch)	**CHECK ONLY ONE** box for each case based on the most serious outcome for that case:				Enter the number of days the injured or ill worker was:		Check the "injury" column or choose one type of illness: (M)					
						Death	Days away from work	Remained at work		Away From Work (days)	On job transfer or restriction (days)	Injury	Skin Disorder	Respiratory Condition	Poisoning	Hearing Loss	All other illnesses
								Job transfer or restriction	Other record-able cases								
						(G)	(H)	(I)	(J)	(K)	(L)	(1)	(2)	(3)	(4)	(5)	(6)
						Page totals	0	0	0	0	0	0	0	0	0	0	0	0

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Injury	Skin Disorder	Respiratory Condition	Poisoning	Hearing Loss	All other illnesses
(1)	(2)	(3)	(4)	(5)	(6)

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

Page 1 of 1

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of…
(M)

(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 50 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name

Street

City State Zip

Industry description (e.g., Manufacture of motor truck trailers)

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

Employment information

Annual average number of employees

Total hours worked by all employees last year

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Company executive Title

Phone Date

OSHA's Form 301
Injuries and Illnesses Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor

Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by

Title

Phone Date

Information about the employee

1) Full Name

2) Street

City State Zip

3) Date of birth

4) Date hired

5) ☐ Male
☐ Female

Information about the physician or other health care professional

6) Name of physician or other health care professional

7) If treatment was given away from the worksite, where was it given?

Facility

Street

City State Zip

8) Was employee treated in an emergency room?
☐ Yes
☐ No

9) Was employee hospitalized overnight as an in-patient?
☐ Yes
☐ No

Information about the case

10) Case number from the Log *(Transfer the case number from the Log after you record the case.)*

11) Date of injury or illness

12) Time employee began work AM/PM

13) Time of event AM/PM ☐ Check if time cannot be determined

14) **What was the employee doing just before the incident occurred?** Describe the activity, as well as the tools, equipment or material the employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

15) **What happened?** Tell us how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."

16) **What was the injury or illness?** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt", "pain", or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

17) **What object or substance directly harmed the employee?** Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.

18) **If the employee died, when did death occur?** Date of death

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

APPENDIX H

Weekly Safety Report

APPENDIX H

WEEKLY SAFETY REPORT

Job Name______________________________ Job#______________________

Week of: Days Without Lost Time Injury:

Describe any recordable incidents or accidents:

What actions were taken to prevent such incidents or accidents from occurring again?

Was training conducted addressing the incident? Y N What date?___

What level of PPE is currently in place?

Has PPE been upgraded or downgraded?

Have Perimeter Air Monitoring action limits been exceeded:

What action was taken to mitigate the exceedance?

Have personal air monitoring limits been exceeded:

What actions were taken?

List any problems with air monitoring equipment:

Write a summary of work completed during the week:

Write a summary of proposed work for the coming week:

Summarize any safety issues that are outstanding:

HSO Name: ________________________ HSO Signature: ________________________

APPENDIX I

Job Safety and Health Protection Poster

You Have a Right to a Safe and Healthful Workplace.

IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act.*
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

The *Occupational Safety and Health Act of 1970 (OSH Act),* P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act.* The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at **www.osha.gov**. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA

www.osha.gov

U.S. Department of Labor • **Occupational Safety and Health Administration** • **OSHA 3165**

APPENDIX E

Community Air Monitoring Plan

APPENDIX E

C241108 Revised RIWP, 02-07-2013
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

> **Continuous monitoring** will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

PLATE

Site Plan With Previous Soil and Water Analytical Exceedances

MW-11	4/24/07	4/24/07
Depth	7-8	25-26
VOCs		
Acetone	14000	ND

MW-10	4/24/07
Depth	5-6
SVOCs	
Benzo[a]anthracene	1500
Benzo[a]pyrene	1400
Benzo[b]fluoranthene	1800
Chrysene	1400
Indeno[1,2,3-cd]pyrene	710
METALs	
Lead	210
Mercury	0.53
Zinc	250

MW-10	5/2/07	5/2/07
Analyte		
METALs	Dissolved	Total
Lead	ND	251
Mercury	ND	2.3
Sodium	2700000	3000000

MW-1	5/24/06
Depth	10-11
SVOCs	
Benzo[a]anthracene	6000
Benzo[a]pyrene	5600
Benzo[b]fluoranthene	5300 M
Benzo[k]fluoranthene	2700 M
Chrysene	5000
Dibenzo[a,h]anthracene	2300 H
Indeno[1,2,3-cd]pyrene	5800 H
METALs	
Lead	170
Mercury	0.85

MW-6	4/17/07	4/17/07	4/17/07
Depth	10-11	13-14	14-15
VOCs			
1,2,4-Trimethylbenzene	170000	450000	200000
1,3,5-Trimethylbenzene	96000	210000	ND
Ethylbenzene	7600	22000	ND
Naphthalene	19000	ND	ND
n-Butylbenzene	26000	76000	57000
n-Propylbenzene	46000	120000	97000
sec-Butylbenzene	NE	36000	40000
METALs			
Arsenic	21	NE	NE

MW-11	5/2/07	5/2/07
Analyte		
METALs	Dissolved	Total
Chromium	ND	60
Lead	ND	42
Manganese	782	1610
Sodium	770000	810000

MW-8	4/23/07	4/23/07
Depth	6-7	13-14
VOCs		
1,2,4-Trimethylbenzene	7000	12000
Acetone	ND	17000
n-Propylbenzene	6500	NE

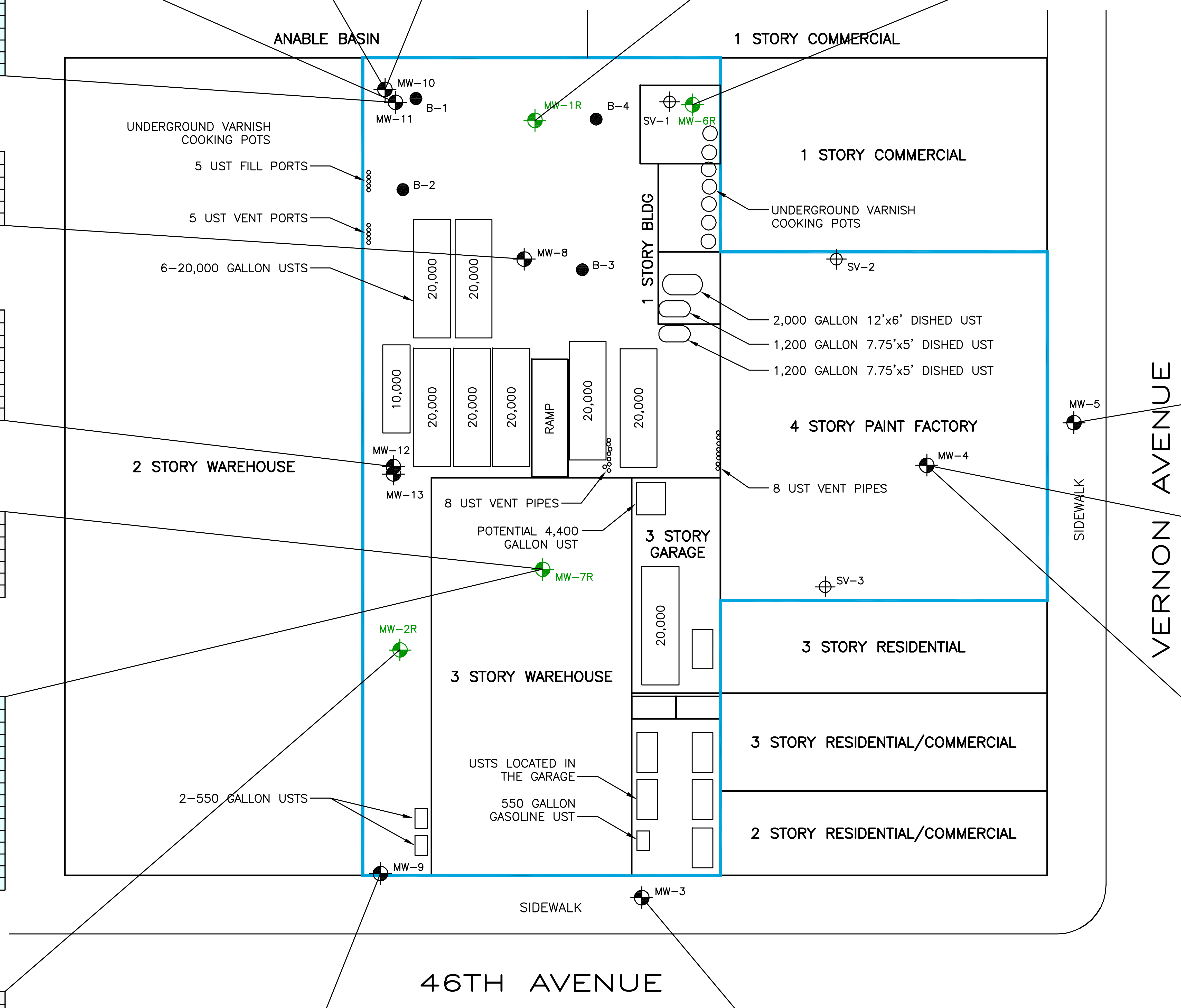
MW-12	4/25/07	4/25/07	4/25/07
Depth	3-4	8-9	17-18
VOCs			
Acetone	240	ND	ND
SVOCs			
Benzo[a]anthracene	7100	ND	ND
Benzo[a]pyrene	5900	ND	ND
Benzo[b]fluoranthene	5900	ND	ND
Chrysene	6600	ND	ND

MW-7	4/17/07	4/17/07
Depth	4-5	6-7
VOCs		
1,2,4-Trimethylbenzene	ND	110000
n-Butylbenzene	42000	29000
n-Propylbenzene	56000	33000
sec-Butylbenzene	35000	ND

MW-7	5/2/07	5/2/07
Analyte		
VOCs		
Isopropylbenzene	NA	87
sec-Butylbenzene	NA	280
tert-Butylbenzene	NA	98
METALs	Dissolved	Total
Arsenic	ND	102
Chromium	ND	160
Copper	ND	454
Lead	ND	1240
Manganese	316	1550
Mercury	ND	2
Nickel	ND	110
Selenium	ND	12
Sodium	31000	40000

MW-2	5/24/06
Depth	10-12
VOCs	
Acetone	2500 JB
Ethylbenzene	1600 J
Methylene chloride	710 JB
Xylenes (total)	28000

MW-9	4/23/07	4/23/07
Depth	14-15	15.5
VOCs		
1,2,4-Trimethylbenzene	29000	23000
1,3,5-Trimethylbenzene	9200	NE
Acetone	13000	14000
n-Propylbenzene	5300	6100



MW-3	5/25/06
Depth	10-12
VOCs	
Acetone	2400 JB
Methylene chloride	670 JB

MW-5	5/2/07	5/2/07	6/5/06	6/5/06
Analyte				
METALs	Dissolved	Total	Dissolved	Total
Lead	ND	ND	ND	44.1
Manganese	785	911	NA	NA
Sodium	630000	680000	NA	NA

MW-4	5/23/06	5/23/06
Depth	11-12	15-16
VOCs	NA	NA
2-Butanone (MEK)	ND	490 J
Acetone	NE	970 JB
Methylene chloride	NE	130 JB
Xylenes (total)	ND	380 J
METALs		
Lead	80.2	NE
Mercury	1.6	1

MW-4	5/2/07	5/2/07	6/5/06	6/5/06
Analyte				
VOCs				
Isopropylbenzene	NA	56	NA	NA
Naphthalene	NA	20	NA	27
n-Butylbenzene	NA	36	NA	NA
n-Propylbenzene	NA	82	NA	NA
p-Isopropyltoluene	NA	8.9	NA	NA
sec-Butylbenzene	NA	53	NA	NA
tert-Butylbenzene	NA	21	NA	NA
METALs	Dissolved	Total	Dissolved	Total
Arsenic	NE	39	NE	NE
Chromium	ND	130	ND	NE
Copper	ND	238	NA	NA
Lead	ND	91	ND	31.3
Manganese	497	2250	NA	NA
Nickel	ND	123	NA	NA

N

LEGEND

▬	PROJECT SITE BOUNDARY
B-2 ●	1975 GEOTECHNICAL SOIL BORING LOCATION
MW-8 ⊕	AKRF MONITORING WELL LOCATION
SV-3 ⊕	AKRF SOIL VAPOR SAMPLING LOCATION
▭	UNDERGROUND STORAGE TANK (UST)

SOIL

Parameter (Concentrations in μg/kg)	Standards* (μg/kg)
VOCs	
1,2,4-Trimethylbenzene	3600
1,3,5-Trimethylbenzene	8400
2-Butanone (MEK)	120
Acetone	50
Ethylbenzene	1000
Methylene chloride	50
Naphthalene	12000
n-Butylbenzene	12000
n-Propylbenzene	3900
sec-Butylbenzene	11000
Xylenes (total)	260
SVOCs	
Benzo[a]anthracene	1000
Benzo[a]pyrene	1000
Benzo[b]fluoranthene	1000
Benzo[k]fluoranthene	800
Chrysene	1000
Dibenzo[a,h]anthracene	330
Indeno[1,2,3-cd]pyrene	500
METALs (Concentrations in mg/kg)	(mg/kg)
Arsenic	13
Lead	63
Mercury	0.18
Zinc	109

Concentrations in μg/kg
μg/kg - Micrograms per kilogram
mg/kg - Milligrams per kilogram
*NYSDEC Part 375 Unrestricted Use Standards
NYSDEC - New York State Department of Environmental Conservation
J - Estimated value
M - Manually integrated compound
H - Alternate peak selection upon analytical review
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
NE - No exceedance
ND - No detection

WATER

Parameter (Concentrations in μg/L)	Standards* (μg/L)
VOCs	
Isopropylbenzene	5
Naphthalene	10
n-Butylbenzene	5
n-Propylbenzene	5
p-Isopropyltoluene	5
sec-Butylbenzene	5
tert-Butylbenzene	5
METALs	
Arsenic	25
Chromium	50
Copper	200
Lead	25
Manganese	300
Mercury	0.7
Nickel	100
Selenium	10
Sodium	20000

Concentrations in μg/L
μg/L - Micrograms per liter
*NYSDEC AWQSGVs
NYSDEC - New York State Department of Environmental Conservation
AWQSGVs - Ambient Water-Quality Standards and Guidance Values
B - Found in laboratory blank
E - Exceeds calibration limit
D - Dilution
J - Estimated value
DUP - Duplicate Sample
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
NE - No exceedances

SOURCE OF MAP
AKRF, ADDITIONAL SUBSURFACE INVESTIGATION REPORT, JUNE 2007

30' 0 30'

Title:

SITE PLAN WITH PREVIOUS SOIL AND WATER ANALYTICAL EXCEEDANCES

REMEDIAL INVESTIGATION WORK PLAN

Prepared For:

VERNON 4540 REALTY LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting and Management

Compiled by: R.M.	Date: 01OCT12	PLATE
Prepared by: B.H.C.	Scale: AS SHOWN	1
Project Mgr: R.M.	Project: 2051.0001Y000	
File: 2051.0001Y105.02.DWG		

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