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August 2, 2005

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Re: Offsite Investigation Work Plan (Revised)
Parcel 9, Queens West Development
Hunters Point, Queens, NY

Dear Mr. Walsh and Mr. Brevdo:

Enclosed is the revised Offsite Investigation Work Plan for a supplemental investigation on off-site areas adjacent to Parcel 9 in the Queens West Development. The investigation is intended to attempt to locate the source of the dense non-aqueous phase liquid (DNAPL) present at the western end of Parcel 9 and in adjacent off-site locations.

The work plan has been revised to address NYSDEC's comments provided to AKRF (via e-mail) on July 7, 2005. A response to the NYSDEC's comments is summarized below:

Comment 1) Figure 3 - In order to more efficiently achieve goals of the off-site investigation, i.e. determine location of the sources for all three NAPL zones existing on the site, I believe that the following changes should be made:

- *MW-1 should be moved towards the south to have it located at the sidewalk area at the south-western corner of parcel 9*
- *MW-2 should be moved toward the south to have it located on the dividing area of 48th Avenue*
- *Additional two wells should be proposed - MW-11 on the northeast side of intersection of Center Blvd. and 47th Road; and MW-12 - on the northern sidewalk area of 47th Road, approximately in the middle of the northern side of Parcel 9 where LNAPL was detected (this would be 80-120 feet east of MW-11).*

MW-1 and MW-2 have been relocated (see Figure 3).

The two locations proposed by the NYSDEC for new wells are very close to the locations of existing wells installed as part of the investigations on the Stage 2 site. MW-11 is near TRC-MW-17 and MW-12 is near TRC-MW-4 (a cluster well). Both locations are on the Stage 2 site (see Figure 3). As a result, we believe that the two additional wells proposed by the NYSDEC (MW-11 & MW-12) are not warranted.

Comment 2) *I believe that soil-gas investigation should be included in the work plan for both Parcel 9 and off-site Parcel 9 (i.e. on Parcel 8).*

The off-site soil gas study for Parcel 9 has already been completed. The results will be included in the off-site investigation report, in addition to any other interim reports detailing the soil gas data.

Comment 3) Page 6, Section 3.3 on the top of page. Determination of depth . . "screens installed with screen below the top of glacial till" is not complete description. Since there appear to be LNAPL and DNAPL on the site, I believe wells have to be screened at water table to detect LNAPL and at deeper elevation to detect DNAPL. Therefore, wells with different screening levels need to be installed.

Section 3.3 has been modified to state that if field screening indicates evidence of free product at the groundwater surface (as LNAPL), then a shallow well will also be constructed and screened across the groundwater surface.

Comment 4) Page 4, Section 3.2 "Soil Sampling", first paragraph - Depth of borings must be sufficient to detect DNAPL.

Our experience with the on-site borings indicates that where DNAPL is present it is located directly above either the till layer or the clay/silt layer that is found at locations where the till dips to deeper elevations. Drilling to 5 feet below the surface of the till or the surface of the bedrock (whichever is shallower), as proposed, is therefore deep enough to detect DNAPL if present.

Comment 5) Page 5, Section 3.2 and 3.3 and Page 8, Section 3.5 - reference to NYSDOH Analytical Services Protocol Category B deliverables. I was under impression that it is NYSDEC's Analytical Services Protocol and not NYSDOH's. NYSDOH's is an ELAP Program that the analytical lab must be approved by.

The reference to NYSDOH has been corrected.

Comment 6) Page 6, Section 3.3, second paragraph – Why turbidity of groundwater must be lower than 10? Regular requirement is 50 NTU. Will AKRF be able to get turbidity in sample lower than 10 NTU?

The turbidity target has been changed to 50 NTU.

Comment 7) Page 6, Section 3.5, 1st paragraph - States that "consequently, groundwater from wells containing LNAPL or DNAPL will not be sampled". Why is that? With this approach we may turn out to not have any groundwater data. Can water samples be taken from mid-span of the well where there is neither LNAPL nor DNAPL present?

The reason for not analyzing groundwater samples from wells with LNAPL or DNAPL is not that it is technically infeasible, but that it does not yield useful information. It can be assumed that any contaminant present in a well as free product will be at its saturated concentration in the dissolved phase.

Comment 8) Figure 3 - I would want to see Figure 3 contain location of all sampling points from (at minimum) the latest RI of Parcel 9 as well as areas of contamination delineated on the figure. This would demonstrate more clearly why we are investigating Parcel 8 as an off-site area for Parcel 9 and why such off-site investigation is warranted.

Figure 3 has been revised to show the prior on-site sampling points and areas of (petroleum and coal tar) contamination.

Comment 9) AKRF may need to add more borings down Center Blvd south of SB-7. MW-1 and MW-2 may not be enough to characterize the tar in that corner of the site.

Monitoring Wells MW-1, 2, 3, 4, 5, and 6 are all placed along Center Boulevard south of SB-7. We've tried to avoid drilling in the center of the more heavily trafficked portion of Center Boulevard at the intersection with 48th Avenue.

We intend on implementing the work in late August 2005, pending approval of the work plan by the NYSDEC and availability of our drilling subcontractors. Please call me at 646-388-9534 or e-mail at marc_godick@akrf.com if you have questions or comments.

Sincerely yours,
AKRF, Inc.



Marc S. Godick
Vice President

cc: Denise D'Ambrosio, DEC
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Submitted to:

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OFF-SITE INVESTIGATION WORK PLAN

PARCEL 9

Queens West Development

Queens, New York

Project Number: 10516

Revised August 2005

Queens West Development – Parcel 9

Site No. C241049

QUEENS, NEW YORK

Offsite Investigation Work Plan

AKRF Project Number: 10516

Prepared for:

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REVISED AUGUST 2005

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1.0 INTRODUCTION

The Queens West Development is a project of the Queens West Development Corporation (QWDC), a subsidiary of New York State's Empire State Development Corp., under the collective sponsorship of The Port Authority of New York and New Jersey, The New York City Economic Development Corporation, and Empire State Development Corporation. The overall Queens West Development site comprises 74 acres along the East River in Hunters Point, Queens, extending from Anable Basin to the north to Newtown Creek to the south (Figure 1). Stage I of the development involves construction of residential buildings on the portion of the site between 47th Road and 50th Avenue. The development sites in this area have been designated Parcels 8, 9, 10, and 11 (Figure 2).

In August 1998, a Voluntary Cleanup Agreement was entered into between New York State Department of Environmental Conservation (NYSDEC) and QWDC. This agreement covered Parcels 8, 9, and 11 and the portion of Center Boulevard between Parcels 8 and 9. In July 2000, the Voluntary Cleanup Agreement was amended to allow it to be separated into separate agreements for each parcel, which would be executed by the designated developer for the parcel. Accordingly, after AvalonBay Communities was selected as the developer of Parcels 8, 9, and 11, AvalonBay executed separate agreements for each of the three parcels in September 2000. In March 2004, AvalonBay requested that DEC transition Parcels 8 and 9 into the Brownfields Cleanup Program.

This Supplemental Remedial Investigation is intended to locate any soil or groundwater contamination which may be found in off-site locations adjacent to Parcels 9, which includes Parcel 8. All work will be performed in accordance with the Quality Assurance Project Plan (Appendix A) the site specific Health and Safety Plan (Appendix B), and the Community Air Monitoring and Odor and Vapor Control Plan (Appendix C).

2.0 SITE DESCRIPTION

2.1 Site Location

Parcel 9 is located in the Hunters Point section of Queens, New York. The parcel is bounded by 5th Street on the east, 48th Avenue on the south, Center Boulevard on the west, and 47th Road on the north. It has a total area of approximately 1.79 acres, and includes Lots 5 and a portion of Lot 19 of Tax Block 19 of Queens County.

The offsite locations are located on Parcel 8, which is across Center Boulevard to the west of the site, and also on Center Boulevard between 47th Road and 49th Avenue, and along 48th Avenue east of Center Boulevard.

2.2 Site and Vicinity Characteristics

Parcel 9 is vacant. Parcel 8 is vacant; all former structures having been demolished in 2001. The entire parcel is surrounded by a chain-link fence. Parcel 10, located across 48th Avenue southeast of the site, is occupied by a high-rise residential building, which also includes a public elementary school, P.S. 78, and a day care center. The area between Parcel 8 and the East River is Peninsula Park, a part of the Queens West waterfront park. The East River is located roughly 300 feet west of the site. The area north of the site, across 47th Road, is currently undergoing remediation and is slated for future residential development.

2.3 Site Geology, Hydrogeology and Subsurface Characteristics

The top 10 to 12 feet of soil over most of the Queens West area is miscellaneous fill, which often includes ash and demolition debris. This is usually underlain by a layer of alluvial sand and/or a stratum of soft gray organic silty clay, representing old marsh deposits. Below the sand and organic deposits is a layer of glacial till up to 30 feet thick, underlain by bedrock.

The groundwater elevations observed during AKRF's 2005 Supplemental Remedial Investigation indicate a general flow from northeast to southwest, towards the East River. These results are generally consistent with studies performed elsewhere in the Queens West area, which show groundwater flow to the west, towards the East River, with some tidal influence at locations close to the river. Groundwater studies performed by TRC Engineers in publicly accessible off-site areas north, east and west of Parcel 8 show local groundwater flowing towards a depression in 47th Road, approximately 150 feet west of 5th Street. The groundwater depression in 47th Road was also noted in the studies performed by AKRF in 1989.

2.4 Nearby Public Areas of Concern

There is a high-rise residential building which contains a public elementary school and a day care center to the south of the site, across 48th Avenue. Peninsula Park, a portion of the Queens West waterfront park, is located immediately west of Parcel 8.

2.5 Site History

The history of the site and the surrounding area is summarized in the Hunters Point Development Final Environmental Impact Statement (June 1990). Hunters Point area was originally a rocky outcrop surrounded by low-lying marshlands and tidal meadows. Filling of the wetlands and development of the area began in the mid-19th century. Starting around 1890, the area became a major industrial center. Historic Sanborn Insurance Maps show the following uses on and adjacent to the site:

Historical On-Site and Area Uses

Year	On-site Uses	Adjacent Areas
1898	Lawson-Valentine Boiler Works Warren Chemical Co. (western edge of site)	West - Warren Chemical Co. North – vacant, small commercial bldgs East – manufacturing, commercial, residential South – Barber Asphalt
1915	Edward Smith Varnish Works Blau Gas Company of America Barber Asphalt	West – vacant North – National Varnish Co. East – manufacturing, commercial, residential South – railyards
1936	Edward Smith Varnish Works Harlem Chemical Co. Stanley Barrel Corp. Crest Mfg – Plumbers Supplies Kelly Dry Ginger Ale Corp.	West – Liquid Carbonic Corp. North – Quimby Corp East – manufacturing, commercial, residential South – railyards
1950	Paint and Varnish Works Harlem Chemical Co. Refrigeration Equip. Mfr. Crest Mfg – Plumbers Supplies Auto Repair.	West – Liquid Carbonic Corp. North – Buchman Spark Wheel Mfr., Mfr. of Detergents and Insecticides East – manufacturing, commercial, residential South – railyards
1970	Hub Paint Works Adam Metal Supply	West – Metal Storage Warehouse North – Buchman Spark Wheel, Mfr., Mfr. of Detergents and Insecticides East – manufacturing, commercial, residential

Year	On-site Uses	Adjacent Areas
		South – railyards
1979	Vacant Charles Offset Co.	West – Hallen Contractors North – Buchman Spark Wheel Mfr., Mfr. of Detergents and Insecticides East – manufacturing, commercial, residential South – railyards
1988	Vacant Charles Offset Co.	West – Hallen Contractors North – Buchman Spark Wheel Mfr., Mfr. of Detergents and Insecticides East – manufacturing, commercial, residential South – railyards
1996	Vacant Charles Offset Co.	West – Hallen Contractors North – Buchman Spark Wheel Mfr., Mfr. of Detergents and Insecticides East – manufacturing, commercial, residential South – vacant

In summary, the eastern end of the site was occupied by varnish or paint manufacturers from sometime prior to 1915 until the 1970's. It has been mostly vacant since that time. The western portion of the site has been occupied by a variety of manufacturing uses. The Blau Gas Company of America occupied a portion of the site in 1915, but was gone by 1936. The Blau Gas process involved "cracking" petroleum to increase the concentrations of the lighter fractions, which were then distilled off, purified, and compressed into cylinders. The waste from this type of process would be a petroleum product distinguishable from manufactured gas plant (MGP) wastes derived from coal. The Blau Gas plant on the site was a small facility which occupied about a one-half acre portion of the site, and is not comparable to a typical MGP facility either in the type of process or the scale of operations. Other historic uses on the western portion of the site include an asphalt company, the Harlem Chemical Company, which manufactured insecticides, a plumbing supply manufacturer, a refrigeration equipment manufacturer, a barrel manufacturer, and an auto repair shop.

2.6 Previous Studies

Soil and groundwater sampling programs were performed on the site in 1985-86 and in 1989 as part of assessments of the entire Queens West Development area (then known as the Hunters Point Waterfront Development). The results are reported in the Final Environmental Impact Statement, Hunters Point Waterfront Development, dated June 1990. Elevated levels of benzene, toluene, ethylbenzene, and xylene (BTEX), and naphthalene were detected in groundwater sampled from a monitoring well near the southwest corner of Parcel 9.

Testing performed by AKRF in 1998 is reported in Site Assessment Report, Queens West Development Site, Parcels 8 and 9, Queens, New York, dated June 1998. This additional testing was requested by NYSDEC, which reviewed and approved the work plan. Groundwater samples from three wells contained elevated levels of BTEX and naphthalene. In 2000, when it was possible to gain access to the interiors of the buildings on Parcel 9, a supplemental sampling program was performed, following a sampling protocol approved by NYSDEC (Supplemental Site Assessment Report, Queens West Development Site, Parcel 9, Building Interiors, Queens, New York, dated September 2001). When the buildings on Parcel 9 were demolished in September-October 2000, two steel vaults set in concrete full of oily water, sludge and debris were discovered. A spill (00-0618) was reported for the site and the steel vaults and the concrete

surrounding them were removed. The Supplemental Site Assessment Report concluded that no changes were warranted in the approved Remedial Work Plan for Parcel 9.

A Supplemental Remedial Investigation (RI) was performed by AKRF on the site in 2005 (Supplemental Remedial Investigation Report, April 2005). The investigation was intended to assess potential contamination from the Blau Gas manufacturing facility, which was located on the western portion of Parcel 9 of the Queens West Development area around 1915, and to provide the data required for development of a Supplemental Remedial Work Plan. Following completion of the Supplemental RI, additional testing was performed to better delineate the horizontal and vertical extent of soil contamination. Soil borings were performed at 17 locations in and around the areas where the Supplemental Remedial Investigation detected hydrocarbon contamination. Levels of metals in the native soils below the fill were at typical background levels.

An Additional Delineation Investigation was initiated in April and May 2005 to further quantify and more accurately delineate the areas of subsurface hydrocarbon contamination and to generate the data required to prepare a Remedial Action Work Plan (RAWP).

2.7 Description of Contemplated Site Use

The proposed development on the site is a high-rise residential building, which would be located on the western half of the site. A multi-level parking garage would occupy the eastern half of the site. Neither structure would have a basement or any subgrade levels.

3.0 FIELD PROGRAM

3.1 Field Program Summary

The objectives of the field-sampling program are:

- To attempt to locate the source of the Dense Non-Aqueous Phase Liquid (DNAPL) present at the western end of Parcel 9;
- To determine the nature and extent of soil and groundwater contamination in off-site locations around Parcel 9.

A total of 15 soil borings and 10 soil borings/monitoring wells will be installed, for a total of 25 sampling locations. The proposed monitoring well and soil sampling locations are shown on Figure 3.

3.2 Soil Sampling

Fifteen soil borings will be completed to characterize subsurface soils and collect soil samples for laboratory analysis. Figure 3 depicts soil boring locations SB-1 through SB-15. The borings will be advanced to a depth of five feet below the surface of the glacial till layer, or to bedrock, whichever is shallower. If field screening indicates that hydrocarbon contamination extends deeper than five feet below the surface of the till layer, then the boring will be continued until clean soil or bedrock is encountered.

The soil borings will be advanced using a direct push probe (DPP) drill rig, such as the HurricaneTM rig. The HurricaneTM rig is equipped with 4-inch solid stem auger drilling capabilities to advance through concrete and other subsurface obstacles that normally preclude the use of standard direct push rigs.

Soil samples will be collected on a continuous basis using a 4-foot long, 2-inch diameter, macrocore piston rod sampler fitted with an acetate liner. Each sample will be split lengthwise and logged by AKRF field personnel. Logging will consist of: describing the soil according to the modified Burmister Classification System; describing any evidence of contamination (e.g., oil-like or tar-like NAPL, staining, sheens, odors); and screening for organic vapors using a photoionization detector (PID).

Two soil samples from each probe will be selected for laboratory analysis based on PID response and visual and olfactory indications of contamination. The depth intervals of samples collected will be determined based on trends observed in the field (i.e., contamination limited to vadose/saturated zone, no contamination observed, contamination observed in a particular depth layer). In the absence of contamination, soil samples from the vadose and saturated zones will be collected immediately above and below the water table, respectively.

The soil samples slated for analysis will be collected into laboratory-supplied containers, sealed and labeled, as described in the Quality Assurance Project Plan (QAPP) (Appendix A), and placed in a chilled cooler. The samples will be analyzed in a laboratory following New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) Category B deliverables. Samples will be analyzed for volatile organic compounds (VOCs - EPA Method 8260), semivolatile organic compounds (SVOCs - EPA Method 8270), polychlorinated biphenyls (PCBs - EPA Method 8081), pesticides (EPA Method 8082) and target analyte list (TAL) metals.

All sampling equipment (probe rods and macrocore sampler) will be decontaminated between sampling locations. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/ Simple Green® and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment.

Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground. All drill cuttings, plastic samples sleeves, and decontamination water will be containerized in 55-gallon drums and handled as described in Section 3.6. Each boring will be pressure grouted with bentonite-cement slurry upon completion.

3.3 Soil Boring/Monitoring Well Installation

Monitoring wells will be installed at ten locations to detect potential DNAPL and to delineate groundwater contamination. Locations of the proposed wells (MW-1 through MW-10) are depicted on Figure 3. All wells will be screened just above the surface of the glacial till (between 20-40 feet below grade). If field screening of soil samples collected at the respective location indicates that light non-aqueous phase liquid (LNAPL) may be present, then a second (shallow) well at the location will be installed and screened across the groundwater surface.

A hollow-stem auger rotary rig will be used to core through any existing asphalt or concrete surface. Soil samples will be collected by driving a split spoon sampler into the subsurface at two-foot intervals until a depth of five feet below the surface of the glacial till layer, or bedrock is encountered, whichever is shallower. Each soil sample will be logged and screened for organic

vapors. Two soil samples will be collected from each soil boring for laboratory analysis. If no evidence of contamination (visual, odor or PID readings) is apparent in any boring location, one sample will be collected from the surface (0-2') and one sample will be collected from the groundwater interface. If evidence of contamination is noted, one of the two soil samples will be collected from the interval where evidence is noted. The soil samples slated for analysis will be collected into laboratory-supplied containers, sealed and labeled, as described in the Quality Assurance Project Plan (QAPP) (Appendix A), and placed in a chilled cooler. The samples will be analyzed in a laboratory following NYSDEC ASP Category B deliverables. Soil samples will be analyzed for VOCs (EPA Method 8260), SVOCs (EPA Method 8270), PCBs (EPA Method 8081), pesticides (EPA Method 8082) and metals.

Borings for the wells will be installed using 6.25-inch outside diameter hollow stem augers and a truck-mounted drill rig. The wells will be constructed with two-inch diameter PVC, with ten feet of 0.02 slotted screens installed immediately above the top of the glacial till. The shallow wells, if required, will be constructed with two-inch diameter PVC, with ten feet of 0.02 slotted screens (four feet of screen above and six feet of screen below the top of the water table). A one-foot sump will be provided at the bottom of each well to provide a reservoir for DNAPL accumulation. The annular space around the well screen will be backfilled with sand filter pack extending from the bottom of the well to one to two feet above the screen. The annular space around the well riser will be sealed with bentonite extending one to two feet above the sand filter pack and completed with a non-shrinking cement mixture to approximately one foot below grade. Monitoring wells will be completed using locking, flush-with-grade gate boxes. A concrete apron will be set around the gate box or steel casing to prevent drainage of surface runoff toward the well.

Following installation, each monitoring well will be developed via over-pumping, or surging and pumping, or until at least three well volumes have been evacuated. The purge water will be monitored for turbidity and water quality indicators (i.e., pH, dissolved oxygen, oxidation-reduction potential, temperature, and specific conductivity) with measurements collected approximately every five minutes. Development will continue until turbidity is less than 50 nephelometric turbidity units (NTUs) for three successive readings or until water quality indicators have stabilized, whichever occurs first. The criteria for stabilization will be three successive readings within 10% for pH, temperature and specific conductivity.

Hollow stem augers will be decontaminated between monitor well locations by steam cleaning using a tap water/Simple Green® solution. Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground. All monitor well drill cuttings, well development water, decontamination water, and purge water will be containerized in 55-gallon steel drums and handled as described in Section 3.6.

3.4 Surveying

At the completion of sampling activities, all existing and newly-installed monitoring wells will be surveyed by a New York State-licensed surveyor. Three elevation measurements will be taken at each well location: the elevation of the ground beside the well; the elevation on the rim of the gate box or protective casing; and the elevation of the top of PVC casing.

3.5 Groundwater Monitoring

Monitoring wells will not be sampled until at least one week following initial development. Prior to collecting the samples, the depth to groundwater and LNAPL or DNAPL (if present) will be measured in the wells using an electronic oil/water interface probe attached to a measuring tape

accurate to 0.01 feet. The probe will be lowered to the bottom of each well to check for the presence of DNAPL. Monitor wells containing measurable LNAPL or DNAPL would be indicative of dissolved phase contaminant concentrations beyond their respective saturation points. Consequently, groundwater from wells containing LNAPL or DNAPL will not be sampled. A sample of the NAPL will be collected and submitted to Meta Environmental, Inc. (Meta) in Watertown, MA for forensic hydrocarbon fingerprint analysis by modified EPA Method 8100.

The water level data, well diameter and depth will be used to calculate the volume of water in each well. The wells will then be purged using low-flow purging techniques, as described in the QAPP. Groundwater samples will be collected using dedicated pump tubing and placed directly into laboratory-supplied sample bottles. The samples will be analyzed in a laboratory following NYSDEC ASP Category B deliverables. Samples will be analyzed for TCL VOCs by EPA Method 8260 and TCL SVOCs by EPA Method 8270. All non-dedicated sampling equipment (e.g., submersible pumps and oil/water interface probe) will be decontaminated between sampling locations using the following procedure:

1. Scrub equipment with a bristle brush using a tap water/Simple Green® solution.
2. Rinse with tap water.
3. Scrub again with a bristle brush using a tap water/Simple Green® solution.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment.

All decontamination water will be placed in 55-gallon drums and handled as described in Section 3.6.

3.6 Management of Investigation-Derived Waste

All investigation-derived waste (IDW) will be containerized in DOT-approved 55-gallon drums. The drums will be sealed at the end of each work day and labeled with the date, the well or boring number(s), the type of waste (i.e., drill cuttings, development water or purge water) and the name of an AKRF point-of-contact. Soil samples collected from soil borings and monitoring well installation activities will be used for waste characterization of soils, since such data would be biased towards areas which are expected to be most contaminated. Notwithstanding, additional waste characterization soil samples will be collected, if warranted. Grab samples will be collected from drums containing well development and purge water for waste characterization of liquids. The samples will be analyzed for VOCs, SVOCs, and lead using TCLP, PCBs, total petroleum hydrocarbons (TPH), ignitability, corrosivity, reactivity, and total cyanide. All drums will be labeled "pending analysis" until laboratory data is available. All IDW will be disposed of or treated according to applicable local, state and federal regulations.

3.7 Citizen Participation

Assistance will be provided to NYSDEC in performing Citizen Participation activities. These activities will include preparing a Fact Sheet that will describe the site, provide a summary of the purpose and goals of the investigation, include a project schedule and milestones, and list sources of additional information. The Fact Sheet will be sent to persons on a mailing list, including adjacent property owners, elected officials, any relevant community groups, and local media, before the start of field work. The mailing list is attached as Appendix E.

4.0 REPORTING REQUIREMENTS

4.1 Progress Report

A monthly progress report, describing the activities conducted during the respective month as outlined in this work plan, will be submitted to the NYSDEC by the 10th day of the following month. Submission of progress reports will be suspended upon submission of the Supplementary Remedial Investigation Report (SRIR) to the NYSDEC, at which time recommendations and a schedule for additional work will be proposed. The progress reports will include the following:

- Activities relative to the site during the previous reporting period and those anticipated for the next reporting period;
- Description of approved activity modifications including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable;
- Update of schedule including percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays; and
- Information regarding activities undertaken in support of the Citizen Participation Plan during the previous reporting period and those anticipated for the next reporting period.

4.2 Site Investigation Report

Upon completion of all field work and receipt of laboratory analytical results, a Supplementary Remedial Investigation Report (SRIR) will be prepared that will: document field activities; present field and laboratory data; evaluate exposure and risks to human health; and discuss conclusions and recommendations drawn from the results of the investigation.

4.2.1 Description of Field Activities

This chapter of the SRIR report will describe the field methods used to characterize the site conditions, including: sampling techniques; field screening equipment; drilling and excavation equipment; monitoring well installation procedures; and management of investigation-derived waste.

4.2.2 Soil Quality

The SRIR report will include a chapter on soil quality that presents field and laboratory data from the soil boring survey. The chapter will include a description of soil characteristics. Field and laboratory analytical results will be presented and compared with regulatory standards and/or guidance values. Figures will be provided that illustrate soil boring locations along with corresponding contaminant concentrations. Soil boring logs and laboratory analytical reports will be provided as attachments.

4.2.3 Groundwater Quality

This chapter will present groundwater monitoring results. Well survey data and water level measurements will be used to create a groundwater contour map and determine groundwater flow direction. Groundwater analytical results will be presented in the body of the report and on figures, and the detected concentrations will be compared to

regulatory standards and/or guidance values. Groundwater sampling logs and laboratory analytical reports will be provided as attachments.

4.2.4 Qualitative Human Health Exposure Assessment

The SRIR will include a Qualitative Human Health Exposure Assessment.

4.3 Schedule of Work

A tentative schedule for implementing the Supplementary Remedial Investigation Work Plan is provided below:

Table 2 - Supplementary Remedial Investigation Schedule

Week after start-up	Activity
1	Geoprobe soil borings and installation of monitoring wells.
2	Installation and development of monitoring wells.
3	Sampling of monitoring wells.

5.0 REFERENCES

1. AKRF Inc.; *Site Assessment Report, Queens West Development Site, Parcels 8 and 9*, Queens, New York; June 1998.
2. AKRF, Inc.; *Supplemental Site Assessment Report, Queens West Development Site, Parcel 9, Building Interiors*, Queens, New York; September 2001.
3. AKRF, Inc.; *Supplemental Remedial Investigation Report, Parcel 9, Queens West Development*, Queens, New York; April 2005.
4. EDR, Sanborn, Inc.; *Historical Fire Insurance Maps*; 1898, 1915, 1936, 1950, 1970, 1979, 1988, and 1996.
5. Hunters Point Waterfront Development; *Final Environmental Impact Statement*, June 1990.
6. TRC Engineers, Inc.; *Results of Initial Groundwater Hydrology Characterization, Queens West Development Stage 2 Site,* August 23, 2004.
7. TRC Engineers, Inc.; *Amended Supplemental Investigation and Design Report No. 10 Queens West Development Stage 2 Site;* December, 2004.
8. TRC Engineers, Inc.; *Supplemental Investigation Report No. 11, Queens West Development Stage 2 Site;* December, 2004.

FIGURES



SCALE IN FEET

0' 1000' 2000' 4000'

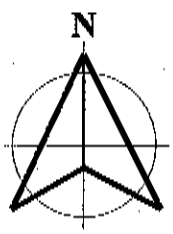
SCALE: 1"=2000'



QUADRANGLE

SOURCE:

USGS TOPOGRAPHIC MAP - BROOKLYN, N.Y.
QUADRANGLE - DATED 1967, PHOTOREVISED 1979



QUEENS WEST PARCEL 9

Queens, New York

PROJECT SITE LOCATION

AKRF

Environmental Consultants

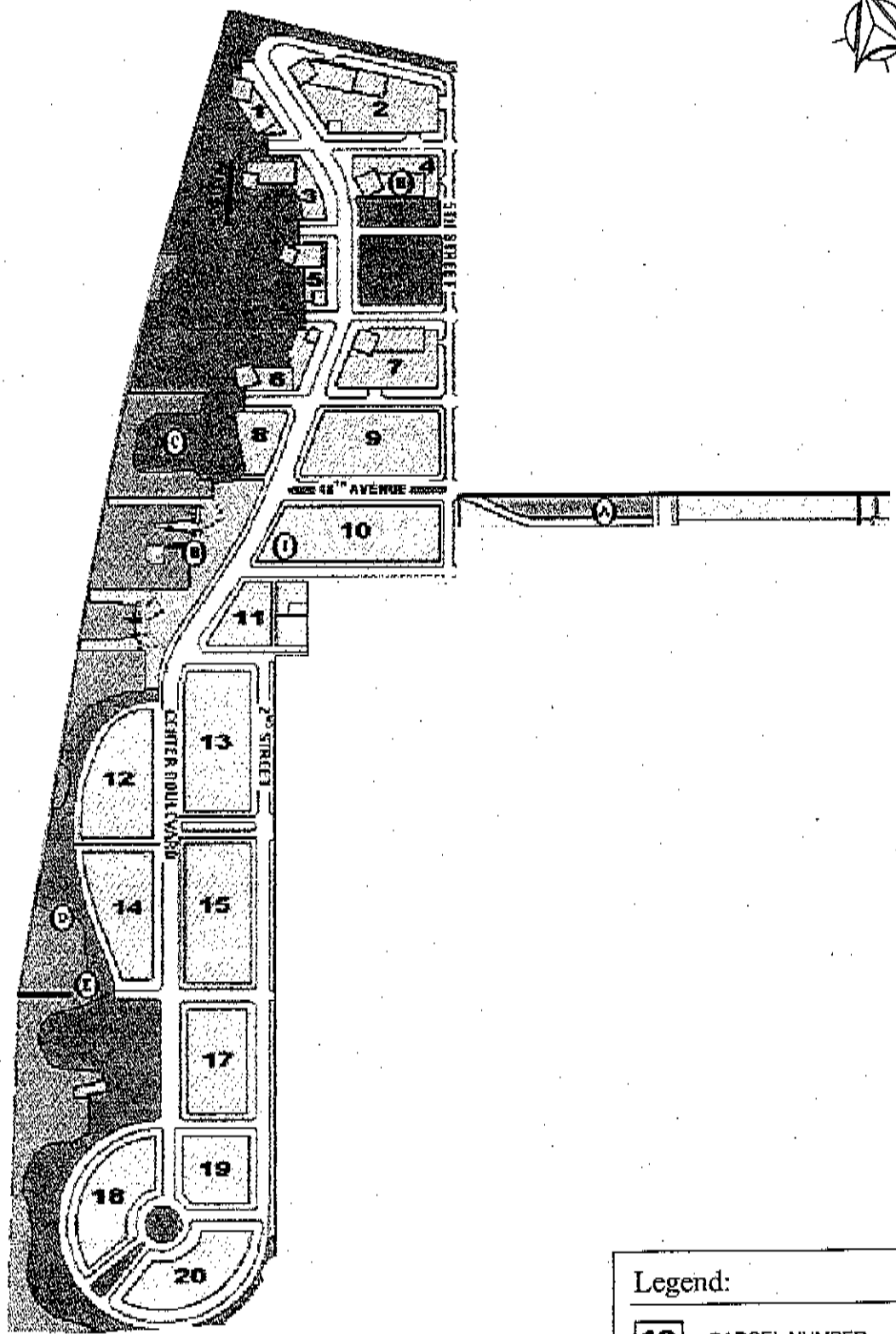
440 Park Avenue South, New York, NY 10016

DATE 04.04.05

PROJECT No. 10516

FIGURE No. 1

2004 AKRF, Inc. Environmental Consultants Q:\akrf-data\10516 Queens West Parcel 9\10516-0001_F1_site location plan.pub



Legend:

10 PARCEL NUMBER

QUEENS WEST PARCEL 9
Queens, New York

QUEENS WEST DEVELOPMENT PARCELS

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE 04.06.05
PROJECT No. 10516
FIGURE No. 2

2004 AKRF, Inc. Environmental Consultants M:\AKRF PROJECT FILES\10515 Queens West Parcel 9\Figures\F2_Site Plan

STAGE 2 SITE

TRC - MW-19 | TRC - MW-18 | TRC - MW-17 | TRC - MW-4 | TRC - MW-5

47th ROAD

PENINSULAR PARK

PARCEL 8

PARCEL 9

CONCRETE SIDEWALK

CONCRETE SIDEWALK

CONCRETE SIDEWALK

CONCRETE SIDEWALK

CENTER BOULEVARD

48th AVENUE

5th STREET

49th ROAD

APARTMENT BUILDING
WTH SCHOOL AND
DAY CARE CENTER

MW-16 | SB-11 | MW-8 | SB-8 | SB-4 | SB-1 | TRC - MW-3 | SB-12 | SB-9 | SB-5 | SB-2 | SB-15 | SB-13 | SB-10 | SB-6 | MW-9 | SB-14 | MW-7 | SB-7 | TRC - MW-7 | MW-6 | MW-1 | SB-3 | MW-2 | MW-5 | MW-3 | MW-4

A-1 | A-2 | A-3 | A-4 | A-5 | A-6 | A-7 | A-8 | A-9 | A-10 | A-11 | A-13

P-1 | P-2 | P-3 | P-4 | P-5 | P-6 | P-7 | P-8 | P-9 | P-11 | P-12 | P-13 | P-14 | P-15 | P-16 | P-17

S-1 | S-2 | S-3 | S-4 | S-5 | S-6 | S-7 | S-8 | S-9 | S-10 | S-11 | S-12 | S-13 | S-14 | S-15 | S-16 | S-17 | S-18 | S-19 | S-20 | S-21

Legend:

- PROJECT SITE BOUNDRY
- STAGE 2 SITE BOUNDRY
- CHAIN-LINK FENCE
- EDGE OF PERMANENT SHEETING
- PROPOSED SOIL BORING / MONITORING WELL
- PROPOSED SOIL BORING
- EXISTING TRC MONITORING WELL
- EXISTING ONSITE MONITORING WELL
- P-2 — SOIL BORING
- S-2 — SOIL BORING (PREVIOUS STUDY)
- APPROXIMATE LIMITS OF EXCAVATION
- PETROLEUM CONTAMINATED SOIL
- COAL TAR CONTAMINATED SOIL

© 2005 AKRF, Inc. Environmental Consultants M:\AKRF Project Files\10516 - Queens West Sites B & 9\Parcel 8 and Offsite Site Investigation Work Plan\Figures\P1_Offsite_Sampling_Plan.dwg

AKRF
Environmental Consultants
440 Park Avenue South, New York, 10016

QUEENS WEST PARCEL 9 OFFSITE INVESTIGATION
Queens, New York

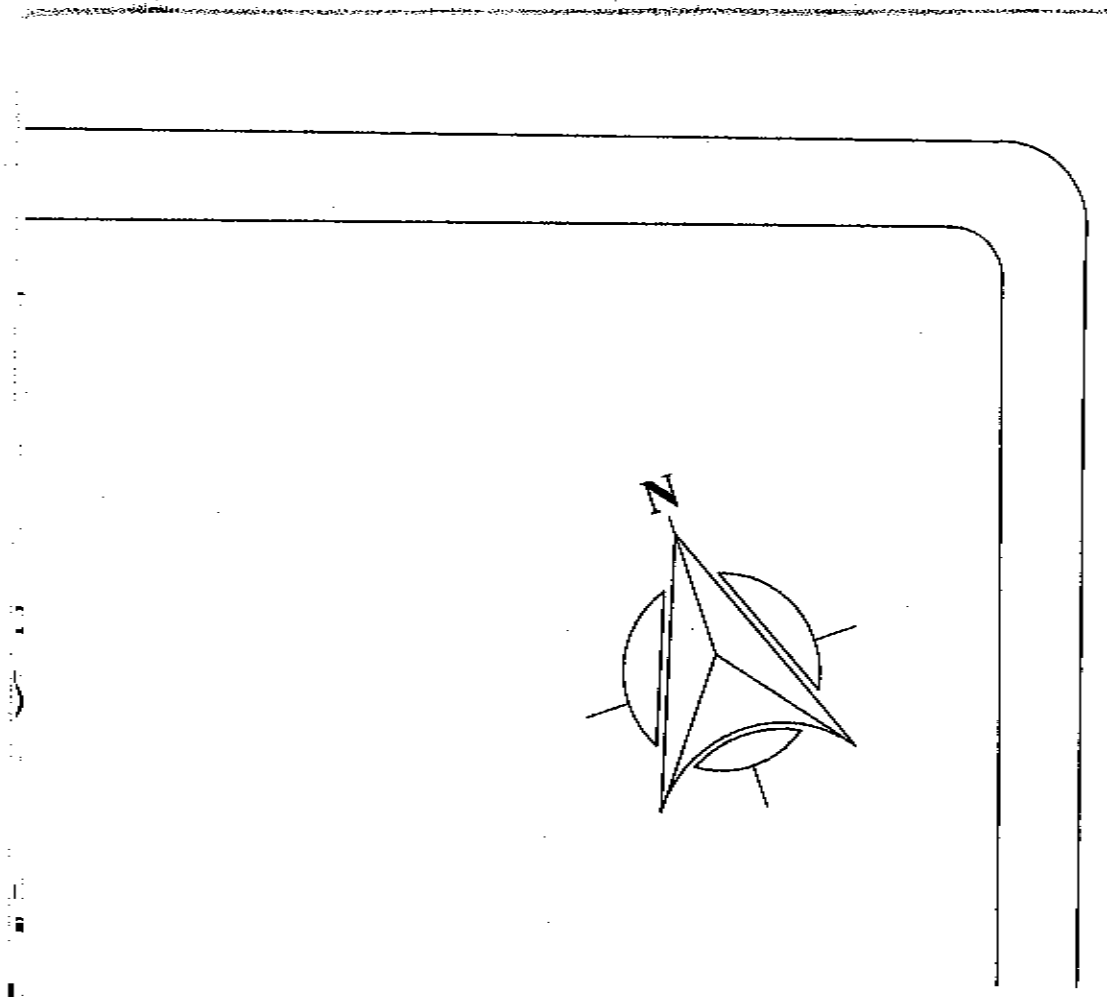
SITE PLAN INDICATING PROPOSED SAMPLING LOCATIONS

DATE
06.08.05

SCALE
1"=70'

PROJECT No.
10516

FIGURE No.
3



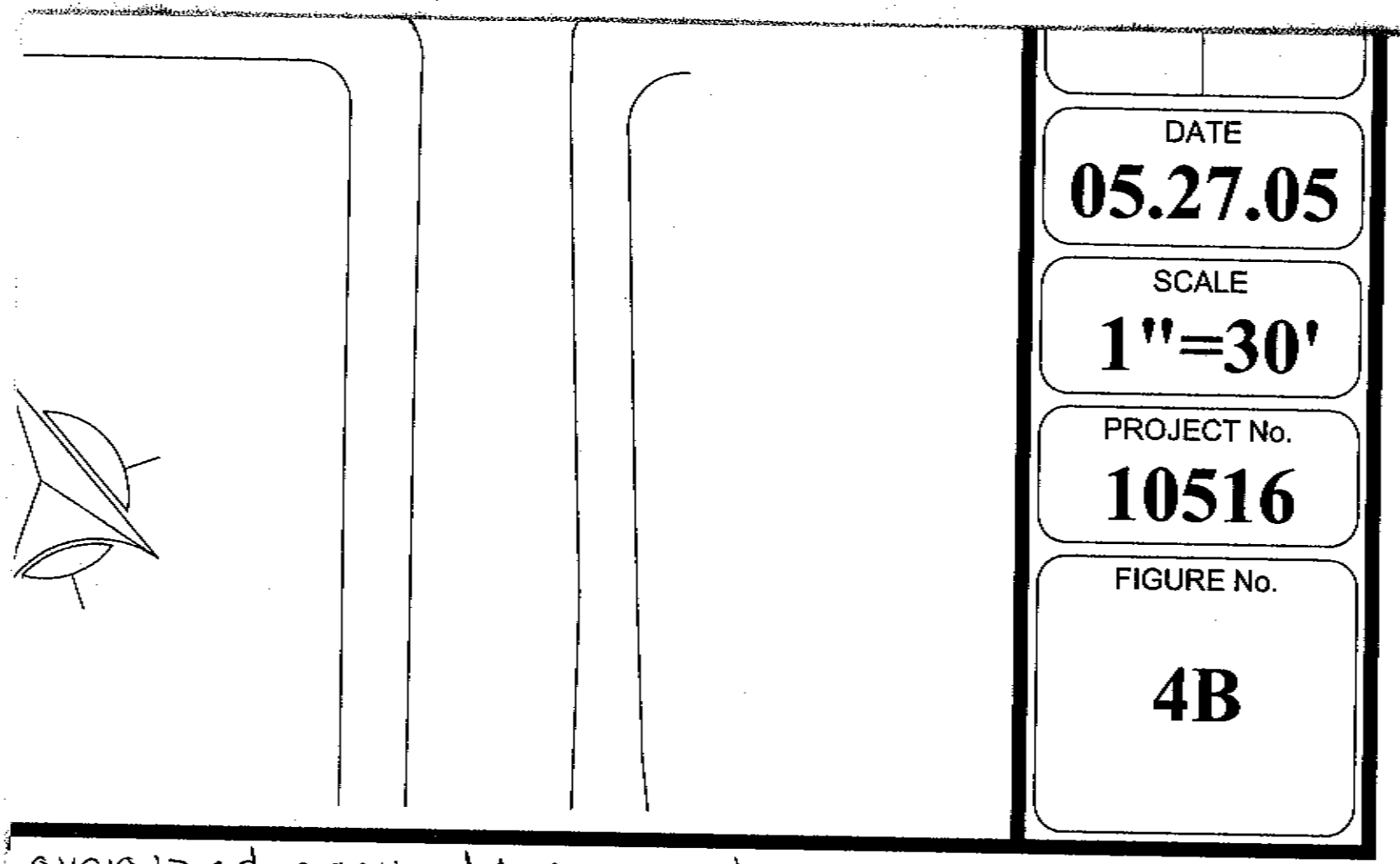
DATE
05.27.05

SCALE
1"=30'

PROJECT No.
10516

FIGURE No.
4A

oversized original: composite Sanborn Map: 1898-1936



DATE
05.27.05

SCALE
1"=30'

PROJECT No.
10516

FIGURE No.
4B

oversized original: composite Sanborn map: 1950-1979

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

Queens West Development

Parcel 9

Offsite Investigation Work Plan

Site No. V00194

QUEENS, NEW YORK

Quality Assurance Project Plan

AKRF Project Number: 10516

Prepared for:

AvalonBay Communities
535 Fifth Avenue
New York, New York 10017

Prepared by:

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, NY 10016
212-696-0670

REVISED AUGUST 2005

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ATTACHMENTS

Attachment A - Resume of Project QA/QC Officer, Project Director and Project Manager

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Offsite Investigation Work Plan (SRIWP) for Parcel 9 at the Queens West Development Site in Hunters Point, Queens, New York. The objective of the QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental investigative, sampling and remedial activities conducted under the SIWP. Adherence to the QAPP will ensure that defensible data will be obtained during the investigation and remediation.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 PROJECT DIRECTOR

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team, the New York State Department of Environmental Conservation (NYSDEC), and Queens West Development to ensure a smooth flow of information between involved parties. Marc S. Godick, LEP, will serve as the project director for the SIWP. Mr. Godick's resume is included in Attachment A.

2.2 PROJECT MANAGER

The project manager will be responsible for directing and coordinating all elements of the SIWP. He will prepare reports and participate in meetings with Queens West Development and/or the NYSDEC. Rebecca Kinal, P.E. will serve as the project manager for the SIWP. Ms. Kinal's resume is included in Attachment A.

2.3 FIELD TEAM LEADER

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and HASP. She will report to the Project Manager on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified, responsible person, able to act professionally and promptly during soil disturbing activities. Jessica Leber will be the field team leader for the SIWP. Ms. Leber's resume is included in Attachment A.

2.4 PROJECT QUALITY ASSURANCE/QUALITY CONTROL OFFICER

The Quality Assurance/Quality Control (QA/QC) Officer will be responsible for adherence to the QAPP. She will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic site visits to assess implementation of the procedures. The QA/QC officer will also be responsible for preparing a Data Usability Summary Report (DUSR) for soil, soil gas and groundwater analytical results, as described in Section 5.0 of this QAPP. Michelle Lapin, P.E. will serve as the QA/QC officer for the SIWP. Ms. Lapin's resume is included in Attachment A.

2.5 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL OFFICER

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. He/she will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued. He/she will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be a representative of STL, Inc. located in Shelton, Connecticut, where all samples will be analyzed.

3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the remedial and investigative activities included in the SIWP. During these operations, safety monitoring will be performed as described in the project Health and Safety Plan (HASP) and all field personnel will wear appropriate personal protective equipment.

3.1 SOIL SAMPLING

Fifteen soil borings will be completed to characterize subsurface soils and collect soil samples for laboratory analysis. Soil borings locations SB-1 through SB-15 are depicted in Figure 3 of the Work Plan. The probes will be advanced to a depth of five feet below the surface of the till layer, or to bedrock, whichever is shallower.

The soil borings will be advanced using a direct push probe (DPP) drill rig, such as the Hurricane™ rig. The Hurricane™ rig is equipped with 4-inch solid stem auger drilling capabilities to advance through concrete and other subsurface obstacles that normally preclude the use of standard direct push rigs.

Soil samples will be collected on a continuous basis using a four-foot long, 2-inch diameter, macrocore piston rod sampler fitted with an acetate liner. Each sample will be split lengthwise and logged by AKRF field personnel. Logging will consist of: describing the soil according to the modified Burmister Classification System; describing any evidence of contamination (e.g., oil-like or tar-like NAPL, staining, sheens, odors); and screening for organic vapors using a PID.

Two soil samples from each boring (e.g., one from the vadose zone and one from below the water table) will be selected for laboratory analysis based on PID response and visual indications of contamination. The depth intervals of samples collected will be determined based on trends observed in the field (i.e., contamination limited to vadose/saturated zone, no contamination observed, contamination observed in a particular depth layer). In the absence of contamination, soil samples from the vadose and saturated zones will be collected immediately above and below the water table, respectively.

The soil samples slated for analysis will be collected into laboratory-supplied containers, sealed and labeled, and placed in an ice-filled cooler. The samples will be analyzed in a laboratory following New York State Department of Health (NYSDOH) Analytical Services Protocol (ASP) Category B deliverables. Soil samples will be analyzed for volatile organic compounds (VOCs - EPA Method 8260), semivolatile organic compounds (SVOCs- EPA Method 8270), polychlorinated biphenyls (PCBs - EPA Method 8081), pesticides (EPA Method 8082) and target analyte list (TAL) metals.

All sampling equipment (probe rods and macrocore sampler) will be decontaminated between sampling locations. The decontamination procedures are described in Section 3.3.

3.2 GROUNDWATER MONITORING WELL INSTALLATION AND DEVELOPMENT

Monitoring wells will be installed at ten locations to detect potential DNAPL and to delineate groundwater contamination. Soil Sampling will also be performed at the monitoring well locations. Locations of the proposed wells (MW-1 through MW-10) are depicted in Figure 3 of the Work Plan. All wells will be screened just above the surface of the glacial till (between 20-40 feet below grade).

A hollow-stem auger rotary rig will be used to core through any existing asphalt or concrete surface. Soil samples will be collected by driving a split spoon sampler into the subsurface at two-foot intervals until a depth of five feet below the surface of the glacial till layer, or bedrock is encountered, whichever is shallower. Each soil sample will be logged and screened for organic vapors. Two soil samples will be collected from each soil boring for laboratory analysis. If no evidence of contamination (visual, odor or PID readings) is apparent in any boring location, one sample will be collected from the surface (0-2') and one sample will be collected from the groundwater interface. If evidence of contamination is noted, one of the two soil samples will be collected from the interval where evidence is noted. The soil samples slated for analysis will be collected into laboratory-supplied containers, sealed and labeled, and placed in an ice-filled cooler. The samples will be analyzed in a laboratory following NYSDOH ASP Category B deliverables. Soil samples will be analyzed for VOCs (EPA Method 8260), SVOCs (EPA Method 8270), PCBs (EPA Method 8081), pesticides (EPA Method 8082) and target analyte list (TAL) metals.

Borings for the wells will be installed using 6.25-inch outside diameter hollow stem augers and a truck-mounted drill rig. The wells will be constructed with two-inch diameter PVC, with ten feet of 0.02 slotted screens installed with four feet of screen above and six feet of screen below the top of the glacial till. A one-foot sump will be provided at the bottom of each well to provide a reservoir for DNAPL accumulation. The annular space around the well screen will be backfilled with sand filter pack extending from the bottom of the well to one to two feet above the screen. The annular space around the well riser will be sealed with bentonite extending one to two feet above the sand filter pack and completed with a non-shrinking cement mixture to approximately one foot below grade. Monitoring wells will be completed using locking, flush-with-grade gate boxes. A cement apron will be set around the gate box or steel casing to prevent drainage of surface runoff toward the well.

Following installation, each monitoring well will be developed via over-pumping, or surging and pumping. The purge water will be monitored for turbidity and water quality indicators (i.e., pH, dissolved oxygen, oxidation-reduction potential, temperature, and specific conductivity) with measurements collected approximately every five minutes. Development will continue until turbidity is less than 50 nephelometric turbidity units (NTUs) for three successive readings or until water quality indicators have stabilized, whichever occurs first. The criteria for stabilization will be three successive readings within 10% for pH, temperature and specific conductivity.

Hollow stem augers will be decontaminated between monitor well locations by steam cleaning using a tap water/Simple Green® solution. Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground. All monitor well drill cuttings, well development water, decontamination water, and purge water will be containerized in 55-gallon steel drums and handled as described in Section 3.6.

Wells will be installed according to the following procedure:

- Measure the depth to water in the open hole using a Solinst® Water Table Meter – Model 101 or equivalent (Section 3.4 of this QAPP).

- Place PVC riser with a ten-foot length of PVC 0.10-slotted screen at the bottom of the borehole. In determining the amount of screen that will be located beneath the water table, the elevation of the seasonal water table will be considered. The well screen will be situated to provide sufficient water in the well for sampling at all times and to limit sample collection close to the base of the well. It is anticipated that at least five feet of screen will be placed below the water table for each well.
- Install No. 1 sand filter pack around the well screen to a depth of one to two feet above the top of the screen.
- Install a bentonite seal to a depth of one to two feet above the filter pack.
- Backfill the remainder of the annular space using a bentonite-cement grout.
- Complete the well with a locking cap flush-with-grade curb box set in concrete. Provide a concrete apron around the curb box to direct run-off away from the well.
- Decontaminate the augers prior to and following installation of each well as described in Section 3.3 of this QAPP.
- Document well installation data (location, depth, construction details, water level measurements) in the field logbook or on field data sheets
- Following well installation, the ten new wells will be developed according to the following procedure:
    - Measure the depth to water using an oil/water interface probe and the total depth of the well using a weighted tape. Use these measurements to calculate the length of the water column. Calculate the volume of water in the well using 0.163 volumes per foot of water column (gallons) as the conversion factors for a 2-inch diameter well.
    - For the first five minutes of well development, develop the well using a submersible pump and re-circulate the water back into the well to create maximum agitation. This method is intended to remove fines from the sand pack, the adjacent formation and from the well.
    - After the first five minutes of well development, develop the well using a submersible pump and discharge the water to five-gallon buckets. Transfer water from the buckets to 55-gallon drums designated for well development water.
    - During development, collect periodic samples and analyze for turbidity and water quality indicators (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.
    - Continue developing the well until turbidity is less than 50 nephelometric turbidity units (NTUs) for three successive readings and until water quality indicators have stabilized to within 10% for pH, temperature and specific conductivity for three successive readings, or until three well volumes have been purged from the well.
    - Document the volume of water removed and any other observations made during well development in the field logbook or on field data sheets.
    - Decontaminate the equipment prior to and following development at each well location as described in Section 3.3 of this QAPP.

All well development water, decontamination, and purge water will be containerized in 55-gallon drums.

3.3 DECONTAMINATION OF SAMPLING EQUIPMENT

All sampling equipment will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/ Simple Green® and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground. Management of Investigation Derived Waste

3.4 MANAGEMENT OF INVESTIGATION DERIVED WASTE

All investigation-derived waste (IDW) will be containerized in DOT-approved 55-gallon drums. The drums will be sealed at the end of each work day and labeled with the date, the well or boring number(s), the type of waste (i.e., drill cuttings, development water or purge water) and the name of an AKRF point-of-contact. Soil samples collected from soil boring will be used for waste characterization of soils, since such data would be biased towards areas which are expected to be most contaminated. Notwithstanding, additional waste characterization soil samples will be collected, if warranted. Grab samples will be collected from drums containing well development and purge water for waste characterization of liquids. The samples will be analyzed for VOCs, SVOCs, and lead using TCLP, PCBs, total petroleum hydrocarbons (TPH), ignitability, corrosivity, reactivity, and total cyanide. All drums will be labeled "pending analysis" until laboratory data is available. All IDW will be disposed of or treated according to applicable local, state and federal regulations.

3.5 SURVEYING AND WATER TABLE READINGS

The 10 groundwater monitoring wells and the 15 boring locations will be surveyed by a New York State-licensed surveyor. Three elevation measurements will be taken at each well location: the elevation of the ground beside the well; the elevation on the rim of the gate box or protective casing; and the elevation of the top of PVC casing.

Water table readings will be taken in the 10 groundwater monitoring wells using a Solinst® Water Table Meter - Model 101 or equivalent. The gate boxes will be unlocked and opened at each well location. The Solinst® Water Table Meter will be turned on and sound tested. The probe of the meter will be inserted into the PVC casing. The probe will be lowered down the casing until the meter alarm indicates the probe is at the water table. A reading of the depth from the top of the top of the PVC casing to the groundwater table will be recorded in the field notebook.

4.0 SAMPLING AND LABORATORY PROCEDURES

4.1 SOIL SAMPLE COLLECTION

Soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system.
- If advancing soil borings, collect an aliquot of soil from each sampling location and place in labeled sealable plastic bags. Place the plastic bags in a chilled cooler to await selection of samples for laboratory analysis. If performing endpoint sampling or characterization sampling, soil can be placed directly in laboratory-supplied sample jars.
- After selecting which samples will be analyzed in the laboratory, fill the required laboratory-supplied sample jars with the soil from the selected sampling location or labeled sealable plastic bags. Seal and label the sample jars as described in Section 4.5 of this QAPP and place in an ice-filled cooler.
- Decontaminate any soil sampling equipment between sample locations as described in Section 3.3 of this QAPP.
- Record boring number, sample depth and sample observations (evidence of contamination, PID readings, soil classification) in field log book and boring log data sheet, if applicable.

4.2 MONITORING WELL SAMPLING

Groundwater samples will be collected at least one week following well development. Low flow sampling techniques will be used, as described in U.S. EPA's Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers [EPA 542-S-02-001, May 2002]. Sampling will be conducted according to the following procedure:

- Prepare the sampling area by placing plastic sheeting over the well. Cut a hole in the sheeting to provide access to the well cover.
- Remove the locking cap and measure the vapor concentrations in the well with a PID.
- Measure the depth to water and total well depth, and check for the presence of light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) using an oil/water interface probe. Measure the thickness of NAPL, if any, and record in field book and well log. Collect a sample of NAPL using a disposable plastic weighted bailer or similar collection device. Groundwater samples will not be collected from wells containing measurable NAPL.
- Use the water level and total well depth measurements to calculate the length of the mid-point of the water column within the screened interval. For example, for a shallow well where the total depth is 15 feet, screened interval is 5 to 15 feet, and depth to water is 7 feet, the mid-point of the water column within the screened interval would be 11 feet. Similarly for a deep well where the total depth is 40 feet, screened interval is 30 to 40 feet, and depth to water is 15 feet, the mid-point of the water column within the screened interval would be 35 feet.
- Connect dedicated tubing to either a submersible or bladder pump and lower the pump such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. Connect the discharge end of the tubing to the flow-through cell of a Hydrolab Quanta multi-parameter (or equivalent) meter. Connect tubing to the output of the cell and place the discharge end of the tubing in a five-gallon bucket.

- Activate the pump at the lowest flow rate setting of the pump.
- Measure the depth to water within the well. The pump flow rate may be increased such that the water level measurements do not change by more than 0.3 feet as compared to the initial static reading. The well-purging rate should be adjusted so as to produce a smooth, constant (laminar) flow rate and so as not to produce excessive turbulence in the well. The expected targeted purge rate will be around 500 milliliters/minute and will be no greater than 3.8 liters/minute.
- Transfer discharged water from the 5-gallon buckets to 55-gallons drums designated for well-purge water.
- During purging, collect periodic samples and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.
- Continue purging the well until turbidity is less than 50 NTU and water quality indicators have stabilized to the extent practicable. The criteria for stabilization will be three successive readings for the following parameters and criteria:

Table 1
Stabilization Criteria

Parameter	Stabilization Criteria
PH	+/- 0.1 pH units
Specific Conductance	+/- 3% mS/cm
ORP/Eh	+/- 10mV
Turbidity	<50 NTU
Dissolved Oxygen	+/- 0.3 mg/l

Notes: mS/cm = millisievert per centimeter
mV = millivolts
NTU = nephthalometric turbidity units
mg/l = milligrams per liter

- If the water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, purging may be discontinued. Efforts to stabilize the water quality for the well must be recorded in the field book, and samples may then be collected as described herein.
- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing and place into the required sample containers as described in Section 4.3 of this QAPP. Label the containers as described in Section 4.5 of this QAPP and place in a chilled cooler. Samples should be collected first for VOCs, then SVOCs, PCBs, and the remaining inorganic analyses.
- Unless the sample is to be filtered at the laboratory, for the dissolved metals sample, collect the water into the plastic filter chamber and seal. Attach a hand pump outfitted with a disposable filter to the chamber and pump the water through filter into the appropriate sample container.
- Collect one final field sample and analyze for turbidity and water quality parameters (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity).

- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of the sample filter in a 55-gallon drum designated for disposable sampling materials and PPE.
- Decontaminate the pump, oil/water interface probe, flow-through cell, and plastic filter chamber as described in Section 3.3 of this QAPP.
- Record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations in the project logbook and field data sheet, if applicable.

4.3 LABORATORY METHODS

Table 2 summarizes the laboratory methods that will be used to analyze field samples as well as the sample container type, preservation, and applicable holding times. An ELAP Certified laboratory will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), i.e., Category B Deliverables and CLP ELAP Certification will be required for confirmatory (post remediation) samples and final delineation samples and Category A (or Category Spills) laboratory data deliverables will be required for all other analyses. If it is anticipated that investigative samples may be used as final endpoint samples, deliverables may be upgraded to Category B and a laboratory with CLP ELAP Certification will be used.

Table 2
Laboratory Analytical Methods for Analysis Groups

ANALYSIS GROUP	MATRIX	PARAMETER	EPA METHOD	SAMPLE CONTAINERS	PRESERVATION	HOLDING TIMES
SOIL ANALYSIS PARAMETERS	solid	TCL VOCs	8260	2 oz. clear glass Septum	4°C	14 days
		TCL SVOCs	8270 BN*	8 oz. clear glass	4°C	14 days
		Pesticides	8082	8 oz. clear glass	4°C	6 months (28 days for Hg)
		PCBs	8081	8 oz. clear glass	4°C	14 days
		TAL Metals	1311/6010B/7470A	8 oz. clear glass	4°C	14 days
GROUNDWATER ANALYSIS PARAMETERS	liquid/sludge	TCL VOCs	8260	(2) 40 ml clear glass vial	HCl, 4°C	14 days
		TCL SVOCs	8270 BN *	3L amber glass	4°C	7 days
		Pesticides	8082	3L amber glass	4°C	7 days
		PCBs	8081	3L amber glass	4°C	7 days
		TAL Metals	6000/7000 series	500ml plastic	HNO_3,4°C	6 months (28 days for Hg)

4.4 QUALITY CONTROL SAMPLING

In addition to the laboratory analysis of the investigative and remedial soil and groundwater samples, additional analysis will be included for quality control measures, as required by the Category B or Category A sampling techniques. These samples may include equipment rinsate blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD) and of duplicate/blind duplicate samples. Equipment blank, MS/MSD and duplicate samples will be analyzed for the same parameter set for which the samples will be analyzed. If the requested parameters include VOCs, a trip blank will be analyzed for volatile organic compounds only. Quality control sampling in accordance with the disposal facility requirements will be performed when collecting samples for disposal characterization.

4.5 SAMPLE HANDLING

4.5.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents and laboratory reports using an alpha-numeric code. All samples will be identified with a prefix of "QW" to designate the Queens West Development Site. Groundwater samples will be identified by the monitoring well number and soil boring samples will be identified by the soil boring number followed by the sample depth interval (in parenthesis). Waste characterization samples collected from 55-gallon drums will be identified by the drum number (e.g., D-1 or D-2) followed by a sample type designation (LQ for liquid and SD for solid).

The designation "QW" will be added at the end of the designation for matrix spike/matrix spike duplicate samples. The field duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. For duplicate soil boring samples, the sample depth will be the actual sample depth interval. Trip blanks and field blanks will be identified with "TB" and "FB", respectively.

Table 3 provides examples of the sampling identification scheme.

Table 3
Examples of Sample Names

Sample Description	Sample Designation
Soil sample collected from 5 to 7 feet at S-3	QW-S-3 (5-7)
Groundwater sample collected from monitoring well A-5	QW-A-5
MS/MSD duplicate sample from AW-8	QW-A-8-MS
Duplicate sample from 12 to 14 feet at S-10	QW-S-10B (12-14)

4.5.2 Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. Soil gas samples will be placed in coolers that do not contain ice. Soil and groundwater samples will be shipped to the laboratory once to twice per week. At the start and end of each workday, field personnel will add ice to the coolers as needed. Soil gas samples will be shipped to the laboratory at the end of each workday.

The samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody form. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the coolers remain sealed during delivery.

4.5.3 Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on chain-of-custody (COC) forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

4.6 FIELD INSTRUMENTATION

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the site for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas.

5.0 DATA REVIEW

The QA/QC officer will conduct a review of all analytical data and prepare a Data Usability Summary Report (DUSR) to assess the quality of the data and determine its usability. To assess the data, the QA/QC officer will:

- Ensure the data package is complete as defined under the requirements for the NYSDEC ASP Category B deliverables and that all data were generated using established and agreed upon protocols.
- Check that all holding times were met.
- Check that all QC data (blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data) fall within the protocol required limits and specifications.
- Compare raw data with results provided in the data summary sheets and quality control verification forms.
- Check that correct data qualifiers were used.
- Evaluate the raw data and confirm the results provided in the data summary sheets and quality control verification forms.

Any Quality Control exceedances will be specified in the DUSR, and the corresponding data package QC summary sheet identifying the exceedances will be attached. The DUSR will identify any data deficiencies, analytical protocol deviations and quality control problems and discuss their effect on the data. Recommendations for resampling and/or reanalysis will be made.

ATTACHMENT A

RESUME OF PROJECT QA/QC OFFICER, PROJECT DIRECTOR, PROJECT MANAGER AND FIELD TEAM LEADER

MARC S. GODICK, LEP

VICE PRESIDENT

General Introduction

Marc S. Godick, a vice president of the firm, has 15 years of experience in the environmental consulting industry. Mr. Godick's broad-based environmental experience includes expertise in remedial investigation, design and implementation of remedial measures, environmental/compliance assessment, litigation support, and storage tank management.

Remedial Investigation, Remediation, and Risk Assessment

Comprehensive experience with completed projects throughout the Mid-Atlantic and New England regions. Specific experience includes development and implementation of multi-site strategies related to regulatory compliance including release reporting, remedial investigations, remediation, and risk assessment at bulk fuel storage/distribution, utility, chemical distribution, industrial, and commercial facilities.

Environmental/Compliance Assessment

Completion and management of Phase I and Phase II environmental site assessment (ESA) and compliance audit projects throughout the United States and in Canada. Provided management support to multi-site environmental assessment programs, with responsibilities including environmental liability analysis, compliance review, and waste management practices. Projects have included assessments of semiconductor reclamation facilities, food processing plants, and numerous other types of industrial and commercial facilities. Several of the projects were multiple-facility audits on a fast-track basis for venture capital firms, banks, and multinational corporations.

Litigation Support

Provided litigation support services for several remediation projects including insurance claims and other cost recovery actions. Provided expert testimony and developed detailed costing estimates and cost allocation models.

Storage Tank Management

Managed several single and multi-facility underground and aboveground storage tank (UST/AST) replacement projects. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction oversight, project budgets, and documentation. Compliance experience includes development and implementation of inspection, maintenance, record-keeping, and Spill Prevention Control Countermeasures (SPCC) programs.

BACKGROUND

Education

B.S., Chemical Engineering, Carnegie Mellon University

M.E., Engineering Science/Environmental Engineering, Pennsylvania State University

Community Leadership Alliance, Pace University School of Law

40 Hour HAZWOPER and Annual Refresher Training

Supervisors of Hazardous Waste Operations (8 Hour)

Certifications/Affiliations

Licensed Environmental Professional (License # 396) – State of Connecticut

Chairman, Joint Village of Larchmont/Town of Mamaroneck Coastal Zone Management Commission

AKRF

Board of Directors, Westchester County Soil and Water Conservation District

Member, NYSDEC Risk-Based Corrective Action (RBCA) Advisory Group for Petroleum-Impacted Sites

Seminars, Lectures & Publications

"Let Nature Do the Work – Onsite Stormwater Management," Westchester County Department of Parks, Recreation and Conservation, Fall 2003

"Water Pollution Control and Site Assessments and Audits," Environmental Health and Safety Issues Course, Building Owners and Managers Institute (BOMI), 1997-1999

"Hydrogeologic and Geological Aspects of Tank Closures and Remedial Action," Underground Storage Tanks Course, Government Institutes, Summer 1996, Fall 1997

"Soil and Groundwater Cleanup at What Cost? A Review of State-of-the-Art Technologies," Pennsylvania Chamber of Commerce, PennExpo, Fall 1995

Technical Review of "Soil Remediation Technologies" and "Ground Water Remediation Technologies" Chapters, Underground Storage Tank Manual, Thompson Publishing Group

RELEVANT EXPERIENCE

Shaws Supermarket Redevelopment Project, New Fairfield, CT

Mr. Godick is the LEP of Record for the remediation of a shopping center site that was contaminated by on-site releases from former dry cleaning operations and off-site gasoline spills. A remediation plan was prepared and approved within one year to enable redevelopment work for a new supermarket and shopping center. The remediation was complicated by the use of groundwater as a potable source at the site and surrounding area. The remediation plan included the removal of contaminated soil and installation of a multi-well pump and treat system for the recovery of non-aqueous and dissolved phase contamination from two of the three aquifers. The soil removal activities and treatment system installation have been completed, and system operation, maintenance, and monitoring are ongoing.

Site Investigation & Remediation–Former Manufactured Gas Plant (MGP), Confidential Client, Westchester County, NY

The site is currently an active retail shopping center. Previously, the site had been utilized as a large former MGP. The project entailed the implementation of a large-scale remedial investigation that addressed the assessment and remediation of occupied buildings, as well as the potential of future redevelopment of the site. Future remediation will consist of hot spot removal, product recovery, and groundwater containment measures. Other engineering and institution controls will also be implemented.

Underground Storage Tank Closure and Site Remediation–Program Management, Con Edison, New York, NY

Mr. Godick provided technical assistance to Con Edison in developing technical submittals and budgets associated with tank closures at over 50 facilities. Technical summaries were prepared for submittal of contractor-prepared closure reports to the NYSDEC. The summaries included a review of historic pre-closure assessments, tank closure data, and provided recommendations for additional assessment, remediation or closure. Subsequently, a three-year program budget was developed for implementation of the UST investigation/remedial program, which Con Edison utilized for internal budgeting purposes.

Site Investigation–Over 20 Facilities, Con Edison, New York, NY

Mr. Godick managed site investigations associated with petroleum, dielectric fluid, and PCB releases at over 20 Con Edison facilities including service centers, substations, generating stations, and underground transmission and

distribution systems. Site investigations have included due diligence site reviews, soil boring installation, monitoring well installation, hydrogeologic testing, and water quality sampling. Risk-based closures have been proposed for several sites.

Site Investigation–7 World Trade Center Substation, Con Edison, New York, NY

Mr. Godick managed the site investigation at the former 7 World Trade Center Substation in an effort to delineate and recover approximately 140,000 gallons of transformer and feeder oil following the collapse of the building. The project involved coordination with several crews, Con Edison, and other site personnel.

Site Investigation–Former Manufactured Gas Plant (MGP) Facilities, Con Edison, New York, NY

Mr. Godick managed site investigations at four former MGP facilities. The investigations at three of the four sites were completed at a Con Edison substation, flush pit facility, and service center, respectively. The details associated with the fourth site are confidential. Site characterizations at the substation and flush pit facility were conducted in preparation of expansion at these locations. The findings from these characterizations were used by Con Edison to make appropriate changes to the design specifications and to plan for appropriate handling of impacted materials and health and safety protocols during future construction activities.

Ground Water Monitoring–Over 20 Facilities, Con Edison, New York, NY

Mr. Godick managed a multi-site contract for ground water monitoring at over 20 facilities throughout Con Edison's footprint at service centers, substations, generating stations, transmission/distribution, and major oil storage facilities (MOSF) sites.

Verizon, Investigation & Remediation, Various Locations, NY, PA and DE

Mr. Godick managed over 50 geologic/hydrogeologic assessments and site remediation projects related to petroleum releases at various facilities. Responsibilities included annual budgeting, day-to-day project management, development and implementation of soil and ground water investigation workplans, ground water modeling, risk evaluation, remedial action work plans, remedial design, system installation, waste disposal, well abandonment, and operation and maintenance. Many of the assessment and remedial projects followed a risk-based approach. Remedial technologies implemented included air sparging, soil vapor extraction, bioremediation, pump and treat, soil excavation, and natural attenuation.

Site Investigation, Risk Assessment and Remediation, Thermadyne Holding Company, Danvers, MA

Mr. Godick managed a remedial investigation and ground water remediation program for a former manufacturing facility in Massachusetts. The project included the design and installation of a ground water remedial system for chlorinated solvent impact within a complex fractured bedrock aquifer. Responsibilities included the review of historic data, collection of extensive new groundwater data, completion of pump testing, computer modeling of the bedrock aquifer, remedial system pilot testing, system design, O&M, waste disposal, and preparation of all necessary reports to the State. To facilitate the closure of the site, a Risk Characterization Report was prepared under the Massachusetts Contingency Plan.

Groundwater and Soil Remediation, BP Oil Company, Various Locations, NJ and PA

Mr. Godick provided support to environmental activities for BP Oil Company in Pennsylvania and New Jersey. Responsibilities included completion of remedial investigations, preparation of remedial action plans, quarterly ground water sampling, and reporting.

Multimedia Compliance and Remediation, Greenburgh Central School District No. 7, Hartsdale, NY

Mr. Godick implemented a multimedia program to address regulatory compliance and remediation at the transportation yard and other facilities. The compliance program included development of an environmental management system including periodic auditing, standard operating procedures, release reporting, and training. Designed and implemented engineering controls and monitoring to satisfy stormwater requirements. Remediation was conducted to address petroleum and solvent contamination from former underground storage tanks and dry wells, which included source removal and natural attenuation of groundwater. Provided support in connection with litigation from the adjoining property owner.

Preliminary Impact Assessment, Proposed Wildlife Refuge and Ecology Center, BASF Corporation, Kearny, NJ

Mr. Godick managed preliminary environmental impact assessment at the location of a former BASF facility. Adjacent to the property is an expanse of mudflats that contained heavy metals, PAHs, PCBs, dioxins and other contaminants originating from numerous point and non-point sources. BASF proposed to cap these mudflats with clean sediments, and to develop a salt marsh wildlife refuge having an area of approximately 180 acres on the remediated portion. A workplan was developed and implemented, which included fish testing to evaluate whether winter flounder used the mudflat as a spawning area, and to evaluate whether winter flounder or summer flounder may utilize the mudflat as a juvenile rearing area. In addition, a plan was implemented to sample the benthic invertebrate community, in order to determine the composition, diversity, and biomass present. Implementation of the workplan was completed during the winter and summer periods of 2001. The benthic invertebrate and fish sampling data indicated that significant winter and summer flounder were not present at the subject site.

Environmental Assessment, Confidential Client, Flexible Packaging Division, Various Locations

Conducted Phase I ESAs and compliance reviews for a major international chemical company, which was divesting their flexible polyethylene packaging division. This program was completed by the seller to provide accurate and appropriate assessment information to a number of potential purchasers. All assessments were completed on a confidential basis with a completed report provided to the client within three weeks from the date of the first site visit.

Environmental Assessment, Polyurethane Foam Manufacturing Company, Various Locations

Conducted Phase I ESAs and compliance reviews at a major polyurethane and polystyrene foam manufacturer with locations throughout the U.S. The program evaluated all environmental aspects of the operation with a summary of potential and material liabilities provided to the client prior to the acquisition. Issues addressed, with estimates as to operational and remedial costs provided, included air emissions, regulatory compliance with historic consent orders, projected plant upgrades required for future compliance, and potential liabilities associated with identified environmental contamination.

Environmental Assessment, Copper Wire Manufacturer, Various Locations

Conducted Phase I ESAs and compliance reviews at multiple wire manufacturing sites, which were evaluated as part of an acquisition by an international manufacturing company. A comprehensive evaluation of each plant was performed with plant sizes ranging from 100,000 to 800,000 square feet. Final reports were delivered to the client within 30 days following the initial site visit.

Litigation Support and Remediation, Former Service Station, Brooklyn, New York

Mr. Godick took over management of remediation of an inactive service station (formerly conducted by another firm). His approach outlined additional characterization and remediation efforts which resulted in successful closure of the spill by NYSDEC within two years. Mr. Godick testified as an expert witness at a hearing in the New York State Supreme Court of Kings County to determine the adequacy of the remediation efforts.

Litigation Support, Cost Recovery Action, New York State Superfund Site, Upstate New York

Provided technical support for the former owner of a New York State Superfund site in upstate New York. Current owner of the property brought a cost recovery action against client as a potential responsibility party. Completed technical review of draft Remedial Investigation/Feasibility Study prepared by opposing party's consultant to develop more cost effective remedial strategy and to better position the client for liability allocation as part of future settlement negotiations. Developed cost allocation paper and model for settlement negotiations. Participated in mediation process.

Litigation Support, Cost Recovery Action, New York State Petroleum Spill Site, New York, NY

Provided technical support for the former owner of a New York City multi-unit residential apartment building. The State of New York brought a cost recovery action against our client as a result of a previous spill from a former underground storage tank. Reviewed invoices and project documentation to dispute work performed by the NYSDEC, which provided the basis for settlement at a fraction of the initial claim.

Cost Analysis, Environmental Insurance Claims, Various Locations

Provided technical support for cost analyses completed for a large national insurance company related to several former MGP and other industrial sites. Responsibilities included evaluation and development of cost-effective remedial strategies, as well as compilation of detailed costs for remedial action implementation and closure.

Litigation Support, Class Action Lawsuit, Confidential Client, NJ

Provided technical support for a class action suit involving a petroleum-impacted community water supply in southern New Jersey. The technical assistance included analysis of expert testimony and coordination with legal counsel in preparing for cross-examination of the opposing party's lead expert witness.

Storage Tank Management, Verizon, Various Locations, NY, PA, DE, and MA

Managed the removal and replacement of underground and aboveground storage tank systems for Verizon in New York, Pennsylvania, Delaware, and Massachusetts. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction oversight, project budget, and documentation. For selected AST sites, managed the development of Spill Control, Contingency and Countermeasures (SPCC) plans.

Storage Tank Management, Citibank, N.A., New York, NY

Managed a storage tank replacement project for a facility located on Wall Street in New York City. The existing underground storage tank was closed in place and replaced with a field-constructed AST system within the building. The project required zero tolerance for service interruptions, disruptions to building operations, or disturbance to occupants of the office space neighboring the new tank location. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction inspections, site assessment for closed-in-place UST, SPCC plan preparation, and responsibility for project budget and documentation.

Storage Tank Management, Barclays Bank, New York, NY

Managed a storage tank upgrade project for a facility located on Wall Street in New York City. The existing USTs were upgraded. Special project issues included management of sidewalk and street closing concerns, as well as ensuring safe access to a day care center located adjacent to the work area. Responsibilities included the management of design, preparation of specifications, contractor bidding, construction oversight, project budget, and documentation.

MICHELLE LAPIN, P.E.

SENIOR VICE PRESIDENT

Michelle Lapin is a professional engineer with more than 18 years of experience in the assessment and remediation of hazardous waste issues. She leads the firm's hazardous materials group and offers over a decade of experience providing strategic planning and management for clients.

As a project manager, Ms. Lapin has been responsible for the administration of technical solutions to contaminated soil, groundwater, and geotechnical problems. Her other project management duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

Ms. Lapin's hydrogeologic experience includes performing groundwater supply investigations, drilling supervision, and formulation and administration of groundwater monitoring programs in Connecticut, New York, New Jersey, New Hampshire, Massachusetts, Rhode Island, Virginia, and Maryland. Her experience with groundwater contamination includes Level B hazardous waste site investigations; execution of leaking underground storage tank studies, including hazardous soil removal and disposal; soil and water sampling; soil gas surveys; wetlands issues. Ms. Lapin is experienced in coordinating and monitoring field programs concerning hazardous waste cell closures. She has performed numerous Phase I, Phase II, and Phase III investigations, many of them in conjunction with large lending institutions, developers, and national retail chains. She is also experienced in submitting and conducting Voluntary Cleanup Agreement work plans with NYSDEC and brownfield redevelopments.

BACKGROUND

Education

B.S., Civil Engineering, Clarkson University

M.S., Civil Engineering, Syracuse University

Professional Registrations

State of New York, P.E.

State of Connecticut, P.E.

Professional Memberships

Member, American Society of Professional Engineers (ASPE), National and CT Chapters

Member, American Society of Civil Engineers (ASCE), National and CT Chapters

Member, Connecticut Business & Industry Association (CBIA), CBIA Environmental Policies Council

RELEVANT EXPERIENCE

Albert Einstein College of Medicine Center for Genetic and Translational Medicine, Bronx, NY

Ms. Lapin directed the firm's hazardous materials work in connection with the construction a new Center for Genetics and Translational Medicine (CGTM) building on the Bronx campus of the Albert Einstein College of Medicine of Yeshiva University. The building is expected to be opened by 2006. AKRF prepared an Environmental Assessment Statement (EAS) that examined such issues as land use, zoning, air quality, urban design and visual resources, hazardous materials, traffic, noise, and air quality. Ms. Lapin's work included analysis

of the existing conditions and potential impacts that the construction could cause to the environment and human health.

Hudson River Park, New York, NY

Ms. Lapin is directing AKRF's hazardous materials work during construction of Hudson River Park, a 5-mile linear park along Manhattan's West Side. As the Hudson River Park Trust's (HRPT's) environmental consultant, AKRF is overseeing preparation and implementation of additional soil and groundwater investigations (working with both NYSDEC and NYCDEP), all health and safety activities, removal of both known underground storage tanks and those encountered during construction. Previously, the firm performed hazardous materials assessments as part of the EIS process, including extensive database and historical research, as well as soil and groundwater investigations. Ms. Lapin has been the senior consultant for the soil and groundwater investigations and remediation, and the asbestos investigations and abatement oversight.

Columbia University Manhattanville Campus EIS, New York, NY

Ms. Lapin is serving as hazardous materials task leader on this EIS for approximately 4 million square feet of new academic, research and neighborhood uses to be constructed north of Columbia University's existing Morningside campus. The work has included Phase I Environmental Site Assessments for the properties within the site boundaries and estimates for upcoming investigation and remediation.

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers Hudson River waterfront, Ms. Lapin headed the remedial investigation and remediation work that included Phase I assessments of 12 parcels, investigations of underground storage tank removals and associated soil remediation, remedial alternatives reports, and remedial work plans for multiple parcels. Several of the city-owned parcels were remediated under a Voluntary Cleanup Agreement; others were administered with state Brownfields grants. Hazardous waste remediation was completed on both brownfield and voluntary clean-up parcels, and construction is underway for mixed-use retail, residential development, and parking.

Davids Island, New Rochelle, NY

Ms. Lapin managed the investigation of the former Army base for Westchester County. The island is planned for county park purposes. The investigation included a Phase I site assessment, with historical research going back to the 17th century, a subsurface investigation, underground storage tank investigation, and asbestos surveys of all remaining structures. Cost estimates were submitted to the County for soil remediation, asbestos abatement, and building demolition. Funding sources are currently being sought.

Site Selection and Installation of 11 Turbine Generators, New York and Long Island, NY

AKRF was retained by the New York Power Authority (NYPA) to assist in the State Environmental Quality Review Act (SEQRA) review of the proposed siting, construction, and operation of 11 single-cycle gas turbine generators in the New York metropolitan area. Ms. Lapin managed the hazardous materials investigation of the sites. The work has included Phase I site assessments, subsurface investigations, and construction health and safety plans.

Cross Westchester (I-287) Expressway Phases V and VI, Westchester County, NY

For the New York State Department of Transportation (NYSDOT), Ms. Lapin served as project manager and was responsible for directing the contaminated materials aspect of the final design effort for the reconstruction of Westchester County's major east-west artery. As part of her duties, Ms. Lapin was responsible for managing the asbestos investigations at eight bridges and wetland delineation along the entire corridor, as well as writing the scope of work and general management of the project.

Shaw's Supermarket, New Fairfield, CT

AKRF is providing consulting services to the developer and owner of a 9-acre site included conducting a remedial investigation and remediation of a site contaminated from former dry cleaning operations and off-site gasoline spills. The investigation included the installation of monitoring wells in three distinct aquifers, geophysical logging, pump tests, and associated data analysis. Ms. Lapin presented the environmental issues and planned remediation to local and state officials during the early stages of the planning process to incorporate their comments into the final remedial design. A remedial action work plan (RAWP) was completed and approved by the Connecticut Department of Environmental Protection within a year to enable redevelopment work for a new supermarket and shopping center. The RAWP included the remediation of soils within the source area and a multi-well pump and treat system for the recovery of non-aqueous and dissolved phase contamination in groundwater. The design of the recovery well system included extensive groundwater modeling to ensure capture of the contaminant plume and the appropriate quantity and spacing of the wells. Ms. Lapin directed the soil removal remedial activities and monitoring for additional potential contamination during construction. In addition, AKRF performed comprehensive pre-demolition asbestos and lead-based paint surveys of the former site structures, and are continuing to provide environmental consulting support for the development of the site. Site development has been completed and a groundwater remediation system was installed during site development. The remediation system is successfully operating. The next phase of work includes and off-site study to determine whether the contamination plume has migrated from the site since area residents use groundwater as a source of drinking water. Ms. Lapin will continue to manage the project through the study and remediation phases.

East 75th/East 76th Street Site, New York, NY

Ms. Lapin served as senior manager for this project that encompassed coordination and direct remediation efforts of this former dry cleaning facility and parking garage prior to the sale of the property and its ultimate redevelopment for use as a private school. A preliminary site investigation identified 20 current and former petroleum and solvent tanks on the property. A soil and groundwater testing program was designed and implemented to identify the presence and extent of contamination resulting from potential tank spills. This investigation confirmed the presence of subsurface petroleum contamination in the soil and solvent contamination from former dry cleaning activities in the bedrock. AKRF completed oversight of the remediation under the State's Voluntary Cleanup Program. Remediation, consisting of tank removals and excavation of contaminated soil and the removal of solvent-contaminated bedrock down to 30 feet below grade, has been completed. AKRF completed oversight of the pre-treatment of groundwater prior to discharge to the municipal sewer system and is currently completing an off-site study to determine impacts to groundwater in downgradient locations.

Former Macy's Site, White Plains, NY

Ms. Lapin managed the pre-demolition work for Tishman Speyer. Work included a Phase I site assessment; subsurface investigation (Phase II), including the analysis of soil and groundwater samples for contamination; a comprehensive asbestos, lead paint, and PCB investigation; radon analysis; and coordination and oversight of the removal of hazardous materials left within the building from previous tenants. Work also included asbestos abatement specifications and specifications for the removal of two 10,000-gallon vaulted fuel-oil underground storage tanks.

Storage Deluxe, Various Locations, NY

Ms. Lapin manages the firm's ongoing work with Storage Deluxe, which includes Phase I and Phase II subsurface investigations, underground storage tank removals and associated remediation, asbestos surveys and abatement oversight, and contaminated soil removal and remediation for multiple sites in the Bronx, Brooklyn, Manhattan, Westchester County, and Long Island.

Home Depot, Various Locations, NY

Ms. Lapin, serving as either project manager or senior manager, has managed the investigations and remediation at multiple Home Depot sites in the five boroughs, Long Island, and Connecticut. The investigations have included Phase I and II site assessments, asbestos and lead paint surveys, abatement specifications and oversight, and soil and groundwater remediation.

Avalon on the Sound, New Rochelle, NY

For Avalon Bay Communities, Ms. Lapin is managing the investigations and remediation of two phases of this residential development, including two luxury residential towers and an associated parking garage. Remediation of the first phase of development (the first residential tower and the parking garage) included gasoline contamination from a former taxi facility, fuel oil contamination from multiple residential underground storage tanks, and chemical contamination from former on-site manufacturing facilities. The remediation and closure of the tank spills was coordinated with the New York State Department of Environmental Conservation (NYSDEC). The initial investigation of the Phase II development—an additional high-rise luxury residential building—detected petroleum contamination. A second investigation was conducted to delineate the extent of the contamination and estimate the costs for remediation. The remediation will be conducted in conjunction with the development plan.

Mill Basin, Gerritsen Inlet, and Paerdegat Basin Bridges, Final Design, Shore Parkway, Brooklyn, NY

Following the preparation of the GEIS for the Belt Parkway Bridges Project, the firm was retained for supplemental work during the final design phase of the project. This included NEPA and SEQRA documentation for three of the bridges—Mill Basin, Gerritsen Inlet, and Paerdegat Basin—which will be federally funded. Ms. Lapin managed the contaminated materials investigation that included a detailed subsurface contaminated materials assessment, both subaqueous and along the upland approaches.

NYSDOT Transportation Management Center (TMC), Hawthorne, NY

AKRF conducted environmental studies for the NYSDOT at the current troopers headquarters in Hawthorne, NY. The property is the proposed site of a new Transportation Management Center. AKRF completed a comprehensive asbestos survey of the on-site building and prepared asbestos abatement specifications; performed a Phase I site assessment; conducted an eletromagnetic (EM) survey that located two fuel oil underground storage tanks, and developed removal specifications for the two underground storage tanks and an aboveground storage tank.

Metro-North Poughkeepsie Intermodal Station and Parking Improvement Project, Poughkeepsie, NY

Ms. Lapin served as project manager of the hazardous materials investigation in connection with AKRF's provision of planning and environmental services for parking improvement projects at this station along the Hudson Line. The project included an approximately 600-space garage, additional surface parking, and an intermodal station to facilitate bus, taxi, and kiss-and-ride movements. Ms. Lapin conducted Phase I and II contaminated materials assessments and worked with the archaeologists to locate an historical roundhouse/turntable.

Metro-North Golden's Bridge, Westchester County, New York

For Metro-North Railroad, Ms. Lapin managed a Phase I Environmental Site Assessment of a property that has since become the new parking area, used by the existing Golden's Bridge train station. Ms. Lapin also conducted a subsurface (Phase II) investigation of the original parking area, track area, and existing platform for the potential impact of moving tracks in the siding area to extend the existing parking area and adding an access from a proposed overhead walkway (connecting the train station to the new parking area). The study also included an assessment for lead-based paint and asbestos on the platform structures.

REBECCA KINAL, P.E.

ENVIRONMENTAL ENGINEER

Rebecca Kinal has nine years of experience in the assessment and remediation of soil and groundwater contamination and other hazardous/non-hazardous waste problems. Her hydrogeologic experience includes in-situ permeability testing, drilling supervision, and computer modeling of groundwater flow. Her experience with soil and groundwater contamination includes underground storage tank leak investigations; hazardous soil removal and disposal; design and operation and maintenance (O&M) of groundwater remediation systems; soil and water sampling; soil gas surveys; fate and transport modeling; wastewater discharge permit preparation; and project coordination with federal, state, and local authorities.

Prior to her employment with AKRF, Ms. Kinal was a project engineer with General Physics Corporation in Columbia, Maryland, where her responsibilities included overseeing fieldwork, preparing and reviewing technical reports, computer modeling, designing remediation systems, and writing proposals.

BACKGROUND

Education

B.S., Civil Engineering, Lafayette College

M.S., Hydrogeology, Rensselaer Polytechnic Institute

RELEVANT EXPERIENCE

Pelham Plaza Site Investigation Report, Pelham Manor, NY

Ms. Kinal managed a Site Investigation at Pelham Plaza, site of a shopping center that formerly contained a manufactured gas plant (MGP). The site is being investigated under a voluntary clean-up agreement entered into with the NYSDEC by the site owner. NYSDEC's MGP group is overseeing the project. The site investigation includes advancing over 100 soil borings with continuous soil sampling to bedrock, installing monitoring and recovery wells, and conducting test pitting both indoor and outdoor locations to collect soil and groundwater samples and determine the extent of Non-Aqueous Phase Liquid (NAPL). Soil gas sampling is also being conducted to determine contaminant concentrations in the vapors beneath the foundation of an on-site retail store. Sediment sampling will be conducted in an adjacent creek to identify off-site impacts, and a tidal survey will be performed to determine tidal influence on groundwater levels at the site.

Shaws Supermarket Redevelopment Project, New Fairfield, CT

Ms. Kinal managed the Remedial Investigation (RI) for a shopping center site that was contaminated by releases from former dry cleaning operations. The investigation included the installation of monitoring wells in the intermediate overburden aquifer and bedrock aquifer, sampling of existing and newly installed wells, geophysical logging in bedrock wells, and pump testing in intermediate and bedrock wells. Ms. Kinal prepared a Remedial Action Work Plan (RAWP) based on results from the RI, which included a conceptual design for a groundwater pump and treat system to contain a plume of perchlorethylene (PCE)-contaminated groundwater identified at the downgradient edge of the site. The RAWP was approved by the Connecticut Department of Environmental Protection. Following CTDEP approval Ms. Kinal prepared bid specifications for installation of the remediation system and a permit application for discharge of the treated groundwater to the on-site storm water system.

Outlet City Site Investigation

Ms. Kinal prepared a work plan for remedial investigation of the Outlet City site, a property in Long Island City that was formerly occupied by a manufacturer of industrial cleaners and pharmaceuticals. The site is being investigated and remediated under the NYSDEC voluntary clean-up program. In preparing the work plan, Ms. Kinal evaluated results from several previous investigations and conducted a limited groundwater sampling program to determine future data needs for designing remediation of creosote-contaminated soil and groundwater. The work plan, currently under NYSDEC review, includes additional soil and groundwater sampling, a tidal survey to determine tidal influence on groundwater levels, and pilot free product recovery testing. Ms. Kinal also helped design a venting system for an on-site basement and performed exposure calculations for the vented vapors.

Davids Island Environmental Audit, New Rochelle, NY

Ms. Kinal managed the hazardous materials portion of the audit of this undeveloped island site, including a Phase I Environmental Site Assessment (ESA) and a Phase II Subsurface Investigation. Several environmental conditions were identified during the Phase I ESA. Ms. Kinal developed a soil sampling plan to investigate these conditions that included collecting soil samples from more than 100 locations and analyzing them for targeted compounds, including volatile organic compounds, semi-volatile compounds, metals, pesticides, and polychlorinated biphenyls (PCBs). Ms. Kinal also oversaw an electromagnetic (EM) survey conducted to identify the location of suspected underground storage tanks on the island. Based on soil sample results, Ms. Kinal estimated the volume of contaminated soil requiring remediation and prepared cost estimates for soil excavation and for transportation and disposal of contaminated soil and hazardous materials.

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Kinal supervised the remediation of Parcels H and I that were contaminated with hazardous soil. During the remediation process, she reviewed the subcontractor health and safety plans, delineated the areas of excavation, and oversaw field activities to ensure compliance with the specifications and appropriate regulations. This property was remediated under the New York State Department of Environmental Conservation (NYSDEC) Brownfields program.

Avalon on the Sound, New Rochelle, NY

Ms. Kinal oversaw the subsurface investigation and soil remediation during the construction of this luxury high-rise apartment building and associated parking garage. Investigation activities included an electromagnetic survey to search for possible underground storage tanks. Remediation activities included removing underground storage tanks, excavating and disposing of soil contaminated with volatile and semi-volatile organic compounds, and collecting end-of-excavation confirmation samples.

U. S. Post Office Main Vehicle Maintenance Facility, Washington, D.C.

While with another firm, Ms. Kinal designed and supervised the installation of a remediation system to treat petroleum-contaminated groundwater. Ms. Kinal also established O&M and monitoring protocols to ensure efficient operation of the air sparging/soil vapor extraction system, and to monitor contaminant recovery/degradation rates.

Aberdeen Proving Ground Building 4025 Site, Aberdeen, MD

While with another firm, Ms. Kinal provided services for this leaking underground storage tank site, Ms. Kinal planned and oversaw investigation and pilot testing activities to delineate contamination and determine feasible in-situ remediation options. Investigation activities included soil and groundwater sampling using a direct-push (Geoprobe) rig and mobile laboratory. Pilot testing included in-situ respirometry testing and field testing of "biosplurping" and other free-product recovery technologies.

JESSICA E. LEBER

ENVIRONMENTAL SCIENTIST

Ms. Leber is an environmental scientist with about one year of professional environmental consulting experience. Her range of experience includes completing environmental site assessments, subsurface investigations, hazardous materials impact studies, and preparing sampling protocols and health and safety plans. Ms. Leber's fieldwork experience includes soil boring installation and sampling, groundwater monitoring well installation and sampling, test pit oversight, and air monitoring.

Prior to joining AKRF, Ms. Leber graduated cum laude from Columbia University with a degree in Environmental Chemistry. She has past experience working in organic and environmental chemistry research laboratories at Columbia University and Stony Brook University. Prior to her graduation, she completed an internship at a small environmental consulting firm in Nassau County.

BACKGROUND

Education

B.A., Environmental Chemistry, Columbia University

Certifications

40 Hour Hazardous Waste Operations Site Worker

New York State-Licensed Asbestos Inspector

RELEVANT EXPERIENCE

Atlantic Yards Arena, Brooklyn, NY

As part of the New York City CEQR process, Ms. Leber served on a team of Hazmat staff conducting Phase I Environmental Site Assessments in accordance with ASTM E-1527-00 related to the potential development of eight city blocks for the Atlantic Yards Arena. Ms. Leber coordinated with clients, property owners, and tenants to conduct the site inspections, historical research, regulatory records review, and preparation of the Phase I report.

Flushing, Queens, NY

Ms. Leber is serving on a team conducting an investigation and remediation of a large PCB-contaminated former utility property in Flushing, Queens. She has completed field work for several hundred soil boring installations in the contaminant delineation phase of the project and has aided in preparing documents for the site's transfer from the State Voluntary Cleanup Program to the State Brownfield Cleanup Program.

Queens West, Long Island City, NY

Ms. Leber conducted field work for a supplemental remedial investigation at this former Blau Gas manufacturing facility on a portion of the Queens West Development site in Long Island City. The work is being conducted as part of a Voluntary Cleanup Agreement with the NYSDEC. Field work activities have included soil boring installation, test pit oversight, and monitoring well installation and sampling. Ms. Leber will analyze the laboratory analytical data and aid in preparing a report of the findings of the investigation.

West - Chambers Street, New York, NY

Ms. Leber completed a subsurface investigation for this property currently in the CEQR process to allow residential and commercial development at the site. Ms. Leber's work included the installation and sampling of soil borings and groundwater monitoring wells, analysis of analytical laboratory data, and preparation of an investigation report. Based on the findings of this study, Ms. Leber prepared a Remedial Action Plan and Construction Phase Health and Safety Plan currently pending approval by the New York City Department of Environmental Protection.

APPENDIX B

HEALTH AND SAFETY PLAN

Queens West Development – Parcel 9

Offsite Investigation

Site No. C241049

QUEENS, NEW YORK

Health and Safety Plan

AKRF Project Number: 10516

Prepared for:

AvalonBay Communities
535 Fifth Avenue
New York, New York 10017

Prepared by:

AKRF, Inc.
440 Park Avenue South, 7th Floor
New York, NY 10016
212-696-0670

AUGUST 2005

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1.0 INTRODUCTION

The Queens West Development is a project of the Queens West Development Corporation (QWDC), a subsidiary of New York State's Empire State Development Corp., under the collective sponsorship of The Port Authority of New York and New Jersey, The New York City Economic Development Corporation, and Empire State Development Corporation. The overall Queens West Development site comprises 74 acres along the East River in Hunters Point, Queens, extending from Anable Basin to the north to Newtown Creek to the south (Figure 1 of Work Plan). Stage I of the development involves construction of residential buildings on the portion of the site between 47th Road and 50th Avenue. The development sites in this area have been designated Parcels 8, 9, 10, and 11 (Figure 2 of Work Plan).

In August 1998, a Voluntary Cleanup Agreement was entered into between New York State Department of Environmental Conservation (DEC) and QWDC. This agreement covered Parcels 8, 9, and 11 and the portion of Center Boulevard between Parcels 8 and 9. In July 2000, the Voluntary Cleanup Agreement was amended to allow it to be separated into individual agreements for each parcel, which would be executed by the designated developer for the parcel. Accordingly, after AvalonBay Communities (Avalon Bay) was selected as the developer of Parcels 8, 9, and 11, AvalonBay executed separate agreements for each of the three parcels in September 2000. In March 2004, AvalonBay requested that New York State Department of Environmental Conservation (NYSDEC) transition Parcels 8 and 9 into the Brownfields Cleanup Program.

This Supplemental Remedial Investigation is intended to delineate any soil or groundwater contamination which may be found on offsite locations adjacent to Parcel 9, which includes Parcel 8 and areas adjacent to Parcels 8, 9 and 10. All work will be performed in accordance with the Supplementary Remedial Investigation Work Plan, Quality Assurance Project Plan (Appendix A), Health and Safety Plan (Appendix B), and the Community Air Monitoring and Odor and Vapor Control Plan (Appendix C).

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES

2.1 Hazard Evaluation

2.1.1 Hazards of Concern

Check all that apply		
(X) Organic Chemicals	(X) Inorganic Chemicals	( ) Radiological
( ) Biological	( ) Explosive/Flammable	( ) Oxygen Deficient Atm.
(X) Heat Stress	( ) Cold Stress	( ) Carbon Monoxide
Comments: No personnel are permitted to enter permit confined spaces.		

2.1.2 Physical Characteristics

Check all that apply		
(X) Liquid	(X) Solid	(X) Sludge
(X) Vapors	( ) Unknown	( ) Other
Comments:		

2.1.3 Hazardous Materials

Check all that apply					
Chemicals	**Solids**	**Sludges**	**Solvents**	**Oils**	**Other**
( ) Acids	(X) Ash	( ) Paints	( ) Halogens	( ) Transformer	( ) Lab
( ) Caustics	( ) Asbestos	( ) Metals	(X) Petroleum	( ) Other DF	( ) Pharm
( ) Pesticides	( ) Tailings	( ) POTW	( ) Other	( ) Motor or Hydraulic Oil	( ) Hospital
(X) Petroleum	(X) Other	( ) Other		(X) Gasoline	( ) Rad
( ) Inks	Fill material			(X) Fuel Oil	( ) MGP
( ) PCBs					( ) Mold
(X) Metals					( ) Cyanide
(X)Other: Coal Tar					

2.1.4 Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Xylenes	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Naphthalene	REL = 10 ppm PEL = 10 ppm	Irritation eyes; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Lead	REL= 0.1 mg/m^3 PEL= 0.05 mg/m^3	Weak, lassitude, insomnia; facial pallor, pale eye, anorexia, low-weight, malnutrition, constipation, abdominal pain, colic; anemia; gingival lead line; tremors, paralysis wrists and ankles; encephalopathy; kidney disease; irritation eyes; hypotension.
Polyaromatic Hydrocarbons (PAHs)	REL= 0.1 mg/m^3 PEL= 5 mg/m^3	Harmful effects on the skin, body fluids, and ability to fight disease after both short and long term exposure, birth defects, and potential occupational carcinogen.
Coal Tar	REL= 0.1 mg/m^3 PEL= 0.2 mg/m^3	Rash, severe irritation of skin, chemical burns of the surfaces of the eyes, convulsions and mental confusion, kidney or liver problems, increased light sensitivity, irritation of the respiratory tract, unconsciousness, dermatitis, bronchitis, and potential occupational carcinogen.
Comments: REL = NIOSH Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

2.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for the implementation of the HASP. The SSO will have a 4-year college degree in occupational safety or a related science/engineering field, and experience in

implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel is outlined in Section 2.3 of this HASP.

2.3 Training

All personnel who enter the work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. In addition, all personnel will have up-to-date 8-hour refresher training. The training will allow personnel to recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety; Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in these objectives before he/she goes onto the site. A site safety meeting will be conducted at the start of the project. Additional meetings shall be conducted, as necessary, for new personnel working at the site.

2.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance 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. The medical release shall consider the type of work to be performed and the required PPE. The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste site work.

2.5 Site Work Zones

During any activities involving subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where exposure to impacted media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support is the zone area where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may changed by SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.

For locations on public streets and sidewalks, the necessary permits will be obtained from the New York City Department of Transportation to close the portion of the street or sidewalk where work is being performed. Appropriate barriers will be set up to secure the area and prevent anyone from approaching within twenty five feet of the work area.

Site Work Zones			
Task	**Exclusion Zone**	**CRZ**	**Support Zone**
Soil Borings	10 ft from Drill Rig	25 ft from Drill Rig	As Needed
Well Installation	10 ft from Drill Rig	25 ft from Drill Rig	As Needed

2.6 Air Monitoring

The purpose of the air monitoring program is to identify any exposure of the field personnel to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed.

2.6.1 Volatile Organic Compounds

An organic vapor meter (OVM) will be used to perform air monitoring during soil disturbance activities to determine airborne levels of total VOCs. The OVM will be calibrated daily with a 100 parts per million (ppm) isobutylene standard.

2.6.2 Work Zone Air Monitoring

Real time air monitoring will be performed with the OVM, particulate matter, and CGI/O2. Measurements will be taken prior to commencement of work and continuously during the work, as outlined in the following table. Measurements will be made as close to the workers as practicable and at the breathing height of the workers. The SSO shall set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in the following table.

Work Zone Air Monitoring Action Levels		
Instrument	**Action Level**	**Response Action**
OVM	Less than 10 ppm in breathing zone	Level D or D-Modified
	Between 10 ppm and 500 ppm	Level C
	More than 500 ppm	Stop work. Resume work when readings are less then 500 ppm.
Combustible Gas Indicator	Less than 20% LEL	Continue Work
	Between 20% LEL and 80% LEL	Stop Work. Resume work when less than 20% LEL
	Above 80% LEL	EVACUATE AREA
Particulate monitor	Less than 5 mg/m3	Level D
	Between 5 mg/m3 and 125 mg/m3	Level C. Apply dust suppression measures. If < 2.5 mg/m3, resume work using Level D. Otherwise, use Level C.

	Above 125 mg/m3	Stop work. Apply additional dust suppression measures. Resume work when less than 125 mg/m3.
Oxygen Monitor	Above 19.5%	Continue Work
	Below 19.5%	Stop Work. Resume work when more than 19.5%
	Less than 20% LEL	Continue Work

Personal Protection Equipment

The personal protection equipment required for various kinds of site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."

AKRF field personnel and other site personnel shall wear, at a minimum, Level D personal protective equipment. The protection will be based on the air monitoring described in this section.

Personal Protection Equipment Requirements		
LEVEL OF PROTECTION & PPE		**Soil Boring/Water Sampling**
Level D (X) Steel Toe Shoes (X) Hard Hat (within 25 ft of drill rig/excavator) (X) Work Gloves	(X) Safety Glasses ( ) Face Shield (X) Ear Plugs (within 25 ft of drill rig/excavator) (X) Nitrile Gloves (X) Tyvek for drill operator if NAPL present	Yes
Level C ***(in addition to Level D)*** (X) Half-Face Respirator OR (X) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge ( ) Organic Cartridge (X) Dual Organic/ Particulate Cartridge	If PID > 10 ppm (breathing zone)
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breath or any odors detected).		

2.7 General Work Practices

To protect the health and safety of the field personnel, field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the site. Contact with contaminated or suspected surfaces should be avoided.

- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

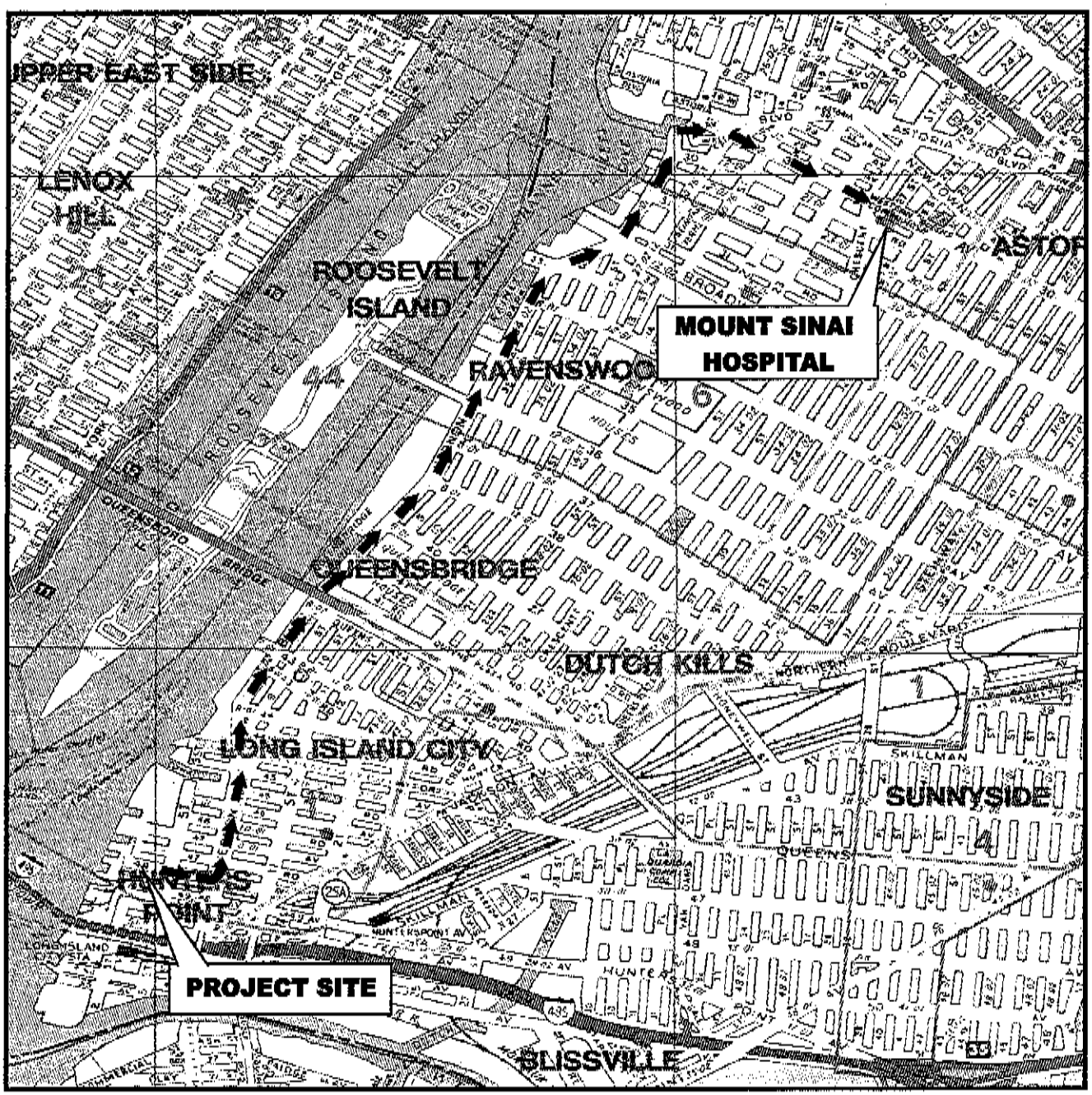
The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the SSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to a hospital by on-site personnel. Directions to the hospital are provided below, and a hospital route map is attached.

3.1 HOSPITAL DIRECTIONS

Hospital Name:	Mt. Sinai Hospital of Queens
Phone Number:	718-932-1000
Address/Location:	25-10 30th Ave., – Long Island City, New York (30th Ave between Crescent Street and 29th Street)
Directions:	Go EAST on 48th Ave to *Vernon Blvd* LEFT onto *Vernon Blvd* RIGHT onto *30th Ave* Go past Crescent Street, the hospital will be on the right.

3.2 EMERGENCY CONTACTS

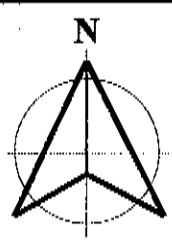
Company	Individual Name	Title	Contact Number
AKRF	Marc Godick	Project Director	646-388-9526 (office) 917-991-4030 (cell)
	Jessica Leber	SSO	646-388-9533(office) 917-612-6175(cell)
AvalonBay Communities	Steve Spiro	Client Representative	212-309-1616
QWDC	David Parker	Dir. Of Operations	212-803-3633
New York State Department of Health	Dawn Hettrick		800-458-1158 ext. 27880
New York State Department of Environmental Conservation	Vadim Brevdo	Project Manager	718-482-4891
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362





QUADRANGLE

SOURCE:
HAGSTROM MAP - NEW YORK CITY 5 BOROUGH ATLAS DATED 1994.



QUEENS WEST PARCEL 9
Queens, New York

HOSPITAL ROUTE MAP

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y.

DATE
05.24.05
PROJECT NO.
10516
FIGURE NO.
1

2004 AKRF, Inc. Environmental Consultants M:\DRIVE\10516 QUEENS WEST SITE B&B\10516-0001_hosp-route.pub

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP

APPROVAL

Signed: _____ Date: _____

AKRF Project Manager

Signed: _____ Date: _____

AKRF Health and Safety Officer

Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the SSO.

AFFIDAVIT

I, _____(name), of _____(company name), have read the Health and Safety Plan (HASP) for the Queens West Parcel 9 site. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signed:	_____	Company:	_____	Date:	_____
Signed:	_____	Company:	_____	Date:	_____
Signed:	_____	Company:	_____	Date:	_____
Signed:	_____	Company:	_____	Date:	_____
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Signed:	_____	Company:	_____	Date:	_____

ATTACHMENT A

POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE
CAS # 71-43-2

Agency for Toxic Substances and Disease Registry ToxFAQs — September 1997

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

(Pronounced bĕn/zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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ETHYLBENZENE
CAS # 100-41-4

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ĕth/ əl bĕn/ zēn′)

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, posticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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CREOSOTE

CAS # 8021-39-4, 8001-58-9, 8007-45-2

Division of Toxicology ToxFAQs™ September 2002

This fact sheet answers the most frequently asked health questions (FAQs) about creosote. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Creosote is a mixture of many chemicals. Eating food or drinking water with high levels of creosote may cause burning in the mouth and throat, and stomach pain. Long-term contact with creosote has been associated with increased risk of contracting cancer. Creosote has been found in at least 46 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is creosote?

Creosote is the name used for a variety of products: wood creosote, coal tar creosote, coal tar, coal tar pitch, and coal tar pitch volatiles. These products are mixtures of many chemicals created by burning of beech and other woods, coal, or from the resin of the creosote bush.

Wood creosote is a colorless to yellowish greasy liquid with a smoky odor and burned taste. Coal tar creosote is a thick, oily liquid typically amber to black in color. Coal tar and coal tar pitch are usually thick, black, or dark-brown liquids or semi-solids, with a smoky odor.

Wood creosote has been used as a disinfectant, a laxative, and a cough treatment, but has since been replaced by better medicines. Coal tar products are used in medicines to treat skin diseases such as psoriasis, and also as animal and bird repellents, insecticides, animal dips, and fungicides. Coal tar creosote is the most widely used wood preservative in the United States. Coal tar, coal tar pitch, and coal tar pitch volatiles are used for roofing, aluminum smelting, and coking.

What happens to creosote when it enters the environment?

- Coal tar creosote is released to water and soil mainly as a result of its use in the wood preservation industry.
- Components of creosote that do not dissolve in water will remain in place in a tar-like mass.
- Some components of coal tar creosote dissolve in water and may move through the soil to groundwater.
- Once in groundwater, it may take years for it to break down.
- Coal tar creosote can build up in plants and animals.
- We do not know what happens to wood creosote when it enters the environment.

How might I be exposed to creosote?

- Using products that contain creosote to improve skin problems such as eczema or psoriasis.
- Eating herbal remedies containing the leaves from the creosote bush, which are sold as dietary supplements.
- Working in the wood preservative, coke-producing, or asphalt industries.
- Using creosote-treated wood in building fences, bridges, or railroad tracks, or installing telephone poles.
- Living in treated-wood houses that may result in air or skin contact with creosote.
- Drinking water contaminated by a hazardous waste site.

How can creosote affect my health?

Eating food or drinking water contaminated with high levels of creosotes may cause a burning in the mouth and throat, and stomach pains. Taking large amounts of herbal remedies containing creosote bush leaves may cause damage to the liver or kidney.

Brief direct contact with large amounts of coal tar creosote may result in a rash or severe irritation of the skin, chemical burns of the surfaces of the eyes, convulsions and mental confusion, kidney or liver problems, unconsciousness, and even death. Longer direct skin contact with low levels of

creosote mixtures or their vapors can result in increased light sensitivity, damage to the cornea, and skin damage. Longer exposure to creosote vapors can cause irritation of the respiratory tract.

How likely is creosote to cause cancer?

Long-term exposure to low levels of creosote, especially direct contact with the skin during wood treatment or manufacture of coal tar creosote-treated products, has resulted in skin cancer and cancer of the scrotum. Cancer of the scrotum in chimney sweeps has been associated with long-term skin exposure to soot and coal tar creosotes. Animal studies have also shown skin cancer from skin exposure to coal tar products.

The International Agency for Research on Cancer (IARC) has determined that coal tar is carcinogenic to humans and that creosote is probably carcinogenic to humans. The EPA has determined that coal tar creosote is a probable human carcinogen.

How can creosote affect children?

There is no unique exposure pathway of children to creosote. Children exposed to creosote will probably experience the same health effects seen in adults exposed to creosote. Children who played on soil contaminated with creosote had more skin rashes than children who played in uncontaminated areas. We do not know whether children differ from adults in their susceptibility to health effects from creosote.

Studies in animals have shown birth defects in the young of mothers exposed to high levels of creosote during pregnancy, but we do not know whether the same effects would occur in humans. Some animal studies indicate that creosotes may cross the placenta and reach the fetus. Because chemical components (PAHs, cresol, phenols) of coal tar creosote may be stored in body fat, they may be found in breast milk and could pass to nursing infants.

How can families reduce the risk of exposure to creosote?

- ❑ If you live in a residential area that used to have a wood preservation facility or gas manufacturing plant nearby, wear long-sleeved shirts and long pants when working or playing outside and avoid using water contaminated with creosote.
- ❑ Instruct children not to come in contact with creosote-treated wood when playing on or near railroad tracks, in ditches close to utility poles, in old barns or other farm structures, or on bridges or piers.
- ❑ Avoid using herbal remedies containing the leaves of the creosote bush and seek alternatives to skin remedies containing creosote.
- ❑ If you are exposed to creosote in the workplace, make sure you do not carry the chemical home in your clothing, skin, hair, tools, or other objects from the workplace (shower before going home).

Is there a medical test to show whether I've been exposed to creosote?

There is no medical test to determine if you have been exposed to creosote. Some components of creosote mixtures can be measured in body tissues, urine, or blood after exposure to creosote. These tests cannot tell whether harmful health effects will occur. The tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 0.2 milligrams of coal tar pitch volatiles per cubic meter of air (0.2 mg/m^3) in workplace air during an 8-hour day, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Creosote (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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LEAD
CAS # 7439-92-1

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,026 of 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is lead?

(Pronounced lĕd)

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays.

Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.
- Much of the lead in inner-city soils comes from old houses painted with lead-based paint.

How might I be exposed to lead?

- Eating food or drinking water that contains lead.
- Spending time in areas where lead-based paints have been used and are deteriorating.
- Working in a job where lead is used.
- Using health-care products or folk remedies that contain lead.
- Engaging in certain hobbies in which lead is used (for example, stained glass).

How can lead affect my health?

Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

At high levels, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can also damage the male reproductive system. The connection between these effects and exposure to low levels of lead is uncertain.

How likely is lead to cause cancer?

The Department of Health and Human Services has determined that lead acetate and lead phosphate may reasonably

be anticipated to be carcinogens based on studies in animals. There is inadequate evidence to clearly determine lead's carcinogenicity in people.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. A large amount of lead might get into a child's body if the child ate small pieces of old paint that contained large amounts of lead. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead.

How can families reduce the risk of exposure to lead?

Avoid exposure to sources of lead. Do not allow children to chew or mouth painted surfaces that may have been painted with lead-based paint (homes built before 1978). Run your water for 15 to 30 seconds before drinking or cooking with it. This will get rid of lead that may have leached out of pipes. Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children. Wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to show whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth and bones can be measured with X-rays, but this test is not as readily available. Medical treatment may be necessary in children if the lead concentration in blood is higher than 45 micrograms per deciliter (45 µg/dL).

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that children ages 1 and 2 be screened for lead poisoning. Children who are 3 to 6 years old should be tested for lead if they have never been tested for lead before and if they receive services from public assistance programs; if they live in or regularly visit a building built before 1950; if they live in or visit a home built before 1978 that is being remodeled; or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers children to have an elevated level of lead if the amount in the blood is 10 µg/dL.

The EPA requires lead in air not to exceed 1.5 micrograms per cubic meter (1.5 µg/m^3) averaged over 3 months. EPA limits lead in drinking water to 15 µg per liter.

The Occupational Health and Safety Administration (OSHA) develops regulations for workers exposed to lead. The Clean Air Act Amendments of 1990 banned the sale of leaded gasoline. The Federal Hazardous Substance Act bans children's products that contain hazardous amounts of lead.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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MERCURY
CAS # 7439-97-6

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?
(Pronounced mĕr'kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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NAPHTHALENE
CAS # 91-20-3

This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to naphthalene happens mostly from breathing air contaminated from the burning of wood or fossil fuels, industrial discharges, tobacco smoke, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has been found in at least 536 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is naphthalene?

(Pronounced năf'thə-lēn')

Naphthalene is a white solid that is found naturally in fossil fuels. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell.

The major products made from naphthalene are moth repellents. It is also used for making dyes, resins, leather, tanning agents, and the insecticide, carbaryl.

What happens to naphthalene when it enters the environment?

- Naphthalene enters the environment from industrial uses, and from its use as a moth repellent.
- It also enters from the burning of wood or tobacco, and from accidental spills.
- Naphthalene evaporates easily.
- In air, moisture and sunlight break it down, often within 1 day.
- Naphthalene in water is destroyed by bacteria or evaporates into the air.
- Naphthalene binds weakly to soils and sediment.
- It does not accumulate in animals or fish.
- If dairy cows are exposed to naphthalene, some of it will be in their milk.
- If laying hens are exposed, some of it will be in their eggs.

How might I be exposed to naphthalene?

- Breathing low levels in outdoor air.
- Breathing air contaminated from industrial discharges or from burning wood or fossil fuels.
- Breathing air in homes or businesses where cigarettes are smoked, wood is burned, or moth repellents are used.
- Drinking water from contaminated wells.
- Touching clothing, blankets, or coverlets that are treated with naphthalene.

How can naphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. People, particularly children, have developed this problem after eating naphthalene-containing mothballs or deodorant blocks. Some of the symptoms of this

problem are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin.

Animals sometimes develop cloudiness in their eyes after swallowing naphthalene. It is not clear if this also develops in people.

When mice were repeatedly exposed to naphthalene vapors for 2 years, their noses and lungs became inflamed and irritated.

How likely is naphthalene to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC) and the EPA have not classified naphthalene as to its human carcinogenicity.

No studies are available in people. Naphthalene has caused cancer in studies in female mice, but not in male mice or in rats of either sex.

Is there a medical test to show whether I've been exposed to naphthalene?

Tests are available that measure levels of naphthalene and its breakdown products in urine, stool, blood, or maternal milk. A small sample of your body fat can also be removed and analyzed for naphthalene. These tests are not routinely available in a doctor's office. However, a sample taken in a doctor's office can be sent to a special laboratory, if needed.

These tests cannot determine exactly how much naphthalene you were exposed to or predict whether harmful effects will occur.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water containing over 0.5 parts of naphthalene per million parts of water (0.5 ppm) for more than 10 days, or 0.4 ppm for longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime, the EPA suggests it contain no more than 0.02 ppm naphthalene. The EPA requires that discharges or spills into the environment of 100 pounds or more be reported.

The Occupational Safety and Health Administration (OSHA) has set a limit of 10 parts per million (10 ppm) for the level of naphthalene in workplace air over an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) considers more than 250 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Carcinogenicity: Ability of a substance to cause cancer.

CAS: Chemical Abstracts Service.

Insecticide: A substance that kills insects.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs September 1996

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ĭ-sī'klĭk ăr'ə-măt'ĭk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TOLUENE
CAS # 108-88-3

Division of Toxicology ToxFAQs™ February 2001

This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency.

What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

What happens to toluene when it enters the environment?

- Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petroleum products as well as from leasking underground storage tanks at gasoline stations and other facilities.
- When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.
- Toluene does not usually stay in the environment long.
- Toluene does not concentrate or buildup to high levels in animals.

How might I be exposed to toluene?

- Breathing contaminated workplace air or automobile exhaust.
- Working with gasoline, kerosene, heating oil, paints, and lacquers.
- Drinking contaminated well-water.
- Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults. Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

How can families reduce the risk of exposure to toluene?

❑ Use toluene-containing products in well-ventilated areas.

❑ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

Is there a medical test to show whether I've been exposed to toluene?

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

XYLENE
CAS # 1330-20-7

This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is xylene?

(Pronounced zī'lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

- Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- It evaporates quickly from the soil and surface water into the air.
- In the air, it is broken down by sunlight into other less harmful chemicals.
- It is broken down by microorganisms in soil and water.
- Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

How might I be exposed to xylene?

- Breathing xylene in workplace air or in automobile exhaust.
- Breathing contaminated air.
- Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- Breathing cigarette smoke that has small amounts of xylene in it.
- Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- The amount of xylene in food is likely to be low.

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ZINC

CAS # 7440-66-6

This fact sheet answers the most frequently asked health questions (FAQs) about zinc. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to high levels of zinc occurs mostly from eating food, drinking water, or breathing workplace air that is contaminated. Exposure to large amounts of zinc can be harmful. However, zinc is an essential element for our bodies, so too little zinc can also be harmful. This chemical has been found in at least 801 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is zinc?

(Pronounced zingk)

Zinc is one of the most common elements in the earth's crust. It's found in air, soil, and water, and is present in all foods.. Pure zinc is a bluish-white shiny metal.

Zinc has many commercial uses as coatings to prevent rust, in dry cell batteries, and mixed with other metals to make alloys like brass and bronze. A zinc and copper alloy is used to make pennies in the United States.

Zinc combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dye, wood preservatives, and ointments.

What happens to zinc when it enters the environment?

- Some is released into the environment by natural processes, but most comes from activities of people like mining, steel production, coal burning, and burning of waste.
- It attaches to soil, sediments, and dust particles in the air.
- Rain and snow remove zinc dust particles from the air.
- Zinc compounds can move into the groundwater and into lakes, streams, and rivers.
- Most of the zinc in soil stays bound to soil particles.
- It builds up in fish and other organisms, but it doesn't build up in plants.

How might I be exposed to zinc?

- Ingesting small amounts present in your food and water.
- Drinking contaminated water near manufacturing or waste sites.
- Drinking contaminated water or a beverage that has been stored in metal containers or flows through pipes that have been coated with zinc to resist rust.
- Eating too many dietary supplements that contain zinc.
- Breathing zinc particles in the air at manufacturing sites.

How can zinc affect my health?

Zinc is an essential element in our diet. **Too** little zinc can cause health problems, but too much zinc is also harmful.

The recommended dietary allowance (RDA) for zinc is 15 milligrams a day for men (15 mg/day); 12 mg/day for women; 10 mg/day for children; and 5 mg/day for infants. Not enough zinc in your diet can result in a loss of appetite, a decreased sense of taste and smell, slow wound healing and

skin sores, or a damaged immune system. Young men who don't get enough zinc may have poorly developed sex organs and slow growth. If a pregnant woman doesn't get enough zinc, her babies may have growth retardation.

Too much zinc, however, can also be damaging to your health. Harmful health effects generally begin at levels from 10-15 times the RDA (in the 100 to 250 mg/day range). Eating large amounts of zinc, even for a short time, can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia, pancreas damage, and lower levels of high density lipoprotein cholesterol (the good form of cholesterol).

Breathing large amounts of zinc (as dust or fumes) can cause a specific short-term disease called metal fume fever. This is believed to be an immune response affecting the lungs and body temperature. We do not know the long-term effects of breathing high levels of zinc.

It is not known if high levels of zinc affect human reproduction or cause birth defects. Rats that were fed large amounts of zinc became infertile or had smaller babies. Irritation was also observed on the skin of rabbits, guinea pigs, and mice when exposed to some zinc compounds. Skin irritation will probably occur in people.

How likely is zinc to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified zinc for carcinogenicity.

Is there a medical test to show whether I've been exposed to zinc?

Zinc can be measured in your blood or feces. This can tell you how much zinc you have been exposed to. Zinc can also be measured in urine, saliva, and hair. The amount of zinc in your hair tells us something about long-term exposure, but the relationship between levels in your hair and the amount that you were exposed to is not clear. These tests are not routinely performed at doctors' offices, but your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

EPA recommends that there be no more than 5 parts of zinc in 1 million parts of drinking water (5 ppm) because of taste. EPA also requires that releases of more than 1,000 (or in some cases 5,000) pounds of zinc or its compounds into the environment be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum concentration limit for zinc chloride fumes in workplace air of 1 milligram of zinc per cubic meter of air (1 mg/m^3) for an 8-hour workday over a 40-hour work week and 5 mg/m^3 for zinc oxide fumes. The National Institute for Occupational Safety and Health (NIOSH) has set the same standards for up to a 10-hour workday over a 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogenicity: Ability to cause cancer.

Milligram (mg): One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1994. Toxicological profile for zinc. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATTACHMENT B

WEST NILE VIRUS/ST. LOUS ENCEPHALITIS PREVENTION

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the CDC Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants) and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

ATTACHMENT C

REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: _____ Project Name/Number: _____

Report Date: _____ Project Manager Name: _____

Summary of any violations of procedures occurring that week:

_____

_____

_____

Summary of any job related injuries, illnesses, or near misses that week:

_____

_____

_____

_____

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

_____

_____

_____

Comments:

_____

_____

_____

Name: _____ Company: _____

Signature: _____ Title: _____

INCIDENT REPORT FORM

Date of Report: _____

Injured: _____

Employer: _____

Site: _____ Site Location: _____

Report Prepared By: _____ _____
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

___Injury	___ Illness	___ Near Miss
__ Property Damage	___ Fire	___ Chemical Exposure
__ On-site Equipment	___ Motor Vehicle	___ Electrical
__ Mechanical	___ Spill	___ Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of Accident/Incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

WITNESS TO ACCIDENT/INCIDENT:

Name:	_____	Company:	_____
Address:	_____	Address:	_____
Phone No.:	_____	Phone No.:	_____
Name:	_____	Company:	_____
Address:	_____	Address:	_____
Phone No.:	_____	Phone No.:	_____

INJURED - ILL:

Name: _____ SSN: _____

Address: _____ Age: _____

Length of Service: _____ Time on Present Job: _____

Time/Classification: _____

SEVERITY OF INJURY OR ILLNESS:

____ Disabling ___ Non-disabling ___ Fatality

____ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: _____

NATURE OF INJURY OR ILLNESS: _____

_____

_____

_____

CLASSIFICATION OF INJURY:

__ Abrasions	_____ Dislocations	____ Punctures
__ Bites	_____ Faint/Dizziness	____ Radiation Burns
__ Blisters	_____ Fractures	____ Respiratory Allergy
__ Bruises	_____ Frostbite	____ Sprains
__ Chemical Burns	_____ Heat Burns	____ Toxic Resp. Exposure
__ Cold Exposure	_____ Heat Exhaustion	____ Toxic Ingestion
__ Concussion	_____ Heat Stroke	____ Dermal Allergy
__ Lacerations		

Part of Body Affected: _____

Degree of Disability: _____

Date Medical Care was Received: _____

Where Medical Care was Received: _____

Address (if off-site): _____

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: _____

_____

Cost of Damage: $ _____

ACCIDENT/INCIDENT LOCATION: _____

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident (Object, substance, material, machinery, equipment, conditions)

_____

_____

_____

_____

Was weather a factor?: _____

_____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

_____

_____

_____

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

_____

_____

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

_____

_____

Modifications:

_____

Was injured using required equipment?:

_____

_____

If not, how did actual equipment use differ from plan?:

_____

_____

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?

ACCIDENT/INCIDENT REPORT REVIEWED BY:

SSO Name Printed

SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

Signature

Title

Signature

Title

Signature

Title

ACCIDENT/INCIDENT FOLLOW-UP: Date:

Outcome of accident/incident:

Physician's recommendations:

Date injured returned to work:

Follow-up performed by:

Signature

Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT D

EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH!



Hand gripping throat

LEAVE AREA IMMEDIATELY, NO DEBATE!

(No Picture) Grip partner's wrist or place both hands around waist

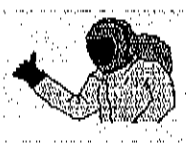
NEED ASSISTANCE!



Hands on top of head

OKAY! – I'M ALL RIGHT!

- I UNDERSTAND!



Thumbs up

NO! - NEGATIVE!



Thumbs down

APPENDIX C

COMMUNITY AIR MONITORING AND VAPOR CONTROL PLAN

Queens West Development – Parcel 9

Offsite Investigation Work Plan

Site # C241049

QUEENS, NEW YORK

Community Air Monitoring and Vapor Control Plan

AKRF Project Number: 10516

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1.0 INTRODUCTION

This Community Air Monitoring and Odor and Vapor Control Plan specifies:

- The procedures to be implemented to control emissions of vapors, particulate matter, or odors resulting from operations on the site;
- The procedures for monitoring to detect any emissions from operations on the site which may impact the surrounding community; and,
- The response measures to be implemented if such emissions are detected.

This Plan shall be implemented during all ground-disturbing activities, which included soil borings and monitoring well installations. Procedures intended to detect and respond to conditions which may affect on-site personnel are specified in the Health and Safety Plan for this site.

2.0 DUST, ODOR, AND VAPOR SUPPRESSION

2.1 Dust, Odor and Vapor Control Measures

Emissions of odors and vapors will be controlled by minimizing, to the extent possible, the exposure of contaminated soil to the atmosphere. No excavations or test pits are planned as part of the Supplementary Remedial Investigation for Parcel 8 and Offsite areas. Specific measures that shall be implemented during the soil borings, monitoring well installations, and groundwater sampling are:

- Promptly containerizing investigation-derived wastes. An adequate supply of DOT-approved 55-gallon drums will be available on the site so investigation-derived wastes may be immediately containerized.

3.0 PERIMETER MONITORING

Perimeter air monitoring will be performed for volatile organic compounds (VOCs) and particulate matter. Monitoring locations will be at the upwind and downwind boundaries of the exclusion zone. An on-site wind sock will be used to monitor the wind direction.

3.1 Perimeter Monitoring – Volatile Organic Compounds

3.1.1 Monitoring Procedure

Perimeter monitoring for VOCs will be conducted using an organic vapor meter (OVM) equipped with a photoionization detector (PID). The OVM will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate the exceedance of an action level. Monitoring for VOCs at the upwind station will be conducted at the start of each workday and every time the wind direction changes to establish background conditions. Monitoring for VOCs at the downwind station will be conducted at a minimum frequency of once every two hours during soil boring and monitoring well installation and on a continuous basis during test pit excavation. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on site for NYSDEC/NYSDOH review.

3.1.2 Response Actions

If the ambient (breathing zone) air concentration of VOCs at the site perimeter exceeds 5 parts per million (ppm) over a 15-minute time weighted running average, but does not exceed 25 ppm, then invasive work

activities will be temporarily halted. If VOC levels readily return to below 5 ppm, then work may resume with continued monitoring. If VOC levels do not readily return to below 5 ppm, then work will be halted and NYSDEC and NYSDOH will be notified immediately. The source of the VOC emissions will be identified and corrective actions taken to reduce emissions. Work will not resume until VOC levels are below 5 ppm.

If the ambient (breathing zone) air concentration of VOCs at the site perimeter exceeds 25 parts per million (ppm) over a 15-minute time weighted running average then work will be halted and NYSDEC and NYSDOH will be notified immediately. Confirmatory air samples will be collected at the upwind and downwind site perimeters for laboratory analysis. Samples will be collected over a half-hour period in six-liter SUMMA canisters using flow controllers set at a rate of 0.2 liters per minute. The air samples will be analyzed for VOCs including tentatively identified compounds (TICs) be EPA Method TO-15. The source of the VOC emissions will be identified and corrective actions taken to reduce emissions. Work will not resume until VOC levels are below 5 ppm and the start-up is approved by NYSDEC and NYSDOH.

3.2 Perimeter Monitoring – Particulates

3.2.1 Monitoring Procedure

Community air monitoring for dust particulates will be conducted using a real time particulate monitor that measures the concentration of airborne respirable particulates less than 10 micrometers in size (PM10). The monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate exceedance of action levels. Monitoring for particulates at the upwind location will be conducted at the start of each workday and every time the wind direction changes to establish background conditions. Monitoring at the downwind station will be conducted at a minimum frequency of once every two hours. Background readings and any readings that trigger response actions will be recorded in the project logbook, which will be available on site for NYSDEC/NYSDOH review.

3.2.2 Response Actions

If downwind PM10 concentrations exceed 100 $\mu g/m^3$ above background for a 15-minute time-weighted average, then invasive work activities will be temporarily halted and resume only after the source of the dust has been identified, dust-suppression measures have been implemented, and the downwind PM10 level is less than 100 $\mu g/m^3$ above background for a 15-minute time-weighted average.

4.0 ODOR AND VAPOR CONTROL CONTINGENCY

If the odor and vapor control measures described in Section 2.0 are not adequate to prevent repeated exceedances of perimeter monitoring action levels, or to prevent off-site impacts as detected by the neighborhood odor and vapor monitoring program, then the invasive activities that resulted in the exceedences will be suspended and following contingency measures will be implemented:

- NYSDEC and NYSDOH will be notified.
- A revised plan for dust, vapor and odor control with alternative work practices and control measures will be submitted to NYSDEC and NYSDOH.
- The suspended activities will not be resumed until the revised dust, vapor and odor control plan is approved by NYSDEC and NYSDOH, and the alternative work practices and control measures are implemented.

APPENDIX D

Appendix D
Parcel 9 Offsite Investigation Work Plan

NYSDEC Generic List of Agreements Draft
Remedial Investigation Work Plans (RIWP), Remedial Investigation Reports (RIR)

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
Remedial Investigation: General		
1. The guidance for Remedial Investigation Work Plans and Remedial Investigations is provided in NYSDEC Division of Environmental Remediation DER-10 Guide (Tech Guide). Remedial investigations should be in substantial compliance with this document.	DER-10 was used as guidance in preparing SRIWP.	X
2. All documents and reports submitted in fulfillment of consent orders and agreements made with NYSDEC will be submitted in both hard copy and in digital format on CD. Digital submittals will include PDF format files for all documents. Data in tabular format will also be submitted in active source files format (such as Excel) to enable direct evaluation by Department staff.	Digital copies of all documents will be submitted upon finalization of reports.	X
3. All digital and hard copy submittals will be addressed to assigned Project Managers for both the Department of Environmental Conservation and the Department of Health.	All documents will be submitted in accordance with this requirement.	X
4. A digital site map will be submitted to the Department and will show site structures, environmental monitoring apparatus and sampling points (wells, borings, test pits), and a recent aerial photo of the site and immediate surrounding area.	Fig. 3; A digital map and aerial photo will be included with RIR.	X
5. A surveyed site map showing the metes and bounds for the subject site as described in the governing agreement with New York State will be submitted. The map should include pertinent roadways and onsite structures. Both hard copy and digital form of this map will be submitted.	Survey of Parcel 9 has been completed and survey of Parcel 8 is pending.	X
6. A topographic map of the site of sufficient scale to assess on-site and local off-site conditions will be provided in the Remedial Investigation Work Plan and the Remedial Investigation Report.	Fig. 1	X
7. Metes and bounds description of the site will include a global positioning system coordinate for the starting point for the description.	Survey of Parcel 9 has been completed and survey of Parcel 8 is pending.	X

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
8. Photographs will be taken of all remedial investigation activities and submitted to NYSDEC in digital form on a CD(s). Photos should illustrate all remedial investigation elements and should be of acceptable quality. Representative photos of the site prior to any remedial actions should be provided. Representative photos should be provided of contaminant sources and source areas and structures. Photos will be submitted to NYSDEC on CD and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH Project Manager (1 copy). CDs should have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical lines. A photo log keyed to photo file ID numbers should be prepared to provide explanation for all representative photos.	N/A	X
9. The Applicant, Volunteer, Responsible Party and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work and the structural integrity of excavations, and structures that may be affected by those excavations (such as building foundations and bridge footings).	Appendix B (HASP); No excavations are planned as part of RI.	X
10. Project numbers will appear on the cover and face page of all reports.	Cover	X
11. A glossary will be provided to provide an explanation of all acronyms used in each report.	Appendix F	X
12. An emergency contact sheet will be provided to NYSDEC's project manager. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.	Appendix B, Section 3.2 (pg. B-7)	N/A
13. All project reports must be submitted in digital form. For older projects that have passed through earlier stages of remedial investigation, the approved documents must be scanned and submitted in digital form to the project manager for NYSDEC.	Digital copies of all documents will be submitted upon finalization of reports.	X
14. A separate list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work must be submitted in the RAWP and should include a citation of the law, statute or code to be complied with, the originating agency, and a contact name and contact phone number.	Sidewalk and street drilling permits will be obtained prior to beginning work.	N/A
15. A comprehensive project schedule for Remedial Investigation will be submitted in the Work Plan.	Section 4.3 (pg. 9)	N/A
16. An itemized summary of projected costs for the proposed remedial activity will be submitted as an appendix to the Remedial Investigation Report. Final costs will be reported as an appendix to the Remedial Investigation.	N/A	X

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
Areas of Concern		
17. A site map will be submitted that shows all of the Areas of Concern (AOC) that have been identified for the project. Map will be to scale. Available maps of drainage systems will be summarized and will include interpretation of piping lines that have environmental significance.	Fig. 3 shows sampling locations, which are considered AOCs based on known Parcel 9 contamination and area history.	X
18. All Areas of Concern (AOC) will be investigated and results will be presented in the Remedial Investigation. Each AOC will be assessed of the need for remedial action in the Remedial Action Work Plan.	Fig. 3 and Section 3.1 (pg. 4) depict and summarize investigation plan.	X
19. Site maps (or portions thereof) will be submitted that provide comprehensive plume analysis showing the concentrations of critical chemicals in groundwater (isopleth maps) that pertain to specific Areas of Concern. The plume analysis should include relevant chemical parameters (i.e. benzene, tetrachloroethylene, etc.) and indices (total VOC's). The hydrogeologic strata represented in the map (i.e. fill, upper glacial aquifer, etc.) will be identified.	N/A	X
20. A plan will be submitted for definition of groundwater plumes with special attention to delineation of the areas of greatest concentration of critical contaminants and the limits of the plume in the down-gradient direction (generally defined as the attainment of groundwater standards). In latter stages of the project, sampling of down-gradient wells will be required to assess the success of remedial measures (Remedial Performance Monitoring) to be taken during the Remedial Action or Interim Remedial Action and subsequent remedial phases.	N/A	X
21. A site map showing the defined Areas of Concern with an overlay of the site development plan will be submitted. The latter will be linked with the description of the proposed end usage of the property and buildings in the text of the report and will be coordinated with NYSDOH.	End use plans for Parcel 0 provided in RAWP; there is currently no final plan for the development of Parcel 8.	X – (if available)
22. A plan for identification of subterranean piping and fuel conveyance systems will be submitted. An analysis of the piping system and its environmental ramifications will be provided with summary maps of the piping systems.	N/A	N/A

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
23. Data submitted in an Remedial Investigation or Remedial Investigation Work Plan that are part of prior investigations for which work plans and subsequent reports have not already been reviewed and approved by the Department and for which site characterization is to be based and/or decisions regarding remedial actions are to be based must be evaluated for use within a Data Usability Site Report (DUSR). A conclusion must be drawn regarding the suitability of the data with respect to sampling and chemical analytical procedures and quality assurance and quality control, for the intended use.	No data for Parcel 8 or offsite. See Parcel 9 – Supplemental Remedial Investigation Report for Parcel 9 data.	X
24. A table of data that reports measurement of non-aqueous phase liquid (NAPL) thickness in monitor wells will be presented. The table should also identify locations where there was evidence of NAPL in borings and the approximate thickness based on boring log observations. Tables should also show where free product was **not** identified. Graphical depictions (maps, etc.) should be provided to show the distribution of NAPL onsite.	N/A	X
25. The design of monitor wells will be assessed to determine their capacity for detecting free product (i.e. appropriate screen interval relative to the water table (LNAPL) or the top of underlying confining beds (DNAPL)).	Section 3.3 (pg. 5-6)	N/A
Record Search		
26. A composite of all Sanborn maps will be submitted that includes a summary presentation of all historical structures and features of environmental significance. The assessment of Areas of Concern will consider all of these structures of environmental significance shown on this map. This map will be delivered on an enlarged sheet. Where a site is very large, and the product map complex, multiple sheets must be provided. All past usages of the property that are relevant to the identification of Areas of Concern should be shown, including buildings and other structures, rail lines, transportation conduits, loading, unloading and storage areas, tanks, and drainage channels and structures (dry wells, pits, culverts, pipes, etc.).	Figure 4A and 4B	X
27. Each Area of Concern will be investigated assessed through direct field assessment including, but not limited to, sampling, test pitting, and soil boring.	Section 3.0	X
28. All Sanborn maps for the site must be submitted in the Remedial Investigation Work Plan and must be presented at a sufficient scale to be legible.	See Section 2.5 – Table 1 for Sanborn map summary. See Figure 4A and 4B for Composite Sanborn Maps.	X

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
Land Usage		
29. A map that shows the land usage in the area surrounding the site will be submitted. The map must be in compliance with guidance in DER-10. The map should include sensitive land uses from a human health perspective (schools, day care, etc.) and sensitive environmental receptors (surface waters, etc.). A map should also include the proximity to the nearest water source.	See Figure 3 and description in Section 2.4.	X
Sampling Plan		
30. A table of proposed samples will be submitted showing all samples that will be collected during site investigations. Samples shown in the table will be cross-referenced with site maps that show sampling locations.	Section 3.2 and Appendix A – Table 3 (pg. A-9)	N/A
31. Analytical methods for all chemical analyses for all media must be summarized in an Analytical Summary Table to be presented in the Remedial Investigation Work Plan and the Remedial Investigation Report. This table must include, at a minimum; matrix type; number of samples per matrix; number of field and trip blanks; analytical parameters tested for each media; associated analytical test methods; number of MS/MSD samples; holding times and preservation methods; sample container type; description of sample methods; and sample storage methods.	Appendix A Table 2 (pg. A-8)	X
Chemical Data and Information		
32. All outstanding data from prior investigations will be summarized, evaluated, and reported in the Remedial Investigation.	N/A	X
33. A site map showing the location of NAPL with postings of data will be submitted. The maps will also include an indication of areas where free product was not located based on reliable monitor well and other data. As necessary, maps of individual Areas of Concern will be provided showing existing sample locations and results for groundwater and soil, all observed thickness of free product in wells, all observed thickness of product-saturated soil/fill in boring logs, and proposed sample locations to complete definition of free product in groundwater/soil.	N/A	X
34. Tables of chemical data for soil, groundwater and other environmental media will be submitted to provide summaries of all sampling. Appropriate standards, criteria and guidance values (i.e. Class GA Groundwater Standards, TAGM 4046, etc.) should be included for comparison. All data must be reported in the Remedial Investigation including data from earlier phases of study.	N/A	X
35. A table summarizing exceedances of applicable standards, criteria, and guidance for groundwater, soil, surface water and other environmental media will be submitted.	N/A	X

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
36. Table summarizing exceedances of proposed site-specific soil action levels (SSSALs) will be submitted.	N/A	X
37. A table of chemical data for computed index parameters (i.e. total cPAH, B(a)P equivalents, total SVOC's, total VOC's, etc.) will be submitted. This data can be included as part of other tables.	N/A	X
38. Large-dimension site maps (sheets) showing posted data for all exceedances of standards, criteria and guidance values for groundwater, soil, surface water and sediment will be submitted.	N/A	X
39. Maps of individual VOC Areas of Concern will be submitted showing existing sample locations and results for groundwater and soil. Proposed supplemental sample locations required to complete definition of AOC in groundwater/soil and design of remedy should be shown.	N/A	X
Groundwater Monitor Wells and Hydrogeology		
40. Groundwater equipotential maps containing current data from on-site monitor wells will be submitted. Maps must be presented for discrete water-bearing zones and must not mix equipotentials for different water-bearing zones. If multiple water-bearing zones are encountered, separate maps will be provided for each zone. Average data for multiple hydraulic head measurements and data from different measurement events will not be used to create equipotential maps. Average data is acceptable where a detailed tidal fluctuation analysis has been performed during a single measurement event.	N/A	X
41. A table of data for all water level measurements taken at wells on-site will be submitted. The table should include date and time of measurement, and the time of the most recent high and low tide for tidally-influenced environments.	N/A	X
42. For sites in tidally influenced environments, groundwater flow will be determined, at a minimum, using averaged head values from monitor wells calculated from non-time-weighted data that has been obtained regularly across complete tidal cycles. A separate map will also show the tidal variability in groundwater head (delta) in monitor wells. Methods of analysis will be discussed. Analyses are not limited to this approach.	N/A	N/A
43. Methods for collection of groundwater head data in tidal environments can include hand measurements taken synoptically at regular intervals throughout complete tidal cycles or use of automated data recording devices using pressure transducers or equivalent data collection methods.	Section 3.5	N/A

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
44. A table of data on the construction details for monitor wells that have been built on-site. This will include screen elevations, date of construction, geologic interval screened, and current status (i.e. available for sampling, destroyed, intact, needs development, etc.).	Appendix A - Section 3.2 (pg. A-3 – A-4)	X
45. Coordinates in GPS will be provided for all groundwater monitor wells, soil borings and test pits performed for site characterization. These features will also be surveyed.	Section 3.4 (pg. 6)	X
46. For sites with known contaminants that have physical properties that suggest deep transport in groundwater column (i.e. compounds with a specific gravity greater than water), or where such contaminants are suspected, a plan for investigation must include well placement at the base of the water column screening the top of the uppermost confining bed, and at least one appropriately placed well at depth below the uppermost confining bed.	Section 3.3 (pg 5-6)	X
47. For all sites, at least one well should be placed at depth to establish vertical flow conditions and hydrogeologic conditions.	Section 3.3 (pg. 5-6)	X
Stratigraphy		
48. Representative geologic cross sections will be submitted that show the occurrence of geologic strata within the entire stratigraphic section likely to be impacted by contaminants beneath the site. These sections must clearly define the hydrostratigraphic significance of unconsolidated layers (water-yielding aquifers such as fill, sands and gravel; aquacludes such as clay; aquatards such as silt or till; etc.) and fractured and competent bedrock. These maps should also be used as base maps for other presentations that show monitor well placement, soil sample collection points and analytical results, and hydraulic head.	N/A	X
Monitor Well Construction and Sampling		
49. In environments containing historic fill, a narrower monitor well slot size and finer-grained and commensurate sand pack will be considered to minimize the inward migration of fines from the formation into the well.	Section 3.3 (pg. 6)	
50. Wells will be developed aggressively to remove fines from the formation, sand pack and well trap. Quiescent well purging and low-flow sampling methods will be used to minimize suspension and mobilization of fines in the well and formation during sampling.	Section 3.3 (pg. 6)	
51. Wells will be constructed with a minimum two-foot blind pipe sediment trap at its base. A cap will be placed over the base of the trap.	Section 3.3 (pg. 6)	

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
Historic Fill and Urban Soils		
52. Historic Fill maps will be submitted that show the location and thickness of historic fill (as distinguished from redistributed natural soils) on-site. Representative geologic cross-sections will be provided to illustrate the occurrence of historic fill.	N/A	X
53. Tables will be submitted that summarize a subset of chemical parameters and computed parameters for on-site soil and historical fill. Multiple tables should be presented with analytes (i.e. Pb, Hg, etc.) in individual columns and discrete sample results in rows. One table should be presented for each of several indicator parameters for the site that shows the ordered ranking of that analyte (from highest concentration in observed samples to lowest in observed samples) with the corresponding results for other analytes. These tables enable tabular assessment of correlation of analytes with other analytes. The analytes that should be included are, at a minimum, trace and minor metals (i.e. Pb, Hg, Cd, Cr, As, Zn, Ni, Cu, Se, Th, Be) and organic compounds found to be abundant at the site (Benzene, PCE, TCE, etc.) and summary parameters (total cPAH, total VOC's, total SVOC's, B(a)P equivalents). A separate assessment should be provided for historical fill if this material can be distinguished from other areas of concern.	N/A	X
54. A monitoring plan will be required to determine the presence of methane derived from the historic fill.	N/A – based on investigation on Parcel 9, it is not anticipated that subsurface materials would be indicative of methane generation.	
55. Sites containing historic fill or other organic-rich fill material will require testing of soil vapor for methane.	N/A – based on investigation on Parcel 9, it is not anticipated that subsurface materials would be indicative of methane generation.	
Soil Gas		
56. Soil gas investigation is required at all sites that contain VOC's and historic fill. Soil gas data and interpretation from surveys performed at the site must be presented in the Remedial Investigation.	Soil gas sampling has already been completed for off-site areas of Parcel 9 and the results will be included in the RI.	
Geophysical Study		
57. Geophysical surveys will be required on most sites. Where buildings are to be demolished in late stages and after remedial investigations are substantially complete, a plan should be developed for geophysical surveys to be performed over the remainder of the site after the buildings and other interferences have been removed.	N/A	

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
58. Geophysical pilot studies should be considered to assess the most effective method for use at the site. Gradiometer magnetometry should be considered to enable distinction of the magnitude and depth of metallic objects in the subsurface.	N/A	
Qualitative Human Health Assessment		
59. An off-site Qualitative Human Health Exposure Assessment will be performed and reported. Sampling necessary to complete this assessment will be performed. Analysis will include current and future exposure assessment scenarios.	Section 4.2.4	X
60. A site map showing the defined Areas of Concern with an overlay of the site development plan will be submitted. The latter will be linked with the description of the proposed end usage of the property and buildings in the text of the report and will be coordinated with NYSDOH.	There is currently no final plan for the development of Parcel 8.	X
61. A site map and plan will be submitted that shows the design detail and location for each of the proposed final surfaces contemplated for the site. This should include, at a minimum, building structure areas, concrete/asphalt areas, and soil cover on open areas.	There is currently no final plan for the development of Parcel 8.	X
62. An off-site Environmental Exposure Assessment will be performed. Where appropriate, surface water sample collection will be included in the characterization program to support the environmental exposure assessment analysis.	Section 4.2.4	X
63. Hazardous wastes and other contaminated media generated during the remedial investigation phase will be stored, transported, and disposed in full compliance with applicable local, state and federal regulations.	Section 3.6 (pg. 7)	X
Reporting		
64. Daily Reports will be provided to the project manager for NYSDEC and NYSDOH during all periods of major investigative activity on remedial projects. These reports will include daily activities with alpha-numeric identification of work areas. These reports will include a summary of substantive findings and other pertinent information including all complaints received from the public.	Section 4.1 describes plan for monthly progress report on the findings of the RI. Daily reports will also be issued in accordance with this requirement.	X

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
Odor Control Plan		
65. An odor control plan will be submitted that is capable of controlling emissions of nuisance odors off-site, and on-site, where there are residents or tenants on the property. Specific odor control methods to be used on a routine basis will be defined in the Remedial Investigation Work Plan. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints. Implementation of all odor controls, including the halt of work, will be the responsibility of the applicant.	Appendix C – Community Air Monitoring Plan and Appendix B – Section 2.6 (HASP)	X
66. Among the means to be considered for minimization of odors during remedial actions include, but are not limited to, limiting the area of open excavations; shrouding open excavations with tarps; use of foams to cover exposed odorous soils; use of chemical odorants in spray or misting systems; and containment of excavation areas through the use of tents and equivalent containment structures.	No excavation is planned in the remedial investigation. Odor control measures will be identified for any future excavation in the RI report or a future RAWP for Parcel 8.	X
Health And Safety Plan		
67. The Health and Safety Plan (HASP) will be submitted as a separate, standalone document independent from the project plans.	Appendix B; Although the HASP has been submitted as an appendix to SRIWP, it was prepared so that it can be a stand alone document.	N/A
68. The Applicant, Volunteer, Responsible Party and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan. This plan must cover both the remedial work and construction work and will be submitted separately from all other investigation and remediation documents prepared under applicable agreements with New York State. This document must be submitted to the State for review. This document is the full responsibility of the above referenced parties and will not be formally approved by the State.	Appendix B - HASP applies to SRIWP activities. A separate HASP will be submitted for any further remedial actions beyond the scope of work in the SRIWP.	X
69. The Site Safety Coordinator will be identified. A resume will be provided.	Appendix B, Section 3.2	N/A
70. Details of the Community Air Monitoring Plan (CAMP) will be defined and will be coordinated with the NYSDOH.	Appendix C –CAMP is consistent with the NYSDOH Generic Community Air Monitoring Plan.	N/A
71. Exceedances observed in the CAMP will be reported in the daily report to the NYSDEC Project Manager.	Appendix C- CAMP - Section 3.1.2	X

Generic List of Agreements Numbers and Description	Addressed in SRIWP	To be Included in RIR
72. The HASP will include affirmative statements to indicate procedures to be followed and not non-committal statements about general requirements for such work.	Language in Appendix B – HASP includes affirmative statements.	N/A
73. HAZWOPER training will be provided as required for remedial investigation activities as appropriate.	Appendix B – Section 2.3 (pg. B-4)	N/A
Citizen Participation		
74. All draft Fact Sheets will be provided to the Department in a WordPerfect file and in the format used by Region 2.	Draft Fact Sheets will be provided as WordPerfect files.	N/A
75. Fact Sheets are the property of New York State. The applicant will be requested to assist in their preparation (such as the development of draft Fact Sheets) and their distribution. However, only Fact Sheets approved by NYSDEC will be issued under any project. No changes will be made to approved Fact Sheets authorized for release by NYSDEC without the express consent of the Department in writing. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.	Section 3.7	N/A
76. A certification of mailing will be sent by the Applicant to the NYSDEC Project Manager following distribution of all Fact Sheets and notices, providing certification that the Fact Sheets were mailed, when they were mailed, a copy of the Fact Sheet, and a list of recipients.	Section 3.7 addresses Fact Sheet mailing. Certification will be provided after mailing, and the mailing list is attached as Appendix E.	N/A
Remedial Investigation Report		
77. A Final Remedial Investigation Report will be submitted that transmits the results of all site investigation data and information, including all of the data obtained during preliminary and supplemental investigations, and thorough evaluation of that data.	Section 4.2	X
78. All primary contaminant sources (including but not limited to tanks and hotspots) identified during site characterization, remedial investigation, and remedial action will be surveyed by a surveyor licensed to practice in the State of New York and will be reported in the Remedial Investigation Report. The location of these sources will also be reported in the Final Remedial Report.	Section 3.4 specifics that all monitoring wells will be surveyed. If additional contaminant sources are identified during the RI, survey results will be included in the RIR.	X
79. The Remedial Investigation Report will include a conceptual site model that explains the occurrence of contaminant sources and their fate and transport at the site in the context of the local site stratigraphy and hydrogeology. The conceptual model will utilize both plan and cross-sectional views of the site.	Section 4.2	X

APPENDIX E

PROJECT MAILING LIST

Queens West Development
DEC Contact List

Queens West - Contact List (1/24/05)

Category	Name	Title	Address Line 1	Address Line 2
United States Congress	Honorable Carolyn Maloney		1051 Third Avenue, Suite 311	New York, NY 10128
United States Senate	Honorable Hillary Rodham Clinton		780 Third Avenue, Suite 2601	New York, NY 10017
United States Senate	Honorable Charles E. Schumer		757 Third Avenue, Room 17-02	New York, NY 10017
NYS Assembly	Honorable Jeffrion L. Aubry	New York State Assembly	102-13A Northern Blvd	Corona, New York 11368
NYS Assembly	Honorable Michael Gianaris		21-77 31st Street, Suite 107	Astoria, NY 11105
NYS Assembly	Honorable Catherine Nolan	Assemblywoman, 37th Assembly District	45-25 47th Street	Woodside, NY 11377
NYS Assembly	Honorable Ivan Lafayette		33-46 92nd Street, Suite 1W	Jackson Heights, NY 11272
NYS Assembly	Honorable Margaret Markey		55-19 69th Street	Maspeth, NY 11378
NYS Attorney General	Honorable Eliot Spitzer		The State Capitol	Albany, NY 12224
NYS Parks, New York City Region	Mary Ellen Kris	Assistant Deputy Commissioner	State Office Building, 163 West 125th Street, 17th Floor	New York, NY 10027
NYS Senate	Honorable Serphin R. Maltese	New York State Senate	71-04 Myrtle Avenue	Glendale, New York 11385
NYS Senate	Honorable George Onorato	Senator 12th District	28-11 Astoria Blvd.	Astoria, New York 11102
NYC Comptroller	Honorable William C. Thompson, Jr.		One Centre Street, Room 530	New York, NY 10007
NYCDEP	Commissioner C.O. Ward	NYC Dept of Environmental Protection	59-17 Junction Blvd	Corona NY 11368
NYCDEP	John Zimmermann, Air Resources	NYC Dept of Environmental Protection	59-17 Junction Blvd	Corona NY 11368
NYCDEP	John Wuthenow	NYC Dept of Environmental Protection	59-17 Junction Blvd	Corona NY 11368
NYC Local Library	Long Island City Public Library - Court Square Branch		25-01 Jackson Avenue	Long Island City NY, 11101
NYC Mayor	Honorable Michael R. Bloomberg	Mayor	City Hall	New York, New York 10007
NYC Public Advocate	Honorable Betsy Gotbaum	Public Advocate	One Centre Street, 15th Floor, North	New York, NY 10007-1602
Queens Borough Office	Helen Marshall	Queens Borough President	120-55 Queens Boulevard	Kew Gardens, New York 11424
Queens Community Board 2 Office	Joseph Conley	Chairperson	43-22 50th Street	Woodside, New York 11377
Queens Council Office	Eric N. Gioia	City Council Member, District 26	47-01 Queens Boulevard (suite 205)	Queens, New York, 11104
Schools with in 0.5 mile radius	Ms. Eleftheria Delis, Principal	PS 78	48-09 Center Boulevard	Long Island City, NY 11109
Schools with in 0.5 mile radius	Jeffrey Levin, Principal	High School for Information Technology	21-16 44th Road	Long Island City NY, 11101
Schools with in 0.5 mile radius	Karen Briggs	Little Ones Nursery School	4-74 48th Ave	Long Island City NY, 11101
Media		The Daily News	450 West 33rd Street	New York, NY 10001
Media		News Day	80-02 Kew Gardens Rd.4th Floor	Kew Gardens, NY 11415-1154
Media		Queens Chronicle	PO Box 74-7769	Rego Park, NY 11374-7769
Media		Western Queens Gazette	42-16 34th Avenue	L.I.C. N.Y. 11101
Media	Michael Camindes	Times News Weekly	PO Box 299	Ridgewood, NY 11386
Local Residents and Businesses	John Montenero		10-19 47th Road	Long Island City, NY 11101
Local Residents and Businesses	Lorence A. Long		1028 46th Road	Long Island City, NY 11101
Local Residents and Businesses	S. Anzalone		104 47th Road	Long Island City, NY 11101
Local Residents and Businesses	D & A LONDON & ABBY BRESSAK		17 BLYDENBURGH CT	NORTHPORT NY 11768
Local Residents and Businesses	M.O. ASSOCIATES C/O The Trotwood Corporation		200 PARK AVE, LOWR 10	NEW YORK NY 10166
Local Residents and Businesses	HOWARD & NORMAN BAKER		2121 43RD AVE	LONG ISLAND CITY NY 11101
Local Residents and Businesses	VINCENT FESTA		23 HILL HOUSE LN	GLEN HEAD NY 11545
Local Residents and Businesses	G. Napolitano		28-11 Astoria Blvd	Long Island City, NY 11102
Local Residents and Businesses	JOHN A CORRIERI		2835 CORPORAL KENNEDY ST	FLUSHING NY 11360
Local Residents and Businesses	CNY/MTA		347 MADISON AVE	NEW YORK NY 10017
Local Residents and Businesses	Jimmy Van Bramer		39-03 46th Street	Sunnyside, NY 11104
Local Residents and Businesses	Ernie Brocks		4-01 44th Drive	Long Island City, NY 11101

Queens West Development
DEC Contact List

Queens West - Contact List (1/24/05)				
Category	Name	Title	Address Line 1	Address Line 2
Local Residents and Businesses	Resident		44-11 51st Street	Long Island City, NY 11101
Local Residents and Businesses	PLAXALL INC		44-68 5th STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	JULIAN FREIRICH FOOD PRODUCTS		46-01 5th St	LONG ISLAND CITY NY 11101
Local Residents and Businesses	KOUTSOURAS, VOULA		47-01 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	El Richlin		47-01 Queens Blvd, Apt 205	Sunnyside, NY 11104
Local Residents and Businesses	CMH REALTY CORP		47-05 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	Morris Met		47-09 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	N BAKER		47-17 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	MAGENTA FINE ARTS INC		47-17 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	HERBERT SMOK		47-27 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	EUGENE KRAL		47-33 5TH STREET	LONG ISLAND CITY NY 11101
Local Residents and Businesses	John Edebohls		4-74 48th Avenue, Apt 10N	Long Island City, NY 11109
Local Residents and Businesses	Sarah Parvell		4-74 48th Avenue, Apt 14G	Long Island City, NY 11109
Local Residents and Businesses	Rita J. Bradley		4-74 48th Avenue, Apt 14G	Long Island City, NY 11109
Local Residents and Businesses	Donald R DePew		4-74 48th Avenue, Apt 15J	Long Island City, NY 11109-5613
Local Residents and Businesses	Susan and Steve Koch		4-74 48th Avenue, Apt 18B	Long Island City, NY 11109
Local Residents and Businesses	Jennifer English		4-74 48th Avenue, Apt 18G	Long Island City, NY 11109
Local Residents and Businesses	Theresa Rohan		4-74 48th Avenue, Apt 19E	Long Island City, NY 11109
Local Residents and Businesses	John Corcoran		4-74 48th Avenue, Apt 20F	Long Island City, NY 11109
Local Residents and Businesses	Toula Polgalaktos		4-74 48th Avenue, Apt 22K	Long Island City, NY 11109
Local Residents and Businesses	Mark Brandea		4-74 48th Avenue, Apt 34C	Long Island City, NY 11109
Local Residents and Businesses	Ann Whipple		4-74 48th Avenue, Apt 6R	Long Island City, NY 11109
Local Residents and Businesses	J. Holtzberg		4-74 48th Avenue, Apt 8G	Long Island City, NY 11109
Local Residents and Businesses	Paul Camilleri		4-74 48th Avenue, Apt PH1B	Long Island City, NY 11109
Local Residents and Businesses	Jennifer Kay		4-74 48th Avenue, Apt. 4X	Long Island City, NY 11109
Local Residents and Businesses	48TH AVENUE LLC		47-43 5TH Street	LONG ISLAND CITY NY 11101
Local Residents and Businesses	G. Donald		4845 38th Street	Long Island City, NY 11101
Local Residents and Businesses	Brian Adams		49-10 Vernon Blvd	Long Island City, NY 11101
Local Residents and Businesses	H.P.C.D.C.		49-10 Vernon Blvd	Long Island City, NY 11101
Local Residents and Businesses	WATER'S EDGE RESTAURANT		4-99 44TH DR	LONG ISLAND CITY NY 11101
Local Residents and Businesses	DELEHANTY PARTNERS		5-01 46 ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	S S ATLAS ISLAND CORP		5-01 47TH Ave	LONG ISLAND CITY NY 11101
Local Residents and Businesses	Bill Lehwitz		50-50 Second Street	Long Island City, NY 11101
Local Residents and Businesses	Morris Met		5-11 47TH Ave	LONG ISLAND CITY NY 11101
Local Residents and Businesses	SEPNER FAMILY LIMITED		5-14 47TH ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	JOSEPH NANCY CORP		5-16 47TH AVE	LONG ISLAND CITY NY 11101
Local Residents and Businesses	TE VANOVER JR		5-16 47TH ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	ANDREW LONDON		5-17 46 ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	Stephen Sloop		5-17 47th Road	Long Island City, NY 11101
Local Residents and Businesses	VINCENT FESTA		5-18 47TH ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	5-19 47TH ASSOCIATES		5-19 47TH Ave	LONG ISLAND CITY NY 11101
Local Residents and Businesses	JAMES CORTAZAR		5-19 47TH ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	Fran Cimino		52 Parkview Drive	Scaringtown, NY 11507
Local Residents and Businesses	ISLAND TAPING INC		5-21 47TH ROAD	LONG ISLAND CITY NY 11101

Queens West - Contact List (1/24/05)				
Category	Name	Title	Address Line 1	Address Line 2
Local Residents and Businesses	SWEHAR REALTY CORP		5-25 47th ROAD	LONG ISLAND CITY NY 11101
Local Residents and Businesses	48TH AVENUE LLC		5-25 48TH AVE	LONG ISLAND CITY NY 11101
Local Residents and Businesses	PLASTIC CENTER INC		5-29 46th AVENUE	LONG ISLAND CITY NY 11101
Local Residents and Businesses	Rose and Charles Amodeo		5-30 47th Road	Long Island City, NY 11109
Local Residents and Businesses	SYLVIN TRADING CORP		5-33 48TH AVE	LONG ISLAND CITY NY 11101
Local Residents and Businesses	BRAD BROCKMAN	QUEENS WEST DEVELOPMENT	633 3RD AVE	NEW YORK NY 10017
Local Residents and Businesses	Marcanci Wu Louie		65-40 182nd Street	Flushing, NY 11365
Local Residents and Businesses	ATTN M MUNICH	JOSEPH NANCY CORP	69 ONTARIO RD	FLORAL PARK NY 11001
Local Residents and Businesses	SEPNER FAMILY LIMITED		7828 GLEN GARRY LN	DELRAY BEACH FL 33446
Local Residents and Businesses	Morris Met		PO BOX 1243	MIDDLEBURG VA 20118
Local Residents and Businesses	JAMES CORTAZAR		PO BOX 8485	LONG ISLAND CITY NY 11101
Local Residents and Businesses	Sarah G.		Queens Corner	38-15 Bell Blvd
Local Residents and Businesses	HERBERT SMOK		STATION PLZ	WOODMERE NY 11598
Local Residents and Businesses	George J. Rheault	Wachtell, Lipton, Rosen & Katz	51 W. 52nd Street	New York, NY 10019-6150

APPENDIX F

GLOSSARY OF TERMS

Glossary of Terms

BCP – Brownfield Cleanup Program
CAMP – Community Air Monitoring Plan
CFR – Code of Federal Regulations
CGI - combustible gas indicator
DER – NYSDEC Division of Environmental Remediation
DUSR – Data Usability Summary Report
ELAP – Environmental Laboratory Accreditation Procedure
EPA – United States Environmental Protection Agency
HASP – Health and Safety Plan
LEL – lower explosive limit
MW – monitoring well
DNAPL – dense non-aqueous phase liquid
NYSDEC – New York State Department of Environmental Conservation
NYS DOH – New York State Department of Health
OSHA – Occupational Safety and Health Administration
PID – photoionization detector
PPE – personal protective equipment
ppm – parts per million
QAPP – Quality Assurance Project Plan
QA/QC – Quality Assurance/Quality Control
RSCO – Recommended Soil Cleanup Objective
SRIWP – Supplementary Remedial Investigation Work Plan
SRIR – Supplementary Remedial Investigation Report
SVOC – semivolatile organic compound
TAGM – Technical and Administrative Guidance Memorandum
TCL – Target Compound List
VOC – volatile organic compound