300 KINGSLAND AVENUE LETTER REPORT
REMEDIAL INVESTIGATION

WORK ASSIGNMENT C007540-2.1

FORMER SPIC AND SPAN CLEANERS & DYERS, INC. SITE
GREENPOINT/EAST WILLIAMSBURG INDUSTRIAL AREA

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
625 Broadway, Albany, New York
Joseph Martens, Commissioner

DIVISION OF ENVIRONMENTAL REMEDIATION
REMEDIAL BUREAU B

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September 2015
LETTER REPORT

300 KINGSLAND AVENUE REMEDIAL INVESTIGATION

FOR THE

FORMER SPIC AND SPAN CLEANERS & DYERS, INC. SITE

SITE ID NO. 224129

BROOKLYN, KINGS COUNTY, NEW YORK

PREPARED FOR:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
REMEDIAL BUREAU B
WORK ASSIGNMENT NUMBER C007540-2.1

PREPARED BY:

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SEPTEMBER 2015
September 9, 2015

Mr. David K. Harrington, P.E.
Senior Environmental Engineer
Remedial Bureau B
Division of Environmental Remediation
NYS Department of Environmental Conservation
625 Broadway, 12th Floor
Albany, New York 12233-7016

Re: NYSDEC Standby Contract, Work Assignment No. C007540-2.1
Former Spic and Span Cleaners & Dyers, Inc., Site ID No. 224129
Letter Report – 300 Kingsland Avenue Remedial Investigation

Dear Mr. Harrington:

URS Corporation - New York (URS) has prepared this Letter Report to summarize the May 2015 field investigation and analytical results at 300 Kingsland Avenue property, immediately southeast of the Former Spic and Span Cleaners & Dyers, Inc. (Spic and Span) Site [New York State Department of Environmental Conservation (NYSDEC) Site Number 224129] in the Greenpoint/East Williamsburg Industrial Area section of Brooklyn, New York (Figure 1). The work associated with the 300 Kingsland Avenue field investigation was completed under NYSDEC Work Assignment No. C007540-2.1.

1.0 INTRODUCTION

The field investigation was completed to fill data gaps concerning the horizontal and vertical extent of soil contamination previously identified beneath the sidewalk near 300 Kingsland Avenue and the dissolved-phase chlorinated volatile organic compound (CVOC) groundwater plume in the shallow overburden groundwater zones beneath the warehouse at 300 Kingsland Avenue. The following soil boring/temporary monitoring wells and sub-slab soil vapor points were installed during the May 2015 field investigation (Figure 2):

Soil Borings
SSB-57 SSB-57A* location moved due to underground pipes
SSB-58 SSB-59** installed temporary well
SSB-60 SSB-61
SSB-62** installed temporary well

Sub-Slab Soil Vapor Points
300-SV-1 300-SV-2
300-SV-3 300-SV-4
300-SV-5 300-SV-6

Activities associated with the 300 Kingsland Avenue May 2015 field investigation consisted of:

- Utility clearance by a geophysical contractor at all soil boring locations;
• Advancement of 6 soil borings using direct push methods up to approximately 25 feet below ground surface (bgs). All boring locations were cleared to 5 feet bgs by hand clearing/Vac-Tron® prior to direct push probing;

• Collection of up to 4 soil samples for analytical testing from each soil boring location and Quality Assurance/Quality Control (QA/QC) samples;

• Converting 2 of the soil borings located within the building at 300 Kingsland Avenue into temporary monitoring wells;

• Collection of groundwater samples from the temporary monitoring wells;

• Collection of sub-slab soil vapor samples plus an outdoor air sample and QA/QC samples from 6 sub-slab soil vapor points;

• Removal of all investigation derived waste (IDW) (e.g., soil cuttings and decontamination water) from the Site on a daily basis; and

• Survey of all new sub-slab soil vapor point and boring locations. The survey was tied into the existing site survey.

2.0 PREVIOUS INVESTIGATIONS

URS has previously conducted eight phases of SC fieldwork and three phases of RI field work at the Spic and Span Site and surrounding area. The results for the previous phases of investigations at the Spic and Span Site have been compiled and reported in the Off-Site and On-Site Phase III RI Reports (URS, September 2014 and URS, March 2015, respectively).

Data obtained by URS as part of the Spic and Span RI show that a shallow source of tetrachloroethene (PCE) soil contamination was identified in the vicinity of monitoring wells DEC-025/025D, which is located on the east side of Kingsland Avenue, south of the Spic and Span Site, adjacent to 300 Kingsland Avenue. The highest concentration of PCE in soil (2,000 milligrams per kilogram [mg/kg]) was found within the top 2.5 feet below the sidewalk at SSB-03 followed by the top 2.5 feet at both DEC-025D and SSB-08 (each at 1,300 mg/kg). SSB-15, which is located approximately 10 feet south of DEC-025D, had the highest photoionization detector (PID) readings (336 to 1,528 parts per million [ppm]) in the upper 20 feet.

PID readings in SSB-16 decreased to 0 ppm at a depth of 26 feet bgs and below. The remainder of the borings around DEC-025 and DEC-025D had significantly lower PID readings. It appears that most of the PCE impacted soil is within the top 15 feet, between 10 feet north and 20 feet south of DEC-025 and DEC-025D.

The north/south horizontal extent of the impacted soil was generally delineated during prior investigations and a vertical profile established. However, the eastern extent of the impacted soil near DEC-025/025D was not delineated and may extend beneath the building at 300 Kingsland Avenue. The western extent of the impacted soil has not been delineated and is assumed to extend under Kingsland Avenue.

The groundwater plume appears to be co-mingled with the contamination from the west side of Kingsland Avenue (307 Kingsland).
3.0 FIELD ACTIVITIES

Field activities at 300 Kingsland Avenue were performed between May 18 and 21, 2015. Site photographs are provided in Attachment 1 and copies of the daily field notes are provided in Attachment 2.

3.1 Utility Clearance

Prior to site work, Zebra Technical Services, LLC of Lynbrook, NY (Zebra) arranged for all appropriate utility clearance mark-outs. This included (but was not limited to) contacting the New York City (NYC) Departments of Environmental Protection and Transportation, the Transit Authority, Consolidated Edison Company of New York (Con Edison), National Grid, and Verizon, in addition to using the Dig-Safely number for New York City – 811 or (800) 272-4480.

3.2 Geophysical Survey

On May 18, 2015, Radar Solutions International of Waltham, MA (RSI) mobilized a one person crew with ground penetrating radar (GPR) and electromagnetic (EM) induction equipment to the site. The purpose of the geophysical survey was to screen for and identify the presence/location of underground utilities in areas where soil borings and soil vapor installations were proposed.

A 10-foot square reference grid was established around each proposed soil boring location prior to collecting the geophysical data. A GSSI SIR-3000 digital radar system was used to perform the GPR survey. GPR data were acquired along lines spaced 1.0 to 2.5 feet apart. The EM induction equipment used to determine the location of buried utilities was a Radiodetection RD8000 locating system and a McLaughlin’s Verifier GX digital locator.

RSI marked utilities and anomalies by spray-painting the outline on the pavement/slab as soon as they were located. Final boring locations were established in areas cleared by RSI. A URS geologist supervised and assisted RSI. RSI’s report is provided in Attachment 3.

3.3 Soil Boring/Temporary Monitoring Well Installation

3.3.1 Pre-Boring Clearing

Prior to any intrusive activities, the subcontractor obtained all necessary permits [i.e., New York City Department of Transportation (NYCDOT) street opening permits] for conducting intrusive activities. On May 18, 2015, Zebra mobilized one Vac-Tron® unit to perform location specific utility clearance at each of the proposed soil boring locations. At each location, an eight inch diameter concrete core drill was used to core through the sidewalk and/or concrete floor. An approximately eight inch diameter by five-foot deep hole was excavated using post-hole diggers, pry bars, and an air knife along with the Vac-Tron® unit. A total of six boring locations were cleared between May 18 and 19, 2015. A large pipe was encountered at 3.25 feet bgs at the first boring location SSB-57. The location was renamed SSB-57A and SSB-57 was re-located approximately 6 feet south. Soil samples were collected for chemical analysis if odors, staining, or elevated PID reading(s) were observed during the pre-boring clearing. After each location was cleared for drilling, the hole was backfilled flush with the sidewalk or floor using the excavated spoils. Rocks and debris were removed and not re-used as backfill. If necessary, the location was temporarily patched with asphalt patch or concrete.

3.3.2 Soil Borings

Between May 19 and 20, 2015, Zebra utilized a track-mounted Geoprobe® 6610 DT hydraulic push unit to advance a 2-inch outside diameter (OD) by 5-foot long, acetate-lined Macrocore sampler at
the six previously cleared soil borings located within, and along, the Site building located at 300 Kingsland Avenue (Figure 2). The soil borings were advanced to depths up to 25 feet bgs. Refusal was encountered at one location (SSB-58) at 19 feet bgs. Upon completion, each soil boring was backfilled with bentonite/Type I Portland cement slurry and the top 4 inches was patched with concrete.

Each macrocore sample was screened with a PID. Up to four soil samples were collected from each boring; one soil sample was collected from the interval just above the water table, the second and/or additional samples were collected from the intervals exhibiting odors, staining, or elevated PID reading(s). Soil boring logs from the six soil boring locations (SSB-57, SSB-58, SSB-59, SSB-60, SSB-61 and SSB-62) are provided in Attachment 4 and discussed herein. A soil boring log was also completed for SSB-57A.

A chain-of-custody (COC) form was maintained and accompanied the soil sample containers to Pace Analytical of Melville, New York (Pace), a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) accredited laboratory. All soil samples were analyzed for target compound list (TCL) volatile organic compounds (VOCs) plus tentatively identified compounds (TICs) by United States Environmental Protection Agency (USEPA) SW846 Method 8260C. Several soil samples were also analyzed for TCL semivolatile organic compounds (SVOCs) plus TICs by Method 8270D, TCL Pesticides/polychlorinated biphenyls (PCBs) by Methods 8081B/8082A and target analyte list (TAL) Metals by Methods 6010C/7471A. All IDW generated from the hand clearing and borings was containerized in DOT approved 55-gallon drums and picked up by AARCO Environmental Services Corporation of Lindenhurst, New York (AARCO) on a daily basis for off-site disposal at a permitted facility.

3.3.3 Temporary Monitoring Well Construction

Two temporary monitoring wells were installed by Zebra during the 300 Kingsland Avenue field investigation. These temporary monitoring wells (SSB-59 and SSB-62) as shown on Figure 2 were constructed with 10 feet of 1-inch inside diameter (ID), Schedule 40 polyvinyl chloride (PVC) 0.010-inch slot screen and approximately 15 feet of riser. The screen was set between 15 and 25 feet bgs. Temporary monitoring well construction logs are included in Attachment 5.

3.4 Groundwater Sampling

On May 20, 2015, URS personnel collected a groundwater sample from each temporary monitoring well (SSB-59 and SSB-62). Each sample was collected using dedicated polyethylene tubing with a foot valve. The groundwater was transferred directly into laboratory supplied sample containers.

All samples were transported under COC via laboratory courier to Pace. The samples were analyzed for TCL VOCs plus TICs by Method 8260C, TCL SVOCs plus TICs by Method 8270D, TCL Pesticides/PCBs by Methods 8081B/8082A and TAL Metals by Methods 6010C/7470A.

Upon completion of groundwater sampling, the PVC screen/riser from each temporary well was removed and the soil boring was backfilled with bentonite/Type I Portland cement slurry. The top 4 inches was patched with concrete.

3.5 Soil Vapor Sampling

On May 20, 2015, URS personnel collected sub-slab soil vapor samples at six locations within the building located at 300 Kingsland Avenue as shown on Figure 3.
At each sub-slab sample location, an electric hammer drill was used to advance a 1-inch diameter hole approximately ½-inch into the concrete slab, followed by a ¼-inch diameter hole through the remaining thickness of the concrete slab and several inches into the sub-slab soil. All concrete and soil debris was brushed away to prevent it from re-entering the hole. A ⅛-inch ID by ¼-inch OD Teflon-lined polyethylene tubing was inserted through the hole in the slab. The tubing/concrete interface was then sealed to the concrete slab with modeling clay.

The sub-slab soil vapor samples were collected in accordance NYSDOH’s Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). The samples were collected using laboratory-evacuated 6-liter Summa® canisters with 1-hour flow regulators calibrated at the flow rate of approximately 0.09 liters per minute (L/min), provided by Eurofins/Air Toxics of Folsom, CA (Eurofins/Air Toxics), a NYSDOH ELAP accredited laboratory. A helium tracer gas was utilized during the sampling of each sub-slab soil vapor location to verify that ambient air was not infiltrating into the sub-slab during sample collection. A one-quart enclosure was placed over the sealed concrete/tubing interface. The tubing was run through an outlet in the enclosure and a silicone gasket was used to seal the interface between the tubing and the enclosure. The enclosure was also sealed at the concrete slab interface with a polyurethane foam gasket. A tank containing ultra-high purity (UHP) helium (99.999%) was connected to the side port of the enclosure and enough helium was released to displace any ambient air and to maintain a positive pressure within the enclosure. Following the application of the tracer gas, approximately 1 liter of soil vapor was purged using a Gillian GilAir-3 air sample pump at a rate of approximately 0.2 L/min into a 1 liter Tedlar bag.

The contents of the Tedlar bag were measured for helium using a Radiodetection/Dielectric MGD-2002 Multi-gas Detector. If the helium concentration was less than 10%, the seal was considered adequate. The enclosure was then removed and the tubing was connected to the Summa canister via the flow controller and sampling commenced. If the concentration of helium exceeded 10%, the clay seal between the sample tubing and the concrete slab was redone and the seal was retested. All sub-slab sample locations passed the helium test the first time. The contents of the Tedlar bag containing the purged soil vapor were subsequently discharged outside the building.

The soil vapor samples were collected over a 1-hour period. Upon opening the canister valve, the initial vacuum pressure was read from the built-in gauge on the flow controller and recorded onto a Summa Canister Sampling Field Data Sheet. After the 1-hour sampling period, the canister vacuum was recorded on the Summa Canister Sampling Field Data Sheet and the valve was then closed. After sampling was completed, the tubing and seal were removed and the sub-slab sample locations were then filled to grade with hydraulic cement. Copies of the completed Summa Canister Sampling Field Data Sheets are provided in Attachment 6.

In conjunction with the sub-slab soil vapor samples, one outdoor air sample was collected from a location outside the building on the Kingsland Avenue side, as shown on Figure 3. The outdoor air sample was collected by opening a summa canister fitted with a 1-hour flow controller and drawing in the ambient air.

All samples were transported under COC via Federal Express to Eurofins/Air Toxics. The samples were analyzed for VOCs following USEPA Compendium Method TO-15.

3.6 Concrete Flag Replacement

The replacement of sidewalk flags on Kingsland Avenue where soil borings were installed will take place at a later date.
3.7 **Investigation Derived Waste Disposal**

AARCO Environmental Services Corporation of Lindenhurst, NY (AARCO) was subcontracted by URS for the daily pick-up and disposal of all drummed IDW at a permitted disposal facility. Copies of the non-hazardous bills of lading and hazardous waste manifests for IDW are provided in Attachment 7.

3.8 **Site Survey**

B. Thayer Associates of Woodbury, NY, was subcontracted by URS to survey all new temporary monitoring well, soil vapor, and soil boring locations. The survey was tied into the existing site survey. All surveying was performed under the supervision of a New York State licensed land surveyor. All vertical control points were referenced to the North American Vertical Datum 1988 (NAVD 1988). Horizontal datum was referenced to the North American Datum of 1983 (NAD 83), New York State Plane Coordinate System, Long Island Zone.

4.0 **STUDY AREA GEOLOGY**

This section discusses the physical characteristics of the study area including: geology, hydrogeology, and standards, criteria and guidance (SCGs).

4.1 **Regional Geology**

The Spic and Span Site is located within the Atlantic Coastal Plain physiographic province of New York State (Broughton, et al. 1966). The Atlantic Coastal Plain is characterized by low relief with elevations ranging from sea level to almost 400 feet above mean sea level (amsl). The lithology of Brooklyn and Queens consists of Cretaceous and Pleistocene age unconsolidated deposits underlain by Precambrian crystalline bedrock. The unconsolidated deposits pinch out in northwestern Queens where bedrock outcrops, but reach a thickness of more than 1,000 feet in southeastern Queens. The unconsolidated deposits form six distinct hydrogeologic units consisting of four aquifers and two confining layers that generally dip to the south-southeast. The units in ascending order are the Lloyd aquifer (0-300 feet thick), the Raritan confining unit (0-200 feet thick), the Magothy aquifer (0-500 feet thick), the Jameco aquifer (0-200 feet thick), the Gardiners clay (0-150 feet thick), and the upper glacial aquifer (0-300 feet thick) (USGS, 1999a and b). The units pinch out to the north-northeast and may not all be found at any one location.

Based on borings performed near the site for unrelated work, the site is underlain from the surface down by the upper glacial aquifer, the Raritan Formation, and crystalline bedrock. The upper glacial aquifer is of Wisconsin age and consists of a terminal moraine, a ground moraine, and glacial outwash deposits whose area is characterized as an unsorted and unstratified mixture of clay, sand, gravel and boulders. The Raritan Formation is recognized as a confining unit which has been described as light to dark gray, brown-red, pink, red and gray-white clay, silty clay and clayey to silty fine sand. Disseminated lignite and pyrite are common and calcareous concretions may be found. Prior to the Site Characterization (SC) Phase VI fieldwork, the Raritan Formation had previously been encountered in three borings performed near the site by the USGS: one boring near Morgan Avenue and Meeker Avenue (-47 feet amsl); one boring under the BQE near the west bank of Newtown Creek (-48 feet amsl); and one boring near Meeker Avenue between Stewart Avenue and Gardner Avenue (-71 feet amsl). The boring near Morgan Avenue and Meeker Avenue penetrated the Raritan Formation into the underlying crystalline bedrock at a depth of -163 feet amsl.

As of December 2013, the Raritan Formation was positively encountered in 10 top of clay well locations on-site at depths between 108.5 and 138.0 feet bgs (elevations of -56.95 to -121.19 feet
and was described as gray with white banding, brown, brownish gray, greenish gray, dark gray
to greenish brown, fine sand and silt, clays with carbonized plant fragments, clays with varying
amounts of sand to silts with varying amounts of sand and clay.

4.2 Site Geology

As shown in the boring logs (Attachment 4), a fill unit is present at the top of 6 of the 7 borings
(SSB-57, SSB-57A, SSB-59, SSB-60, SSB-61, and SSB-62), varying in thickness from
approximately 1.1 to 5 feet, and consists of a heterogeneous mixture of sand, silt, gravel and varying
amounts of construction and demolition debris (i.e., concrete, etc.). Beneath the fill, the shallow
overburden consists primarily of a sand and silt mixture, with some clayey silt in the southwestern
most boring (SSB-58). The water table was found at depths ranging from 14 feet bgs in the west to
17 feet bgs in the east. This is consistent with data from previous investigations.

4.3 Standards, Criteria and Guidance (SCGs)

Soil

Three sources of soil SCGs are considered appropriate for this site: site-specific background soil
samples; NYSDEC Part 375; and NYSDEC CP-51. Site-specific background soil sample results are
detailed in the Spic and Span RI (URS, September 2012). Part 375 criteria are considered as SCGs
for soil samples in conjunction with CP-51 criteria. CP-51 supplements Part 375 by providing
criteria for contaminants previously included under TAGM 4046 where values were not included in
Part 375. Hereafter, mention of Part 375 includes incorporation of CP-51 criteria values. Part 375
Unrestricted Use criteria are considered to assist in the development of a remedial alternative capable
of achieving unrestricted future use, as required by DER-10 Section 4.4 (b) 3 ii. In addition, criteria
for the Protection of Groundwater are considered as SCGs for contaminants which exceed
groundwater SCGs. Soil SCGs also considered appropriate for the site are Residential and Restricted
Residential criteria. These soil SCGs are included on the analytical tables presented in Section 5.

Groundwater

The SCGs for groundwater are the Class GA standards and guidance values presented in NYSDEC
Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and
Guidance Values and Groundwater Effluent Limitations, June 1998 (including subsequent revisions).
These groundwater SCGs are included on the analytical tables presented in Section 5.

Soil Vapor

There are no SCGs for soil vapor. However, the sub-slab soil vapor results were evaluated using the
decision matrices in NYSDOH’s Guidance for Evaluating Soil Vapor Intrusion in the State of New
York (October 2006).

5.0 ANALYTICAL RESULTS

Full deliverable data packages [i.e., equivalent to NYSDEC Analytical Service Protocol (ASP)
Category B] were provided by the laboratory and included all reporting forms and raw data
necessary to fully evaluate and verify the reported analytical results.

A Data Usability Summary Report (DUSR) was prepared following the guidelines provided
NYSDEC Division of Environmental Remediation DER-10 Technical Guidance for Site
Investigation and Remediation, Appendix 2B - Guidance for Data Deliverables and the Development
of Data Usability Summary Reports, May 2010. The data packages were reviewed for compliance
with analytical method requirements and the applicable USEPA Region II QA Standard Operating
Procedures  The type and quality of analytical results that are needed to answer specific environmental questions and support proper environmental decisions met the project quality objectives (PQOs) for this sampling event.

The complete validated analytical results from the soil, groundwater, and soil vapor samples are presented in the DUSR in Attachment 8, on a compact disk (CD). Data summary tables, Form I and Form Ie (TICs) are provided in the DUSR and include the reporting limit for each non-detected compound.

5.1  Soil Analytical Results

A summary of detected compounds exceeding Unrestricted Use, Protection of Groundwater and Site Background criteria in the soil samples collected from soil borings is presented in Table 1A. Table 1B lists the detected compounds exceeding Residential and Restricted Residential Use criteria. Figure 4 presents soil data exceeding Unrestricted Use, Protection of Groundwater and/or Site Background criteria and Figure 5 presents soil data exceeding Residential Use and/or Restricted Residential Use criteria. Tables 2A and 2B provide a statistical summary of the detected parameters for the soil samples as follows: the number of detections; the minimum, maximum and average values; and the location and depth of the maximum value.

PCE was detected in every sample, but was above Unrestricted Use and Protection of Groundwater criteria in half of samples collected. Concentrations exceeding criteria ranged from a high of 320 mg/kg (SSB-57 at 10-11 feet bgs) to 1.6 mg/kg (SSB-59 at 15-16 feet bgs).

Trichloroethene (TCE) was detected above Unrestricted Use and Protection of Groundwater criteria in two samples, both from location SSB-57 (1.9 mg/kg at 1-1.5 feet bgs and 0.67 mg/kg at 10-11 feet bgs). Cis-1,2-dichloroethene (cis-1,2-DCE) was detected above Unrestricted Use and Protection of Groundwater criteria in SSB-57 (0.35 mg/kg at 10-11 feet bgs). 1,2-dichloroethane (1,2-DCA) was detected above Unrestricted Use and Protection of Groundwater criteria in SSB-59 (0.030 mg/kg at 15-16 feet bgs) and SSB-62 (0.026 mg/kg at 15-17 feet bgs).

Additional VOCs detected above Unrestricted Use and Protection of Groundwater criteria include: methylene chloride in SSB-59 (0.054 mg/kg at 15-16 feet bgs); and acetone in 11 samples ranging in concentrations of 0.43 mg/kg (SSB-62 4-5 feet bgs) down to 0.055 mg/kg (SSB-60 4.5-5 feet bgs).

The SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene [also known as polynuclear aromatic hydrocarbons (PAHs)] were at concentrations exceeding their Unrestricted Use and Protection of Groundwater criteria in one soil sample, collected from SSB-57 at 1-1.5 feet bgs.

Metals detected at concentrations exceeding their Unrestricted Use and Protection of Groundwater criteria in soil included:

- Aluminum, cadmium, chromium, copper, iron, lead, vanadium, and zinc in SSB-57 at 1-1.5 feet bgs;
- Cadmium, iron, manganese, and thallium in SSB-57 at 7-8 feet bgs;
- Cadmium and iron in SSB-58 at 18-19 feet bgs and SSB-61 at 15-17 feet bgs;
- Iron in SSB-60 at 4.5-5 and 14-15 feet bgs;
- Cobalt and iron in SSB-62 at 1-1.5 feet bgs; and
- Cadmium, iron, and selenium in SSB-62 at 15-17 feet bgs.

Only metals in soil were detected at concentrations exceeding Site Background criteria and included:
Iron and zinc in SSB-57 at 1-1.5 feet bgs; and
Iron in SSB-57 at 7-8 feet bgs and SSB-58 at 18-19 feet bgs.

PCE exceeded Residential Use criteria in two locations: SSB-57 (22 mg/kg at 1-1.5 feet bgs, 6.1 mg/kg at 7-8 feet bgs, 320 mg/kg at 10-11 feet bgs, and 6.2 mg/kg at 14-15 bgs); and SSB-62 (100 mg/kg at 4-5 feet bgs). PCE in SSB-57 (1-1.5 feet bgs and 10-11 feet bgs) exceeded Restricted Residential Use criteria. No other VOCs exceeded either Residential or Restricted Residential Use criteria in the soil samples.

Several PAHs (i.e., benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene) were detected at concentrations exceeding their Residential Use and/or Restricted Residential Use criteria in the soil sample collected from SSB-57 at 1-1.5 feet bgs. No other SVOCs exceeded either Residential Use or Restricted Residential Use criteria in the soil samples.

Metals detected at concentration exceeding their Residential and/or Restricted Residential Use criteria in soil included:
- Cadmium and iron in SSB-57 at 1-1.5 feet bgs, SSB-58 at 18-19 feet bgs, SSB-61 at 15-17 feet bgs, and SSB-62 at 15-17 ft bgs;
- Cadmium, iron, and manganese in SSB-57 at 7-8 feet bgs;
- Iron in SSB-60 at 4.5-5 and 14-15 ft bgs; and
- Cobalt and iron in SSB-62 at 1-1.5 feet bgs.

No other compounds were detected at concentrations above their criteria in the soil samples analyzed.

5.2 Groundwater Analytical Results

A summary of the detected compounds in the groundwater samples collected from temporary monitoring wells (SSB-59 and SSB-62) is presented in Table 3. Results exceeding Technical Guidance Series Memorandum (TOGS) No. 1.1.1 Class GA groundwater criteria are indicated with a circle. The locations of detected compounds that have exceeded their respective criteria are shown on Figure 6.

It should be noted that the concentrations of detected compounds in the groundwater samples may be biased high due to the method of collection which resulted in turbid samples (i.e., temporary wells without a sand pack, not developed or significantly purged, and sampled using a foot valve).

The analytical results of the groundwater samples exceeding groundwater SCGs are summarized as follows:
- PCE in SSB-59 at 2,000 micrograms per liter (µg/L) and SSB-62 at 12,000 µg/L;
- TCE in SSB-59 at 23µg/L and SSB-62 at 500 µg/L;
- Cis-1,2-DCE in SSB-59 at 58 µg/L and SSB-62 at 3,900 µg/L;
- Trans-1,2-dichloroethene in SSB-62 at 6 µg/L;
- Vinyl chloride in SSB-62 at 7 µg/L.
- 1,1-Dichloroethene in SSB-62 at 7 µg/L
- 1,2-DCA in SSB-62 at 34 µg/L and SSB-59 at 6 µg/L
- 1,1,1-Trichloroethane in SSB-62 at 14 µg/L
• Benzene and chloroform in SSB-62 and methylene chloride in both samples.
• Lead in SSB-59, cadmium in SSB-62 and antimony, beryllium, chromium, iron, magnesium, manganese, nickel and sodium in both samples.

With the exception of bis(2-ethylhexyl)phthalate (BEHP), no SVOCs, pesticides or PCBs were detected in the groundwater samples and BEHP did not exceed the groundwater SCG.

5.3 Sub-Slab Soil Vapor and Outdoor Air Analytical Results

Sub-slab soil vapor and outdoor air results are presented on Table 4 and shown on Figure 7. A statistical summary of the soil vapor results is presented on Table 5.

PCE was detected in all sub-slab soil vapor sample locations with concentrations ranging from 340,000 micrograms per cubic meter (µg/m³) at 300-SV-03 to 18,000,000 µg/m³ at 300-SV-01.

TCE was detected in all sub-slab soil vapor sample locations with concentrations ranging from 8,400 µg/m³ at 300-SV-03 to 91,000 µg/m³ at 300-SV-02.

Cis-1,2-DCE was detected in all sub-slab soil vapor sample locations with concentrations ranging from 4,100 µg/m³ in SV-03 to 31,000 µg/m³ in 300-SV-02.

Additional VOCs detected in sub-slab soil vapor samples include: 1,1,1-trichloroethane (12,000 µg/m³ in 300-SV-05); chloroform (780 in 300-SV-03 to 3,200 µg/m³ in 300-SV-02); and toluene 28,000 µg/m³ in 300-SV-05).

Although there are no criteria for soil vapor alone, it should be noted that in accordance with the NYSDOH decision matrices (Attachment 9), the recommended action based on the concentrations of PCE and TCE in the sub-slab soil vapor is mitigate.

Results from the outdoor air sample indicated low level detections ranging from 0.28 to 14 µg/m³ of the following VOCs: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,4-dioxane, 4-ethyltoluene, acetone, carbon tetrachloride, dichlorodifluoromethane, ethanol, ethylbenzene, methylene chloride, n-hexane, PCE, toluene, TCE, trichlorofluoromethane, and xylenes.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Based upon the results of this and previous site investigations, the following conclusions are provided.

6.1.2 Soil

Based upon the soil borings advanced and soil samples collected within the 300 Kingsland Avenue building, the eastern extent of the shallow PCE impacted soils beneath the adjacent sidewalk area does not appear to extend beneath the 300 Kingsland Avenue building. The horizontal and vertical extent of PCE contamination in soil adjacent to the 300 Kingsland property has been delineated, as shown on Figures 8, 9, and 10. The concentration of TCE and breakdown products in relation to the PCE concentration suggests the PCE is the primary source of these contaminants and appears to originate beneath the sidewalk between sampling locations SG-071 to the north and SSB-017 to the south. The source of PCE is assumed to extend from the west wall of the building to the eastern curb line of Kingsland Avenue. The PCE impacted soil extends to the water table.
6.1.3 **Groundwater Analytical Results**

Groundwater in the shallow water bearing zone beneath the 300 Kingsland property exhibited high concentrations of PCE (2 ppm to 12 ppm). This area is likely contributing to the groundwater plume originating upgradient at the Former Spic and Span Cleaners & Dyers Site source on the west side of Kingsland Avenue. The concentrations of TCE and breakdown products in relation to the PCE concentrations suggest the PCE is the primary source of these contaminants. The overall dissolved phase plume extent from the Spic and Span Site was previously characterized during the Off-Site and On-Site Phase III RI Reports (URS, September 2014 and URS, March 2015, respectively).

6.1.4 **Sub-Slab Soil Vapor**

The concentrations of PCE and TCE in soil vapor beneath the 300 Kingsland slab result in a recommended action of mitigate, based on the NYSDOH decision matrices.

6.2 **Recommendations**

The following recommendations are offered for consideration by the Department.

- Evaluate options for soil remediation adjacent to the 300 Kingsland Avenue property in the Feasibility Study.
- Design and install a system to address the high concentrations of CVOCs in the sub-slab soil vapor at 300 Kingsland Avenue. Such a method may include, but is not limited to, a sub-slab depressurization (SSD) system.
- If a SSD system is installed, indoor air sampling is recommended to gauge the effectiveness of the SSD system.
- Develop a soil management plan to address any future earthwork activity at 300 Kingsland Avenue. Such a plan should focus on the handling/disposal of excavated materials, and require air monitoring during excavation activities in the form of perimeter monitoring and a community air monitoring program (CAMP).
7.0 REFERENCES


NYSDEC. May 2010. DER-10 Technical Guidance for Site Investigation and Remediation


URS, September 2012. Final – Remedial Investigation, Former Spic and Span Cleaners and Dyers, Inc. Site

URS, September 2014. Final – Off-Site Phase III Remedial Investigation Report, Former Spic and Span Cleaners and Dyers, Inc. Site.

URS, March 2015. Final – On-Site Phase III Remedial Investigation Report, Former Spic and Span Cleaners and Dyers, Inc. Site
8.0 **TABLES, FIGURES, AND ATTACHMENTS**

The following tables, figures, and attachments are included as part of this letter report:

**Tables** (following text)

| Table 1A | Summary of Detected Compounds in 300 Kingsland Avenue Soil Samples – Unrestricted Use, Protection of Groundwater and Background Criteria |
| Table 1B | Summary of Detected Compounds in 300 Kingsland Avenue Soil Samples – Residential and Restricted Residential Criteria |
| Table 2A | Statistical Summary of Detected Compounds in 300 Kingsland Avenue Soil Samples – Unrestricted Use Protection of Groundwater and Background Criteria |
| Table 2B | Statistical Summary of Detected Compounds in 300 Kingsland Avenue Soil Samples – Residential and Restricted Residential Criteria |
| Table 3 | Summary of Detected Compounds in 300 Kingsland Avenue Groundwater Samples |
| Table 4 | Summary of Detected Compounds in 300 Kingsland Avenue Sub-Slab and Outdoor Air Samples |
| Table 5 | Statistical Summary of Detected Compounds in 300 Kingsland Avenue Sub-Slab Soil Vapor Samples |

**Figures** (following Tables)

| Figure 1 | Site Location |
| Figure 2 | Soil Boring/Temporary Monitoring Well Locations |
| Figure 3 | Sub-Slab/Soil Vapor Sampling Locations |
| Figure 4 | Soil Analytical Results Exceeding Unrestricted Use, Protection of Groundwater and Soil Background Criteria |
| Figure 5 | Soil Analytical Results Exceeding Residential Use and Restricted Residential Use Criteria |
| Figure 6 | Groundwater Analytical Results |
| Figure 7 | Sub-Slab/Soil Vapor Analytical Results |
| Figure 8 | Historical Soil Analytical Results Exceeding Unrestricted Use and Protection of Groundwater Criteria |
| Figure 9 | Historical Soil Analytical Results Exceeding Residential Use and Restricted Residential Use Criteria |
| Figure 10 | Tetrachloroethylene Isoconcentration Contours in Soil |

**Attachments** (following Figures)

| Attachment 1 | Photographic Log |
| Attachment 2 | Field Notes |
| Attachment 3 | Geophysical Survey Report |
| Attachment 4 | Soil Boring Logs |
| Attachment 5 | Temporary Monitoring Well Construction Logs |
| Attachment 6 | Summa Canister Sampling Field Data Sheets |
| Attachment 7 | Investigation Derived Waste Disposal Documents |
| Attachment 8 | Data Usability Summary Report (on CD) |
| Attachment 9 | NYSDOH Decision Matrices |
Please contact me at 716-856-5636 if you have any questions or comments.

Sincerely,

URS Corporation

[Signature]

Michael Gutmann
Project Manager

cc: File: 11176359 (R-1)
George Kisluk URS