

KeySpan Corporation Environmental Asset Management One Metrotech Center Brooklyn, NY 11201

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Joseph M. Moloughney, P.E.
Environmental Engineer
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C
11<sup>th</sup> Floor
625 Broadway
Albany, New York 12233-7017

Re: Supplemental Remedial Investigation (RI) Work Plan

Carroll Gardens/Public Place

Former Citizens Gas Works Manufactured Gas Plant (MGP) Site

Brooklyn, New York Site No. V00360-2

Dear Mr. Moloughney:

KeySpan Corporation (KeySpan) is submitting this work plan to conduct supplemental remedial investigation (RI) activities at and adjacent to the Carroll Gardens/Public Place [Former Citizens Gas Works Manufactured Gas Plant (MGP)] Site located in the Carroll Gardens neighborhood of Brooklyn, New York. Based upon RI activities completed to date, the lateral extent of the MGP-related impacts has not been fully determined to the east, south and to the west of the site. Volatile organic compounds (VOC) [including benzene, toluene, ethyl benzene, and xylenes] were detected sub-slab soil vapor samples collected beneath the warehouse located at Parcel III of the Carroll Gardens/Public Place. These findings are summarized within the Draft Remedial Investigation Report for the site issued in June 2005. Plate 1 summarizes the lateral extent of tar and previous sample locations completed as part of RI. The New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) provided comments to the Draft RI Report for the Carroll Gardens/Public Place Site in a letter dated August 29, 2005 [NYSDEC/NYSDOH comment letter].

This work plan was prepared to delineate the lateral extent of tar and associated groundwater impacts in the vicinity of the Carroll Gardens/Public Place site and to address Comment 2 of the NYSDEC/NYSDOH comment letter which requested that indoor air sampling be conducted in the warehouse at Parcel III of the Carroll Gardens/Public Place site.

The proposed supplemental investigation will include drilling soil borings and installing monitoring wells with Geoprobe® drill and/or resonant sonic drilling methods. Sub-slab soil vapor, indoor air and outdoor air samples will be collected using Summa Canisters®.

The objectives of the supplemental investigation are to:

- Evaluate the lateral extent of MGP-related tar and the associated groundwater impacts through additional subsurface soil and groundwater sampling and analysis.
- Evaluate the groundwater flow and potential exposure pathway to groundwater in the vicinity of the Carroll Gardens/Public Place Site. This will be completed by gauging the newly installed and existing monitoring well network and by groundwater sample analyses.
- Investigate the air quality at the warehouse at Parcel III through the collection and analysis of soil vapor, indoor air, and outdoor air samples.

The completion of the proposed supplemental RI activities will provide a better understanding of the nature and extent of MGP tar-related impacts within soil vapor, subsurface soil and groundwater and will be used to refine the existing conceptual site model for the site.

The remainder of this document presents the proposed work plan for the supplemental remedial investigation.

# **Supplemental RI Scope of Work**

The supplemental remedial investigation scope of work will be conducted in general accordance with the procedures specified in the New York State Department of Environmental Conservation (NYSDEC)-approved *Remedial Investigation Work Plan, Citizens Gas Works Former MGP Site* dated February 11, 2003. All work conducted will comply with NYSDEC-approved *Remedial Investigation Health and Safety Plan, Citizen Gas Works Former MGP Site* dated February 28, 2003. Soil vapor and ambient air samples will be collected in general accordance with the Draft Guidance for Evaluating Soil Vapor Intrusion (New York State Department of Health (NYSDOH) [Draft NYSDOH Soil Vapor Guidance], 2005) and United States Environmental Protection Agency (USEPA) Standard Operating Procedure No. 2042: "Soil Gas Sampling."

# **Proposed Supplemental RI Activities**

## Soil Boring Installation and Subsurface Soil Analysis

To evaluate the lateral extent of tar-related impacts in the vicinity of the site, up to fourteen borings (CGSB-53 to CGSB-61, GC-GP-21 to GC-GP-23, GC-GP-27, and GC-GP-28) will be completed using direct push Geoprobe<sup>®</sup> or resonant sonic drilling methods. Borings with the prefix "GC" have been proposed as part of the Gowanus Canal Sediment Investigation that was issued on June 8, 2005. The proposed installation depths of the Gowanus Canal Sediment Investigation borings will be increased to achieve the objective to delineate the vertical extent of MGP –related impacts. The proposed soil boring locations are shown on Plate 1.

Supplemental RI borings, CGSB-34/ MW-20, SB-50 and SB-51, were initially proposed as part of supplemental investigations in the fall of 2004 to delineate off-site tar and groundwater impacts at the Carroll Gardens/Public Place site. However, these borings were not completed because a permit from New York City Transit and property access were not able to be secured prior to demobilization of the subcontractor in the spring of 2005. These borings will not be completed as part of supplemental investigation because of access and liability constraints for working on the MTA parcels. In lieu of these borings, subsurface soil borings (CGMW-25/CGSB-55, CGMW-32/CGSB-61, and CGMW-31/GCGP-27) proposed as part of this work plan will delineate lateral extent of tar and associated groundwater impacts to the west and south of the Carroll Gardens/ Public Place Site.

The specific drilling method used will depend upon the subsurface geologic conditions, the proposed completion depth of the boring, subsurface utilities, and site access. If Geoprobe<sup>®</sup> drilling methods are utilized, then each soil boring will be completed utilizing a 4-foot or 5 –foot MacroCore<sup>®</sup> sampler equipped with a discrete sampling device. Each boring completed with Geoprobe<sup>®</sup> drilling methods will be abandoned with a Portland cement/ bentonite mixture that will be tremmied from the bottom of the boring to the top of the boring. Each location will be resurfaced with blacktop patch or cement. If resonant sonic drilling methods are used, samples will be collected continuously by a 5-foot or 10-foot long core barrel and will be cased off using larger diameter outer casing. Upon completion, each resonant sonic boring not completed as a monitoring well will be abandoned with a Portland cement/bentonite mixture that will by tremmied from the bottom of the boring to the top of the boring.

Each soil boring will be continuously sampled from approximately 5 feet below ground surface (below expected subsurface utilities) to a depth of at least 10 feet below the deepest observation of tar in the nearest soil boring or 10 feet below visually impacted material, whichever is greatest. For example, the deepest observation of tar in CGMW-16/CGSB-48, located on Lot 138 to the east of the Gowanus Canal, was encountered at an elevation of approximately -27 feet North American Vertical Datum (NAVD) [approximately 34 feet below ground surface]. Therefore, the proposed CGMW-29/CGSB-59 soil boring/monitoring well on Lot 153 will be advanced at least to an elevation of approximately -38 feet NAVD [approximately 45 feet below ground surface], if tar is not observed. Table 1 summarizes the boring identification number, approximate location, proposed completion depth, and boring location rationale.

Up to two soil samples will be selected for laboratory analysis from each boring. One depth interval indicating the greatest degree of contamination will be submitted for laboratory analysis to evaluate the magnitude of the observed impacts at each boring. One sample from beneath the observed impacts will be submitted for laboratory analysis to assess the vertical extent of the observed impacts. In the event that no MGP tar-related impacts are encountered, then a sample will be collected to evaluate the soil conditions at the approximate depth/elevation as tar impacts encountered in the closest nearby boring.

Each soil sample will be submitted to Severn-Trent Laboratories (STL) in Shelton, Connecticut for analysis. STL is a New York State Department of Health (NYSDOH) Environmental Laboratory Accredited Laboratory (ELAP). Analysis will include:

- Volatile organic compounds (VOCs) according to Environmental Protection Agency (EPA) Method 8260B
- Semi-volatile organic compounds (SVOCs) according to Method 8270C
- Resource Conservation Recovery Act (RCRA)- 8 metals according to EPA Method 6010
- Total cyanide (TCN) according to EPA Method 9012A

Quality assurance/quality control (QA/QC) soil and groundwater samples will be submitted as specified in the NYSDEC-approved work plan. QA/QC samples will include a blind duplicate, matrix spike/matrix spike duplicate (MS/MSD), and field rinsate blank will be collected at a frequency of 1 per 20 samples collected or once a week. The QA/QC samples will analyzed for the same suite of analysis (VOC, SVOC, RCRA-8, and TCN) as the samples submitted for laboratory analysis. Trip blank samples will be analyzed for VOC analysis per shipment of samples to the laboratory.

## Monitoring Well Installation, Groundwater Analysis, and Groundwater Gauging

Ten groundwater table monitoring wells (CGMW-23 through CGMW-33) will be installed at selected soil boring locations within the shallow groundwater water zone. The proposed wells will be used to evaluate the potential groundwater impacts, potential exposure route groundwater, and to refine groundwater flow within the shallow groundwater zone (water table) in the vicinity of the site. Table 1 summarizes the location and rationale of the proposed monitoring wells. Plate 1 shows the locations of the monitoring wells.

Monitoring wells installed with a Geoprobe<sup>®</sup> will be constructed using 2.5 inch outer diameter [1.5-inch inner diameter (ID)] pre-packed monitoring well screens in general accordance with the NYSDEC-approved RI Work Plan. If tar is encountered, then the monitoring well will be constructed with a sump beneath the screen for potential tar recovery. If sonic drilling methods are used, standard 2-inch ID monitoring well construction will be completed in accordance with the RI Work Plan.

Each monitoring well will be developed and sampled in accordance with methods described within the NYSDEC-approved RI Work Plan. One groundwater sample will be collected from each monitoring well no sooner than two weeks after development. Each groundwater sample will be analyzed for VOCs, SVOCs, RCRA-8 Metals, and TCN. One set of QA/QC samples will be submitted as part of the groundwater sample collection. Trip blanks will be analyzed for VOCs for every shipment of samples to the laboratory.

Each newly installed monitoring well and existing monitoring well will be gauged at high and low tides to evaluate the groundwater flow at the site and nearby areas.

## Soil Vapor and Indoor Air Sampling and Analysis

As requested by the NYSDEC/ NYSDOH, six soil vapor sample locations (GCSV-01 through CGSV-06) will be re-sampled as part of the supplemental RI. These soil vapor ports were previously installed through the floor of the warehouse at Parcel III as part of RI activities in 2003. Soil vapor samples will be collected in general accordance with the Draft NYSDOH Soil Vapor Guidance. Prior to the collection of the soil vapor samples, the integrity of each soil vapor sample port will be confirmed through tracer gas monitoring. Soil vapor from each sample port will be screened with for tracer gas prior to and following sample collection. Each soil vapor sampling port will be evacuated of air at a rate that does not exceed 0.2 liters per minute. Subslab soil vapor samples will be collected at each port using certified-clean Summa® canisters with a 6 liter capacity. Each Summa® canister air sample will be collected over an approximate 8-hour period through a calibrated flow control valve provided by the laboratory. The sample rate will not exceed 0.2 liters per minute.

Six indoor, ambient air samples (AS-1 through AS-6) will be located throughout the interior of the warehouse (Plate 1). Three outdoor air ambient air samples (AS-7 through AS-9) will be located on Parcel III (Plate 1). Indoor and outdoor ambient air samples will be collected concurrently with sub-slab vapor samples using certified-clean Summa® canisters with a 6 liter capacity. Each Summa® canister air sample will be collected over an approximate 8-hour period through a calibrated flow control valve provided by the laboratory. The sample rate will not exceed 0.2 liters per minute.

QA/QC samples will include a blind duplicate for one sub-slab vapor sample.

Sub-slab vapor and ambient air samples will be shipped to Air toxics in Folsom, CA. The air samples will be analyzed for VOCs, including naphthalene, by EPA method TO-15. In addition, sub-slab vapor samples will be analyzed for the tracer gas. Air Toxics will provide New York State Category B data deliverables for the air analyses that will be provided in both electronic and printed format.

A building assessment will be conducted prior to the collection of the ambient air and soil vapor sampling. Information to be collected during the building assessment will include:

- Information regarding commercial occupants, chemical use and storage
- Location and use of heating and air conditioning systems
- Sketches of the floor plan which will include information regarding but not limited to sample locations, chemical storage, heating and air conditioning ventilation systems, sumps, foundation cracks, garages, and other pertinent information

• Representative digital photographs will be taken to document building conditions and photographs of potential sources of VOCs (stored chemicals, fuels, etc) will be taken.

Weather conditions, including precipitation, indoor and outdoor temperature, and barometric pressure will be recorded during the collection of air samples.

### Survey

Each newly installed soil boring and monitoring well location will be surveyed by a New York State licensed surveyor. The survey locations will be incorporated into the site-wide survey database.

#### Data Validation and Management

STL will provide New York State Category B data deliverables in electronic and printed format. All data will be incorporated into the existing site database. Laboratory data will be collected and validated in general accordance with the New York State Analytical Services Protocols (ASP). Data will be validated and data usability summary reports will be prepared evaluating the usability of the data.

#### Report Preparation

The newly obtained data will be incorporated into the site-wide database and will be used to supplement the understanding of the conditions in the vicinity of the Carroll Gardens Public Place Site. The supplemental RI findings will be incorporated into a supplemental RI report for the Carroll Gardens/Public Place Site. The report will discuss the supplemental RI findings regarding the nature and extent of the MGP-tar related impacts within soil and groundwater in the vicinity of the site, summarize the geologic findings, update the site conceptual model, and will provide an evaluation of potentially complete exposure pathways in the vicinity of the site.

#### Schedule

Field activities can commence following the NYSDEC and NYSDOH approval of this scope of work. The field program is tentatively scheduled to commence in late November. The work is anticipated to last for approximately 3 weeks. Issues affecting the start date are access agreements, utility clearance for the borings, potential utility conflicts based upon the utility mark outs, and the NYSDEC and NYSDOH approval of the supplemental RI work plan.

If you have any questions or require additional information, please feel free to contact me at (718) 403-3053 or by e-mail at tbell@keyspanenergy.com

Sincerely,

Tracey L. Bell

Manager

Environmental Asset Management

#### Attachments

cc: L. Liebs (KeySpan; 1 CD)

- A. Quartararo (NYSDEC; 1 copy, 1 CD)
- T. Kunkel (NYSDEC Region 2; 1 copy, 1 CD)
- G. Litwin (NYSDOH; 1 copy, 1 CD)
- R. Kulikowski (NYC Office of Environmental Coordination; 1 copy, 1 CD)
- J. Chan (NYC Office of the Deputy Mayor for Economic Development and Rebuilding; 1 copy, 1 CD)
- D. Hetrick (NYSDOH; 1 copy, 1 CD)
- T. Bell (KeySpan; 1 copy; 1 CDs)
- A. Prophete (KeySpan; 1 copy, 1 CD)
- D. Riccobono (KeySpan; 1 CD)
- S. Ostrow (Ostrow & Partners; 1 CD)
- D. Terry (GEI)

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#### Table 1 Sample Location Rationale Supplemental Remedial Investigation Carroll Gardens/Public Place Site Site V00360-2 Brooklyn, New York

	Location	Rationale	Approximate Completion Depth	Approximate Completion Elevation (Feet NAVD)	Number of Samples			Volatile Organic Compounds (VOC's)	Semi-volatile Organic compounds (SVOCs)	Conservation Recovery Act ( RCRA) 8 Metals		
Proposed Sample Identification Number					Soil	Groundwater	Air	EPA Method 8260B	EPA Method 8270C	EPA Method 6010	Total Cyanide EPA Method 9012A	TO-15 with Naphthalene
CGSB-53/ CGMW-23	Located within the Nelson Street right-of-way (ROW) approximately 75 feet to the west of the New York City Transit (NYCT) subway tracks.	Boring to evaluate soils to the west of CGSB-31 (within Smith Street) where sheens and naphthalene odors encountered within soils at 20 to 26 feet.  Monitoring well to evaluate potential impacts within the shallow groundwater zone (water table).	•	-17	2	1		x	x	×	X	raphilalelle
CGSB-54/ CGMW-24	Located within the Luquer Street ROW approximately 75 to the west of the New York City Transit (NYCT) subway tracks.	Boring to evaluate soils to the west of CGSB-33 (within Smith Street) where petroleum staining and sheen were encountered at 22.5 feet to 30 feet.  Monitoring well will be installed to evaluate groundwater flow and potential impacts within the shallow groundwater zone (water table).	40	-11	2	1		x	х	x	×	
CGSB-55/ CGMW-25	Located within the 4th Place ROW approximately 75 feet to the west of the New York City Transit (NYCT) subway tracks.	Boring to evaluate potential impacts at the groundwater table within the shallow groundwater zone to the west of the Carroll Gardens/ Public Place site.	44	-10	2	1		×	х	×	Х	
CGSB-56/ CGMW-26	Located on the side walk on the east side of Hoyt Street ROW approximately 65 feet north of the intersection of 4th Street	Boring and monitoring well to evaluate potential impacts at the groundwater table within the shallow groundwater zone to the north of the Carroll Gardens/ Public Place site.	44	-27	2	1		×	х	х	×	
CGSB-57/ CGMW-27	anoroximately 130 feet to west of the	Boring and monitoring well to evaluate potential impacts at the groundwater table within the shallow groundwater zone to the north of the Carroll Gardens/ Public Place site.	44	-27	2	1		x	х	X	x	
CGSB-58	Located on the east side of Bond Street, approximately 140 feet to the north of the intersection of 4th Street.	Boring to evaluate tar impacts to the north of CGSB-44/ CGMW-11.  Monitoring well will be installed to evaluate groundwater flow and potential impacts within the shallow groundwater zone (water table).	77	-56	2	0		x	x	x	Х	
CGSB-59/ CGMW-29	Located to the south of the 6th Street Basin on Block 990, Lot 153.	Boring to evaluate tar impacts to the east of CGSB-48/ CGMW-16 where tar impacted soils were encountered as deep as 34 feet.  Monitoring well will be installed to evaluate groundwater flow and potential impacts within the shallow groundwater zone (water table).	45	-38	2	1		x	х	x	×	
CGSB-60/ CGMW-30	Located within the sidewalk of 9th Street ROW to the east of the Gowanus Canal	Boring to evaluate potential tar impacts to the southeast of CGSB-52/CGMW-22 where tar impacted soils were encountered as deep as 38 feet.  Monitoring well will be installed to evaluate groundwater flow and potential impacts within the shallow groundwater zone (water table).	48	-42	2	1		×	×	x	х	

# Table 1 Sample Location Rationale Supplemental Remedial Investigation Carroll Gardens/Public Place Site Site V00360-2 Brooklyn, New York

CGSB-61/ MW-32	Located to the south of 9th Street on Block 480, Lot 8.	Boring to evaluate potential tar impacts to the south of CGSB-26/CGMW06D [Huntington Street] where tar impacted impacted soils were encountered to a maximum depth of approximately 82 feet  Monitoring well will be installed to evaluate shallow groundwater flow and potential impacts within the shallow groundwater zone (water table).	92	-82	2	1		×	х	х	х	
	Located to the north of Gowanus Canal on Block 466, Lot 17.	Boring to evaluate the lateral extent of tar to the east of CGSB-44/ MW-11 where visual tar impacts were observed to 62 feet.	72	-56	2 <sup>3</sup>	1		х	×	×	×	
GC-GP-22 <sup>1,2</sup>	Located on Block 977, Lot 3, to the south of the Gowanus Canal	Boring to evaluate the lateral extent of tar to the east of CGSB-44/ MW-11 where visual tar impacts were observed to 62 feet.	72	-56	2³	0		х	Х	х	X	
	Located on Block 977, Lot 3, to the south of the Gowanus Canal	Boring to evaluate the lateral extent of tar to the east of CGSB-44/ MW-11 where visual tar impacts were observed to 62 feet.	72	-56	2³	0		×	Х	х	×	
GC-GP-27 <sup>-2</sup> / CGMW-31	Located to the south of 9th Street on Block 480, Lot 8.	Boring to evaluate potential tar impacts to the south of CGSB-26/CGMW06D [Huntington Street] where tar impacted impacted soils were encountered to a maximum depth of approximately 82 feet  Monitoring well will be installed to evaluate groundwater flow and potential impacts within the shallow groundwater zone (water table).	92	-82	23	1		×	×	x	х	
GC-GP-28 <sup>2</sup> /CGMW-33	Located to the south of 9th Street on Block 1007, Lot 1.	Boring to evaluate potential tar impacts to the southeast of CGSB-52/CGMW-22 where tar impacted soils were encountered as deep as 38 feet.  Monitoring well will be installed to evaluate groundwater flow and potential impacts within the shallow groundwater zone (water table).	48	-42	23	1		х	х	х	×	
CGSV-01 to CGSV-06	Located within the warehouse at Parcel III of the Carroll Gardens/ Public Place Site	Sub-slab soil vapor sample location to analyze concentrations beneath the concrete slab foundation of the warehouse.					1					Х
CGAS-01 to CGAS-06	Located within the warehouse at Parcel III of the Carroll Gardens/ Public Place Site	concentrations within the warehouse.					1					Х
	Located outside the warehouse on Parcel III of the Carroll Gardens/ Public Place Site.	Ambient air samples to analyze outdoor air concentrations.					1					Х

<sup>&</sup>lt;sup>1</sup> Borings will be advanced deeper than proposed in the Gowanus Canal Sediment Sampling Work Plan to meet the objectives of the RI.

<sup>&</sup>lt;sup>2</sup> Includes soil samples from the Gowanus Canal Sediment Sampling Work Plan dated June 8, 2005.

