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Mr. Amen M. Omorogbe, P.E.
Project Manager MGP Remedial Section
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7010

Re: Former Clifton, Staten Island MGP Site
Supplemental Remedial Investigation (RI) Revised Work Plan

Dear Mr. Omorogbe:

On behalf of our client, KeySpan Energy (KeySpan), GEI Consultants, Inc. (GEI) is submitting this interim data deliverable and revised work plan to conduct supplemental remedial investigations and feasibility study (FS) support investigations at the former manufactured gas plant (MGP) site located at 25 and 40 Willow Avenue, Clifton, Staten Island, New York. This work plan has been revised to incorporate comments on the initial March 14, 2002 work plan as provided by the New York State Department of Environmental Conservation (NYSDEC) in their letter dated April 12, 2002 and comments provided by the New York State Department of Health in their letter dated April 26, 2002 (as transmitted via email by NYSDEC on May 13, 2002).

Included as part of this submittal are:

- Table 1 - Chemical data summary tables for subsurface soil samples collected in November and December 2001
- Table 2 - Chemical data summary tables for surface soil samples collected on the residential parcels on Lynhurst Avenue in November 2001
- Plate 1 - An updated site-wide base map showing all explorations completed to date
- Plate 2 - Updated cross sections A-A' and F-F' from the August 2000 Draft RI Report
- Plate 3 - Four cross sections completed around Relief Holder No. 2 on the 40 Willow Avenue parcel
- Plate 4 - Photographic documentation of the test pits completed around Relief Holder No. 2 in December of 2001

The remainder of this document presents our proposed work plan for additional investigations and discusses the new findings as a framework to explain the rationale for the additional investigations. Figures 1 and 2 present the locations of the proposed additional explorations. Following your review of this work plan, please contact Ms. Tracey Bell, with KeySpan, with your approval or if you have any questions.

Work Plan

The work described herein will be conducted in accordance with the procedures specified in the New York State Department of Environmental Conservation (NYSDEC)-approved November 9, 1998 RI Work Plan for the site. In addition, the work will be conducted following the quality assurance/quality control (QA/QC) procedures established in the approved RI work plan. All field activities will comply with the health and safety procedures specified in the NYSDEC-approved site-specific Health and Safety Plan.

Supplemental Remedial Investigation Activities:

Soil Investigation - Lynhurst Avenue Residential Parcels

The findings from boring SB-77 completed on November 20, 2001 on the 59 Lynhurst Avenue residential parcel indicate the presence of MGP residuals beneath this property beginning at a depth of approximately 33.5 feet below ground surface (bgs) and extending to 39.5 feet bgs at the terminus of the boring (Plate 2). Previous borings completed on the Lynhurst Avenue residential parcels determined that MGP residuals were not present to a depth of approximately 20 feet below ground surface. Therefore, the potential lateral extent of MGP residuals beneath the residential parcels will be assessed by completing three soil borings (SB-79, SB-80, and SB-87). Borings SB-79 and SB-80 will be completed respectively on residential parcels located at 63 and 51 Lynhurst Avenue. SB-87 will be completed on either of the residential parcels located at 53 or 55 Lynhurst Avenue, depending upon access. Two of the three borings will be installed until at least five feet of visually clean material is encountered or the extent allowable by the drilling equipment, whichever is encountered first. The third boring will be completed to approximately 40-foot deep (Figure 1).

Each boring will be located approximately 20 feet to the southeast of the fence line between the 40 Willow Avenue parcel and the residential lots located on Lynhurst Avenue. The actual location of the proposed boring will be dependant upon physical constraints at the parcels and negotiated access agreements to the residential lots. The soil borings will be installed using a track-mounted Geoprobe® drill rig.

Soil samples will be collected continuously from the ground surface within each boring using 4-foot long MacroCore® samplers. A discrete sampler device will be used during the collection of all MacroCore® samples. Up to two soil samples from each boring will be submitted to Severn Trent Laboratories (STL) in Shelton, Connecticut for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), poly-nuclear aromatic hydrocarbons (PAHs), RCRA-8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), and total cyanide (TCN). STL is an approved New York State ELAP laboratory. Each subsurface soil boring will be back-filled with bentonite chips and hydrated with water upon completion.

QA/QC samples will include one laboratory-blind duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) sample, one equipment rinsate blank sample, and one trip blank sample per day of sample shipment to the STL. Trip blank samples will be analyzed for BTEX; the other QA/QC samples will be analyzed for BTEX, PAHs, and RCRA-8 metals, and TCN.

STL will provide New York State Category B data deliverables for the soil samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Groundwater Assessment and Evaluation of Volatilization Potential to Indoor Air - Lynhurst Avenue Residential Parcels

KeySpan proposes evaluating whether the presence of deep MGP residuals beneath the residential parcels abutting the 40 Willow Avenue parcel potentially affects the indoor air of the residential dwellings. If VOCs are present in the groundwater beneath the dwellings, a potential exists for volatile compounds to volatilize to the indoor air of the dwellings. To carry out this evaluation, groundwater samples will be collected from temporary piezometer (micro-well) locations (PZ-5 through PZ-12) adjacent to each of the residential dwellings (49 through 67 Lynhurst Avenue) and the volatile concentrations of the groundwater samples will be used to estimate indoor air concentrations (Figure 1). This exposure analysis will use a model developed by the United States Environmental Protection Agency (EPA) for estimating indoor air exposure concentrations and the associated health risks from subsurface vapor transport into buildings. The model is based on the analytical solutions of Johnson and Ettinger in "Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings" (1991, *Environ. Sci. Tech.* 25(8): 1445-1452).

The groundwater samples will be collected through temporary micro-wells installed by Geoprobe® methods adjacent to the residential dwellings. Each micro-well will

be installed to depths below the residential dwelling floor slab or basement floor (if present) as follows:

- If the groundwater elevation is below the elevation of the basement floor, then a groundwater sample will be collected approximately 4 feet below the encountered groundwater table.
- If the groundwater elevation is above the basement floor, then a groundwater sample will be collected from the elevation of the basement floor to 4 feet below the basement floor.
- If the groundwater elevation is below the slab foundation of a dwelling, then a groundwater sample will be collected approximately 4 feet below the encountered groundwater table.

These sampling scenarios will based upon basement elevation information collected from the residents by KeySpan personnel prior to the commencement of sampling. Immediately following installation of a micro-well, a groundwater grab sample will be collected using low-flow sample collection methods. Each groundwater grab sample will be submitted to STL for analysis of volatile organic compounds (VOCs) by EPA method 8260 and semi-volatile organic compounds (SVOCs) by EPA method 8270. One blind duplicate sample, one MS/MSD, and an equipment rinsate blank sample will be collected and analyzed for VOCs and SVOCs as listed above. One trip blank sample (VOC analysis) will be submitted per shipment of samples to STL. Following collection of the groundwater grab sample, each micro-well will be removed and the borehole will be backfilled with bentonite chips.

If necessary because of physical constraints or limited access, the temporary groundwater sampling points may be hand installed by GEI personnel or GEI's subcontractor.

STL will provide New York State Category B data deliverables for the groundwater samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Lynhurst Avenue Evaluation

Completion of soil boring SB-78 determined the presence of MGP residuals at a depth of 44 to 50 beneath Lynhurst Avenue. No MGP residuals were encountered above or below this interval (Plate 2). Therefore, three borings (SB-84 through SB-86) will be drilled on the southern side of Lynhurst Avenue, in the sidewalk (Figure 1) to evaluate the potential lateral extent of MGP residuals beneath

Lynhurst Avenue. Based upon visual and analytical findings (Table 1) from boring SB-78, the proposed borings will be completed to be approximately 50 to 60 feet bgs.

Because of limited space within the street, these soil borings will be installed using a track or truck-mounted Geoprobe®. Soil samples will be collected continuously from each boring using 4-foot long MacroCore® samplers equipped with a discrete sampler device. Up to two soil samples from each boring will be submitted to STL for analysis of BTEX, PAHs, RCRA-8 metals, and TCN.

QA/QC samples will include one laboratory-blind duplicate sample, one MS/MSD sample, one equipment rinsate blank sample, and trip blank samples. Trip blanks will be submitted at a frequency of one trip blank set per day of sample shipment to the laboratory. Trip blank samples will be analyzed for BTEX; the other QA/QC samples will be analyzed for BTEX, PAHs, and RCRA-8 metals, and TCN.

Off-Site Evaluation of Tar Migration from 25 Willow Avenue Parcel

Soil borings SB-68 through SB-73, completed in December 2001, evaluated the presence and integrity of the glacial till layer along Bay Street that serves as a confining layer to vertical tar migration (Figure 2). Plate 2 shows the geologic and physical observations from these borings. The glacial till surface was encountered approximately 8 to 15 feet bgs along the southern portion of the 25 Willow Avenue parcel in borings SB-71, SB-72, and SB-73. No MGP-related odors or visual impacts were noted in these borings. The shallow depth of the confining till and the lack of observed MGP residuals demonstrates that tar is not migrating from the 25 Willow Avenue site toward Bay Street in the vicinity of these borings.

To the north, the confining glacial till was encountered deeper at approximately 33 to 41 feet bgs in borings SB-68, SB-69 (RW-17), and SB-70A (RW-18). MGP residuals were present in borings SB-69 (RW-17) and SB-70A (RW-18) within well-sorted gravelly-sand located above the confining glacial till. This gravelly-sand likely represents a glacial outwash channel with its axis oriented northeasterly.

During a groundwater sampling event in January 2002, approximately 2 feet of a tar/water mixture was gauged within the bottom of RW-18. Discrete tar blebs were also observed in the water from well RW-17. Both wells are screened above the confining till within the inferred glacial stream channel.

To evaluate the potential lateral extent of tar to the northeast of borings SB-69 (RW-17) and SB-70A (RW-18), three borings (SB-81 through SB-83) will be completed across Bay Street on a triangular shaped parcel between Bay Street and Edgewater Street. Each boring will be advanced approximately 10 feet into the till

unit, which is located approximately 30 to 40 feet bgs. Soil samples will be collected continuously from each boring using 4-foot long MacroCore® samplers equipped with a discrete sampler device. Up to two soil samples from each boring will be submitted to STL for analysis of BTEX, PAHs, RCRA-8 metals, and total cyanide. Should field conditions indicate the presence of potential recoverable tar, one of the above listed borings will be completed as a 2-inch polyvinyl chloride (PVC) monitoring well with a sump beneath the screen to serve as a potential recovery well. The monitoring well will be constructed in accordance with the methods described in the NYSDEC-approved November 9, 1998 RI Work Plan. Each boring not completed as a monitoring well will be abandoned with a Portland/bentonite grout mix following completion.

Following the potential installation of the monitoring well (RW-19), the monitoring well will be developed in accordance with methods described within the NYSDEC-approved November 9, 1998 RI Work Plan. Groundwater samples will be collected no sooner than two weeks after development. Each groundwater sample will be collected and analyzed for BTEX, PAHs, RCRA-8 metals, and total cyanide. One blind duplicate, one MS/MSD, and one equipment rinse blank will be collected and analyzed for BTEX, PAHs, RCRA-8 metals and total cyanide. One trip blank sample will be submitted for BTEX analysis.

The parcel is presently a gravel/grass parking area. KeySpan will have to obtain property access to the parcel prior to drilling. Space is limited and significant underground utilities are anticipated within the parcel. The presence of these utilities will dictate the actual location of the borings. Each boring will be marked out by GEI or KeySpan personnel prior to the commencement of the drilling to identify possible conflicts with underground utilities.

Quality assurance/quality control samples will include one laboratory-blind duplicate sample, one MS/MSD sample, one equipment rinsate blank sample, and trip blank samples. Trip blanks will be submitted at a frequency of one trip blank set per day of sample shipment to the laboratory. Trip blank samples will be analyzed for BTEX; the other subsurface soil QA/QC samples will be analyzed for BTEX, PAHs, RCRA-8 metals, and TCN.

STL will provide New York State Category B data deliverables for the groundwater samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Feasibility Studies (FS) and Interim Remedial Measure (IRM) Support Investigations

In addition to the supplemental RI activities described above, GEI will conduct additional work to support the FS for the 40 Willow Avenue parcel and to support the IRM planned to remediate lead in soils on the Lynhurst Avenue residential parcels.

Photographs/Sketch Lynhurst Avenue Residential Properties

To support the lead removal IRM, GEI will photograph, document, and sketch the backyards for the residential parcels located at #49 through #67 Lynhurst Avenue. This information will assist in the estimate of the potential areas for lead-impacted surficial soils to be removed at the parcels.

Former Relief Holder #2 Floor Profile

In November 2001, twelve Geoprobe® borings were completed around Relief Holder No. 2 on the 40 Willow Avenue parcel to provide refined extent of tar information for use in the FS. Three test pits were also completed in December 2001 to confirm the location, size, and integrity of the holder walls (Figure 1). Plate 3 presents cross sections for the borings completed around the relief holder and Plate 4 presents photographic documentation of the test pit activities.

In addition to the twelve Geoprobe® borings and three test pits already completed, additional data will be collected to support the feasibility study. To determine the configuration of the holder floor, and therefore, refine the materials volume estimate within the holder, a transect of Geoprobe® borings will be completed across the holder floor. Approximately six Geoprobe® borings (GP-13 through GP-18) will be completed inside the former Relief Holder No. 2 located on 40 Willow Street parcel. Figure 1 shows the proposed boring locations. Four borings (GP-13 through GP-16) will be drilled in a northeast to southwest transect to obtain information regarding the elevation and the geometry of the bottom of Relief Holder No. 2. Two additional borings (GP-17 and GP-18) will be completed inside the holder wall to determine the degree of tar present.

Each boring will be advanced until the bottom of the holder is encountered (approximately 20 feet bgs). Soil samples will be collected continuously from each boring using 4-foot long MacroCore® samplers equipped with a discrete sampler device. The samples will be described and screened in the field. No analytical soil samples will be collected from these borings.

Survey

The locations and elevations of each newly completed soil boring and temporary micro-well will be surveyed by a New York State licensed surveyor. These survey data will be incorporated into the site survey database.

RI Report Revision

The newly obtained data will be incorporated into the site-wide database, will be used to supplement the understanding of site conditions, and will be incorporated into the RI report for the site. Following evaluation of the analytical data and assuming that no further investigations are required, the existing RI report will be revised and submitted for NYSDEC review and approval. The revised RI report will include new boring completion logs, summaries of laboratory data, laboratory data reports, and an evaluation and discussion of the mobility of dissolved phase contaminants and DNAPL tar.

In addition, at the request of the NYSDEC, the laboratory summary data tables will include a column showing NYSDEC regulatory standards, criteria and guidance (SCGs) values. Summary tables for each media showing the contaminants of concern that exceed NYSDEC regulatory standards and SCGs will also be included in the RI report. These summary tables will include the media, class of contaminant, contaminant of concern, concentration in parts per billion, and frequency of exceedance and a comparison to SCG values per contaminant. The summary tables will also include a column or row for carcinogenic PAHs including benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene).

Schedule

A detailed project schedule for the upcoming scope of work is attached as part of this revised work plan submittal. Field activities to drill the planned soil borings installations can commence following NYSDEC approval of this work scope. The field program is currently scheduled to start on May 20 and drilling activities will last for approximately three weeks.

- Relief Holder No. 2 characterization (GP-13 through GP-18) will be tentatively be started on May 20 and completed by May 21, 2002.
- Off-site evaluation of tar migration (SB-81, 82, and 83 with one of these borings tentatively being completed into monitoring well RW-19) will tentatively be started on Wednesday May 22 and tentatively completed by May 28.
- Lynhurst Avenue evaluation will tentatively be completed starting on Wednesday May 29 and tentatively completed by June 3, 2002.

- Soil investigation-Lynhurst Avenue residential parcels and groundwater assessment and evaluation of volatilization potential to indoor air-Lynhurst Avenue parcels, and photographs/sketch Lynhurst Avenue properties for interim remedial measure (IRM) activities will tentatively started on June 3, 2002 and completed by Friday June 7, 2002.

Issues affecting the start date include negotiation of access agreements, utility clearance for the offsite borings, and NYSDEC review and approval of this work plan letter. The schedule will address the field activities, data evaluation, report preparation, review, revision, and report submittal dates.

If you have any questions or require any additional information, please contact Ms. Tracey Bell at 718-403-3053 or by email at tbell@keyspanenergy.com.

Sincerely,

GEI CONSULTANTS, INC.

David B. Terry, P.G., ~~LEP~~
Project Manager

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Enclosures
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