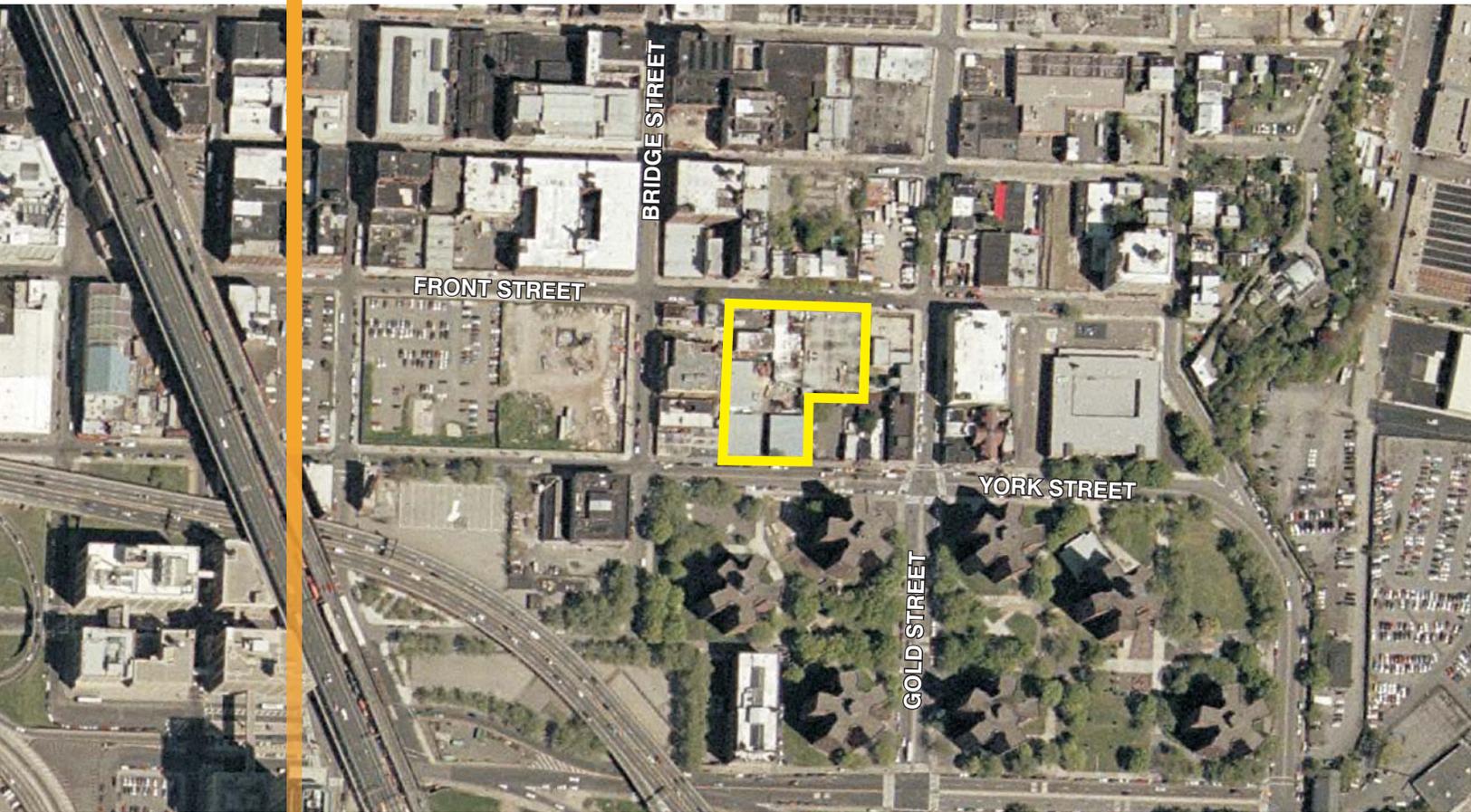


Site Characterization

for the

Front Street Former Gas Holder Site

206 & 218 Front Street
Brooklyn, New York 11202
KeySpan Site #224063



Prepared for:

KeySpan Corporation

One Metrotech Center
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WORK PLAN

SITE CHARACTERIZATION WORK PLAN
For The
FRONT STREET FORMER GAS HOLDER SITE
206 & 218 FRONT STREET
BROOKLYN, NEW YORK 11202
KEYSPAN SITE #224063

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This Site Characterization (SC) Work Plan, prepared by URS Corporation (URS) on behalf of KeySpan Corporation (KeySpan), is designed to provide detailed, step-by-step procedures for field activities to be implemented during a subsurface investigation at the Front Street Former Gas Holder Site (KeySpan Site #224063) in Brooklyn, Kings County, New York (Figure 1).

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) are the lead regulatory agencies overseeing the investigation and remediation, if necessary, at the Front Street site. This work is being performed in accordance with the Administrative Consent Order (ACO), Index #A2-0552-0606.

This SC Work Plan presents a description of field activities to be conducted during the site investigation. This SC Work Plan also identifies objectives and rationale of the site investigation, investigation locations, analytical program, and project schedule.

Included as appendices to this Work Plan are a Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP). The FSP describes procedures to be followed for all field investigation activities. The QAPP describes sampling and laboratory procedures/protocols to be used. The HASP describes health and safety protocol that covers URS personnel and subcontractors. The FSP, QAPP, and HASP are intended to apply to all site activities covered by this Work Plan, as well as future site investigations. These documents will be amended, as needed, to address additional site activities as they arise should they be different than those described in the current versions of these documents.

At the completion of the site characterization, URS will present the findings of the investigation in a Site Characterization Report that will include recommendations for further actions, if warranted.

TABLE OF CONTENTS

WORK PLAN

| | <u>Page No.</u> |
|---|-----------------|
| 1.0 INTRODUCTION | 1-1 |
| 1.1 Background..... | 1-1 |
| 1.2 Previous Investigations | 1-2 |
| 1.3 Site Characterization Objectives..... | 1-2 |
| 1.4 Scope of Work | 1-2 |
| 2.0 SITE INVESTIGATION ACTIVITIES | 2-1 |
| 2.1 Utility Clearance | 2-1 |
| 2.2 Drilling and Well Installation | 2-1 |
| 2.2.1 Hollow Stem Auger Drilling | 2-1 |
| 2.2.2 Monitoring Well Installation, Development and Sampling..... | 2-2 |
| 2.3 Surface Soil Sampling | 2-3 |
| 2.4 Surveying..... | 2-3 |
| 2.5 Investigation-Derived Waste Characterization and Disposal | 2-3 |
| 2.6 Community Air Monitoring Plan..... | 2-4 |
| 3.0 SITE CHARACTERIZATION REPORT | 3-1 |
| 3.1 Qualitative Exposure Assessment..... | 3-1 |
| 3.2 Analyze Data and Prepare Report..... | 3-1 |

FIGURES

(Following Tables)

| | |
|----------|-----------------------------|
| Figure 1 | Site Orthophoto |
| Figure 2 | Site Plan |
| Figure 3 | Proposed Sampling Locations |

TABLES
(Following Text)

| | |
|---------|---|
| Table 1 | Summary of Samples and Analytical Parameters |
| Table 2 | Analytical Method, Sample Container and Preservation Requirements, and Analytical Holding Times |

APPENDICES
(Following Figures)

| | |
|------------|--------------------------------|
| Appendix A | Field Sampling Plan |
| Appendix B | Quality Assurance Project Plan |
| Appendix C | Health and Safety Plan |

1.0 INTRODUCTION

1.1 Background

The Front Street Former Gas Holder site is located at 206 & 218 Front Street near the Manhattan Bridge in Brooklyn, New York (Figure 1). The site, situated between Gold Street on the east and Bridge Street on the west, occupies an area of approximately 60,000 square feet and extends from Front Street on the north and York Street on the south (Figure 2).

Information pertaining to the history of the site is limited. Sanborn fire insurance maps for 1887, 1904, and 1915 show that the site was used by Brooklyn Union and Gas Company as a gas holder facility. One gas holder was in the northwestern portion of the site in 1887 and a second gas holder was in the southeastern portion of the site in 1904 and 1915.

Although the site was still owned by Brooklyn Union and Gas in 1938, the 1938 Sanborn map shows that the gas holders were no longer present. Subsequent Sanborn maps show that the site was used as a parking lot and later developed for commercial businesses.

Information obtained from the NYC Property Research website indicates that the site is currently divided into two parcels. The 206 Front Street parcel is 8,190 square feet in size and is occupied by a seven-story apartment building currently in the final stages of construction. The building has a footprint of 80 feet by 70 feet. The 218 front Street parcel is 49,200 square feet in size and is occupied by several one-story structures. The one structure affronting Front Street appears to be a warehouse. The remainder of the parcel and the structures that affront on York Street appear to be covered lumber storage areas. KeySpan does not own any of the properties that occupy the former Front Street Gas Holder site.

1.2 Previous Investigations

At this time, URS is unaware of any previous investigations conducted at the site. URS is currently performing a records search to gain additional information on the site history. The information obtained through the records search will be compiled into a Records Search Report. Relevant information will be used in the site evaluation that will be included in the Site Characterization Report.

1.3 Site Characterization Objectives

The objective of the SC is to clearly determine whether there are manufactured gas plant (MGP) impacts at the site and whether those impacts pose a significant threat to human health or the environment. These objectives will be attained through an investigation that will include the collection and analysis of subsurface soil and groundwater samples. The list of analytical parameters consists of those contaminants typically associated with MGP wastes.

The site characterization will include drilling and well installation and the collection and analysis of subsurface soil and groundwater samples. Surface soils will also be collected if there are areas of exposed soil. Also, if found, product samples will be collected and analyzed to determine the type of product. Although KeySpan does not own the former Front Street site, for the purpose of this site characterization, it is assumed that URS will be granted access to the site to investigate the selected areas.

1.4 Scope of Work

All field activities will be coordinated and documented by URS. Drilling and well installation services will be provided by Aquifer Drilling & Testing, Inc. (ADT), laboratory analyses will be performed by Hampton-Clarke (Veritech), waste disposal services will be provided by Clean Earth of Philadelphia, and land surveying services will be provided by YEC, Inc.

The subsurface investigation program will provide information that will assist in determining the absence/presence of MGP-related impacts at the site and, if present, if those impacts pose a potential threat to human health or the environment.

The investigation will consist of advancing eight soil borings, four of which will be completed as monitoring wells. All soil borings will be advanced to a depth of 40 feet. These investigation points will be installed at the following areas as shown in Figure 3:

- Two wells will be installed on Front Street north of the location of the original gas holder.
- Two wells will be installed on York Street south of the location of the second gas holder (it is noted that the proposed boring locations are in the middle of an active driveway and the final boring locations may need to be adjusted in the field to accommodate ongoing facility activities).
- Two soil borings will be advanced within the footprint of the original gas holder
- Two soil borings will be advanced within the footprint of the second gas holder. (It is noted that the proposed borings are located on private property and completion of the borings will require obtaining permission to access to the site from the property owner).

If evidence of contamination is found close to the target depth, that boring will be advanced approximately 5 feet beyond the observed contamination for the purpose of vertical delineation.

If a dense non-aqueous phase liquid (DNAPL) is encountered, the potential for remobilization and downward migration will be limited by following the procedures set forth in Attachment B, DNAPL Contingency Plan.

The soil borings will enable the collection of subsurface soil samples that will be inspected and field screened to determine the presence of contamination. Select samples will be submitted to the laboratory for chemical analysis of target compounds typically associated with MGP sites. These target compounds include volatile organic compounds (VOCs) such as benzene, ethylbenzene,

toluene, and xylenes (BTEX); semi-volatile organic compounds (SVOCs), which include polycyclic aromatic hydrocarbons (PAHs); metals; and cyanide.

If free product is encountered, samples will be analyzed to identify the type of product (MGP waste, petroleum, transformer fluid, etc.).

Four of the soil borings will be completed as monitoring wells to enable the collection of groundwater samples. The groundwater will be analyzed for the same target compounds as mentioned above for the soil samples. The monitoring wells will also be used to monitor groundwater levels for the determination of the direction of groundwater flow.

If areas of exposed surface soils are present, representative samples of the upper 2 inches of soil will be collected and analyzed for the abovementioned target compounds.

If MGP impacts are discovered during the investigation, a vapor intrusion investigation may be required. The need for a vapor intrusion investigation will be determined by the NYSDEC.

2.0 SITE INVESTIGATION ACTIVITIES

The following subsections describe the activities that will be performed during the site characterization activities. Detailed procedures are presented in the FSP.

2.1 Utility Clearance

Proposed boring locations will be identified and marked with paint or flagging prior to installation. Utilities in areas designated for intrusive activities will be cleared through the Underground Facilities Protective Organization (UFPO) 1-800-962-7962. Private utility locating services may also be used. All private utilities and agencies will be contacted separately.

Vehicle access routes to drilling and boring locations will be determined and cleared by the URS field representative prior to any field activities. The driller will be responsible for acquiring sidewalk-opening permits for the proposed sidewalk wells.

Prior to drilling, each proposed soil boring will be manually cleared to a depth of five feet.

2.2 Drilling and Well Installation

2.2.1 Hollow Stem Auger Drilling

During the investigation, eight soil borings will be advanced, four of which will be completed as flush-mount monitoring wells, at the proposed locations shown in Figure 3. The final location of each soil boring/well will be based upon field conditions.

Based on URS's experience in the area, groundwater occurs at a depth of approximately 15 feet. The proposed soil borings will be advanced to approximately 25 feet below the water table (i.e., total depth of 40 feet). The wells will be installed with the well screens spanning the water table.

Split-spoon samples will be collected continuously through the entire boring. Upon recovery, each soil sample will be visually inspected to identify the presence of tar or oil, sheens, or staining. The soil will also be screened with a photoionization detector (PID) for volatile organic vapors. Results will be documented on boring logs. Soils will be described following the procedures resented in the FSP.

Two soil samples from each soil boring will be retained for chemical analysis. In each soil boring, one soil sample will be collected from the upper 5 feet of the boring. The second sample will be collected from the depth interval of greatest apparent contamination.

2.2.2 Monitoring Well Installation, Development and Sampling

During the investigation, four 2-inch ID PVC monitoring wells are proposed for installation. Upon the completion of the well borings, 2-inch I.D. Schedule 40 polyvinyl chloride (PVC) monitoring wells will be set through the augers. Screens will be of a sufficient length to span the water table. The screens will have 0.020-inch machined slots. The bottom of the screen will be fitted with a one-foot long sump.

At least 48-hours following completion of drilling and well installation, each monitoring well will be developed by pumping until the discharged water is relatively sediment free and the indicator parameters (pH, temperature, and specific conductivity) have reached steady state. A turbidity meter will be used to monitor effectiveness of development. A turbidity reading of < 50 Nephelometric Turbidity Units (NTU) and steady state pH, temperature, and specific conductivity readings will be used as a guide for discontinuing well development. The monitoring wells will be developed as described in the FSP. Development water will be containerized in 55-gallon drums for off-site disposal.

Water levels will be measured using an electronic interface probe/water level indicator. Water levels will be collected sequentially from all site wells during one continuous monitoring event.

Each new and existing well will also be checked for the presence of DNAPL using the electronic interface probe/water level indicator. Alternately, if the interface probe cannot detect the DNAPL due to its viscosity, a weighted cotton string will be lowered to the bottom of the well and the bottom portion of the string stained by DNAPL will be measured to determine the DNAPL thickness.

Prior to the collection of groundwater samples, each well will be purged using the low-flow purging technique as described in the FSP.

Any observations of sheen, blebs, free-phase product/tar, staining or coating of the sampling equipment, odor, etc. made during sampling of groundwater will be included in the groundwater sample collection log.

2.3 Surface Soil Sampling

If areas of exposed surface soil are present, representative soil samples will be collected for chemical analysis of the target compounds. Surface soils will be collected following the procedures presented in the FSP.

2.4 Surveying

All borings and monitoring wells will be surveyed by a New York State-licensed surveyor. The elevation of each point will be determined to +/- 0.01 foot. A permanent benchmark will be established at the site. The locations and elevations will be tied into the New York State Plane Coordinate System and Mean Sea Level.

2.5 Investigation-Derived Waste Characterization and Disposal

All soil cuttings, decontamination water, and development water will be contained in 55-gallon drums and temporarily staged at an approved location.

URS will collect representative samples of the investigation-derived wastes (IDW) for proper waste characterization (as determined by the disposal facility).

The IDW subcontractor will be responsible for removing all containers of IDW from the work site as needed. All waste will be disposed of at a permitted off-site disposal facility.

2.6 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds and dust particulates will be conducted during the drilling program following the Community Air Monitoring Plan (CAMP) procedures presented in the HASP. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of the Vapor Emission Response Plan section of the CAMP.

If particulate levels at the downwind station exceed particulate levels at the upwind station by more than 100 µg/m³, work activities will be halted and appropriate dust suppression measures will be employed.

3.0 SITE CHARACTERIZATION REPORT

3.1 Qualitative Exposure Assessment

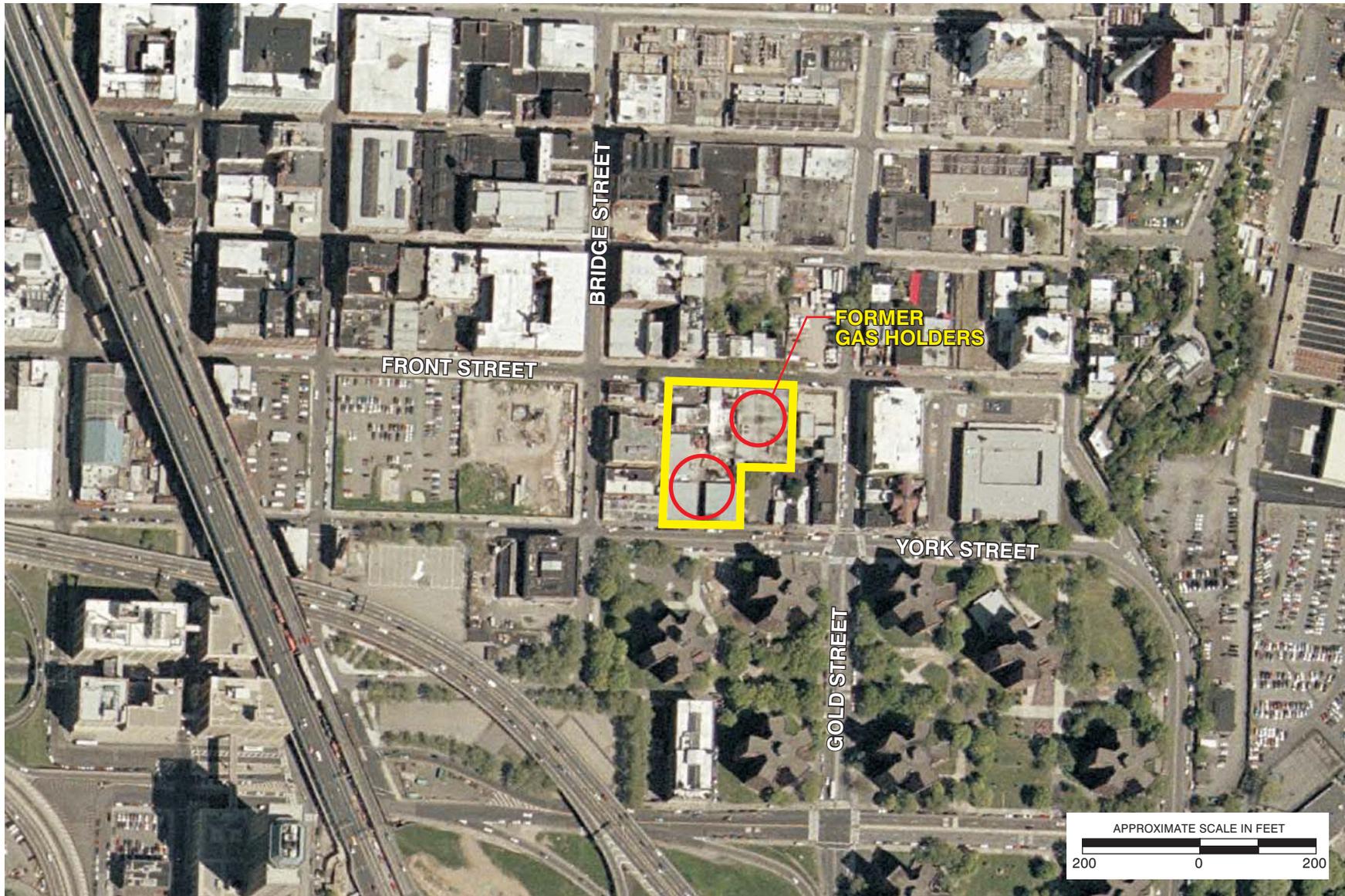
URS will conduct a qualitative human health exposure assessment to evaluate potential risks to human health associated with potential exposure to site media. The assessment will be completed in accordance with the NYSDEC's *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002). The human health exposure assessment includes an evaluation of the site conditions, identifying exposure pathways, and evaluating contaminant fate and transport.

3.2 Analyze Data and Prepare Report

After URS completes the scope of work, we will prepare a draft report within ten (10) weeks of receipt of the last analytical data package. Supporting data, including the analytical data, boring logs, and field notes will be included in the draft report.

The report will include a thorough summary of the background information and investigative procedures. The geology and hydrogeology section of the report will be based on a literature review and the results of the site investigation. The physical characteristics of the soil will also be described.

The report will include a discussion of the analytical data collected during the investigation, conclusions that are based on our background review, our geologic and hydrogeologic interpretation, the analytical data, a qualitative human health exposure assessment, and conclusions and recommendations.



FRONT STREET FORMER GAS HOLDER SITE
SITE ORTHOPHOTO

FIGURE 1



FRONT STREET FORMER GAS HOLDER SITE
SITE PLAN

FIGURE 2



FRONT STREET FORMER GAS HOLDER SITE
PROPOSED SAMPLE LOCATION PLAN

FIGURE 3

TABLE 1
SUMMARY OF SAMPLES TO BE COLLECTED AND ANALYTICAL PARAMETERS
FRONT STREET FORMER GAS HOLDER SITE CHARACTERIZATION
KEYSPAN SITE #224063

| Parameter | Analytical Method ^{1,2} | Estimated Number of Samples | Field QA/QC Samples | | | | Total No. of Samples |
|-----------------------------------|----------------------------------|-----------------------------|---------------------|------------------------|----------------|-------------|----------------------|
| | | | Field Duplicates | MS/MSD/MD ⁵ | Rinsate Blanks | Trip Blanks | |
| I. Subsurface Soil Samples | | | | | | | |
| TCL/STARS VOCs ³ | 8260B | 16 | 1 | 1/1 | 1 | 0 | 20 |
| TCL/STARS SVOCs ³ | 8270C | 16 | 1 | 1/1 | 1 | 0 | 20 |
| PCBs (as Aroclors) | 8082 | 16 | 1 | 1/1 | 1 | 0 | 20 |
| TAL Metals ⁴ | 6010B/7471A | 16 | 1 | 1/1 | 1 | 0 | 20 |
| Total Cyanide | 9014 | 16 | 1 | 1/1 | 1 | 0 | 20 |
| II. Surface Soil Samples | | | | | | | |
| TCL/STARS VOCs ³ | 8260B | 4 | 1 | 0/0 | 0 | 0 | 5 |
| TCL/STARS SVOCs ³ | 8270C | 4 | 1 | 0/0 | 0 | 0 | 5 |
| PCBs (as Aroclors) | 8082 | 4 | 1 | 0/0 | 0 | 0 | 5 |
| TAL Metals ⁴ | 6010B/7471A | 4 | 1 | 0/0 | 0 | 0 | 5 |
| Total Cyanide | 9014 | 4 | 1 | 0/0 | 0 | 0 | 5 |
| III. Groundwater Samples | | | | | | | |
| TCL/STARS VOCs ³ | 8260B | 4 | 1 | 1/1 | 1 | 1 | 9 |
| TCL/STARS SVOCs ³ | 8270C | 4 | 1 | 1/1 | 1 | 0 | 8 |
| PCBs (as Aroclors) | 8082 | 4 | 1 | 1/1 | 1 | 0 | 8 |
| TAL Metals ⁴ | 6010B/7470A | 4 | 1 | 1/1 | 1 | 0 | 8 |
| Total Cyanide | 9014 | 4 | 1 | 1/1 | 1 | 0 | 8 |
| IV. Product Samples | | | | | | | |
| Fuel Fingerprint | 8100 (modified) | 1 | 0 | 0 | 0 | 0 | 1 |
| V. Waste Characterization | | | | | | | |
| TCLP Extraction | 1311 | 1 | 0 | 0 | 0 | 0 | 1 |
| TCLP Volatiles | 8260B | 1 | 0 | 0 | 0 | 0 | 1 |

1. NYSDEC Analytical Services Protocol (ASP), June 2000 Edition.
2. USEPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, January 1999.
3. Target compound list (TCL) and Spill Technology and Remediation Series (STARS) volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) as listed in USEPA CLP Statement of Work OLM04.2 and NYSDEC STARS Memo #1, respectively.
4. Target analyte list (TAL) metals as listed in USEPA CLP Statement of Work ILM04.0/5.0.
5. MS/MSD samples will be collected for VOC, SVOC, and PCB analyses. MS/MD samples will be collected for metals and cyanide analyses.

PCBs - Polychlorinated biphenyls

MS/MSD/MD - Matrix spike/matrix spike duplicate/matrix duplicate

TABLE 2
SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME REQUIREMENTS
FRONT STREET FORMER GAS HOLDER SITE CHARACTERIZATION
KEYSPAN SITE #224063

| Analytical Method/Parameter | Container Size/Type* | Number of Containers to Be Collected | Preservation | Maximum Holding Time (from VTSR) |
|-----------------------------|----------------------|--------------------------------------|--|---|
| Groundwater Samples | | | | |
| TCL/STARS VOCs | 40 mL glass vial | 3 | HCl to pH<2, 4 °C | Analysis: 10 days (7 days if not preserved to pH<2) |
| TCL/STARS SVOCs | 1L amber glass | 2 | 4 °C | Extraction: 5 days Analysis: 40 days |
| PCBs (as Aroclors) | 1L amber glass | 2 | 4 °C | Extraction: 5 days Analysis: 40 days |
| TAL Metals | 1L plastic | 1 | HNO ₃ to pH<2, 4 °C | Analysis: 180 days (26 days for Hg) |
| Total Cyanide | 500 ml amber glass | 1 | NaOH to pH>12, 4 °C | Analysis: 12 days |
| Total Recoverable Phenolics | 1L amber glass | 2 | H ₂ SO ₄ to pH<2, 4 °C | Analysis: 26 days |
| Soil Samples | | | | |
| TCL/STARS VOCs | 2 oz. glass jar | 2 | 4 °C | Analysis: 7 days |
| TCL/STARS SVOCs | 4 oz. glass jar | 1 | 4 °C | Extraction: 5 days Analysis: 40 days |
| PCBs (as Aroclors) | 4 oz. glass jar | 1 | 4 °C | Extraction: 5 days Analysis: 40 days |
| TAL Metals | 4 oz. glass jar | 1 | 4 °C | Analysis: 180 days (26 days for Hg) |
| Total Cyanide | 4 oz. glass jar | 1 | 4 °C | Analysis: 12 days |
| Total Recoverable Phenolics | 4 oz. glass jar | 1 | 4 °C | Analysis: 26 days |
| Product Samples | | | | |
| Fuel Fingerprint | 40 mL glass vial | 1 | 4 °C | Extraction: 5 days Analysis: 40 days |

*Number and size of containers may vary based on laboratory sample volume requirements.

VTSR - Validated time of sample receipt