Interim Remedial Measure Completion Report

Peekskill – Central Avenue
Former Manufactured Gas Plant Site
Peekskill, New York

Prepared by:

RETEC Engineering, P.C.
1001 W. Seneca Street, Suite 204
Ithaca, NY 14850

RETEC Project Number: CECN5-16580-400

Prepared for:

Consolidated Edison Company of New York, Inc.
4 Irving Place
New York, New York 10003

April 27, 2005

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Prepared by:

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Joshua Millard, Project Geologist

Reviewed by:

_____
John T. Finn, Project Engineer

April 27, 2005

Engineer's Certification

I certify that the Soil Removal Plan (Plan), as outlined in the letter from Con Edison to NYSDEC and NYSDOH dated June 21, 2004, was implemented and all construction activities were completed in accordance with the Plan and were witnessed by me or by a person under my direct supervision.

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and condition of work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Consolidated Edison Company of New York, Inc., for specific application to the Central Avenue MGP Works site in Peekskill, New York.

No other warranty, express or implied, is made.

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John T. Finn, P.E. Date

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Executive Summary

An Interim Remedial Measure (IRM) was performed from July 7 through 9, 2004 at the former Central Avenue manufactured gas plant (MGP) site (Site) located on the north side of Central Avenue between Nelson and North Division Streets in the City of Peekskill, Westchester County, New York. The IRM was performed in accordance with the Soil Removal Plan prepared for Consolidated Edison Company of New York (Con Edison) by RETEC Engineering, P.C. (RETEC), and submitted to the New York State Department of Environmental Conservation (NYSDEC) in June 2004.

The former MGP is composed of an irregularly-shaped parcel covering a total area of 0.4 acres. None of the former MGP structures are present above the ground surface at the Site. The first MGP structures were constructed on the Site sometime between 1855 and 1868. Sanborn Fire Insurance Maps (Sanborn maps) for the area of Peekskill where the Site was located, indicate that the MGP operated between 1895 and 1900. In the 1920s, a police headquarters and jail, a city garage, and oil house were constructed on the Site. In the 1960s, these structures were removed, and the Site was developed as a paved municipal parking lot. By 1993, the Barham House Apartments had been constructed adjacent to the northeast corner of the Site. A small area of the Barham House building foundation (approximately 600 square feet) overlies the northeast corner of the Site.

During the Site Characterization Study (SCS) that was conducted by Con Edison during the summer of 2003, minor evidence of MGP-related residue was observed. Specifically, trace amounts of hardened tar-like material were observed at approximately three feet below ground surface (ft bgs) at soil boring SB-6 and moderate to strong coal-tar like odor was detected in shallow soil at soil boring SB-8. These soil borings and the associated MGP-related soil impacts appeared to be isolated to the central portion of the parking lot. The objective of the IRM was to remove the grossly impacted soils encountered at, and in the vicinity of, soil borings SB-6 and SB-8.

The IRM was performed from July 7 to July 9, 2004, and consisted of the following field activities:

- Community air monitoring;
- Soil excavation, transport, and disposal;
- Post-excavation soil sampling and analysis;
- Backfilling with clean soil; and
- Sealing the excavation with asphalt paving.

On June 30, 2004, prior to implementing the intrusive IRM activities, a geophysical survey was conducted to locate subsurface utilities (e.g., electric, gas, water, sewer, etc.) and any remnant subsurface structures in the excavation area. The survey was performed in an effort to avoid damaging any utilities or structures during subsequent excavation.

On July 7 and 8, 2004, a total of 241.5 tons (approximately 161 cubic yards) of material was loaded directly into lined dump trucks from an excavation measuring 32 by 26 feet. The east, south, and west walls were excavated to a depth of 5 feet. The soil was removed to the bedrock surface, approximately 7.5 ft bgs along the north wall and center of the excavation. The excavated soil was transported as non-hazardous waste to Tilcon New York, Inc. (Tilcon) in Wharton, New Jersey, for thermal treatment as New Jersey Waste Type ID-27 (petroleum/MGP hydrocarbons).

After all grossly impacted soil was excavated, RETEC collected 21 post-excavation soil samples consisting of ten sidewall composite samples, seven bottom grab samples, and four discrete sidewall samples. The samples were sent to Severn Trent Laboratories (STL) located in Pittsburgh, Pennsylvania, for analysis of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Two discrete post-excavation soil samples were also sent to Environmental Testing Laboratories located in Farmingdale, New York, for forensic analysis, along with a sample of the tar-impacted soil which was disposed of. The excavation was backfilled on July 8 and 9, 2004 with 262.85 tons of New York State Department of Transportation (NYSDOT) Item #4 virgin quarry gravel. The gravel was supplied by C. K. Equities, Inc. of Montrose, New York. The parking lot was paved on July 13-15, 2004 by P&P Construction of New Rochelle, New York.

During the excavation, a 2.5-foot-thick concrete pad was encountered at 0.8 ft bgs. While approximately 16 square feet of the surface of the pad was uncovered, the buried northern extent of the pad was not exposed. The location of the pad does not correlate with MGP structures or post MGP structures identified on Sanborn maps.

No evidence of the former McGregory's Brook, such as channel sediments or the culvert that previously contained the brook, were encountered during the excavation. It was anticipated that remnants of the brook would be encountered, since both the historical Sanborn maps and geophysical surveys indicated that the feature had previously transected the central area of the Site and the excavation area.

With the exception of soil sample SW-06, the analytical results for the post-excavation soil samples showed that the concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs) were within the range of concentrations for these compounds detected in subsurface soil samples collected from across the Site during the SCS.

The forensic analysis of post-excavation soil samples indicated that the samples contained a mixture of compounds common to both petroleum and MGP sources. This is consistent with the detection of petroleum-like odors at the northern end of a pipe encountered along the west side of the excavation.

The source of petroleum hydrocarbons at the south side of excavation is unknown, but could be related to historical releases of fuel oil related to post-MGP operations at the site, or due to gasoline releases from vehicles in the parking lot.

The analytical results for discrete post-excavation soil sample SW-06, which was collected from below the concrete slab, contained comparatively high concentrations of both BTEX and PAHs. In accordance with the Soil Removal Plan (RETEC, 2004b), which stated that the excavation would not be advanced beyond subsurface obstacles, soil beneath the concrete pad was left in place. Field observations indicated that the soil below the slab exhibited a strong petroleum-like odor, but did not show signs of petroleum staining. Sample SW-10, collected beneath the pad to the northwest of SW-06, had much lower BTEX and PAH concentrations, indicating that the high concentrations detected at SW-06 quickly decrease to the north and that only a small volume (approximately less than one cubic yard) of moderate to heavily impacted soil remains beneath the slab. Risk to the public and to utility workers is low due to the significant barrier the pad provides limiting potential exposure routes. Likewise, the placement of a fresh asphalt surface over the parking lot reduces the potential for leaching to groundwater.

Based on the subsurface conditions observed in the excavation, and the analytical results of post-excavation soil samples, it is concluded that the grossly impacted soil identified at the Site during the SCS was removed in accordance with the Soil Removal Plan (RETEC, 2004b).

The City of Peekskill has indicated to Con Edison that it plans to continue to use the property as a paved parking lot in the short term, but that it will ultimately develop it as a municipal parking garage. Con Edison has discussed with the City the option of an environmental easement/deed restriction coupled with a soil management plan; the City is currently considering this option. According to the findings and the proposed future site use, no further investigation and/or remediation activities are warranted.

1 Introduction

This Interim Remedial Measure (IRM) Completion Report provides a description of activities that were completed at the Central Avenue former manufactured gas plant (MGP) site in Peekskill, New York (Site) during the summer of 2004. The Site location is illustrated in Figure 1-1. These activities were performed to address soil containing residual material from the operation of the former MGP. The report has been prepared for Consolidated Edison Company of New York, Inc. (Con Edison) by RETEC Engineering, P.C. (RETEC).

The IRM was performed from July 7 through July 9, 2004. The IRM entailed the excavation and removal of affected soil, its transportation and disposal off site at a licensed disposal facility, and restoration of the disturbed area. This report describes the site history and purpose of the IRM, soil removal activities, results of post-excavation soil samples, and recommendations. This report was prepared in accordance with guidelines of the New York State Department of Environmental Conservation (NYSDEC) as specified in the December 2002 draft of *DER-10, Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002).

1.1 Project Background

In August 2002, Con Edison entered into a voluntary cleanup agreement (VCA) with the NYSDEC to investigate and, if necessary, remediate MGP sites that were formerly owned and/or operated by Con Edison or its predecessor companies. In accordance with the VCA, Con Edison developed a Site Characterization Study (SCS) work plan for the investigation of the Central Avenue former MGP. The work plan was submitted to and approved by the NYSDEC and New York State Department of Health (NYSDOH). During July 2003, Con Edison and its environmental consultant, RETEC, implemented the SCS.

During the SCS, subsurface soil at borings SB-6 and SB-8 exhibited evidence of MGP-related impacts. At soil boring SB-6, a trace amount of hardened tar-like material was observed at approximately three feet below ground surface (ft bgs). Soil at both of these soil borings exhibited moderate to strong odors and produced elevated concentrations of total volatile organic compounds (VOCs) during field screening of the soil headspace. Maximum total VOC concentrations measured during headspace screening were 398 parts per million (ppm) in soil samples from SB-6 and 461 ppm in SB-8. Similar soil conditions were not detected or observed in any of the other 15 soil borings or the test pits advanced at the Site during the SCS. Because the only grossly impacted soil encountered during the SCS appeared to be isolated to the discrete central area of the parking lot in the immediate vicinity of soil borings SB-6 and SB-8 (RETEC, 2004a), the IRM was focused in this area.

1.2 Purpose of Work

The objective of this IRM was to remove the grossly impacted soils encountered in the shallow soils in the center of the Site in the vicinity of soil borings SB-6 and SB-8. For the purpose of the IRM, evidence of gross soil impacts was defined as visible staining or the presence of liquid or solid tar. It was anticipated that the removal of the affected soils, combined with repaving of the majority of the Site, would significantly reduce the potential for impacts to groundwater by source removal and reducing the potential for leaching of organic compounds from the soil. Removal of the soil would also eliminate the potential for exposure to any on-site workers during future redevelopment of the Site as an enclosed parking garage.

1.3 Scope of Work

The scope of work for this IRM, as defined in the Soil Removal Plan (RETEC, 2004b), included the following field tasks:

- Underground utility clearance and geophysical survey.
- Community air monitoring.
- Soil excavation, transport, and disposal.
- Post-excavation soil sampling.
- Backfilling and paving.

All activities were performed in accordance with the Site-Specific Health and Safety Plan included in Appendix C of the SCS Work Plan (RETEC, 2003).

1.4 Report Organization

This IRM Completion Report is organized into the sections and appendices listed below.

- **Section 2 –** provides a description of the Peekskill – Central Avenue MGP Site and its investigation history.

- **Section 3 –** provides a description of activities performed as part of the IRM at the Peekskill – Central Avenue MGP Site.

- **Section 4 –** provides a discussion of observations made during the RA, chemical analyses performed, data quality evaluation, and analytical results of post-excavation soil samples.

- **Section 5 –** provides a summary of the work and a set of conclusions.

- **Section 6 –** outlines recommendations for supplemental activities.

- **Section 7 –** provides a list of references cited in the IRM Completion Report.

- **Tables and Figures** for the IRM Completion Report are provided in their own respective sections following Section 7.

- **Appendix A –** provides a set of photographs documenting the work performed.

- **Appendix B –** provides the waste disposal certificates for the soil removed from the site, and invoices for the clean backfill material.

- **Appendix C –** is the Data Usability Summary Report (DUSR) and associated Laboratory Reports with the validator's corrections. Note that this DUSR and Laboratory Report also includes the information for the resampling of monitoring well MW-5, which was also performed in July 2004.

2 Site Description and History

2.1 Site Description

The Central Avenue Works former MGP site is located on the north side of Central Avenue between Nelson Street (formerly Union Street) and North Division Street in the City of Peekskill, Westchester County, New York (Figure 2-1). The former MGP occupied an irregularly-shaped parcel covering a total area of approximately 0.4 acres. Based on a review of historic records, the former MGP began operations sometime between 1855 and 1868. Two gas holders were present in the northern portion of the former MGP property. Additional MGP structures included three retort areas, an iron storage area, a storehouse for coke and coal, two purifying areas, and several storage or warehouse buildings. Sanborn Fire Insurance Maps (Sanborn maps) for the area of Peekskill where the Site was located, indicate that the MGP operated until sometime between 1895 and 1900.

After the plant was shut down, the land that contained the former MGP served a variety of purposes. In the 1920s, a police headquarters and jail, a city garage, and an oil house (located where the gas holders had been) were constructed on the Site. In the 1960s these structures were removed and a second phase of post-MGP construction began, which included apartments (along the northeast corner), a parking garage (along the north and west sides of the Site), and a paved municipal parking lot. By 1993, the Barham House Apartments had been constructed adjacent to the northeast corner of the Site. A small area of the Barham House building foundation (approximately 600 square feet) overlies the northeast corner of the Site.

Today, none of the former MGP facility structures are present above the ground surface. Most of the Site is currently a metered parking lot, with portions of a two-story parking garage owned by the City of Peekskill and the Barham House Apartments located over the northern and western edges of the Site.

2.2 Site Investigation History

The current site layout and the location of test-pits, soil borings, and monitoring wells installed during the SCS are shown on Figure 2-1. As described in Section 1.2, during the SCS, subsurface soil encountered in borings SB-6 and SB-8 exhibited heavy staining, strong hydrocarbon-like odor, and elevated total VOC concentrations in headspace screening measurements. Maximum total VOC concentrations measured during headspace screening of soil samples from soil borings SB-6 and SB-8, using an organic vapor meter equipped with a photoionization detector (PID), were 398 ppm and 461 ppm, respectively. At SB-6, a trace amount of a hardened tar-like material was observed at approximately three ft bgs. Similar soil

quality was not observed in other soil borings and the conditions appeared to be isolated to the central portion of the parking lot.

In response to the field observations and analytical results for subsurface soil samples collected during the SCS, Con Edison developed a Soil Removal Plan for the excavation, removal, and disposal of grossly impacted soil in this area of the site. The work plan was subsequently submitted to the NYSDEC and NYSDOH for approval in June 2004 (RETEC, 2004b).

3 Remedial Action Activities

This section provides a description of the methodologies used for conducting the IRM at the Central Avenue former MGP Site. Descriptions of all field activities conducted during the IRM are included by field task. Photographs showing various phases of work performed and field observations are attached as Appendix A. The limits of excavation and the locations of post-excavation soil samples are shown on Figure 3-1.

The specific tasks performed during the IRM are listed below.

- Underground utility clearance and geophysical survey
- Community air monitoring
- Soil Excavation, transport, and disposal
- Post-excavation soil sampling
- Backfilling and paving

All activities except for paving were performed by RETEC or its subcontractors. The utility clearance and geophysical survey were conducted on June 30, 2004. The soil excavation, off-site transport, disposal, and backfilling took place July 7 through 9, 2004. Paving was performed between July 13 and 15, 2004 by P&P Construction of New Rochelle, New York, under the direction and supervision of Con Edison. All site activities were conducted in accordance with the Soil Removal Plan (RETEC, 2004b) and the Site-Specific Health and Safety Plan (HASP) included in the Site Characterization Study Work Plan (RETEC, 2003).

3.1 Underground Utility Clearance and Geophysical Survey

Prior to the initiation of intrusive activities, RETEC contacted Dig Safely New York to arrange for the location and marking of all underground utilities in the vicinity of the proposed excavation. RETEC personnel met on site with personnel from ProMark, a utility mark-out contractor supporting the New York Code 753 utility location (one-call) program. Water and sewer lines were marked by the City of Peekskill.

The mark-out of utilities inside the Site boundaries (i.e., not on the public streets and sidewalks) was performed by Enviroprobe Service, Inc. (Enviroprobe) of Westmont, New Jersey, under contract to RETEC. Enviroprobe used ground-penetrating radar (GPR) and electromagnetic survey methods to scan the area of the planned excavation. During the course of the utility survey, Enviroprobe also noted the locations of any anomalous readings that it considered to be potentially indicative of underground structures.

3.2 Community Air Monitoring

The community air monitoring was performed to provide real-time measurements of total VOCs and particulate (airborne dust) concentrations, if any, in air surrounding the worksite. Temporary air monitoring stations were established at the downwind perimeter and upwind of the excavation work area when intrusive investigation activities were in progress at the Site. Additionally, site personnel monitored any odors produced during the intrusive activities. The monitoring was designed to provide protection for the downwind community, such as residences, business, and on-site workers not directly involved with the project, from potential releases of airborne contaminants resulting from the remedial activities. In addition, the monitoring results were used to document that work activities did not spread contamination off site through the air.

Total VOCs and airborne particulates were monitored continuously with an organic vapor meter, which was equipped with a PID and dust meter, respectively, located upwind and downwind of each work zone. The VOC and particulate levels at each location were recorded every 15 minutes. The PID and dust meter were equipped with data loggers capable of calculating a 15-minute running average of concentrations. Specific action levels for VOCs and particulates are provided in the SCS Work Plan (RETEC, 2003). Action levels were not exceeded during the remediation and no response actions were required.

3.3 Soil Removal, Transport, and Disposal

The excavation of impacted material was performed on July 7 and 8, 2004 by Brookside Environmental, Inc. (Brookside) of Baldwin, New York, under contract to RETEC. RETEC measured and marked the location of 10 by 10 foot excavations centered on the locations of soil borings SB-6 and SB-8 (Photos 1 through 3, Appendix A) as proposed in the Soil Removal Plan (RETEC, 2004b). Brookside mobilized a Hitachi Zaxis 160 LC excavator to the Site, and began loading soil from the excavation directly into dump trucks. The soil was transported as New Jersey Department of Environmental Protection (NJDEP) ID-27 Waste Type to Tilcon New York, Inc. (Tilcon) in Wharton, New Jersey, for thermal treatment. A total of 241.5 tons (approximately 161 cubic yards) of material was excavated and transported off site. The certificates of disposal issued by Tilcon for each load of soil are included in Appendix B.

In accordance with the Soil Removal Plan, the excavation was advanced to the limits of visibly impacted material based on hydrocarbon staining and the presence of liquid or solidified tar. As the soil removal activities progressed, the limits of the two discrete excavations were expanded and merged to form a roughly rectangular-shaped single excavation that measured approximately 32 by 26 feet (Photo 6). The excavation was advanced to approximately 5 ft

bgs along the east, south, and west boundaries. The center of the excavation was advanced to the top of bedrock, which was encountered at approximately 7.5 ft bgs.

A 2.5-foot-thick steel-reinforced concrete slab was encountered at approximately ten inches bgs along the northern excavation boundary (Photos 9, 12, and 13). A section of slab measuring approximately 16 square feet was exposed. The portion of the slab that extended to the north, outside the excavation boundaries, was not exposed; however, the east and west facing walls extended north beyond the southern-most end of the slab. The central portion of the excavation was advanced to the bedrock surface, approximately 7.5 ft bgs. The excavation was advanced to visibly un-impacted material to the north on the east and west sides of the concrete slab. The limits of the excavation are shown on Figure 3-1.

3.4 Post-Excavation Soil Sampling

Following the completion of soil removal activities on July 8, 2004, RETEC collected a total of 20 post-excavation soil samples. One additional sample was collected on July 9, 2004, which brought the total number of samples to 21. These samples were used as a quantitative assessment of the soil quality at the limits of the excavation, and included 10 composite sidewall samples, seven bottom samples, and four discrete or grab samples from the sidewalls. The sample designation, sample type, sample depth, and laboratory analyses completed for each soil sample are provided on Table 3-1.

Sidewall (SW) samples were collected at each location shown on Figure 3-1 as a composite from ground surface to the bottom of the excavation at each sample location. Sidewall samples for VOCs analysis were collected from the wall using a clean stainless steel spoon and immediately transferred into laboratory-supplied sample jars. Sidewall samples for analysis semi-volatile organic compound (SVOC) were collected by scraping soil from the sample interval along the wall into a stainless-steel bowl. The soil was homogenized and transferred to laboratory glassware. Post-excavation bottom grab samples, designated 'SB', were collected using a clean stainless steel spoon at the locations shown on Figure 3-1.

Discrete soil samples (SD) were collected from isolated spots on the excavation wall at the locations shown on Figure 3-1. Note that due to a labeling error, samples SW-11 and SW-12 are both discrete soil samples, and not composite sidewall samples. The discrete sidewall samples were collected from locations where unusual soil conditions were observed:

- SD-01 was collected from a dark brown to black ash-like material observed at 2.5 ft bgs, which exhibited a petroleum-like odor.

- SD-02 was collected from soil in the northwest corner of the excavation that exhibited a gasoline or petroleum-like odor at 6.25 ft bgs.

- SW-11 was collected from beneath the thick concrete pad at the north side of the excavation, to assess whether concentrations of VOCs and SVOCs decrease with distance to the north.

- SW-12 was collected from a white ash-like material at three ft bgs in the east wall of the excavation.

Soil samples were packed in coolers with ice, and sent by overnight courier under proper chain-of-custody procedures to Severn Trent Laboratories (STL) of Pittsburgh, Pennsylvania, for analysis. STL is a current participant in the New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) and has current Contract Laboratory Protocol (CLP) certification for all analyte categories. To meet the data quality objectives for the RA, NYSDEC Analytical Service Protocols (ASP) were used and all results were reported in Category B deliverables.

The soil samples collected during the IRM were analyzed for:

- Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) SW-846 Method 8260B, and

- Semi-volatile Organic Compounds (SVOCs) by USEPA SW-846 Method 8260C.

Discrete soil samples SD-01, SD-02, and a sample of the tar-impacted soil that was disposed of (lab sample SR-1), were also submitted to Environmental Testing Laboratories (ETL) of Farmingdale, New York, for forensic analysis by EPA Modified Method 8100. The ETL laboratory report summarizing these analytical results is presented in Appendix C. Note that sample SD-01 was incorrectly labeled in this laboratory analytical report as SB-8.

The analytical reports from STL were reviewed in accordance with the current USEPA National Guidelines for Organic Data Review (USEPA, 1999) by a RETEC chemist to assess the quality of the data relative to its use for the evaluation of soil quality. Based on the review, RETEC prepared a DUSR. The report is included with the analytical reports in Appendix C. As part of the data review process, the analytical results were qualified, as appropriate, in accordance with the data review protocols. The data summary tables included in this report reflect the findings of the DUSR. The data were all found to be acceptable, with the exception of 37 VOC results for bromomethane and chloroethane. There results were rejected due to low instrument sensitivity.

These compounds are not associated with the former MGP; therefore, there is no impact on the analytical assessment of the Site conditions.

Consistent with the SCS, the post-excavation soil sample analytical results are compared to the recommended soil cleanup objectives (RSCOs) concentrations listed in NYSDEC Technical Administrative Guidance Memorandum HWR-94-4046 – Determination of Soil Cleanup Objectives and Cleanup Levels [TAGM 4046] (NYSDEC, 1994). However, the RSCOs were not used during the IRM to determine the limits of the excavation.

3.5 Excavation Backfilling and Paving

The excavation was backfilled on July 8 and 9, 2004 with 262.85 tons of NYSDOT-specification Item #4 virgin quarry gravel. The gravel was supplied by C. K. Equities, Inc. of Montrose, New York. Copies of the invoices for the backfill material are provided in Appendix A. The excavation was backfilled in two-foot lifts followed by compaction of each lift. Backfilling was continued until the gravel level was approximately three inches below the existing asphalt parking lot grade.

On July 13 through 15, 2004, the upper three to four inches of the excavation were filled with a layer of hot asphalt coarse-base. Low areas of the parking lot were also backfilled and graded with coarse-base, and the entire parking lot was then covered by a 2-inch-thick layer of hot asphalt top coat.

4 Results of the Remedial Action

4.1 Field Observations

The following is a summary of the observations made during the remedial excavation of subsurface structures, including a concrete slab, wood planks, and several pipes. Miscellaneous fill material, such as an old steel bucket (Photo 5) and 1-inch diameter pipes, were also observed in the upper 4 feet of the excavation. Photographs of some of these structures are included in Appendix B.

A 2.5-foot-thick concrete pad with its surface parallel with the parking lot surface was observed along the northern boundary of the excavation (Photos 9, 12, and 13). The top of the slab was encountered at approximately 10 inches (0.8 feet) bgs. A four-foot length of the southern portion of the concrete slab was exposed within the excavation. The northern extent of the pad was not exposed. The location of the slab does not correlate with the location of former MGP structures shown on the Sanborn maps. Soil beneath the pad exhibited a strong petroleum odor without any signs of staining. Bedrock was encountered approximately 4.2 feet below the bottom of the concrete slab near its southern end.

A structure constructed of wood plank was encountered at approximately three ft bgs in the eastern-most portion the excavation (Photo 8). The cross section of the wood feature measured approximately one foot by one foot and extended in a north-south orientation parallel with the eastern wall of the excavation. The purpose of the structure is not known and was not apparent.

A 2-inch diameter steel pipe (Photo 7) and a 12-inch diameter clay pipe (Photo 10) oriented north to south and northwest to southeast, respectively, were uncovered at 5 ft bgs along the west wall of the excavation. The excavation was advanced four feet to the west above the pipes.

Small amounts of groundwater approximately three inches deep collected intermittently on the bedrock surface where exposed. Although the measured depths of groundwater in upgradient and adjacent wells (i.e., MW-1 through MW-4) indicate that the water table is above the bottom of the excavation, the overall absence of water entering and collecting in the bottom of the excavation suggests that the water table in the overburden aquifer in this area of Peekskill is locally perched and does represent a continuous saturated zone.

The excavation was advanced to visibly un-impacted soil to the north along the east and west edges of the concrete pad; however, in accordance with the Soil Removal Plan (RETEC, 2004b), soil was not removed from beneath the concrete structure. Field observations indicated that the soil below the slab exhibited a strong petroleum-like odor, but did not show signs of petroleum staining.

4.2 Post-Excavation Soil Sample Analytical Results

The post-excavation soil samples collected for laboratory analysis during the IRM are listed in Table 3-1. The VOC and SVOC analytical results are summarized on Tables 4-1 and 4-2, respectively. The analytical results for total BTEX (benzene, toluene, ethylbenzene, and xylenes) and total polynuclear aromatic hydrocarbons (PAHs) detected in subsurface soils during the 2004 IRM and the 2003 SCS are presented on Figure 4-1.

The post-excavation soil samples were collected and analyzed to allow a general comparison of the subsurface soil quality at the boundaries of the excavation with the overall quality of subsurface soil across the Site as per the findings of subsurface soil samples collected and analyzed during the 2003 SCS. The analytical results for the post-excavation samples are discussed below.

4.2.1 VOC Results

The VOCs in all soil samples except for SW-06 (obtained directly beneath the concrete slab at the northern end of the excavation) were less than the RSCOs for individual compounds and for total VOCs (10,000 ug/kg or micrograms per kilogram). With the exception of SW-06, total BTEX concentrations ranged from non-detect to a maximum value of 183.8 ug/kg in SW-07 (0–3.92 feet). This concentration is comparable to the total BTEX result of 220 ug/kg collected from MW-5 (4 to 5 feet), the highest BTEX result detected in subsurface soil during the 2003 SCS (excluding soil collected from SB-6 and SB-8).

The highest BTEX result, and the only post-excavation soil VOC sample with RSCO exceedances (toluene and total VOCs), was sidewall sample SW-06, collected from 3.35 to 7.5 feet. This sample was collected along the north excavation wall below the concrete pad. Note that sample SW-10 collected beneath the west side of the pad had much lower BTEX concentrations (41.4 ug/kg) and no RSCO exceedances.

4.2.2 SVOC Results

The results of the SVOC analyses showed that, with the exception of SW-06, all soil samples had total SVOC concentrations below the RSCO of 500,000 ug/kg. Individual PAH compounds were detected in all of the post-excavation soil samples, with several of them exceeding their individual RSCOs.

Excluding results from SW-06, total PAH concentrations ranged from 2,133 ug/kg (SW-11 [3.5 feet]) to 347,000 ug/kg (SB-05 [6 feet]). These results are comparable to the total PAH concentrations detected in subsurface soil samples collected during the SCS (excluding soil collected at SB-6 and SB-8),

which ranged between 4 ug/kg (MW-4 [7-8.5]) to 311,900 ug/kg (MW-5 [4–5 feet]). The concentrations of total SVOCs detected in post-excavation soil samples are similar to those detected in subsurface soil samples collected from similar depths during the 2003 SCS. This indicates that the grossly impacted soil was removed from the Site and that the remaining soil is of similar quality to that of the balance of the Site. As discussed in the SCS, most of the soil at the Site has been reworked by site redevelopment, and urban fill materials have been incorporated into the soil.

The highest total SVOC concentrations were detected in sidewall sample SW-06 collected from 3.35 to 7.5 ft bgs. As discussed above, this sample was collected from below the concrete pad. Consistent with the VOC results, total PAH results were much lower in sample SW-10 collected beneath the west side of the pad and to the north of SW-06.

4.2.3 Fingerprint Results

The forensic analysis of samples SD-01, SD-02, and SR-1 (tar-impacted soil) was not conclusive. Chromatograms for all three samples appear to show a mixture of petroleum and coal-tar related hydrocarbons. Based on the comparison of the chromatograms for the field samples with those for petroleum fuel and dielectric oil standards, none of the field sample chromatograms matched the standards. However, using all available information for these samples including field observations, laboratory analytical data, and the chromatograms, several conclusions were made regarding the nature of the soil quality and potential source materials associated with each. The conclusions are discussed below.

Sample SD-01 was obtained from an ashy soil at the southeast corner of the excavation. The soil at this location exhibited a petroleum-like odor. Comparing the chromatogram of this soil to that of the coal tar source material (SR-1), the patterns appear to be similar. The concentration of PAHs in SD-01 was very low (2.67 ppm), while the total hydrocarbon result was 391 ppm, as reported for the fingerprint analysis using Method 8100 analysis. This implies that the majority of the hydrocarbons in the sample are from a petroleum source. The similarities between the chromatograms of SD-01 and SR-1 are likely due to the coal-related compounds associated with both the tar and the ash.

Sample SD-02 was obtained from the northwest corner of the excavation, at a soil location that exhibited a gasoline-like odor and gray staining. The analytical results for this sample indicated a total hydrocarbon concentration of 303 ppm, and a total PAH concentration of 25.45 ppm (based on the fingerprint analysis). When compared with the chromatogram of SR-1, this sample shows a significant difference, with a pattern more influenced by lighter hydrocarbons. This light-hydrocarbon content may be responsible for the gasoline-like odor noted at the site. Furthermore, the gray staining of this

sample is typical of that often observed at petroleum sites where the petroleum has emulsified with groundwater.

5 Summary and Conclusions

From July 7 to 9, 2004, an IRM was performed by RETEC and its subcontractors at the former Central Avenue MGP site, located in Peekskill, New York. In accordance with the Soil Removal Plan (RETEC, 2004b), the excavation was advanced to the limits of visibly-impacted material based on hydrocarbon staining and the presence of liquid or solidified tar to the east, south, and west.

The IRM entailed the excavation of 241.5 tons (approximately 161 cubic yards) of material from an area of the central portion of the Site, which measured 32 feet by 26 feet. Soil was removed from within this area to depths ranging from 5 to 7.5 ft bgs. The excavated material was transported off site and disposed of at a permitted disposal facility where it was treated by thermal desorption. During excavation, a 2.5-foot-thick concrete slab was encountered 0.8 ft bgs along a 4-foot long section of the north wall of the pit. Due to accessibility constraints, approximately one cubic yard of affected soil was not removed from beneath the concrete pad. The excavation was backfilled with NYSDOT Item #4 stone, compacted, and the entire parking lot was then paved with hot-mix asphalt.

Prior to backfilling, a total of 21 subsurface soil samples were collected from throughout the excavation. The post-excavation samples included 10 sidewall samples, seven bottom samples, and four discrete samples. Analytical results for the post-excavation samples showed that, with the exception of the sample collected beneath the concrete slab, the concentrations of VOCs and SVOCs in the soil in the walls and bottom of the excavation are similar to those in the subsurface soil samples collected from across the Site during the 2003 SCS. Specifically, the concentrations are below the RSCOs for total VOCs and SVOCs. The soil below the concrete slab contained BTEX and PAH concentrations that exceeded the RSCOs for total VOCs and total SVOCs, respectively.

In conclusion, the IRM effectively removed the grossly impacted subsurface soil observed at and in the vicinity of soil borings SB-6 and SB-8 in accordance with the Soil Removal Plan. Although a small volume of impacted soil was left in place below the concrete slab, this material is not expected to be of environmental significance due to the barrier created by the concrete and overlying layer of asphalt pavement, which will minimize the potential for leaching of, and direct exposure to, the underlying soil.

6 Recommendations

Based on subsurface observations and analytical results of post-excavation soil samples, the goal of the IRM to remove the grossly impacted soil at and in the vicinity of soil borings SB-6 and SB-8 was successfully achieved in accordance with the Soil Removal Plan (RETEC, 2004b). No further activities associated with the IRM are recommended. Due to the concentrations of total PAHs in the residual subsurface soil, the final remedy for the Site will include an environmental easement and soil management plan for the property. Based on recent discussions with Con Edison, the City of Peekskill is currently considering this option.

7 References

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