United States Environmental Protection Agency
Region III
Corrective Action Program

Environmental Indicator Inspection Report
For

Philadelphia Coke Co., Inc.
4501 Richmond Street
Philadelphia, PA 19137

USEPA ID No. PAD000427906

Prepared By

Baker

January 2012

TABLE OF CONTENTS

LIST OF APPENDICES

RCRA SITE INSPECTION REPORT

Purpose: To gather relevant information for the Philadelphia Coke Co., Inc. (PCC, facility, or site) in order to determine whether human exposures and groundwater releases are controlled, as per Environmental Indicator (EI) Determination forms.

Documentation Review: Prior to the site visit, Michael Baker Jr., Inc. (Baker) personnel conducted a records review of the Pennsylvania Department of Environmental Protection (PADEP) South East Regional Office and the United States Environmental Protection Agency (USEPA) Region III Philadelphia Office files.

Attendees at Site Inspection:

Name	Organization	Phone Number	E-Mail Address
Jamey Stynchula	GEI Consultants	856-608-6860	jstynchula@geiconsultants.com
Andrew Gilbert	PADEP	848-250-5771	agilbert@pa.gov
Jennifer Wilson	PADEP	484-250-5744	jewilson@pa.gov
Rick Schmitz	National Grid	516-545-2569	Richard.schmitz@us.ngrid.com
Meredith Reiner	Baker	609-807-9590	mreiner@mbakercorp.com

Meeting Summary: A meeting at the former facility property (facility or site) was held with the attendees noted above on August 11, 2011. Ms. Reiner presented the property owner representatives with information regarding USEPA Region III's Corrective Action process, the EI Assessment Program and the legislation driving this program. Under this investigation, USEPA Region III is focusing on two interim EIs to evaluate whether any unacceptable risk to human health and/or the environment is ongoing at each priority facility. The two indicators are determining if human exposures and groundwater releases are controlled. Prior to and during the site inspection, outstanding issues and discrepancies encountered in the file review summary were discussed.

The site visit continued with an overview of areas to be observed and a tour of the former facility. Photographs of the property are presented in Appendix A: Photographs.

A. Location and Operational History of the Facility, Including all Wastes Generated at the Facility and their Management

Site Layout and Background Information

Site Layout

The facility was located at 4501 Richmond Street, Philadelphia, Pennsylvania, on a flat, 63-acre industrial site in the "Bridesburg Section" of Philadelphia (Appendix B: Figure 1 - Facility Location Map). The property is bordered by Richmond, Orthodox, and Buckius Streets, as well as the Delaware River. The main portion of the property, north of the former railroad tracks, is entirely enclosed by a chain linked fence. The property is ten feet above sea level.

The facility had various operations including coke storage, coal storage, coke oven batteries, a rail line, a smoke stack, decanter tar bottoms, gas holders, a boiler house, a machine shop, and other structures (Appendix B: Figure 2 - Former Facility Operations and Appendix B: Figure 3 Facility Layout, Main Area) and fuel blending operations (Appendix B: Figure 4 – Facility Layout, South Area).

The site visit confirmed that all operations of the facility have been decommissioned, dismantled, and removed, with only cracked portions of concrete pads and asphalt paved areas remaining. The entire property is now overgrown with trees, brush and high grasses. Several piles of debris were identified among the brush and portions of the fence have been cut and evidence of vandalism was noted.

Background Information

PCC operated a gas manufacturing and coke production facility in Philadelphia County, Philadelphia, Pennsylvania. The facility was active from January 1929 until its permanent closing on May 12, 1982.

The facility was decommissioned, the structures were dismantled, and various cleanup and closure activities took place from 1982 through 1988, ultimately removing 30,000 tons of contaminated soil and operational related wastes. The site also underwent various environmental investigations including groundwater monitoring and soil sampling activities. Certified closure of the facility was provided to PADEP in December 1994. As a result of stabilized groundwater monitoring trends of contamination, PADEP terminated the groundwater monitoring requirement in 1999. Available

documentation does not indicate that any formal release of liability was applied for or extended to the facility.

During its active years, the facility produced upwards of 220,000 tons of coke annually. The facility operated as a large quantity generator (LQG) of hazardous waste under the USEPA facility identification No. PAD000427906. Historical air permits are on file with the City of Philadelphia but are not presented in this report due their irrelevance in lieu of the closure of the facility. The facility also operated under a National Pollutant Discharge Elimination System (NPDES) permit No. PA0011401 for effluent discharge to the Delaware River. Historically, industrial waste discharged to the Delaware River via a pipe that ran underground throughout the property. Various operations' discharges and stormwater discharged to the river (Appendix B: Figure 3 – Facility Layout, Main Area). There were historical effluent concentration exceedances of cyanide and minor oil leaks from Outfall 001.

The facility was operated by PCC from 1929 to 1982. According to a 1942 land use map, the property was owned by the Koppers Company (Koppers), which held the controlling interest in a joint venture with Eastern Enterprises. In 1950, Eastern Enterprises split from Koppers. PCC was a division of Eastern Associated Coal Corporation, a subsidiary of Eastern Enterprises. A 1962 land use map identified the facility was owned by PCC, which maintained ownership during the facility's decommissioning.

In November 2000, KeySpan Corporation acquired Eastern Enterprises. Subsequently, in February 2007, National Grid USA purchased KeySpan Corporation. The City of Philadelphia Property Assessors website (accessed March 31, 2011) and stormwater website (accessed April 5, 2011) identified the property as being owned by Eastern Enterprises.

Land Use

The use of the property currently remains idle, with no development since the facility's closure. The surrounding properties are mixed commercial, industrial, and residential uses.

According to the March 21, 2007 development review, PADEP designated the site as a Brownfield Action Team (BAT) Site (BAT0020) to encourage redevelopment. Thus, current plans for the vacant property include the development of 2,115 housing units (apartments and townhomes) and retail units

that will extend along the waterfront. The property is zoned as a Waterfront Redevelopment District (WRD). The City of Philadelphia Property Assessors website identifies the property as zoned Heavy Industrial. The property is served by public water and sewer.

Waste Types and Quantities

During its operation, the facility primarily used bituminous coal with some anthracite coal to produce foundry coke. The principal source of the waste materials from the coking operations was the coke gas cleaning system. The process generated hazardous wastes including: waste liquor, decanter tank tar sludge (K087) and spent iron oxide (containing cyanide and phenol). The wastes were stored on site prior to off-site disposal. Historical wastes contained in solid waste management units (SWMUs) were removed during 1982 closure and 1988 cleanup activities (summarized in the *Investigations and Remedial Action to Date* section).

Releases

There were three release incidents identified at the facility from review of documents: 1) an inspection in April 6, 1971 that identified illegal discharges to the Delaware River; 2) on September 16, 1976, an oil discharge (estimated at 1 gallon) originated from a small coal tar impoundment and seeped through a crack in a cooling water discharge trench; and 3) in March 23, 1981 observation of an unpermitted discharge of water resulting from a work crew attempting to clear a blockage in a line by pumping water from the No. 7 manhole onto the ground. All of these releases were reported to PADEP and corrected. Additional details are provided in the *NPDES* section.

Appendix C contains an inventory of documents and references used in this report.

Permit and Regulatory Action History

Waste

A Notification of Hazardous Waste Activity was made to the USEPA on August 13, 1980. The USEPA issued facility identification No. PAD000427906 on October 9, 1980. The facility submitted the Part A Hazardous Waste Permit Application on November 18, 1980. On December 23, 1980, the USEPA acknowledged receipt of the Part A Hazardous Waste Permit Application. The USEPA confirmed on July 24, 1981 that the facility could generate hazardous waste as an interim status

facility.

On October 22, 1982, PCC notified PADEP that the facility had terminated manufacturing operations at 9 a.m. on May 12, 1982 and that they were working with a consultant to remove hazardous wastes from the site.

PADEP requested the Part B Hazardous Waste Permit Application on October 27, 1982.

The facility notified PADEP on December 28, 1982 that the removal of hazardous wastes was complete. The facility indicated that they anticipated installing 10 to 12 monitoring wells at the site after completing negotiations with their consultant. In June 1983, Roy F. Weston (RFW) submitted a Closure Plan for the facility (summarized in the *Investigations and Remedial Action to Date* section). On July 5, 1983, PADEP sent the Philadelphia Health Department a copy of the Closure Plan for review. On August 1, 1983, they responded with comments and questions dealing with contractor procedures.

On October 27, 1983, PADEP issued a Notice of Violation (NOV) for not complying with the groundwater monitoring requirements, because the monitoring wells had not been installed. On November 9, 1983, PCC responded to the NOV by citing that 4,400 tons of hazardous waste had been removed and "that if there was a violation of the regulations, the cause of the violation will have been eliminated by the removal of the waste materials from the site. I do not believe the installation of wells is necessary".

On December 13, 1983, PADEP accepted the Closure Plan with the provision of assessing possible groundwater contamination via monitoring wells and a sampling plan. On March 30, 1984, PADEP requested documentation of the disposition of hazardous materials and again requested information about PCC's groundwater monitoring program. On April 13, 1984, the facility responded and enclosed a December 6, 1983 letter that was sent to PADEP documenting the final disposal and indicated that information concerning groundwater would be provided at a later date after leaks in the water mains associated with the fire system were repaired.

On August 17, 1984, Kipin Industries Inc. (Kipin) on behalf of the facility provided PADEP with a site map that illustrated the locations of the proposed monitoring wells and a sketch of a typical well (i.e., a "Sampling Plan"). The letter indicated that PCC was in the process of retaining Woodward-Clyde Consultants (WCC) under contract to manage the investigation

On August 31, 1984, the USEPA requested submittal of the Part B Hazardous Waste Permit Application. PCC responded on September 18, 1984 that no Part B Hazardous Waste Permit Application would be filed as the facility was no longer operational and was closed.

On February 21, 1985, the USEPA provided PADEP comments and requested changes to the Draft Sampling and Analysis Plan. On March 4, 1985, WCC provided a revised Sampling and Analysis Plan to PADEP.

On July 16, 1985, WCC sent PADEP a Hydrogeological Assessment which was conducted at the facility. Analytical results for the second, third and fourth quarter groundwater sampling events were provided to PADEP on September 26, 1985, January 17, 1986, and April 8, 1986 respectively (summarized in the *Investigations and Remedial Action to Date* section).

On September 12, 1985, PADEP approved the June 1983 Closure Plan.
On April 15, 1986, WCC submitted a soil sampling program work plan to PADEP for review. The USEPA commented on the work plan on May 8, 1986, recommending changes to sample collection.

On July 11, 1986, PADEP issued an NOV for bonding requirements for post-closure care.

On July 15, 1986, PADEP issued an NOV for quarterly monitoring deficiencies. PADEP indicated that monitoring well W-2 may not have been representative of background groundwater quality, parameters had not been monitored in quarterly during the background year, replicate measurements from the upgradient monitoring well was not obtained, and an annual evaluation of groundwater surface elevations was not performed.

On August 27, 1986, WCC submitted the revised work plan for the soil sampling program including five sample locations including: 1) the waste liquor pit, 2) underground storage tank area, 3) decanter tar bottoms area, 4) tar plains, and 5) lime pit. PADEP approved the plan on September 18, 1986 as noted in the 1992 *Engineer's and Owner's Certification of Closure for WMUs*. Following the sampling, PADEP requested a map identifying areas of waste management units (WMUs) on October 31, 1986.

On January 29, 1987, WCC submitted a Hydrogeologic and Soils Investigation report (summarized in the *Investigations and Remedial Action to Date* section).

On July 22, 1987, the facility noted that the Federal regulatory arena favored using technologies which ultimately destroy or detoxify wastes rather than transferring them to a disposal area. Thus, the facility advanced options such as bioremediation or other remedial technologies.

On January 28, 1988, the facility sent a follow-up letter following the December 21, 1987 meeting to discuss anticipated closure approaches. It detailed cleanup levels for the polycyclic aromatic hydrocarbons (PAHs).

On February 15, 1988, WCC submitted a Soil Contamination Assessment report in response to PADEP's request to develop volume estimates of contaminated soil that must be handled at closure (summarized in the *Investigations and Remedial Action to Date* section).

Later in February 1988, the facility submitted a Detailed Work Plan for Field Pilot Land Treatment Tests; it was subsequently revised in July 1988. The test' objective was to evaluate the biodegradability of coal tar-related contaminants in soil. The proposed treatment units would consist of 16 feet by 24 feet plots and inoculated with naturally occurring microbes to digest coal tar contamination.

On March 28, 1988, PADEP requested additional information to evaluate cleanup levels.

On April 6, 1988, WCC submitted information to PADEP following a meeting on the same day. It further described the remediation program and gave a proposed schedule. On April 21, 1988, PADEP approved the bioremediation pilot study, but indicated that total PAHs could not be used for soil cleanup characterizations and cleanup levels would be set for specific compounds. Additionally, WCC performed additional work to control infiltration/leachate from the stockpiles and proposed a different procedure for determination of background groundwater quality. On May 20, 1988, WCC proposed cleanup criteria and gave details of how materials would be excavated and stored. The sum of concentrations of PAH compounds identified by USEPA as suspected carcinogens would be limited to 50 parts per million (ppm) and no individual compound of the six carcinogenic polycyclic aromatic hydrocarbons (CPAHs) would exceed 15 ppm. These were based on two other Records of Decision (RODs) issued by the USEPA at the time for sites with similar contaminants. While it was never officially approved by PADEP, WCC noted that it represented a reasonable and conservative criterion.

Closure activities proceeded in accordance with verbal authorization from PADEP on June 3, 1988 and documented in a June 16, 1988 WCC letter. The activities were initiated on July 12, 1988 and completed on December 30, 1988. PADEP visited the site at least three times to review the cleanup effort (Certification of Closure, 1992).

On February 6, 1989, PADEP sent an NOV following a January 18, 1989 inspection and requested that the W-2 and W-4 be returned to proper operation (1982 to 1989 inspections). On February 22 1989, the facility responded noting that repairs would be made. On March 8, 1989, groundwater samples were collected from the two newly replaced monitoring wells, along with the other four site monitoring wells (Certification of Closure, 1992).

On February 24, 1989, WCC sent PADEP confirmatory analytical data for the backfilling operations, that indicated the materials were non-hazardous, and requested authorization to backfill. PADEP authorized the backfilling on June 20, 1989.

In September 1989, the facility submitted certification of closure documents and a site restoration work plan. PADEP verbally indicated that they would not review the document until the coal tar-contaminated soils were treated on site or removed. Thus, PADEP returned the documents to the facility. A total of 29,400 tons of the soils were subsequently removed from the site and disposed as residual waste (Certification of Closure, 1992).

On October 12, 1989, PADEP conducted an inspection and noted that the site was undergoing closure. PADEP noted a hazardous waste determination should be performed on the two areas of ground where blue stained rocks were observed (potentially cyanide). (Note: There was no further documentation in the file concerning this specific area.) Also, PADEP requested that the facility determine the exact extent of the waste oil contamination near the railroad right-of-way and dispose of contaminated soils off-site. A plan to remediate the area was to be submitted to PADEP by November 30, 1989. In May 1990, WCC submitted a Tank Farm Area Restoration Conceptual Design report (summarized in the *Investigations and Remedial Action to Date* section).

On September 7, 1990, PADEP issued an NOV for failing to submit the required quarterly groundwater monitoring reports. On September 7, 1990, WCC sent the quarterly groundwater report. On November 6, 1990, PADEP sent a civil penalty payment request for failing to submit quarterly groundwater monitoring reports.

On January 8, 1991, PADEP collected a sample from MW-2R for volatile organic analysis following identification of a compound tentatively identified as naphthalene, as well as a second sample identified as C_3-substituted benzene. All results exceeded 2.0 micrograms per liter (ug/L) and benzene was 80 ug/L.

On June 11, 1991, PADEP enclosed an application for the soil remediation unit and noted that the Philadelphia Department of Health should be contacted regarding air permits. On June 21, 1991, PADEP informed the in-situ remediation contractor that they would need to prepare a groundwater remediation and treatment plan to treat contaminated groundwater. PADEP remained concerned regarding the appearance of dibenzofurans related to dioxin.

On December 1, 1992, WCC submitted a second Engineer's and Owner's Certification of Closure for WMUs report, for SWMUs and hazardous waste management units (HWMUs) (Appendix B: Figure 5 - Waste Management Unit Location Map) (summarized in the *Investigations and Remedial Action to Date* section).

On May 6, 1993, WCC submitted a Groundwater Monitoring Plan noting four monitoring wells installed in March 1985 and two wells in 1987 (summarized in the *Investigations and Remedial Action to Date* section).

On June 7, 1993, WCC sent PADEP notification that the seal pot, located in the former byproducts building piping trench, was discovered during excavation activities and was cleaned in September 1992. Coal tar and debris were removed. WCC proposed closure procedures that would pump surface water through a granular activated carbon filter with discharge on-site. Additionally, WCC proposed to fill the seal pot with concrete immediately upon pumping out all surface water, and fill the access excavation above the seal pot to grade with adjacent on-site fill.

On September 16, 1993, PADEP responded to the facility's September 2, 1993 letter and requested an amendment to the Groundwater Monitoring Plan. PADEP noted that naphthalene, benzene, toluene, ethylbenzene, and ammonia nitrogen were potentially mobile and quarterly analysis would continue for benzene, toluene, ethylbenzene, and xylenes (BTEX), trichloroethene (TCE), and tetrachloroethylene (PCE), and the PAHs. The remaining parameter analysis plan was satisfactory. In addition, PADEP approved leaving the seal pot in-place for closure.

On September 16, 1993, WCC submitted a grading plan for the site. The remaining six buildings were removed in August 1993.

On December 3, 1993, WCC sent PADEP a Certification of Closure for the seal pot in response to PADEP's November 22, 1993 inspection. It noted that closure activities were completed on October 19, 1993 and that solid materials classified as characteristically hazardous for benzene (D018) were removed in September 1992.

On September 28, 1994, Eastern Enterprises notified PADEP of the proposed plan to complete the grading program. It noted that clean soil would be imported and spread approximately 6 inches thick.

On December 23, 1994, a Certification of Closure was signed for the facility formerly known as the Philadelphia Coke Company and located at 4501 Richmond Street, Philadelphia, Pennsylvania in accordance with the closure plan approved by PADEP on December 13, 1983.

On March 13, 1996, an inspection noted that the facility was abandoned and that groundwater sampling was conducted on September 8, 1994 and on March 13, 1996.

Comprehensive Groundwater Monitoring Evaluations (CMEs) were conducted by PADEP in 1996 and 1997 (summarized in *Investigations and Remedial Action to Date* section).

On March 23, 1998, WCC requested approval of the revised groundwater monitoring program. It noted that monitoring of the six wells sufficiently defined future trends in groundwater constituents. WCC requested PADEP's concurrence with this report and requested that monitoring be changed from quarterly to annually. On September 14, 1998, PADEP approved the request to reduce the monitoring frequency from quarterly to annually.

On July 26, 1999, PADEP reviewed relevant groundwater monitoring data for quarterly sampling events from 1985 through 1998 noting concentrations of contaminants of concern (COCs) had significantly decreased. Iron, manganese, specific conductance, potassium, sodium, calcium, magnesium, sulfate, and chloride remained elevated even after the removal of wastes in 1988. It noted that benzene and naphthalene in groundwater collected at MW-2R were above the Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs), but had not migrated to

downgradient sampling points and no other wells exhibited elevated results and deemed the exceedances localized for the past five years. As elevated levels for the remaining constituencies persisted throughout the groundwater monitoring program both before and after the Resource Conservation and Recovery Act (RCRA) clean-up activities, PADEP deemed them a natural phenomenon and indicated groundwater quality was stable. PADEP thus terminated the monitoring requirement.

On October 27, 1999, a CME inspection was conducted by PADEP (summarized in the *Investigations and Remedial Action to Date* section).

On March 3, 2000, PADEP responded to Eastern Enterprise's request for the release of the bond held for closure and post-closure liabilities. The release was not possible until the post-closure care period of liability expired on July 26, 2000.

Air

The City of Philadelphia has facility files related to air permitting for the facility. Note: As PCC is no longer operating and air emissions are irrelevant, these files were not reviewed for this report.

NPDES

On March 1951, the Commonwealth of Pennsylvania, Department of Health issued an Industrial Wastes Permit (No. 1379) to PCC for the proposed works for treatment of wastes from the facility's coke, gas and coal chemicals production for discharge to the Delaware River. The permit included the intermediate treatment of sewage requirement of: 75% removal of suspended solids; 65% removal of organic pollution load; removal of oils, grease, acids, alkalis, toxic, putrescible, taste and odor producing substances; provide effective disinfection; and disposal of sludge.

Process wastewaters generated at the facility were discharged to municipal sewers (included ammonia still liquors to the sanitary sewer). Chlorination was used as a pretreatment to remove cyanide and sulfide compounds. All other wastewater (predominantly non-contacting cooling water generated from the liquor plate cooler, barometric condenser, and the gas cooler) as well as some stormwater, was discharged to the Delaware River via Outfall 001. An oil-skimming device was installed at the outfall and was put in use prior to commencing effluent discharge (Appendix B: Figure 4 – Facility Layout, South Area).

On May 20, 1971, PADEP issued an NOV to the facility following an inspection on April 6, 1971 that identified illegal discharges to the Delaware River. On July 1, 1971, the facility submitted a discharge application to the U.S. Army Corps of Engineers (USACE).

On January 3, 1972, a court stipulation was enacted against the facility to conduct testing for cyanide discharges. On August 25, 1972, PADEP issued an NOV for having discharges without a permit. On February 1, 1973, PADEP made notification that meetings were held regarding the illegal discharge in late 1971. These meetings were held to resolve differences in cyanide test results between PADEP and PCC analytical methods.

On December 1, 1973, the facility submitted an Engineering Study of Industrial Wastewater Management. The facility submitted the study to the Delaware River Basin Commission (DRBC) on December 10, 1975.

An NPDES permit was issued to PCC on August 9, 1974 by Water Quality Management, Norristown, with the condition that an application for a Pennsylvania permit would result within 90 days.

On December 19, 1975, the facility notified the DRBC that it submitted its discharge permit application and fee. PCC noted that on March 3, 1951, the Pennsylvania Sanitary Water Board issued the facility Permit No. 1379 and that PCC applied to the USACE (and subsequently processed by USEPA) on May 1, 1972 to discharge wastewater to the Delaware River under NPDES permit No. 0011401.

On January 7, 1976, PADEP notified the facility that the Pollution Incident Prevention Plan (PIPP) (the precursor to the Preparedness, Prevention, and Contingency Plan) was unsatisfactory. PADEP received a revised PIPP from the facility on February 18, 1976.

On February 9, 1976, PADEP notified the facility that the permit application had been reviewed and that some issues needed resolved, including an unsatisfactory PIPP. These modifications were necessary to the quench station to prevent periodic overflow. On February 18, 1976, the facility responded by noting that operational changes had been made. On July 28, 1976, PADEP approved the permit. On September 30, 1976, the DRBC approved Water Quality Management Permit No. 5175203.

On September 16, 1976, the facility notified PADEP that an oil discharge (estimated at 1 gallon) originated from a small coal tar impoundment had seeped through a crack in a cooling water discharge trench and entered the sewer line. On March 3, 1977, PADEP requested a PIPP following an inspection. PADEP issued an NOV on January 10, 1978 following a discharge of oil from the skimmer basin.

On May 23, 1978, PADEP issued the facility an NOV for exceedances in cyanide and ammonia concentrations. On June 1, 1978, the facility indicated that cyanide and ammonia concentrations from their samples were less than those sampled and reported by PADEP. PCC believed the source of the leak may have been the quench station, which comes from the final gas cooler.

On July 2, 1979, PADEP notified the facility that they were in violation of Permit No. 5175203 for an observed oil discharged to the skimmer basin and an elevated concentration of cyanide from the sample collected during the May 8, 1979 inspection. On July 20, 1979, the facility notified PADEP that oil leakage from the oil skimmer had been stopped, and that PCC's duplicate sample exhibited a considerably lower concentration of cyanide.

On March 27, 1981, the facility responded to the March 23, 1981 observation of an unpermitted discharge of water resulting from a work crew attempting to clear a blockage in a line by pumping water from the No. 7 manhole onto the ground.
On July 6, 1981, PADEP notified the facility of several violations relating to the unpermitted water discharge and several housekeeping items at the facility. The facility responded on July 28, 1981, noting that the extraneous plank was removed from the oil skimmer along with oil-soaked pads and booms.

On February 22, 1982 and May 21, 1982, PADEP sent the facility a notice that PADEP samples for cyanide from Outfall 001 had high concentrations, resulting in an NOV being issued. PADEP issued an NOV on August 12, 1982 for failing to submit the discharge monitoring report (DMR). On June 28, 1982, PCC indicated that all production ceased on May 12, 1982 and the facility effluent was plugged near the outfall and rendered out-of-service and the facility would be demolished in the future.

B. Description of all Solid Waste Management Units (SWMUs) and/or Areas of Concern (AOCs)

SWMUs

The 1992 Engineer's and Owner's Certification of Closure for WMUs report for SWMUs and HWMUs provides details of closure and monitoring for the following areas (Appendix B: Figure 5 – Waste Management Unit Location Map):

Area	SWMU	HWMU
Tar Storage Tanks (K087)		X
Waste Liquor Pit (K087)		X
Trash Pile	X	
Tar Plains (K087)		X
Clean Oxide	X	
Wood Trays	X	
Tar Decanters and Lagoon (K087)		X
Iron Oxide Boxes and Pile (D003)		X
Process Piping	X	

The SWMUs and HWMUs were certified as closed following various closure and cleanup activities (summarized in *Investigations and Remedial Action to Date* section).

Storage Tanks

There are no available records documenting the facility maintained PADEP-registered aboveground storage tanks (ASTs) and/or underground storage tanks (USTs).

Tar Storage Tanks

The facility had two aboveground steel tanks that were used to store product coal tar from coal gas cleaning operations with estimated capacities of 1,000,000 and 500,000 gallons (Appendix B: Figures 2 and 3). These tanks are summarized in the Engineer's and Owner's Certification of Closure for WMUs (1992) report in the *Investigations and Remedial Action to Date* section.

Fuel Blending Tanks

Aboveground fuel blending tanks were located south of the main area of the facility located between the railroad tracks (Appendix B: Figure 4 – Facility Layout South Area). One tank farm had concrete secondary containment for four fuel tank foundations, as described in the Tank Farm Area Restoration Conceptual Design (1990). Fuel types and tank specifications remain unknown. The two fuel oil tanks, located west of the tank farm, were surrounded by earthen dikes. The tank farm was identified as "not RCRA" by PADEP (August 29, 1990).

Fresh and Spent Oil Tanks

During closure activities, the one fresh oil tank remained on site was filled with clean sand; the one spent oil tank was removed and scrapped, as documented in the Engineer's and Owner's Certification of Closure for WMUs report (1992). The USTs were located adjacent the fuel gas holder foundation in the former decanter area.

USTs

Seven USTs were reported to have been removed at PCC, completed between July 11 and 15, 1991 per the July 1991 Monthly Status Report dated July 17, 1991. Some visual indication of contamination was observed during the removal of the gasoline UST. PADEP's Storage Tank Department was contacted, and the excavation was backfilled for safety reasons. No other visual contamination was observed. Soil samples were collected for the closures and WCC stated they would be preparing reports summarizing the UST removal activities. Note: No closure reports were found during the file search.

AOCs

There were no other AOCs identified at the site which were not already designated as a HWMU or SWMU.

Investigations and Remedial Action to Date

Initial Removal of Hazardous Waste, 1982

On October 22, 1982, PCC notified PADEP that the facility had terminated manufacturing operations at 9 a.m. on May 12, 1982 and that a consultant, Clean Venture, Inc. (Clean Venture), was retained to remove hazardous wastes from the site.

The facility notified PADEP on December 28, 1982 that the removal of hazardous wastes was complete. The facility indicated that the tar decanters and other production equipment had been removed and scrapped and the open pits cleaned and filled. The total amount of tar waste material shipped to an offsite landfill was 4,481.40 tons.

In addition to confirming the waste removal, PCC indicated that two meetings had been held with representatives from the RFW. These meetings discussed preparing a closure plan for the facility as well as anticipating the installation of 10 and 12 test wells at the site.

Closure Plan, 1983

In June 1983, RFW submitted a Closure Plan for the facility. During closure, the site was surrounded by a six-foot fence and a security firm provided guard services. The plan noted the closure of the facility and the removal and disposing of remaining decanter tar waste and spent iron oxide. The storage area for the decanter tar waste consisted of three open pits, two of which were concrete-lined and one having an earthen bottom. This area was identified in Part A Hazardous Waste Permit Application as surface impoundment storage (S04) with a capacity of 40,000 gallons. The spent iron oxide was stored on an asphalt pad and in oxide boxes. This area was identified as waste storage area (S03) with a capacity of 2,000 cubic yards (CY). In addition approximately 1,800 cy of tar decanter waste (K087) and 2,800 cy of spent iron oxide which were generated during operations prior to closure were stored on-site prior to off-site disposal. Also, an inspection identified tar remaining in the two storage tanks and an area (tar plains) surrounding the trash pile (Appendix B: Figure 3 – Facility Layout, Main Area). Specific areas to be addressed by the closure plan and estimated quantities included:

- Tar storage tanks (decanter sludge - 650 cy)
- Waste liquor pit (ammonia sludges and tar sludge - 275 cy),
- Trash pile (cleanup tar waste, coal fines, other debris - 2,000 cy)

- Tar plains (decanter tar waste - 2,200 cy),
- Clean iron oxide (unused iron oxide - 2,000 cy)
- Wood trays/wood debris (300 cy)
- Tar decanters (tar decanter waste - 1,800 cy)
- Iron oxide boxes and pile (spent iron oxide - 2,700 cy)
- Process pipe (asbestos-containing insulation -100 to 150 cy)

Prior to demolition, the process and residual piping were steam cleaned with residues collected and disposed. The remaining chemicals such as sulfuric acid were sold to other firms.

The Closure Plan indicated that during closure, all hazardous wastes were to be removed from onsite storage. Since the site does not have any hazardous waste disposal facilities, groundwater monitoring was determined to not be required at closure in accordance with the Pennsylvania hazardous Waste Management Regulations (see Sections 75.265 (s) (8) and 75.265 (n)). The Closure Plan also stated a Post-Closure Plan was not required because the site is not a disposal facility, and all wastes were being removed at closure.

Hydrogeological Assessment, 1985

On July 16, 1985, WCC sent PADEP a Hydrogeological Assessment report which was conducted at the facility. Four monitoring wells (W-1 through W-4) were installed in March 1985 to assess groundwater quality. The results from the first of four groundwater sampling events indicated the groundwater flow direction was observed to be radially outward from a central high point at W-2 (Appendix B: Figure 6 – Groundwater Contour Map).

The sediments at the site consist of recent alluvial floodplain and channel deposits, which are overlain by man-made fill material (sand, brick fragments, coal and cinder). The uppermost natural deposit encountered in the monitoring wells was a brown to gray, fine to coarse sand containing clay, silt and gravel. Below the sand is a sequence of very soft, silty clays deposited by the Delaware River. The wells were advanced 2 to 7 feet into the clay unit and terminated. The clay layer acts as a lower confining unit to groundwater in the overlying recent deposits and was, therefore, not penetrated. An historical boring indicates the silty clay layer is approximately 20 feet thick. Underlying the silty clay layer is a sequence of sand and gravel of varying thickness which lies directly on crystalline (mica schist) bedrock (WCC, 1987).

Groundwater samples were analyzed for volatile organic compounds (VOCs), base/neutral compounds, acid-extractable compounds, groundwater quality parameters and contamination, Appendix II parameters, and additional inorganic parameters. No priority pollutant compounds were detected in groundwater collected from W-1. The sample collected at W-2, located near old lagoons in the center of the site, contained a relatively high concentration of acid-extractable compounds, particularly phenol at 2,710 parts per billion (ppb) and 2,4-dimethylphenol at 27,600 ppb. Other than methylene chloride, volatile organic compounds detected in W-2 include benzene (143 ppb), toluene (60 ppb), and ethylbenzene (3.0 ppb). Base/neutral compounds detected in W-2 include nitrobenzene (90 ppb) and bis (2-chloroethoxy) methane (15 ppb).

It was concluded from the groundwater levels and quality that the PCC site is not presenting a threat to groundwater contamination in the surrounding environment. Three additional quarterly rounds of groundwater sampling were scheduled.

On September 26, 1985, WCC supplied PADEP the analytical results of the second quarter groundwater sampling event. W-1, located near the former tar plains at the property perimeter, and W-2, located near the former tar decanter bottoms and center of the site, contained VOCs, notably benzene and toluene, and several base/neutral compounds, most notably acenaphthene. W-2 also contained ethylbenzene, phenol, and 2,4-dimethylphenol. Other inorganic compounds were also observed at elevated concentration, such as: cyanide, chloride, sulfate, arsenic, sodium and iron, with the highest concentrations observed in samples from W-2. These results were consistent with the results from the first quarter. Groundwater was again determined to flow radially outward from a central high located near W-2.

On January 17, 1986, and April 8, 1986, WCC sent the analytical results for the third and fourth quarters of groundwater sampling, respectively. Noted concentration trends identified in the previous two rounds continued, with W-2 exhibiting the highest concentrations.

Hydrogeologic and Soils Investigation, 1987

On January 29, 1987, WCC submitted a Hydrogeologic and Soils Investigation report to assess the site's subsurface geologic, groundwater flow, and soil and groundwater quality conditions, as well as evaluate the effectiveness of the previous site clean-up activities. The purpose was to evaluate the degree of contamination and document the presence or absence of residual hazardous materials in the subsurface and to assess the groundwater quality in the water-table aquifer based on the groundwater

sampling conducted in 1985 and 1986. In October 1986, two additional monitoring wells (W-5 and W-6) were installed to better define the groundwater flow between W-2 and W-4 as illustrated on Appendix B: Figure 6 - Groundwater Contour Map. All six monitoring wells at the site were installed in the upper water table aquifer which is comprised of miscellaneous fill, gravel, sand, and silt extending from the ground surface to a confining and relatively impermeable organic silty clay layer at a depth ranging from 1 to 14 feet below ground surface (bgs).

Detected VOCs (benzene, methylene chloride, toluene, and ethylbenzene) were limited to groundwater collected from W-1 and W-2. The VOCs did not appear to follow any trend over the four rounds of sampling. Acid extractables (phenol and 2,4-dimethylphenol) were restricted to W-2. Fifteen priority pollutant base/neutral extractables were detected in the groundwater including: acenapthene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, bis(2-chloroethyl)ether, bis(2-chloroethoxy)methane, bis(2-ethylhexyl)phthalate, 2,6 dinitrotoluene, fluorene, fluoranthene, naphthalene, phenanthrene, pyrene, hexachloroethane and nitrobenzene. Seven quarters of groundwater samples were collected and analyzed from April 1985 through October 1986.

Soil Sampling Results

As there was no confirmatory sampling during the closure/removal activities, PADEP and the USEPA requested additional investigations of the following areas to determine the effectiveness of the previous clean-up activities. The sampling was to determine the presence of contamination, not delineate the extent of contamination. A total of 18 soil samples (including one background sample) varying from a depth of 6-inches to 10 feet were collected for priority pollutant organic analyses (VOC, base/neutral extractables, and acid extractables).

Decanter Tar Bottom Area: Seven shallow borings were advanced (six to nine feet bgs) in the decanter tar bottoms area (near the center of facility) to assess the effectiveness of the waste removal program. The area consists of two concrete lined pits, 10 feet wide, 12 feet long, and 8 feet deep and an earthen lined lagoon, 15 feet wide, 75 feet long, and 8 to 10 feet deep. All borings within the pit displayed evidence of contamination including elevated organic vapor readings (screened with an HNU photoionization detector [PID]), strong odors, visible staining of fill materials suggesting that tar materials were present, and detection of 15 coal tar related base/neutral extractables. The fill materials inside the lagoon contain the highest concentrations (62,100 to 568,100 ppb) of total base/neutrals extractables. Outside the lagoon within the fill materials, the total base/neutral

extractables concentrations decline substantially (2,420 to 16,530 ppb). Methylene chloride (29 ppb total), benzene (80 ppb total), toluene (50 ppb total), and ethylbenzene (84 ppb total) were detected in the samples.

Tar Plains: Three soil samples (collected randomly from nine possible sample locations) were collected in the tar plains area (in the southwestern corner of the plant). Samples were composited over the 6 to 18 inch depth interval at each location. Observations included staining, odors, and an oily sheen. Analytical results indicated the presence of coal tar related base/neutral extractables, acid extractables were not detected, and VOCs were limited to low levels (methylene chloride [27 ppb total], benzene [6 ppb total], and toluene [22 ppb total] were detected in the samples..

Lime Pit: Along the western boundary of the facility, one boring advanced to 10 feet bgs, was use to evaluate the Lime Pit. From 0 to 5 feet, a mixture of dry sand and fill materials were encountered. At a depth of 5 feet, a resistant layer 16 inches thick, of white to gray cemented sand sized material was encountered. Below a depth of 5.5 feet bgs, the water table was encountered and the subsurface materials appeared stained and had a strong odor. Soil samples for chemical analysis B-9A and B-9B were collected at depths of 4 to 6 and 8 to 10 feet, respectively. Results of priority pollutant volatiles, acid, and base/neutral extractable analyses indicate the presence of base/neutral extractable contamination. All sixteen coal tar related base/neutral compounds were detected in the two lime pit soil samples. Total base/neutral concentrations of 102,940 ppb (B-9A) and 51,520 ppb (B-9B) were reported. Additional priority pollutant compounds detected were reported at significantly lower concentrations; phenol (570 ppb), benzene (10 ppb), and toluene (5 ppb) in sample B-9B.

Waste Liquor Pit: This area was a concrete lined rectangular pit to store tar sludges, acids, and spent solvents. Soils from a single boring (advanced to 12 feet bgs) were stained and had a very strong odor at the water table (6.5 feet). A silty clay unit was encountered at a depth of approximately 9 feet bgs. Analytical results for soil sample B-8A (collected at the 8 to 10 foot-depth interval) revealed contamination restricted to base/neutral extractable compounds. Fifteen of the sixteen coal tar related base/neutral compounds were detected. A total base/neutral extractable concentration of 57,190 ppb was reported. No VOCs were detected.

Site Background: A single “background” surface soil sample (at the northwest corner of the site; 6 to 12 inch interval) had no visible signs of contamination, but 11 of 16 detectable coal tar related base/neutral extractable compounds were detected in the sample. No background subsurface soil

samples were collected.

Groundwater: Water Quality Standards, Conclusions, Recommendations

Water Quality Standards: During seven rounds of water quality samples, the proposed guidelines for primary and secondary drinking water parameters were exceeded for nine parameters at the facility.

- Primary: W-2 had benzene, fluoride, chromium, and cyanide exceedances of prescribed limits for various quarters.

- Secondary: Iron, manganese, nitrate, total dissolved solids (TDS), and sulfate exceeded the standards at least one round of monitoring in all four monitoring wells.

In addition, the following parameters exceeded other guidelines such as the Recommended MCL (RMCL) for parameters that did not have MCLs at the time of the study including: 2,5-demethylphenol, acenaphthene, benzo(a)anthracene, benzo(a)pyrene, bis(2-chloroethyl)ether, fluoranthene, fluorene, hexachloroethane, phenanthrene and pyrene.

Conclusions: The report concluded that groundwater was monitored in a shallow, unconfined aquifer beneath the facility and its quality has been impacted by previous waste management practices. Underground utilities have a hydraulic effect on groundwater flow (Appendix B: Figure 6 – Groundwater Contour Map). W-2 exhibited the highest level of contamination, resulting from the tar decanter area storage. Contaminated soils were present in the subsurface. Additional site remediation was warranted and contaminated soils would continue to be a source of contaminants to the groundwater. Waste materials were still present in the subsurface at the tar decanter area. A closure plan to address the closure of WMUs and continued groundwater monitoring was recommended.

Recommendations: The report recommended continuing quarterly groundwater monitoring of the original four wells with reduced analytical parameters, semi-annually sample W-5 and W-6 and additional new wells, install additional shallow wells to further delineate the contaminant plum near W-2, install deeper wells to investigate the deeper aquifer, and further investigation the tar decanter area soils. Note: No information was found during the file search indicating deeper wells were installed at the site.

Soil Contamination Assessment, 1988

On February 15, 1988, WCC submitted a Soil Contamination Assessment report in response to PADEP's request to develop volume estimates of contaminated soil that must be handled at closure. Thus, the facility conducted an exploratory soil boring program in December 1987 via 67 borings on a grid pattern to delineate the extent of soil contamination. Analysis was completed via fluorometric analyses of 343 samples on site and via laboratory analyses for quantification of individual compounds. The assessment enabled a detailed delineation of the three-dimensional extent of soil contamination in the former coking operations area. Using a site-specific background level of 100 ppm of total PAHs, the total quantities of soil above this level was approximately 22,000 cy of materials, of which 3,000 cy consisted of residual tar materials for off-site disposal and 19,000 cy of soils were amenable to on-site biological degradation treatment. Soils would be excavated to a maximum depth of 10 feet.

Composite confirmatory soil sampling was conducted in the area of the former coking operations and results provided to PADEP on February 24, 1989 (Appendix B: Figure 7 – Confirmatory Soil Sample Areas). The cleanup criterion of 50 ppm (set forth in their May 20, 1988 letter) of the suspected carcinogenic PAH compounds were achieved. Backfilling will be completed with imported fill. On June 20, 1989, PADEP approved backfilling in the areas.

Tank Farm Area Restoration Conceptual Design, 1990

In May 1990, WCC submitted a Tank Farm Area Restoration Conceptual Design report which included an evaluation of the former tank farm area used to blend fuel oils for off-site customers and conceptual design for the biorestoration of the area. It aimed to mitigate fuel oil contamination of fill soils and shallow perched groundwater in the area. The area was 2.5 acres and located at the edge (south area) of the property nearest the Delaware River (Appendix B: Figure 4 – Facility Layout, South Area). The area contained two diked tank farms, a pump house, and a boiler house. It was served by a railroad siding and truck loading station. The tanks were demolished and removed, and secondary structures demolished to ground level. One tank farm had concrete secondary containment for four fuel tank foundations; the second tank farm held two fuel oil tanks surrounded by earthen dikes. No aboveground facilities exist, and several underground structures remain, but are believed to be inactive and sealed (except at the second tank farm area).

Test pits revealed that the fill consisted of predominately sand and gravel, with some silt and rubble. The depth to water in the fill was approximately 3.5 feet bgs. A thin layer of floating oil (separate

phase liquid [SPL]) was present at the top of the saturated zone. TPH ranged from 80 ppm to greater than 20,000 ppm. Total PAHs were detected in a composite surface soil sample (3.7 ppm) and polychlorinated biphenyls (PCBs) were undetected in two surface soil composite samples.

Two monitoring wells (MW-13 and MW-14) were installed in December 1989 in the thin saturated zone of the fill down gradient of the tank farm. Samples collected in January 1990 were analyzed for total petroleum hydrocarbons (TPH) and PAHs; both down gradient wells indicated levels of TPH contamination. Detected PAHs in MW-13 were said to be attributable to the suspended silt in the groundwater sample.

In March 1990, a pumping well (PW-1) and two piezometers (P-1 and P-2) were installed to perform a pump test to evaluate saturated zone hydraulic characteristics. The two piezometers were located 20 and 50 feet away from PW-1, respectively. In April 1990, a pump test was conducted for 12 hours at a continuous pumping rate of 4 gallons per minute. Also, tidal monitoring was conducted at the piers where the maximum measured difference in the river stage over one tidal cycle was six feet. Soil sampling was performed during monitoring well installations and analyzed for TPH. The highest TPH concentrations were observed in the unsaturated zone of the fill layer.

WCC concluded that shallow groundwater within the former tank area was contaminated with TPH, both dissolved and as a SPL. Decreasing TPH concentrations in groundwater samples across the area indicated the TPH contamination had not migrated far horizontally. Moreover, the continuous clay aquiclude on the property implied that vertical migration of contamination was limited. TPH contamination in the groundwater was derived from floating oil observed in the test pits) and from unsaturated zone soil through which percolating precipitation passes.

In one location, at the edge of the boiler house, approximately 20 CY of weathered bunker C fuel oil-contaminated soils were evident at the ground surface. It was disposed off site.

Based on these results, WCC proposed an in situ biorestoration process where groundwater would be withdrawn from the shallow contaminated zone, treated to remove free product and re-dispersed into the shallow zone with nutrient and oxygen supplementation. Groundwater collection would be achieved through the use of sumps screened through the saturated fill layer. Confirmatory samples will be collected from soil borings advanced down to the silty clay aquiclude. Biorestoration will be complete when TPH concentrations are less than 300 ppm.

Engineer's and Owner's Certification of Closure for WMUs, 1992

On December 1, 1992, WCC submitted a second Engineer's and Owner's Certification of Closure for WMUs prepared for the SWMUs and HWMUs in accordance of PADEP hazardous waste management regulations. It noted the status of the some of the monitoring wells:

- W-1: monitors groundwater downgradient from the former tar plains area; no contamination associated with former coal gas or tar processing operations

- W-2: monitors groundwater in the vicinity of former tar decanters; highest levels of groundwater contamination in the shallow zone

- W-3: exhibits essentially no contamination with the former coal gas or tar processing operations

- W-4: monitors background groundwater conditions upgradient of the former plant processing areas

The Engineer's and Owner's Certification of Closure for WMUs report also gave background/summary information for the soil and groundwater sampling endeavors throughout the 1980s:

Associated Chemical and Environmental Services (ACES) completed closure activities in 1988 and removed the following materials:

- Decanter tank tar sludge (K087) and visually contaminated soil: 9,370 tons
- Water contaminated from excavation activities: 439,800 gallons
- Various waste materials: 12 drums
- Fuel oil from unknown source floating in excavations: 250 gallons
- Rubble of railroad ties and wooden timbers: 65 CY
- Scrap metal: 60 tons

The documented closure of identified SWMUs and HWMUs included the following:

Tar Storage Tanks (HWMU): These two above-ground steel tanks were used to store product coal tar

from coal gas cleaning operations with estimated capacities of 1,000,000 and 500,000 gallons, respectively. As of June 1983, they had 650 CY of coal tar and/or decanter tank tar sludge. Kipin excavated and removed 3,755 tons of the waste. The tanks were dismantled and reclaimed for scrap.

Waste Liquor Pit (HWMU): This two-chamber solid concrete pit (25 feet wide by 25 feet long by 10 feet deep) was cleaned out during the 1988 closure activities. Odorous fill and rubble were removed and the interior concrete walls and floor were scraped clean. The pit was filled with demolition rubble including some concrete from the tar decanter foundations that had a thin coating of tar pitch (approved by PADEP).

Trash Pile (SWMU): This 50 foot by 250 foot unit held 2,000 CY of tar waste, coal fines, wood, rubble, steel, and other debris. Kipin removed 1,500 tons of rubble and debris and disposed of it on site, though the exact disposal location is unknown. An estimated 550 tons were also disposed at an off-site landfill.

Tar Plains (HWMU): This 150 foot by 450 foot area in the southwest corner held waste including coke breeze, tar from spills, decanter tar sludge, and miscellaneous rubble during operations. In 1983 materials were screened and then disposed on-site (240 tons at an unknown location) and at two separate landfills (472 and 1,888 tons). K087 waste materials were removed to a landfill in 1988. Six backhoe test pits were excavated to assess subsurface conditions during the 1988 closure activities. No further indication of any K087 materials remained. In 1992 approximately, 2,006 tons of non-hazardous coke breeze and coal fines were removed from the site for disposal at a landfill.

Clean Oxide (SWMU): This SWMU had 2,200 tons of waste that were disposed on-site at an unknown location by Kipin in 1983.

Wood Trays (SWMU): Kipin processed 300 CY of wood trays by grinding and processing into solid fuel in 1983. No other records exist.

Tar Decanters (HWMU): A total of 4,481 tons of waste consisting of a mixture of tar decanter sludge and spent iron oxide was sent to a landfill. In September 1982, Clean Venture initiated closure of this unit. ACES completed additional closure in 1988. Most of the decanter tank tar sludge (K087) was removed in 1982 from the decanters and adjacent decanter sludge lagoon; the areas were reportedly backfilled. Soil investigations by WCC in 1987 identified additional areas of K087 materials in the

nearby vicinity. Thus, in 1988, additional soil and the concrete foundations were removed by ACES. Small pockets of identified sludge were subsequently excavated and removed.

Iron Oxide Boxes and Pile (HWMU): These two rectangular above-ground steel containers erected on concrete foundations contained a mixture of iron oxide and wood chips through which coal gas was passed through during gas cleaning operations. Clean Venture removed wastes in 1982 to a landfill. The above-grade portion was demolished and salvaged. WCC's soil investigation in 1987 revealed additional areas of K087 in the vicinity and revealed additional small pockets of sludge that were subsequently excavated and removed.

Process Piping (SWMU): Asbestos-containing insulation from process piping totaled 30 CY; it was sent to a landfill during closure in 1982. No other documentation is available.

To achieve closure criteria, 16 composite soil samples from a 50 feet by 50 feet grid were collected and analyzed, one from each of the 16 sampling areas identified in Appendix B: Figure 7 - Confirmatory Soil Sample Areas. Sample Area 16 was the only area that exceeded the 50 ppm CPAH, believed to be the former coal tar-derived macadam paving, since no tar decanter sludge (K087) was observed in the area. After excavating each area, samples were collected and analyzed. Analytical data indicated that the remaining soils in all 16 areas were nonhazardous.

Groundwater: As previously described, a groundwater monitoring program was implemented at the facility beginning in 1985. Details included:

- W-1: no contamination associated with the former coal gas or tar processing operations; no uncontrolled migration

- W-2/2R: appeared to be impacted by contaminants associated with the former coal gas and tar processing operations; monitoring would continue

- W-3: (downgradient) no contamination/migration

- W-4: (upgradient) was replaced. bis(2-ethylhexyl)phthalate (20 ppb) is a compound not associated with former plant processing areas

- W-5: (upgradient) low levels of contaminants potentially related to former plant operations

- W-6: low levels of contaminants potentially related to former processing areas

Conclusions: The report concluded that the five HWMUs and four SWMUs were closed in accordance with the PADEP-approved Closure Plan. Low levels of contaminants potentially related to former plant operations are present in groundwater from three of the six monitoring wells, though there was no indication that they were migrating from the site in an uncontrolled manner according to WCC.

Groundwater Monitoring Plan, 1993

On May 6, 1993, WCC submitted a Groundwater Monitoring Plan summarizing groundwater monitoring activities and trends at the site. In accordance with Pennsylvania RCRA Regulations, a long-term monitoring plan was identified, including semi-annual and annual groundwater sampling.

The Groundwater Monitoring Plan noted that there was no uncontrolled migration of contaminants and no existing or anticipated plan to utilize the shallow groundwater. WCC expected groundwater quality to continue to improve due to natural attenuation and biodegradation.

The presence of dibenzofurans detected in W-2R and MW-6 during the first quarter 1991 sampling event was summarized in the report. Dibenzofuran can be associated with dioxins, but it is typically a product of high-temperature carbonization process used a former manufactured gas plant sites; therefore, dibenzofuran at the PCC site is not likely to be related to dioxins.

CME, 1996 and 1997

CMEs were conducted by PADEP (split samples with WCC) in 1996 and 1997. Samples collected by WWC were analyzed for select PAHs, TCE, PCE, benzene, ethylbenzene, toluene, total organic carbon (TOC), total organic halides (TOX), pH and specific conductance from groundwater collected from MW-1R, MW-2R, MW-3, MW-4, MW-5, and MW-6. The samples were collected in March 1996 and February 1997. WWC results are presented in the following table.

PARAMETER (ug/L*)	1996/1997 CME MONITORING WELL RESULTS					
	MW-1R	**MW-2R**	**MW-3**	**MW-4R**	**MW-5**	**MW-6**
PAHs	--/ ND	--/ ND	--/ ND	--/ ND	--/ 43	--/ ND
TCE	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*33/ 14*	ND/ ND
PCE	ND/ ND	ND/ ND	ND/ ND	ND/ ND	***55****/* ND	ND/ ND
Benzene	ND/ ND	*83/ 42*	ND/ ND	ND/ ND	ND/ ND	3/ *10*
Ethylbenzene	ND/ ND	1/ ND	ND/ ND	ND/ ND	ND/ ND	2/ 3
Toluene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	2/ 5
TOC (mg/)	29/ 19	28/ 24.4	12/11.2	42/ 45.3	5/ 4.3	8/ 7.2
TOX	33/ 17.7	42/ 29.5	25/ 20.6	11/ 9.5	71/ 95	6/ 7.1
pH	7.05/ 6.96	8.45/ 8.17	6.88/ 6.74	6.93/ 6.79	6.39/ 6.6	7.01/ 6.7
Specific Conductance (umhos/cm)	3,370/ 2,740	2,140/ 1,780	6,640/ 3,630	2,160/ 2,590	293/ 392	1,080/ 828
Naphthalene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Acenaphthylene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Acenaphthene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	48/ 62
Fluorene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	11.9/ 17.5
Phenanthrene	ND/ ND	9.8/ 7.6	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Anthracene	ND/ ND	2.1/ 1.5	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Fluoranthene	ND/ ND	3.12/ 2.61	ND/ ND	ND/ ND	0.78/ ND	1.07/ 0.74
Pyrene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Benzo(a)anthracene	ND/ ND	0.17/ 0.14	ND/ ND	ND/ ND	0.25/ ND	*0.49/* 0.28
Chrysene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Benzo(b)fluoranthene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*0.44/* ND
Benzo(k)fluoranthene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	0.24/ 0.13
Benzo(a) pyrene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*0.55/* ND
Dibenzo(a,h)anthracene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Benzo(g,h,i)perylene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND
Indeno(1,2,3-cd)pyrene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*0.86/* ND

Notes: * All results in ug/L except where indicated
** Proposed property use included residential units
ND = Not Detected;
-- = not applicable
micromhos/centimeter = (umhos/cm)

CME, 1999

PADEP's summary of the last CME inspection (October 27, 1999) stated the historically TCE, PCE, naphthalene, ethylbenzene, benzene and toluene (all site-related contaminants) were extremely elevated in concentration in the monitoring well samples. However, since 1996, the identified contaminants have exhibited decreasing concentrations trends. Some other constituents in groundwater, sulfate, chloride, specific conductance, TOC, TOX, phenols and ph have remained stable since 1985; some (specific conductance and sulfate) have maintained concentrations above the MCLs for drinking water. (Note: However, the concentrations are below the PADEP Land Recycling Program, Act 2 medium specific concentration [MSCs] for groundwater in non-use aquifers, which is the case for the aquifer beneath the facility.)

The groundwater program at the facility started with quarterly sampling, but in 1998, PADEP allowed for a reduction in monitoring to annual, for the reasons stated above. The groundwater is apparently stable and there does not appear to be a need for further monitoring after 1999.

Note: On July 26, 1999, PADEP reviewed relevant groundwater monitoring data for quarterly sampling events from 1985 through 1998 noting concentrations of COCs had significantly decreased. Iron, manganese, specific conductance, potassium, sodium, calcium, magnesium, sulfate, and chloride have remained elevated even after the removal of wastes in 1988. It noted that benzene and naphthalene in MW-2R were above the SDWA MCLs, but had not migrated to downgradient sampling points and no other monitoring wells detected elevated results and deemed the exceedances localized for the past five years. As elevated levels for the remaining constituencies persisted throughout the groundwater monitoring program both before and after the RCRA clean-up activities, PADEP deemed them a natural phenomenon and indicated groundwater quality was stable. PADEP thus terminated the monitoring requirement.

Inspections

Following the facility's closure, an inspection on June 4, 1982 noted a lack of the following: 24-hour surveillance, inspection schedule, written operation record, groundwater monitoring program, closure and post-closure plan, 2-feet freeboard in a surface impoundment, surface impoundment inspections, waste dispersal wind prevention, and run-off collection prevention. An NOV was issued on June 29, 1982.

On February 6, 1989, PADEP sent an NOV following a January 18, 1989 inspection and requested that W-2 and W-4 be returned to proper operation. On February 22, 1989, the facility responded noting that repairs would be made. On March 8, 1989, groundwater samples were collected from two newly replaced monitoring wells, along with the other four site monitoring wells (Certification of Closure, 1992).

On October 12, 1989, PADEP conducted an inspection and noted that the site was undergoing closure. Also, on March 13, 1996, an inspection noted that the facility was abandoned and that sampling was conducted on September 8, 1994 and on March 13, 1996.

On December 3, 1993, WCC sent PADEP a Certification of Closure documents for the seal pot in

response to PADEP's November 22, 1993 inspection. It noted that closure activities were completed on October 19, 1993 and that solid materials (D018: benzene) were removed in September 1992.

On September 28, 1994, Eastern Enterprises notified PADEP of the proposed plan to complete the grading program. It noted that clean soil would be imported and spread approximately 6 inches thick.

On December 23, 1994, a Certification of Closure was signed for the facility formerly known as the Philadelphia Coke Company and located at 4501 Richmond Street, Philadelphia, Pennsylvania in accordance with the closure plan approved by PADEP on December 13, 1983.

Routine hazardous waste inspections were conducted on March 9, 1983, June 17, 1983, November 16, 1983, December 21, 1983, March 22, 1984, June 6, 1984, July 5, 1984, February 14, 1985, September 18, 1985, September 24, 1985, January 16, 1986, July 8, 1986, January 9, 1987, September 29, 1987, October 12, 1989, July 10, 1990, August 28/29, 1990, January 8, 1991, and May 4, 1993.

PADEP conducted inspections at the empty facility noting it was closed, razed, shut down, and no hazardous waste was present on: August 1, 2000, December 15, 2000, August 28, 2002, June 9, 2004, April 1, 2005, February 24, 2006, August 1, 2007, February 25, 2008, January 8, 2009, and March 22, 2010 (2000 to 2010 inspections).

On March 13, 2003, an inspection noted that Keyspan Energy was on site and that they had acquired the property when they bought the previous company that owned the site. Keyspan Energy was collecting samples as part of a preliminary assessment.

NPDES

NPDES inspections were conducted on February 13, 1975, April 7, 1976, June 10, 1976, November 4, 1976, January 3, 1978, June 22, 1978, May 8, 1979, December 18, 1979, May 6, 1980, June 24, 1980, August 12, 1980, March 23, 1981, December 30, 1981, January 14, 1982, March 29, 1982, June 15, 1982, January 11, 1983, and February 6, 1985 .

A March 4, 1982 inspection noted that the spilled oil on the ground around the quench tower and manhole had been cleaned up, though some oily residue remained.

A September 2, 1982 inspection noted that the NPDES permit had been cancelled.

C. Description of Exposure Pathways for all Releases or Potential Releases

Air: The facility was located in Philadelphia, Pennsylvania with a 2009 population of 1,547,297, according the US Census Bureau (www.factfinder.census.gov, accessed August 31, 2011). The City of Philadelphia has files relating to air permitting for the facility. As PCC is no longer operating; therefore, there are no emissions.

The groundwater at the facility was observed to be at depths that ranged from approximately 2.2 to 9.4 feet below the ground surface (bgs) during the 1996 CME sampling. Shallow groundwater resides in a shallow layer (approximately 10 foot thick) of fill and recent sands. Volatile organic compounds (VOCs) detected in the uppermost aquifer during the 1996 and 1997 CME sampling events conducted shortly before termination of monitoring at the site had concentrations of volatile organics in the interior of the property but not at the perimeter of the property boundaries. There are no buildings on the site or buildings located within 100 feet of historical monitoring well locations with documented groundwater exhibiting elevated VOCs.

Groundwater: Information obtained from the Pennsylvania Department of Conservation and Natural Resources (DCNR) Groundwater Information System (PaGWIS) accessed on February 5, 2011 provided the following information regarding 15 groundwater wells located within a 0.5 mile radius of the facility; all were southwest of the property. Six were owned by American Smelting and Refining and have been destroyed. Three wells were drilled in 1920 and were 400 feet deep; three wells were drilled in 1914 and were 200 feet deep. Six wells were owned by Keystone Concrete; all destroyed. Most of these wells were drilled in 1975 and ranged from 80 to 100 feet in depth. Three wells were owned by Liberty Corporation; drilled in 1903, are 55 feet deep, and were listed as unused. According to the Philadelphia Department of Public Health, the Bridesburg Outboard Club, which is located immediately east of PCC, also maintains a potable water well on their property. This well is located sidegradient to downgradient of the facility. It was reported by the Philadelphia Department of Health that the water is used for restroom use. Specifics about the well, typical pumping rate, well depth, or other construction details were not provided. MW-3 is the closest downgradient well to the Bridesburg Outboard Club. Groundwater collected from MW-3 exhibited concentrations of VOCs and PAHs below detection during the 1996 and 1997 CME sampling events,

although specific conductance concentrations were elevated (>3000 umhos/cm).

The groundwater at the facility was observed to be at depths that ranged from approximately 2.2 to 9.4 feet bgs during the 1996 CME sampling. Shallow groundwater resides in a shallow layer (approximately 10 foot thick) of surficial deposits of variable thickness, consisting of natural sands and gravels deposited by the Delaware River, as well as man-made fill materials. Groundwater flow in the upper aquifer does not conform to regional trends. It indicates radial groundwater flows away from a centrally high area near MW-2 with relatively flat gradients (0.002 to 0.006 foot/foot typical) both toward the Delaware River to the east and to the west (WCC, 1993). The site lies over both an upper unconfined aquifer and lower confined aquifer.

Surface Water/Sediment: The site is 10 feet above sea level and less than 100 feet from the Delaware River. Based on information obtained from PADEP eMapPA (accessed February 5, 2011), the Delaware River is a designated use warm water fishery according to the standards contained in Title 25, Chapter 93 (Water Quality Standards) of the Pennsylvania Code. The site is within a mile of the Federal Emergency Management Agency (FEMA) 100 year floodplain and within the Philadelphia Water Department area.

The facility discharged wastewater to the sanitary sewer. Non contact waste water and stormwater discharged via Outfall 1. A few minor incidents occurred during the operation of the facility. No sediment data is available.

Soil: Surface soils at the site are composed of primarily of fill. Areas of the site were backfilled with demolition rubble, and clean iron oxide during the decommissioning of the facility. However, hazardous waste was removed from the facility, and it was certified closed in accordance with the closure plan 1994.

The site lies along the westernmost margin of the Atlantic Coastal Plain Physiographic Province, characterized by relatively undiversified lowland. It is underlain by a wedge of unconsolidated sediments which thicken in a southeasterly direction. The subsurface soil is characterized by a sequence of sand and fill materials underlain by a geologically recent silty clay alluvium layer.

D. Exposure Pathway Controls and/or Release Controls Instituted at the Facility

Air: As the facility is no longer operating, air emissions from facility operations are no longer a factor of concern. The entire facility has been dismantled and removed and areas where waste material was stored and may have impacted soils have been remediated, thus reducing the sources for groundwater contamination which were exhibiting decreasing trends when monitoring was discontinued.

USEPA has requested that the vapor intrusion pathway be evaluated as part of the EI process. The USEPA 2002 OSWER *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* provides a methodology for vapor intrusion evaluation under current land use conditions using available site data. It should be noted that the USEPA 2002 guidance is not generally recommended for use in evaluating settings that are primarily occupational; however, a neighborhood is located adjacent and northwest of the facility and a recreational facility is located adjacent and northeast of the facility.

In 1987, soil samples were collected from borings during the Hydrogeologic and Soils Investigation to determine the effectiveness of the previous clean-up activities. The sampling was to determine the presence of contamination, not delineate the extent of contamination. The sampling targeted the main areas of the facility: decanter tar bottoms, tar plains, lime pit, and waste liquor pit . A total of 17 soil samples varying from a depth of 6-inches to 10 feet were collected for priority pollutant organic analyses (VOCs, base/neutral extractables, and acid extractables). The VOC detected were as follows:

Parameter (ppb)	**PA Defaults Res Vol to IA Screen (ppb)**	**B-1A**	B-1B	B-2A	B-2B	B-3A	B-3B	B-4A	B-5A	B-6A	B-7A	B-7B	B-8A	B-9A	B-9B	TP-1	TP-2	TP-3
Location		DTB	DTB	DTB	DTB	DTB	DTB	DTB	DTB	DTB	DTB	DTB	WLP	LP	LP	TP	TP	TP
Methylene Chloride	380	BDL	BDL	18	BDL	11	BDL	BDL	BDL	BDL	BDL	BDL	WLP	BDL	BDL	10	17	BDL
Benzene	370	80	BDL	BDL	BDL	BDL	BDL	BDL	BDL	9	9	15	BDL	BDL	10	BDL	BDL	6
Toluene	76,000	50	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5	22	BDL	BDL
Ethylbenzene	*5,700*	*84*	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL – Below detection level
DTB – Decanter tar Bottoms
TP – Tar Plains
LP – Lime Pit
WLP – Waste Liquor Pit

None of the concentrations exceeded the PADEP Defaults Residential Volatilization to Indoor Air Screen (Defaults using SL-SCREEN.XLS version 2.3 03/01; PADEP Soil parameters; 15 cm to bottom of enclosed space; 150 cm to top of contamination; RL = 10-5, HQ = 1.) As such, they also do not exceed the USEPA-PA Defaults Nonresidential PELs Volatilization to Indoor Air Screen.

Volatile organic compounds detected in the uppermost aquifer during the 1996 and 1997 CME sampling events conducted shortly before termination of monitoring at the site had TCE concentrations greater than the USEPA Target Groundwater Concentration as listed below:

PARAMETER (ug/L)	1996/1997 CME MONITORING WELL RESULTS						*USEPA Target Groundwater Concentration**
	MW-1R	MW-2R	MW-3	MW-4R	MW-5	MW-6	
TCE	ND/ ND	ND/ ND	ND/ ND	ND/ ND	**33/ 14**	ND/ ND	5.0
PCE	ND/ ND	ND/ ND	ND/ ND	ND/ ND	**55**/ ND	ND/ ND	5.0
Benzene	ND/ ND	**83/ 42**	ND/ ND	ND/ ND	ND/ ND	3/ **10**	5.0
Ethylbenzene	ND/ ND	1/ ND	ND/ ND	ND/ ND	ND/ ND	2/ 3	700
Toluene	ND /ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	2/ 5	1,500

Note: * USEPA OSWER Guidance, 2002, where the soil attenuation factor = 0.001; Risk = 1E-06

Groundwater collected from MW-2R, that is located approximately 125 feet off of the facility fence line near the residential neighborhood, exceeded the USEPA generic target groundwater screening value for indoor air for TCE. MW-5, that is located near the northwest portion the facility, exceeded the USEPA generic target groundwater screening value for indoor air for TCE and PCE. Monitoring well MW-6, that is located near the center of the facility, exceeded the USEPA generic target groundwater screening value for indoor air for benzene. No volatiles were detected in MW-1R, which is closest to the property boundary in southwest corner the facility. No volatiles were detected in MW-3, which is closest to the property boundary in south portion the facility. No volatiles were detected in MW-4R, which is closest to the property boundary in northwest portion the facility. An historical boring log indicates the silty clay layer below the shallow water zone is approximately 20 feet thick. Under current conditions, it is concluded that no controls are relevant for the vapor exposure pathway.

Note: Currently, no deed restrictions are in place.

Groundwater: Upon the facility's closure, the impact to soils and subsequently the groundwater were investigated. Impacted soils were remediated through removals and in-situ methods. Monitoring of the groundwater was conducted on a regular basis with oversight from the PADEP and USEPA, eventually reaching acceptable concentrations to permit the discontinuation of future monitoring after 1999. The neighboring properties, within a 0.5 mile radius of the site, are reportedly connected to the public water supply, except for the Bridesburg Outboard Club. According to the Philadelphia Department of Public Health, the Bridesburg Outboard Club, located immediately east of PCC, maintains a potable water well on their property which reportedly use the water for restroom use. It is unknown if there are signs designating any use restrictions at the club. The PCC property has no deed restriction or land use covenant prohibiting the use of groundwater.

A PADEP Land Recycling Program, Act 2 site, Rohm & Haas Philadelphia Plant East Area 1, which received a Non-Use Aquifer Determination on April 16, 1999 is located less than 0.4 mile (approximately) northeast of the site, and 0.6 mile (approximately) north of the Bridesburg Outboard Club well.

Concentrations of the COCs in the site groundwater were generally below the residential used aquifer MSCs at the site monitoring wells during the 1996 and 1997 CME investigations except for TCE collected from MW-5 in 1996 and 1997, PCE in MW-5 in 1996, benzene in MW-2R in 1996 and 1997 and MW-6 in 1997, and benzo(a)anthracene, benzo(b)fluoranthene, benzo(a) pyrene, and indeno(1,2,3-cd)pyrene in MW-6 in 1996. Only PCE in MW-5 exceeded the residential non-used aquifer MSC during 1996. In general, groundwater concentrations indicated a general decreasing trend over time at the facility, which was why PADEP allowed the facility to discontinue monitoring after 1999. Some concentrations, such as benzene (16 ug/L) and naphthalene (36 ug/L) remained elevated above drinking water standards (5 ug/L and 30 ug/L, respectively) in groundwater collected from MW-2R, but appeared to be relatively stable and localized (PADEP, July 26, 1999). The concentrations were also below detection levels in groundwater collected from MW-1, MW-3 and MW-4 during 1996 and 1997, which were the perimeter downgradient wells for the facility.

PARAMETER (ug/L*)	1996/1997 CME MONITORING WELL RESULTS						Non-Use Aquifer – Residential MSC **	*Used Aquifer – Residential MSC **
	MW-1R	MW-2R	MW-3	MW-4R	MW-5	MW-6		
PAHs	--/ ND	--/ ND	--/ ND	--/ ND	--/ 43	--/ ND	--	--
TCE	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*33/ 14*	ND/ ND	50	5
PCE	ND/ ND	ND/ ND	ND/ ND	ND/ ND	***55***/ ND	ND/ ND	50	5
Benzene	ND/ ND	*83/ 42*	ND/ ND	ND/ ND	ND/ ND	3/ *10*	500	5
Ethylbenzene	ND/ ND	1/ ND	ND/ ND	ND/ ND	ND/ ND	2/ 3	70,000	700
Toluene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	2/ 5	100,000	1,000
TOC (mg/)	29/ 19	28/ 24.4	12/11.2	42/ 45.3	5/ 4.3	8/ 7.2	--	--
TOX	33/ 17.7	42/ 29.5	25/ 20.6	11/ 9.5	71/ 95	6/ 7.1	--	--
pH	7.05/ 6.96	8.45/ 8.17	6.88/ 6.74	6.93/ 6.79	6.39/ 6.6	7.01/ 6.7	--	--
Specific Conductance (umhos/cm)	3,370/ 2,740	2,140/ 1,780	6,640/ 3,630	2,160/ 2,590	293/ 392	1,080/ 828	--	--
Naphthalene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	30,000	100
Acenaphthylene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	16,000	2,200
Acenaphthene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	48/ 62	3,800	2,200
Fluorene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	11.9/ 17.5	1,900	1,500
Phenanthrene	ND/ ND	9.8/ 7.6	ND/ ND	ND/ ND	ND/ ND	ND/ ND	1,100	1,100
Anthracene	ND/ ND	2.1/ 1.5	ND/ ND	ND/ ND	ND/ ND	ND/ ND	66	66
Fluoranthene	ND/ ND	3.12/ 2.61	ND/ ND	ND/ ND	0.78/ ND	1.07/ 0.74	260	260
Pyrene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	130	130
Benzo(a)anthracene	ND/ ND	0.17/ 0.14	ND/ ND	ND/ ND	0.25/ ND	*0.49/* 0.28	11	0.29
Chrysene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	1.9	1.9
Benzo(b)fluoranthene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*0.44/* ND	1.2	0.29
Benzo(k)fluoranthene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	0.24/ 0.13	0.55	0.55
Benzo(a) pyrene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*0.55/* ND	3.8	0.2
Dibenzo(a,h)anthracene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	0.6	0.029
Benzo(g,h,i)perylene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	0.26	0.26
Indeno(1,2,3-cd)pyrene	ND/ ND	ND/ ND	ND/ ND	ND/ ND	ND/ ND	*0.86*/ ND	62	0.29

Notes: * All results in ug/l except where indicated; 1996 values from WCC/ 1997 values from PADEP.
** Proposed property use included residential units
ND = Not Detected
-- = not applicable

As the vertical delineation of groundwater quality was not conducted at the site, no deed restrictions are in place to restrict groundwater use at the site for potable use, and with the presence of the Bridesburg Outboard Club well located east of the site, it is unknown whether controls are needed for the use of groundwater at this time. Note: The Bridesburg Outboard Club is located adjacent to land that was identified as the Rohm & Haas Co. residual waste landfill and downgradient of the Rohm & Haas drum storage and container storage area (PADEP, August 29, 1990).

Surface Water/Sediment: The closest surface water body to the facility is the Delaware River, approximately 100 feet to the east. During its operation, several NOVs were issued pertaining to oily discharges (in minor quantities) in violation of NPDES permits at the time. Upon it closure, the facility posed no further direct discharge impact to the Delaware River. In groundwater, the concentrations of the COCs were below detection at the far downgradient wells (MW-1R and MW-3) in the main area, and therefore, should not be a source of contamination to the surface water/sediment.

Two monitoring wells (MW-13 and MW-14) were installed in December 1989 in the thin saturated zone of the fill down gradient of the tank farm. In-situ biorestoration of groundwater was achieved through the use of sumps screened through the saturated fill layer. Confirmatory samples were collected from soil borings advanced down to the silty clay aquiclude. Biorestoration will be complete when TPH concentrations are less than 300 ppm.

Based on the information presented, it is concluded that no controls are relevant for the surface water/sediment exposure pathway.

Soil: Since the facility ceased operations in 1982, access to the property has been restricted by a perimeter fence of the main area. During it operations, the facility produced and stored waste at the facility, which impacted the site soils. Highly contaminated soils were removed and appropriately disposed, while mildly contaminated soils were remediated with other remedial methods such as bioremediation. The facility was certified as closed in accordance with the closure plan in 1994.

The facility was remediated to removed PAHs with a combined CPAH concentrations not to exceed 50 ppm with no individual of the six CPAH exceed 15 ppm. Soils were remediated in 16 areas as illustrated on Appendix B: Figure 7 – Confirmatory Soil Sample Areas. The maximum concentrations of base neutrals in the confirmation samples from the Soil Contamination Assessment (1988) were as follows:

Parameter	Maximum Concentration Remaining On-site (mg/kg)	Sample Area	*Direct Contact Residential MSC*	Direct Contact Nonresidential MSC – Surface Soil	Direct Contact Nonresidential MSC –subsurface surface soil	**Soil to Groundwater Residential Used Aquifer TDS ≤ 2,500**	Soil to Groundwater Non Residential MSC Used Aquifer TDS ≤ 2,500
Acenaphthene	1.27	I	13,000	170,000	190,000	2,700	4,700
Acenaphththylene	1.33	XVI	13,000	170,000	190,000	2,500	6,900
Anthracene	7	XVI	66,000	190,000	190,000	350	350
Benzo(a)anthracene*	*17.7*	XVI	5.7	110	190,000	25	320
Benzo(a)pyrene*	*11*	XVI	0.57	11	190,000	46	46
Benzo(b)fluoranthene*	*22*	XVI	5.7	110	190,000	40	170
Benzo(g,h,i)perylene	8.7	XVI	13,000	170,000	190,000	180	180
Benzo(k) fluoranthene	***	XVI	57	1,100	190,000	610	610
Chrysene*	26.7	XVI	270	11,000	190,000	230	230
Dibenzo(a,h) anthracene*	*2.13*	XVI	0.57	11	190,000	13	160
Fluoranthene	31.7	XVI	8,800	110,000	190,000	3,200	3,200
Fluorene	2.57	V	8,800	110,000	190,000	3,000	3,800
Indeno(1,2,3-c,d)pyrene*	*7*	XVI	5.7	110	190,000	2,200	28,000
Naphthalene	**26.7**	VIII	4,400	56,000	190,000	25	25
Phenanthrene	23	XVI	66,000	190,000	190,000	10,000	10,000
Pyrene	24.7	XVI	6,600	84,000	190,000	2,200	2,200
Total PAHs	188.4	XVI	--	--	--	--	--
Total Carcinogenic PAHs	85.5	XVI	--	--	--	--	--

Notes: Maximum concentration based on 16 confirmation samples from the Soil Contamination Assessment (1988). One confirmatory sample per remedial area.

MSC = PADEP Medium Specific Concentration

Note that samples from Area XIV exceeded the standard so additional excavation was conducted and the area was resampled (sample XIVR).

*** = compound could not be distinguished from benzo (b) fluoranthene in analysis; reported values are the combined concentrations

While the concentrations in area XVI exceeded the required cleanup criteria of 50 ppm of the carcinogenic PAHs, the source was believed to be the former coal tar-derived macadam paving that covered Area XVI and not the decanter tank tar sludge (K087) waste, because no K087 waste was observed in the area. Therefore, no further action was taken in Area 16; however, no follow up testing was performed to verify this hypothesis. The current residential MSCs were exceeded for several of the carcinogenic PAHs in Area XVI. However, the concentrations are less than or equal to the non-residential MSCs for all of the tested PAHs. The maximum naphthalene concentration slightly exceeded the soil to groundwater MSCs in Area VIII. While no monitoring well was specifically located in Area VIII, naphthalene was not detected in groundwater during 1996 and 1997 at any of the existing site six monitoring wells. An insitu biorestoration process where groundwater was withdrawn from the shallow contaminated zone, treated to remove free product and re-dispersed into the shallow zone with nutrient and oxygen supplementation was performed in the south area. Biorestoration was to be complete when TPH concentrations are less than 300 ppm in the confirmatory soil samples. In summary, direct contact residential MSCs were exceeded for several of the carcinogenic PAHs in Area XVI, biorestoration was complete when TPH concentrations were less than 300 ppm in the soil in the south area, access to the site is permissible through the un-maintained perimeter fence operations, there are no deed restrictions, and the site is adjacent a residential neighborhood and recreational facilities. Therefore, it is concluded that controls are relevant for the soil exposure pathway.

E. Follow-up Action Items

USEPA Region III will decide if additional information or sampling at the facility is required to determine whether or not the environmental indicators have been met or if corrective action is required for the facility.

APPENDIX A

Photographs

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **1**	
VIEW **South**	
PHOTOGRAPHS BY **Baker**	

Comments: View from Main Gate.

PHOTOGRAPH **2**	
VIEW **Southeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Intersection of Lefevre and Garden Streets.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **3**	
VIEW **West**	
PHOTOGRAPHS BY **Baker**	

Comments: Northern area of property.

PHOTOGRAPH **4**	
VIEW **Northeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Former garage and storage building location. Northern property boundary.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **5**	
VIEW **Southwest**	
PHOTOGRAPHS BY **Baker**	

Comments: Adjacent property across Orthodox Street.

PHOTOGRAPH **6**	
VIEW **Southwest**	
PHOTOGRAPHS BY **Baker**	

Comments: Adjacent property across Orthodox Street.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **7**	
VIEW **Northwest**	
PHOTOGRAPHS BY **Baker**	

Comments: Property boundary at Orthodox Street.

PHOTOGRAPH **8**	
VIEW **West**	
PHOTOGRAPHS BY **Baker**	

Comments: Vandalized fence along Orthodox Street.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **9**	
VIEW West	
PHOTOGRAPHS BY **Baker**	

Comments: Vandalized fence along rail line.

PHOTOGRAPH **10**	
VIEW **Southwest**	
PHOTOGRAPHS BY **Baker**	

Comments: View along southern property boundary.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **11**	
VIEW **South**	
PHOTOGRAPHS BY **Baker**	

Comments: Coal pier.

PHOTOGRAPH **12**	
VIEW **South**	
PHOTOGRAPHS BY **Baker**	

Comments: Pier.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **13**	
VIEW **South**	
PHOTOGRAPHS BY **Baker**	

Comments: Former ship docking area.

PHOTOGRAPH **14**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Outfall 1.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **15**	
VIEW **South**	
PHOTOGRAPHS BY **Baker**	

Comments: Southern view towards rail line and coal pier.

PHOTOGRAPH **16**	
VIEW **Southeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Southeast corner of property.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **17**	
VIEW **Southeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Eastern property boundary along Buckius Street.

PHOTOGRAPH **18**	
VIEW **East**	
PHOTOGRAPHS BY **Baker**	

Comments: Adjacent school property across Buckius Street.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **19**	
VIEW **Northeast**	
PHOTOGRAPHS BY **Baker**	

Comments: Northeast corner of property.

PHOTOGRAPH **20**	
VIEW **North**	
PHOTOGRAPHS BY **Baker**	

Comments: Unused portion of northern property looking at Garden Street.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **21**	
VIEW **Northwest**	
PHOTOGRAPHS BY **Baker**	

Comments: Northwest corner of property.

PHOTOGRAPH **22**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former oil skimmer basin.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **23**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former area of excavation.

PHOTOGRAPH **24**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former change house floor.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **25**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former tar decanter area.

PHOTOGRAPH **26**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former tar decanter area.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **27**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former office and lab area.

PHOTOGRAPH **28**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former coke oven battery location.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **29**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Concrete fragment in excavation area.

PHOTOGRAPH **30**	
VIEW **Northwest**	
PHOTOGRAPHS BY **Baker**	

Comments: Monitoring well MW-1 along Orthodox Street.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **31**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Monitoring well MW-2.

PHOTOGRAPH **32**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Monitoring well MW-3.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **33**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Monitoring well MW-4.

PHOTOGRAPH **34**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former parking lot.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **35**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former coal storage pile area.

PHOTOGRAPH **36**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former smokestack foundation location.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **37**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Old tank foundation location.

PHOTOGRAPH **38**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former oxide box location.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **39**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former spent iron oxide excavation area.

PHOTOGRAPH **40**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former tar plains area.

MICHAEL BAKER JR., INC. – PHOTOGRAPHIC RECORD

SITE NAME: Philadelphia Coke Co., Inc.

PHOTOGRAPH **41**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Former tar plains area.

PHOTOGRAPH **42**	
VIEW **Exterior**	
PHOTOGRAPHS BY **Baker**	

Comments: Monitoring station.

APPENDIX B

Figures

● –PaGWIS Wells

Source: PASDA.2008

800 0 400 800

1 inch = 800 ft.

SCALE: 1" = 800'	DATE: NOVEMBER 2011
S.O. NO.: 120686	FILE: 120686–PCC–08
DSN/DWN: MM/RRR	CHK: SRF

Baker MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

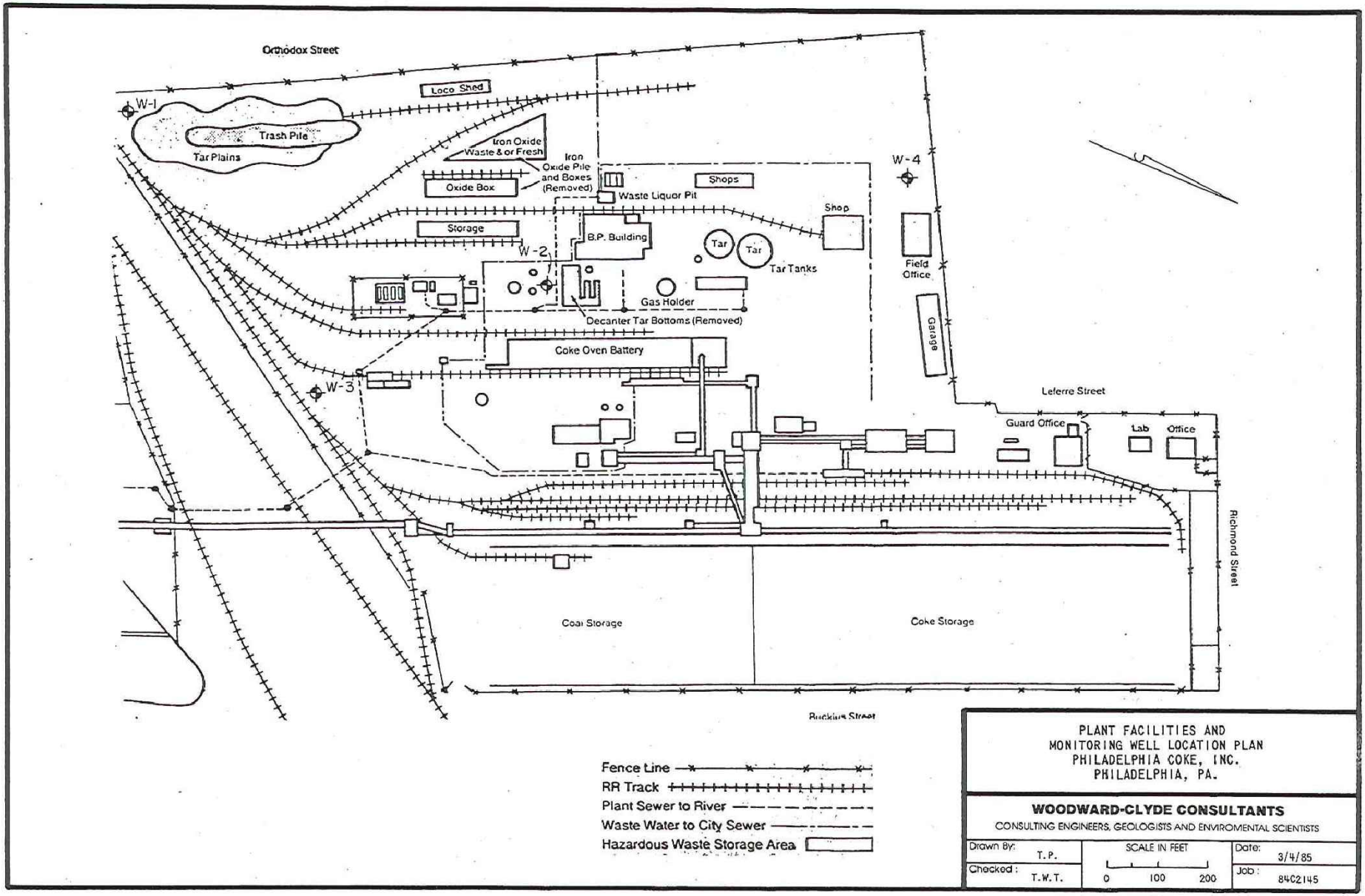
FIGURE 1
FACILITY LOCATION MAP
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137

Temple University Libraries, Urban Archives

FIGURE 2
FORMER FACILITY OPERATIONS
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137

SCALE: NOT TO SCALE	DATE: NOVEMBER 2011
S.O. NO.: 120686	FILE: 120686-PCC-02
DSN/DWN: MM/WJH	CHK: SRF

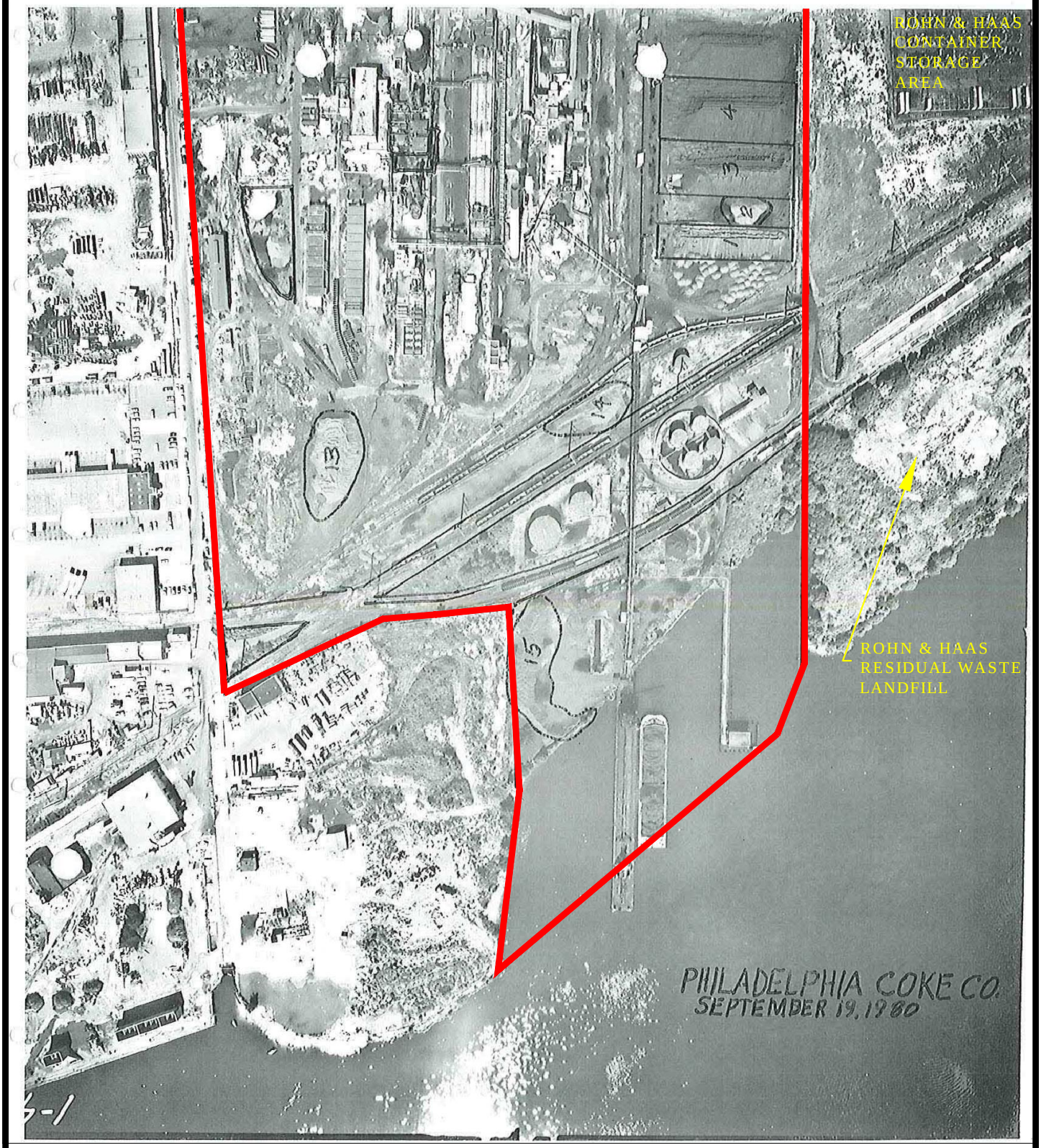
Baker MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA



SCALE: AS SHOWN	DATE: FEBRUARY 2011
S.O. NO.: 120686	FILE: 120686-PCC-03
DSN/DWN: MM/WJH	CHK: SRF

Baker MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 3
FACILITY LAYOUT, MAIN AREA
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137



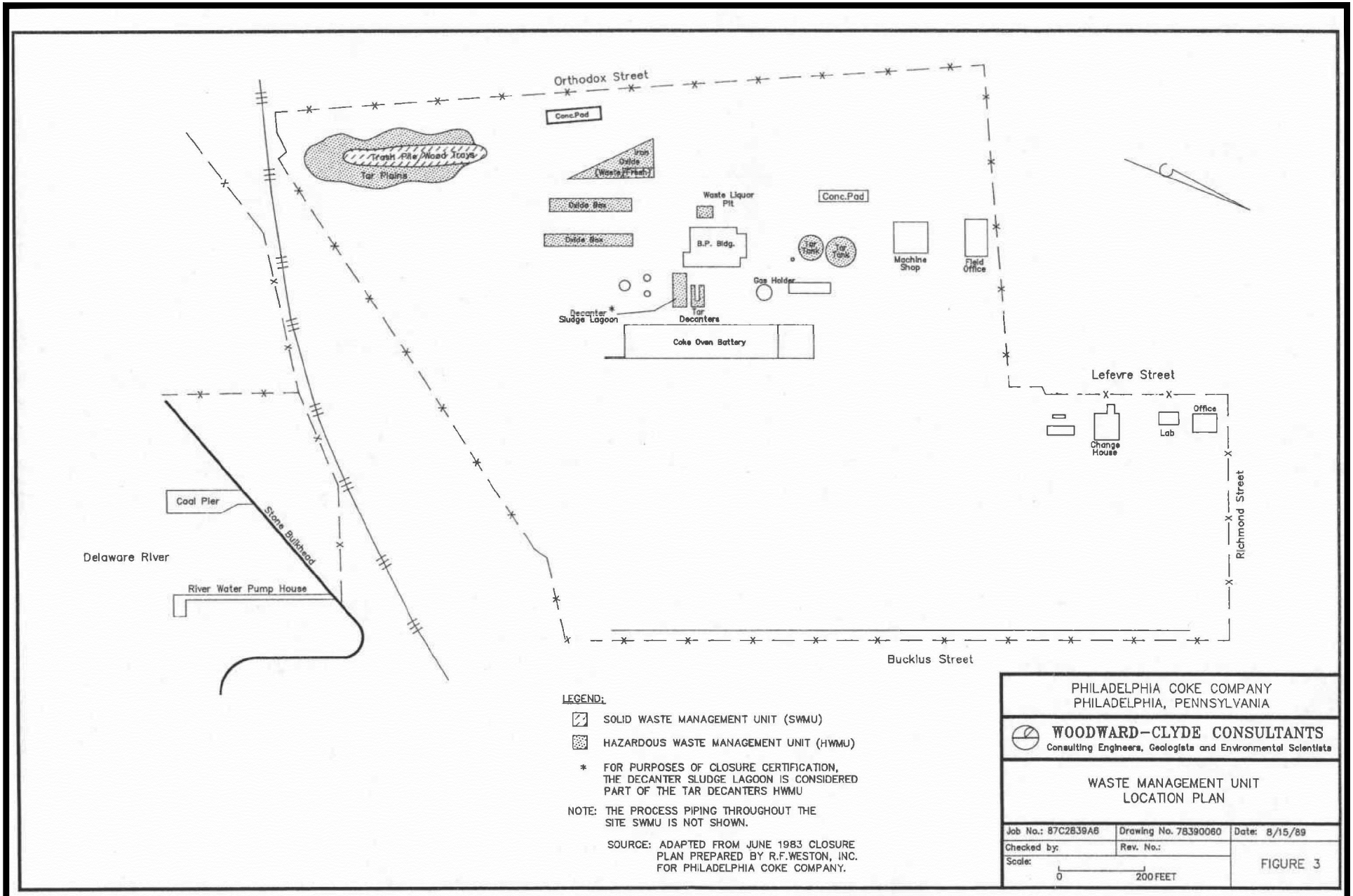
Source:
WASTE PERMIT APPLICATION
NOVENBER 18, 1980 (BASEMAP)
PADEP INSPECTION, AUGUST 1990

FIGURE 4
FACILITY LAYOUT, SOUTH AREA
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137

SCALE: NOT TO SCALE	**DATE:** NOVEMBER 2011
S.O. NO.: 120686	**FILE:** 120686-PCC-06
DSN/DWN: MM/RRR	**CHK:** SRF

Baker
Michael Baker Jr., Inc.

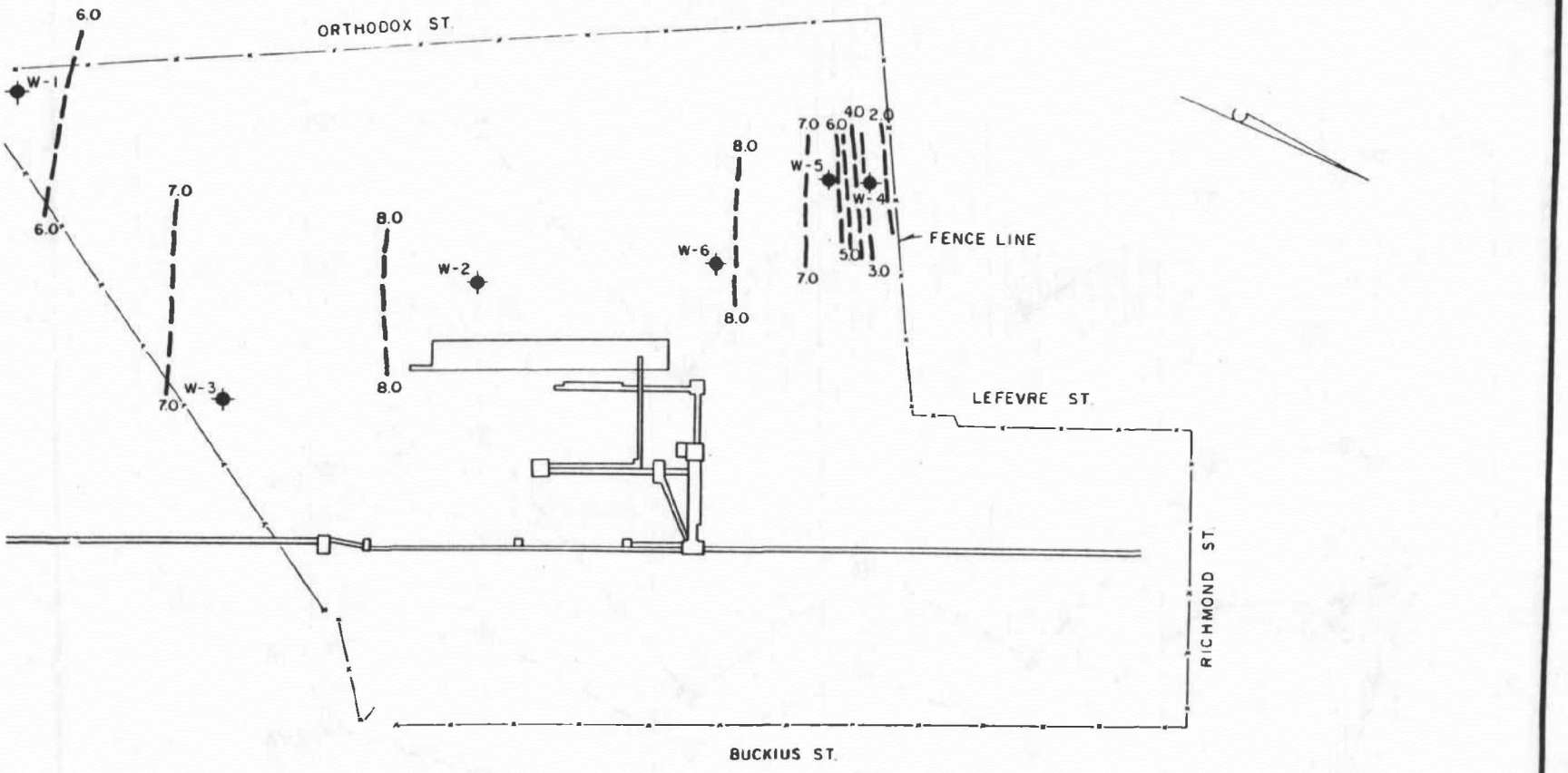
MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA



SCALE: AS SHOWN	DATE: NOVEMBER 2011
S.O. NO.: 120686	FILE: 120686-PCC-04
DSN/DWN: MM/WJH	CHK: SRF

Baker MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 5
WASTE MANAGEMENT UNIT LOCATION MAP
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137



GROUNDWATER ELEVATIONS, OCT. 27, 1986
PHILADELPHIA COKE COMPANY
PHILADELPHIA, PENNSYLVANIA

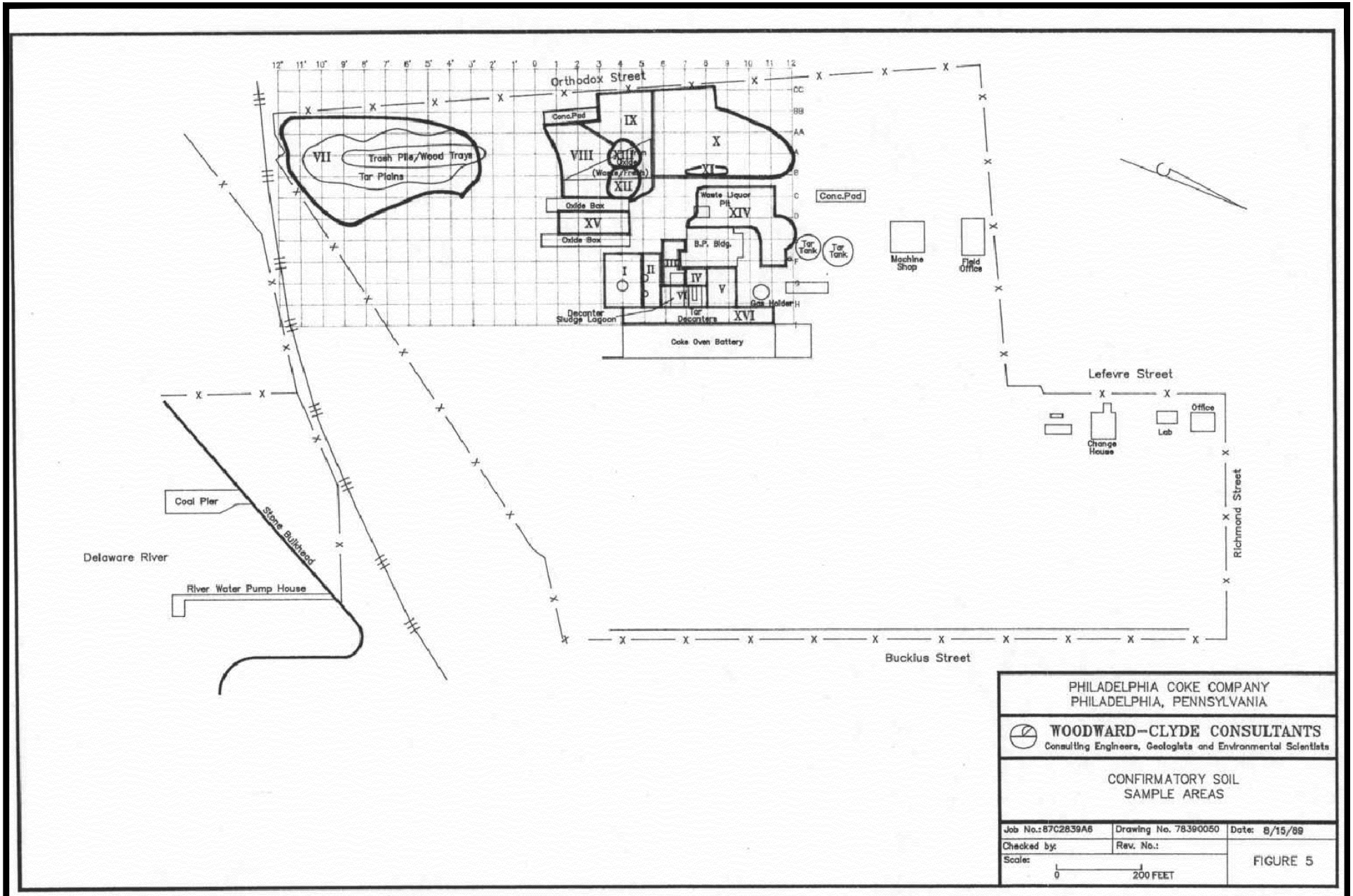
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn By T.P.	SCALE IN FEET 0 200	Date 12/8/86	
Checked T.W.T.		JO 84C2145	

SCALE: AS SHOWN	DATE: NOVEMBER 2011
S.O. NO.: 120686	FILE: 120686-PCC-07
DSN/DWN: AAF/RRR	CHK: SRF

Baker MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 6
GROUNDWATER CONTOUR MAP
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137



SCALE: AS SHOWN	DATE: NOVEMBER 2011
S.O. NO.: 120686	FILE: 120686-PCC-05
DSN/DWN: MM/WJH	CHK: SRF

Baker MICHAEL BAKER JR., INC.
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 7
CONFIRMATORY SOIL SAMPLE AREAS
PHILADELPHIA COKE COMPANY
4501 RICHMOND STREET
PHILADELPHIA, PENNSYLVANIA 19137

APPENDIX C

Inventory of Documentation and Reference Documents

The following is a list of documents in the order referenced in the report:

Document Date	Document
March 21, 2007	Site Development Review
August 13, 1980	Notification of Hazardous Waste Activity
October 9, 1980	EPA ID No. Issued
November 18, 1980	Part A Application
December 23, 1980	Acknowledge Notification
July 24, 1981	Acknowledge Processing Part A
October 22, 1982	Notification of Closure and Disposal
December 28, 1982	Removal Complete
June 1, 1983	Closure Plan
October 27, 1982	Formal Part B Request
July 5, 1983	Closure of Hazardous Waste Facility
August 1, 1983	City Review of Closure Plan
October 27, 1983	NOV
November 9, 1983	Waste Removed
December 13, 1983	PADEP Accept Closure Plan
August 17, 1984	Monitoring Well Site Map
March 30, 1984	Request of Waste
April 13, 1984	Waste Disposal Follow Up
August 31, 1984	Part B Request
September 18, 1984	Site Closed Will not Submit Part B
February 21, 1985	USEPA Draft Sampling and Analysis Plan
March 4, 1985	Revised Sampling Plan
July 16, 1985	Hydrogeologic Assessment
September 26, 1985	Hydrogeologic Investigation
January 17, 1986	Third Quarter 1985 Sampling
April 8, 1986	Fourth Quarter 1985 Sampling
September 12, 1985	Closure Plan Approved
April 15, 1986	Work Plan Soil Sampling
May 8, 1986	Soil Sampling EPA Comments
July 11, 1986	NOV Bonding
July 15, 1986	NOV Wells
August 27, 1986	Revised Soil Sampling Program
December 1, 1992	Engineering and Owner Certificate of Closure
October 31, 1986	PADEP Request of WMUs
January 29, 1987	Hydrogeologic & Soils Investigation
July 22, 1987	Remediation Options
January 28, 1988	Letter Follow-up PAH
February 1, 1988	WP Field Pilot Land Treatment Tests

February 15, 1988	Soil Contamination Report
March 28, 1988	PADEP Response
April 6, 1988	Follow-up Response
April 21, 1988	PADEP Approves Pilot Study
May 20, 1988	Proposed Cleanup Criteria
June 16, 1988	WCC Letter Documenting PADEP Verbal Approval
February 6, 1989	NOV GW Wells
1982-1993	Hazardous Waste Inspections
February 22, 1989	Facility Response
February 24, 1989	Nonhazardous Results
June 20, 1989	PADEP Backfill Approval
September 1, 1989	WCC Certificate of Closure Report
May 1, 1990	Tank Farm Area Restoration Conceptual Design
September 7, 1990	NOV Quarterly Groundwater Monitoring
September 7, 1990	Quarterly GW Reports
November 6, 1990	Civil Penalty GW Monitoring
January 8, 1991	PADEP Groundwater Results
June 11, 1991	PADEP Application Soil Remediation Unit
June 21, 1991	Groundwater Monitoring
May 6, 1993	Groundwater Monitoring Plan
June 7, 1993	Closure of Seal Pot
September 16, 1993	Grading Plan for Site
September 16, 1993	Groundwater Response
December 3, 1993	Seal Pot Closure
September 28, 1994	Grading Plan for Site
December 23, 1994	Certificate of Closure Seal Pot
March 13, 1996	Inspection
1996	Comprehensive Groundwater Monitoring Evaluation
1997	Comprehensive Groundwater Monitoring Evaluation
March 23, 1998	Groundwater Approval Request
September 14, 1998	Groundwater to Annual Requirement
July 26, 1999	Termination of Groundwater Monitoring
October 27, 1999	CME Inspection
March 3, 2000	Bond Release Response
May 20, 1971	NOV Cyanide
July 1, 1971	Permit Application
January 3, 1972	Court Stipulation Cyanide Testing
August 25, 1972	NOV No Permit for Discharge
February 1, 1973	Meeting for NOV
December 1, 1973	Engineering Study of Wastewater
December 10, 1975	Industrial Waste Application

December 19, 1975	Notice of Application
January 7, 1976	PIPP Unsatisfactory
February 18, 1976	Revised PIPP
February 9, 1976	Application Questions
February 18, 1976	Response to Letter
July 28, 1976	PADEP Approval
September 16, 1976	Response to PADEP
September 30, 1976	DRBC Decision
March 3, 1977	DEP Requests PIPP
January 10, 1978	NOV
May 23, 1978	Result of NOV
June 1, 1978	Response to Results
July 2, 1979	Response to Inspection
July 20, 1979	Response to Oil Leak
March 27, 1981	Response to Discharge
July 6, 1981	NOV Housekeeping
July 28, 1981	Response to Inspection
February 22, 1982	NOV Cyanide
May 21, 1982	NOV Cyanide
August 12, 1982	NOV DMR
June 28, 1982	Response to NOV
June 29, 1982	NOV
2000-2010	Hazardous Waste Inspections
1975-1985	Facility NPDES Inspections