

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Philadelphia Coke Company
Facility Address: 4501 Richmond Street, Philadelphia, PA 19137
Facility EPA ID #: PAD000427906

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

If yes – check here and continue with #2 below.

If no – re-evaluate existing data, or

If data are not available skip to #6 and enter “IN” (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of “Current Human Exposures Under Control” EI

A positive “Current Human Exposures Under Control” EI determination (“YE” status code) indicates that there are no “unacceptable” human exposures to “contamination” (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all “contamination” subject to RCRA corrective action at or from the identified facility [i.e., site-wide]).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The “Current Human Exposures Under Control” EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program’s overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be “contaminated”¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale/Key Contaminants</u>
Groundwater	X			Volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAH) detected in groundwater at the facility above medium specific concentration (MSCs). In the case of the Contaminants of concern (COCs) here, the MSCs are equivalent to EPA’s Maximum Contaminant Levels (MCLs) or within the Regional Screening Level (RSL) risk range of 10 ⁻⁶ to 10 ⁻⁴ .
Air (indoors) ²		X		No structures remain at the site.
Surface Soil (e.g., <2 ft)		X		Impact limited to specialized areas which were address with subsurface soil remediation. The facility was remediated to removed PAHs with a combined carcinogenic PAH (CPAH) concentrations not to exceed 50 ppm with no individual of the six CPAH exceed 15 ppm. Soils were remediated in 16 areas.
Surface Water		X		Facility is now closed and no discharges are expected.
Sediment		X		COCs in groundwater were below detection in the far downgradient monitoring wells.
Subsurf. Soil (e.g., >2 ft)		X		Impact limited to specialized areas which were address with subsurface soil remediation. 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.
Air (outdoors)		X		Facility operated under air permits on file with City of Philadelphia. Facility in now closed.

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Background Information

Philadelphia Coke Co., Inc. (PCC) was located at 4501 Richmond Street, Philadelphia, Pennsylvania, on a flat, 63-acre industrial site in the "Bridesburg Section" of Philadelphia. 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 and fuel blending operations. 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 the Pennsylvania Department of Environmental Protection (PADEP) in December 1994. As a result of stabilized groundwater monitoring trends of contamination, PADEP terminated the groundwater monitoring requirement in 1999.

The August 11, 2011 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.

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. 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.

Groundwater:

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.

Upon the facility's closure, the impact to soils and subsequently the groundwater were investigated. Impacted 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.

Concentrations of the COCs in the site groundwater were generally below the residential used aquifer MSCs, EPA MCLs,

and EPA RSLs 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. 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. 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. Results of the 1996 and 1997 CME are presented in the table below.

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/L)	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.

ND = Not Detected;

-- = not applicable

Air (indoors):

There are no structures remaining at the site thus indoor air quality is no longer relevant. The entire facility has been dismantled and removed and areas where waste material was stored and may have impacted soils have been remediated.

Soil:

Since the facility ceased operations in 1982, access to the property has been restricted by a perimeter fence of the main area. 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. 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
Acenaphthylene	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. These concentrations are less than or equal to the non-residential MSCs or within EPA's RSL risk range of 10^{-6} to 10^{-4} 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 bioremediation 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. Bioremediation was completed when TPH concentrations were less than 300 ppm in the confirmatory soil samples. In summary, concentrations are below non-residential MSCs or within EPA's RSL risk range of 10^{-6} to 10^{-4} for all of the tested PAHs, bioremediation 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.

Surface Water/Sediment: The closest surface water body to the facility is the Delaware River. PCC is 10 feet above sea level and less than 100 feet from the Delaware River. During its operation, several notices of violations (NOVs) were issued pertaining to oily discharges (in minor quantities) in violation of NPDES permits at the time. Upon its 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 bioremediation 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. Bioremediation was completed and TPH concentrations were less than 300 ppm.

No sediment data is available. However, based on the information presented above, EPA has concluded that sediment is not reasonably suspected to be contaminated above appropriately protective risk-based levels.

Air (outdoors): As PCC is no longer operating, air emissions from operations are no longer a factor of concern.

Reference:

Environmental Indicator Inspection Report for Philadelphia Coke Co., Inc., EPA ID No. PAD004427906,
Prepared by Michael J. Baker Jr., Inc., January 2012

3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

Contaminated Media	<u>Residents</u>	<u>Workers</u>	<u>Day-Care</u>	<u>Construction</u>	<u>Trespassers</u>	<u>Recreation</u>	<u>Food³</u>
Groundwater	No	No	No	No	No	No	No
Air (indoors)							
Soil (surface, e.g., <2 ft.)							
Surface Water							
Sediment							
Soil (subsurface e.g., >2 ft.)							
Air (outdoors)							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not “contaminated” as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“___”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

 X If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

 If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.

 If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code.

Rationale and Reference(s):

The use of the property currently remains idle with no development since the facility’s closure. Groundwater is not currently or anticipated to be used in the near future. Concentrations of constituents in groundwater above EPA MCLs and EPA RSLs are isolated to a central location on site and do not migrate beyond the facility boundary. Vertically, drilling logs and regional maps show a continuous clay layer which acts as an impermeable barrier resulting in an inability for contaminants to migrate to deeper aquifers. Therefore, EPA has determined that exposures cannot be reasonably expected under the current land and groundwater use.

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.

4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be “significant”⁴ (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

5. Can the “significant” exposures (identified in #4) be shown to be within acceptable limits?

_____ If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be “unacceptable”) - continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.

_____ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

Rationale and Reference(s):

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the Information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Philadelphia Coke Company facility, EPA ID # PAD000427906, located at 4501 Richmond Street, Philadelphia, PA 19137 under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

 NO - "Current Human Exposures" are NOT "Under Control."

 IN - More information is needed to make a determination.

Completed by (signature) [Signature] Date 4/10/13
(print) Kevin Bilash
(title) RPM

Supervisor (signature) [Signature] Date 4-10-13
(print) Paul Gotthold
(title) Associate Director, LCD
(EPA Region or State) EPA R3

Locations where References may be found:

USEPA Region III
Land and Chemicals Division
1650 Arch Street
Philadelphia, PA 19103

PADEP
South East Regional Office
2 E Main Street
Norristown, PA 19401

Contact telephone and e-mail numbers
(signature) [Signature]
(print) Kevin Bilash
(title) RPM

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.