

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Imperial Metal and Chemical Company
Facility Address: 3400 Aramingo Avenue, Philadelphia, Pennsylvania 19134
Facility EPA ID #: PAD070283023

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 “Migration of Contaminated Groundwater Under Control” EI

A positive “Migration of Contaminated Groundwater Under Control” EI determination (“YE” status code) indicates that the migration of “contaminated” groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original “area of contaminated groundwater” (for all groundwater “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 “Migration of Contaminated Groundwater Under Control” EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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).

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2. Is groundwater known or reasonably suspected to be “contaminated”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

 X If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

 If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

 If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

The former Imperial Metal and Chemical Company (Imperial or facility) was located at 3400 Aramingo Avenue in the City of Philadelphia, Philadelphia County, Pennsylvania. The property is located in a primarily commercial/residential area of northeast Philadelphia. High-density residential areas are located to the north, west, and south. A retail gas station is located directly southwest of the property. Tioga Fuel Co. (a bulk heating oil and kerosene storage facility) is located directly northeast. The nearest residences are located approximately 75 feet southwest.

Imperial operated as a large quantity generator (LQG) of hazardous waste under United States Environmental Protection Agency (USEPA) ID number PAD 070283023. The facility manufactured type metal, and zinc and magnesium plates for the graphic arts industry and later began manufacturing lithographic plates (flat, thin-gauge aluminum sheets with specially prepared surfaces and photosensitive coatings) when the use of type metal was phased out. The facility also reclaimed economically valuable quantities of tin from type metal dross accepted from its customers that was resold. Imperial occupied its property from at least 1930 through 1986. In 1986, the facility phased out its type metal manufacturing operation and moved its lithographic plates manufacturing operation to 2050 Byberry Road, Philadelphia, Pennsylvania. The Aramingo Avenue facility was closed in 1986. The Byberry Road facility was operated under a separate USEPA ID number. Imperial no longer operates at either location. The former Aramingo Avenue facility was demolished in 1987, and Imperial Plaza Shopping Center (Plaza) now operates at this address.

Historically, the facility was bound on the north by other industrial facilities (primarily the Delaware Alloy Forge Company) which together with Imperial, occupied the entire city block that was bound by Aramingo Avenue to the south, East Ontario Street to the west, Tulip Street to the north, and East Tioga Street to the east. Imperial’s portion of the property was L-shaped and approximately 3.5 acres in size. Small scale aerial photographs of the area dated October 20, 1967 (before the facility began operating at this location); August 28, 1975; and July 12, 1983 show a series of buildings (the plant and an office building) situated along Aramingo Avenue. Aerial photographs provided by USEPA dating from 1940 through 1999 show these buildings remained relatively consistent throughout the facility’s operation. A drum storage platform was located on the southwest end of the plant building, and a drum storage yard was present north of the drum storage platform. A baghouse and a large emissions stack were also present at the plant building. A propane tank was located northwest of the office building. The office building was constructed in 1960; Imperial reportedly stored chemicals in the basement of this building during their operations. The remainder of the property was used for plant processes, but no details related to these processes were found in the administrative record.

In approximately 1987, the facility and neighboring industrial structures were demolished, and the Plaza was constructed on the entire 6.8 acre city block bound by Aramingo Avenue, and East Tioga, Tulip, and East Ontario Streets. The Plaza is a U-shaped building totaling approximately 125,000 square feet of one-story steel frame structure on a 4-inch concrete slab foundation. The pre-existing two-story office building located on the southeast corner of the property at the intersection of Aramingo Avenue and East Tioga Street anchors the Plaza. The first floor is currently occupied by the IHOP restaurant, and the second floor is vacant. This building has a basement. A subfloor pit with stairs was observed on

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 appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

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the north side of the basement. There appears to have been stairs from the first floor to the original grade of the basement floor. Groundwater was observed in the pit; however, no odors were noted. Other tenants of the Plaza include a bank, a gym, beauty salons, physicians' offices, retail stores, and small restaurants.

The former facility covered the southern half of the shopping center and three-quarters of the left third of the complex that now consists entirely of impermeable surfaces (buildings, asphalt, and concrete). The property is provided with public utilities including public water provided by Philadelphia Water and Sewer Department (PWD).

Waste

The facility operated as an LQG of hazardous waste. The facility submitted a Notification of Hazardous Waste Activity Form to USEPA on August 15, 1980 as a treatment, storage, and disposal (TSD) facility. Part A of the Hazardous Waste Permit Application was submitted to USEPA on November 18, 1980, which indicated that the facility generated 240 tons of emission control dust/sludge from secondary lead smelting (USEPA Hazardous Waste Code K069 - emission control dust/sludge from secondary lead smelting) annually and stored 2,500 gallons of K069 waste in containers. On July 23, 1981, USEPA granted the facility interim status to operate under USEPA ID No. PAD070283023. Limited documentation suggests that the facility generated several thousand pounds of metal dust containing tin per month that was sent offsite for recycling.

In addition, the facility possessed an air pollution equipment license from the City (license number 747672). As the facility was razed in 1986 and replaced with the Plaza, the historic air permit records held by the City were not reviewed.

On June 13, 1984, the Pennsylvania Department of Environmental Protection (PADEP or its predecessors) issued a Notice of Violation (NOV) based on a May 17, 1984 hazardous waste inspection. The following violations were identified: shipments of hazardous waste were offered to unlicensed transporters; hazardous waste was shipped without use of proper manifest; containers of hazardous waste were not properly labeled; quarterly reports were not submitted to PADEP; a Preparedness, Prevention and Contingency (PPC) plan was missing; and hazardous waste was exported to a foreign country without proper notification to PADEP. On May 28, 1985, PADEP issued an NOV based on a May 1, 1985 hazardous waste inspection. The following violations were identified:

- hazardous wastes were offered to unlicensed transporters; authorization was not received from TSD facilities
- USEPA format manifests were not used for out-of-state shipments
- manifests were not filled out properly and completely
- manifests were not routed properly and within time limits
- shipping containers were not marked and labeled appropriately
- containers of 110 gallons or smaller were not marked with required Pennsylvania label
- placards were not offered to transporters; wastes were not stored in proper containers and properly marked and labeled
- containers were not appropriately managed
- containers were not clearly marked with accumulation dates such that they were visible for inspection
- quarterly reports were not submitted to PADEP
- the PPC plan was not approved and implemented
- special requirements were not followed for international shipments

Furthermore, PADEP recommended that the facility review the appropriate regulations and re-notify as a recycler, reclaimer, and reuser of lead dross (USEPA Hazardous Waste Code D008) in addition to a generator of outgoing K069 waste. On June 20, 1985, the facility replied to the NOV stating that Imperial was not a secondary lead smelter. Rather the facility accepted type metal dross from its customers and reclaimed tin (misconstrued as lead) in the form of a mixed oxide from it (type metal was essentially an alloy of tin, lead, and antimony). Remanufacturing of the dross produced a high tin dust that was added to the mixed oxide material, drummed, sold, and shipped offsite within 30 days. Because the material had economic value, the facility stated that it was not considered emission control dust/sludge from secondary smelting; therefore, the K069 designation corresponding to generation of a waste material was not accurate. The facility further stated that the type metal facility would be phased out and operation of the plant would cease by January 1986.

On May 28, 1986, the facility replied to USEPA's letter dated April 27, 1986 requesting information for solid waste

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management units (SWMUs) that may be in operation at the facility. The facility believed the requirements alluded to in the letter did not apply because the operations did not include the processing of lead dross. The letter also confirmed the type metal, zinc, and magnesium plate business was discontinued in early 1986, and the facility was producing lithograph plates, which they believed did not require a Resource Conservation and Recovery Act (RCRA) permit.

There was no documented formal closure of the waste storage areas at the time the facility ceased operations at the Aramingo Avenue location in 1986. There were no documented releases of wastes related to the facility identified in the regulatory files. The facility structures, with the exception of the former office building, were demolished in 1986. The Plaza was constructed in 1987 and all surfaces were paved or covered with concrete.

SWMUs

An Environmental Priorities Initiative Preliminary Assessment (PA) Letter Report, dated June 11, 1990, was prepared for the facility by NUS for the USEPA. Two drum storage areas were identified in the PA. A 150 square foot drum storage platform was located near the southwestern corner of the plant building and a 150 square foot drum storage yard was located north of the drum storage platform. No detailed descriptions of these storage areas were provided in the PA because the facility had closed prior to NUS' site visit. A drawing submitted with the facility's Part A of the Hazardous Waste Permit Application on November 18, 1980, indicates that the 150 square foot drum storage platform may have been inside the plant building; whereas, the 150 square-foot drum storage yard was outside the building.

The 1983 aerial photograph shows a possible group of drums located directly northwest of the baghouse and a possible drum storage platform on the southwest side of the plant building. In addition, the 1983 aerial photograph shows the open northwestern portion of the property along East Ontario Street was not well maintained and was covered with scrap materials. The remaining open portions of the property appear to be paved with asphalt and used for parking.

During the May 2012 site visit, the suspected locations for the former SWMUs were identified to be beneath the current Plaza stores. The entire property was covered with impermeable surfaces (buildings, paved, and concrete surfaces). No landscaped or vegetated areas were observed on the property. The well points installed in the IHOP basement by their contractor were observed; however, the four groundwater monitoring wells were no longer present. A subfloor pit with stairs was observed on the north side of the basement. This appears to have been stairs from the first floor to the original grade of the basement floor. Groundwater was observed in the pit. No odors were noted.

Storage Tanks

An aboveground storage tank (AST) that was used to store propane was located directly north of the former office building. There are no underground storage tanks (USTs) or other ASTs documented in the administrative record. However, City building permits reviewed for the Phase 1 Environmental Site Assessment (ESA) of the property prepared in 2006 included indications that permits were issued for storage tanks dated 1930, 1936, 1941, 1942, and 1953. In addition, two additional documents referenced the use of storage tanks at the facility. A document dated July 1981 indicated a 2,500-gallon tank was used to temporarily store liquid wastes. A USEPA hazardous waste permit application dated October 1973 indicated use of a 600-gallon storage tank and an incinerator with a capacity of 20 gallons per hour. Details including the type of tanks (USTs or ASTs), location, size, and content were not found in the records.

Geology and Hydrogeology

The regional geology in the vicinity of the site consists of the Quaternary age Trenton Gravel, a gray to pale reddish-brown, medium to coarse-grained very gravelly sand with interbedded clay silt and cross-bedded sand layers, underlain by the Cretaceous age Potomac Group and Raritan Formation that make up the Potomac-Raritan-Magothy aquifer, the major water supply source for New Jersey residents.

The Trenton Gravel aquifer that underlies the facility has high porosity and high permeability, and is hydraulically interconnected with other rock units due to its relatively similar lithologies and discontinuous confining clay layers. Wells in the Trenton Gravel yield between 10 and 400 gallons per minute (gpm) with a median yield of 100 gpm. The upper sand unit in the Potomac-Raritan-Magothy aquifer forms a hydraulically continuous unit with the Trenton Gravel, and together they act as a single aquifer. The middle sand unit yields range from 90 to 775 gpm, and the lower sand unit yields range from 30 to 1,350 gpm with an average yield of 400 gpm.

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Site-specific hydrogeologic investigations indicate that groundwater flow in the shallow aquifer beneath the facility is generally from north to south. The elevation of the shallow groundwater table in the vicinity of the facility occurs at approximately 7 feet below ground surface (bgs).

Residents within a three-mile radius of the facility obtained their water from three public water suppliers at the time of the PA. PWD provides water to the property and the surrounding area. PWD's source water is obtained via three surface water intakes. Two of the intakes, the Queen Lane and Belmont intakes, are located on the Schuylkill River approximately 5.4 miles west-northwest and 5.5 miles west of the facility, respectively (NUS, 1990 and PWD, 2008). The third intake, the Baxter intake, is located on the Delaware River approximately 6 miles northeast and upstream of the facility. According to PWD's 2008 Annual Drinking Water Quality Report, the former facility and surrounding area are serviced by water obtained from the Baxter intake. The New Jersey American Water Company (NJAWD) and Camden City Water Authority (now United Water Camden) provide water to New Jersey residents. NJAWC's source water is obtained from six groundwater wells ranging in depth from 170 to 199 feet located in Pennsauken, New Jersey approximately 2.4 to 2.7 miles south-southeast of the facility. United Water Camden's source water is obtained from up to 24 groundwater wells ranging in depth from 150 to 270 feet located in Pennsauken, New Jersey approximately 2.15 to 3.4 miles east and in Parkside, New Jersey approximately 4.4 miles south of the facility.

No private water supply wells were identified within a three mile radius of the facility at the time of the PA (NUS, 1990). No domestic water supply wells were identified within a 0.5-mile radius according to the Pennsylvania Department of Conservation and Natural Resources Groundwater Information System (PaGWIS, accessed May 21, 2010).

The PaGWIS database lists 31 groundwater wells within a 0.5-mile radius of the facility. Nineteen (19) of the wells are listed as destroyed. These wells were installed between 1904 and 1952 and range in depth from 37 to 1,100 feet. Four wells are listed as unused. These wells are located approximately 0.5 miles southeast (2), 0.5 miles northwest (1), and 0.3 miles southwest (1) of the facility. The wells were installed between 1915 and 1976 and range in depth from 53 to 553 feet. Four wells were recently abandoned in February 2011. These wells were located approximately 0.5 miles northeast of the facility and appear to have been environmental monitoring wells (depths are reported as 22 feet). Two new wells that also appear to be environmental groundwater monitoring wells (15 and 20 feet deep) were installed in March 2011 and are located approximately 0.42 miles southeast of the facility. One well is listed as mine, industrial use. It is located approximately 0.45 miles east of the facility, was installed in 1986 and is 15 feet deep. One well is listed as withdraw, industrial use. It is located approximately 0.33 miles northwest of the facility, was installed in 1951 and is 583 feet deep. The locations of these wells and whether any are currently in use were not verified.

Investigations

Act 2 Investigations/Remediation, – 2006 to 2011

The PADEP eMapPA database (accessed April 5, 2010) lists Imperial Plaza Shopping Center as a site in PADEP's Land Recycling Program, Act 2, for soil media. Imperial/Aramingo is identified as the owner. Investigation and remediation work was completed from 2006 through 2010, and is discussed in the following sections. The final report demonstrating attainment of the site-specific standard for light non-aqueous phase liquids (LNAPL) on groundwater and attainment of the statewide health standard for soil and groundwater was approved by PADEP on January 4, 2011 (Pennsylvania Bulletin, 2011). An environmental covenant (EC) for the property was approved by PADEP on March 21, 2011, and was recorded in the City Recorder of Deeds on April 1, 2011.

Groundwater - In 2005, the property owner completed a Phase 1 ESA to identify recognized environmental concerns (RECs) related to past operations conducted at the property during which LNAPL was identified in the basement of the IHOP restaurant. Subsequent investigations identified petroleum-contaminated groundwater beneath the eastern portion of the property and inside of the IHOP basement. In 2006, their contractor collected a sample of the LNAPL from the two sumps located in the basement floor of the IHOP. Fingerprint analysis of the LNAPL indicated it was consistent with a significantly degraded diesel fuel or similar material. A groundwater sample was collected from beneath the product in one of the basement sumps in the IHOP building and was analyzed for target compound list (TCL) semi-volatile organic compounds (SVOCs), iron, diesel range organics (DRO), and total petroleum hydrocarbons (TPH) (oil and grease, biochemical oxygen demand (BOD), chemical oxygen demand (COD), and total suspended solids (TSS) were also analyzed but not evaluated for this EI). The following SVOCs, iron, DRO, and TPH concentrations were detected in the sump groundwater sample and are compared to the current PADEP non-residential groundwater medium-specific

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concentrations (MSCs) (updated January 8, 2011 - there were no changes to the MSCs for the parameters listed in the following table.)

Parameter	PADEP Non-Residential MSC (ug/L)	Sump (ug/L)
Acenaphthene	3,800	0.2 J
Anthracene	66	1.8 J
Benzo(a)anthracene	3.6	1 J
Benzo(a)pyrene	0.2	0.5 J
Benzo(b)fluoranthene	1.2	0.4 J
Benzo(k)fluoranthene	0.55	0.5 J
Chrysene	1.9	1 J
Fluoranthene	260	4.1 J
Fluorene	1,900	8.7 J
Phenanthrene	1,100	0.8 J
Pyrene	130	3 J
Iron	300*	25,800
DRO	NE	351,000
TPH	NE	5,300

ug/L – Micrograms per liter

NE – Not established

J – Approximated value (result was less than quantitation limit but greater than zero)

*Value listed is the secondary maximum contaminant level (SMCL). An MSC for iron has not been established.

Bold, underline – Concentration exceeds the MSC (benzo(a)pyrene) or secondary maximum contaminant level (SMCL) (iron)

The concentrations of the SVOCs generally were below the non-residential groundwater MSCs. Benzo(a)pyrene was detected above the MSC, and iron was detected above the SMCL of 300 ug/L (an MSC for iron has not been established).

Groundwater samples were collected from the four monitoring wells installed on the East Tioga Street portion of the property. The groundwater samples were initially analyzed TCL SVOCs, DRO, TPH, oil and grease, BOD, COD, TSS in 2006. The following SVOCs, DRO, and TPH concentrations were detected and are compared to the current PADEP non-residential groundwater MSCs.

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Parameter	PADEP Non-Residential MSC (ug/L)	Concentration (ug/L)			
		MW-1	MW-2	MW-3	MW-4
2,4-dimethylphenol	2,000	0.5 J	2.4 J	ND<10	ND<50
2-methylnaphthalene	410	0.4 J	ND<12	ND<10	92
4-methylphenol	510	ND<10	0.7 J	ND<10	ND<50
Acenaphthene	3,800	2.3 J	1.8 J	7.6 J	23 J
Anthracene	66	0.3 J	ND<12	ND<10	ND<50
bis(2-ethylhexylphthalate)	6	<i>ND<10</i>	<i>ND<12</i>	<i>10 J</i>	<u>570</u>
Dibenzofuran	100	ND<10	ND<12	ND<10	22 J
Fluoranthene	260	ND<10	0.8 J	0.5 J	1.8 J
Fluorene	1,900	0.5 J	0.9 J	11	47 J
Isophorone	100	ND<10	ND<12	ND<10	11 J
Naphthalene	100	ND<10	0.4 J	ND<10	ND<50
Phenanthrene	1,100	1 J	0.7 J	14	82
Pyrene	130	ND<10	0.7 J	0.8 J	5.2 J
DRO	NE	260	490	7,600	21,400
TPH	NE	ND<1,000	ND<1,000	14,500	34,500

NE – Not established

ND – Not detected, value reported is detection limit

J – Approximated value (result was less than quantitation limit but greater than zero)

Bold, italics – Detection limit is above the MSC

Bold, underline – Concentration exceeds the MSC

The concentrations were below the MSCs, with the exception of bis(2-ethylhexyl)phthalate which was detected above the MSC in sample MW-4. The highest detected concentrations were reported in sample MW-4, which was the closest monitoring well to Tioga Fuel. The groundwater flow direction was interpreted to be from north to south across the property. Based on this information, their contractor concluded that the source of the LNAPL and petroleum-impacted groundwater was from an upgradient source directly northeast of the property for which a history of releases of fuel oil and enforcement action by PADEP had been documented. In addition, it was concluded that the operation of the sump pumps in the IHOP basement lowered the water table in this area and may have been inducing flow of groundwater and/or free product floating on the water table towards the basement.

In 2006, Imperial/Aramingo (the current property owner) removed the sump pumps and poured a three-foot thick concrete floor over the existing concrete floor in the IHOP basement. The new floor was designed to be situated above the seasonal high groundwater table and to mitigate the potential for infiltration of groundwater or migration of vapors into the building from the petroleum contamination in the groundwater.

From May 2006 through May 2007, their contractor conducted quarterly groundwater samples from the four site monitoring wells. The analyte list was reduced to include benzene, toluene, ethylbenzene, cumene, bis(2ethylhexyl)phthalate, naphthalene, fluorene, and phenanthrene. Benzene, toluene, ethylbenzene, and bis(2-ethylhexyl)phthalate were not detected in the groundwater samples collected during any of the five sampling events. None of the compounds analyzed were detected at MW-2 during the five events. The following compounds were detected sporadically in MW-1 (first and second quarters), MW-3 (first, second, third, and fifth quarters), and MW-4 (second, third, and fourth quarters) at concentrations below the PADEP residential groundwater MSCs as shown in the following table (the PADEP residential MSCs shown in the table reflect revisions effective January 8, 2011).

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Parameter	PADEP Residential MSC (ug/L)	Range of Concentrations Detected in Monitoring Wells (ug/L)
Cumene	840	<2.0 to 2.6
Fluorene	1,500	<2.0 to 8.7
Naphthalene	100	<1.0 to 1.8
Phenanthrene	1,100	<2.0 to 3.4

The results for the five quarterly events noted an overall decrease in dissolved phase fuel constituent concentrations in groundwater.

The thickness of LNAPL measured in MW-4 increased from 0.24 feet to 0.87 feet between the second and fifth quarterly groundwater sampling events, which correlated with the removal of the sump pump system and stabilization of the water table beneath the basement. The LNAPL once encountered in the piezometers installed in the basement was no longer detected. Between April 2009 and April 2010, their contractor evaluated the extent of the LNAPL beneath the site, and concluded that the LNAPL remained limited to the vicinity of MW-4. Their contractor conducted six months of monitored recovery followed by installation of sorbent booms in MW-4 which decreased the thickness of the LNAPL by a factor of 20 (from 20 inches to 1 inch). Constituents of concern (COCs) were not detected in groundwater samples collected at MW-1 located downgradient MW-4 since August 2006, suggesting the LNAPL was not impacting the groundwater at the site.

PADEP granted Imperial/Aramingo liability relief under Act 2 on the eastern portion of the property for LNAPL on groundwater (site specific standard) and petroleum-impacted groundwater and soil (statewide health standard), for benzene, toluene, ethylbenzene, cumene, bis(2-ethylhexyl)phthalate, and SVOCs related to an upgradient release of fuel oil. The four site groundwater monitoring wells were abandoned; however, the well points in the basement of the IHOP remain in place.

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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"² as defined by the monitoring locations designated at the time of this determination)?

 X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"²).

 If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"²) - skip to #8 and enter "NO" status code, after providing an explanation.

 If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The results for the five quarterly events noted an overall decrease in dissolved phase fuel constituent concentrations in groundwater. The thickness of LNAPL measured in MW-4 increased from 0.24 feet to 0.87 feet between the second and fifth quarterly groundwater sampling events, which correlated with the removal of the sump pump system and stabilization of the water table beneath the basement. The LNAPL once encountered in the piezometers installed in the basement was no longer detected. Between April 2009 and April 2010, their contractor evaluated the extent of the LNAPL beneath the site, and concluded that the LNAPL remained limited to the vicinity of MW-4. They conducted six months of monitored recovery followed by installation of sorbent booms in MW-4 which decreased the thickness of the LNAPL by a factor of 20 (from 20 inches to 1 inch). COCs were not detected in groundwater samples collected at MW-1 located downgradient MW-4 since August 2006, suggesting the LNAPL was not impacting the groundwater at the site.

² "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

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4. Does "contaminated" groundwater discharge into surface water bodies?

_____ If yes - continue after identifying potentially affected surface water bodies.

 X If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

There are no surface water bodies located onsite or in the immediate vicinity of the facility. The closest surface water bodies are Frankford Creek, located approximately one mile east of the facility and the Delaware River located approximately 1.3 miles south of the facility. According to the PADEP eMapPA application (accessed April 5, 2010), designated use for Frankford Creek and the Delaware River as defined in Chapter 93 (Water Quality Standards) of Title 25 (Environmental Protection) of the Pennsylvania Code is warm water fishery. Both water bodies are listed as non-attaining segments on the Streams Integrated List, impaired for fish consumption related to unknown sources of polychlorinated biphenyls (PCBs).

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5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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6. Can the discharge of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR
2) providing or referencing an interim-assessment,⁵ appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

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7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

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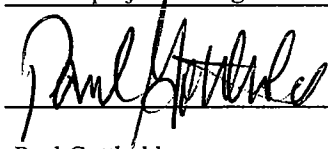
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8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Imperial Metal and Chemical Company facility, EPA ID # PAD070283023, located at 3400 Aramingo Avenue, Philadelphia, PA 19134. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

NO - Unacceptable migration of contaminated groundwater is observed or expected.

IN - More information is needed to make a determination.

Completed by	(signature)		Date	<u>8/2/2013</u>
	(print)	<u>Grant Dufficy</u>		
	(title)	<u>RCRA project Manager</u>		
Supervisor	(signature)		Date	<u>8-8-13</u>
	(print)	<u>Paul Gotthold</u>		
	(title)	<u>Assoc. Dir., PA Remediation, LCD</u>		
	(EPA Region or State)	<u>EPA Region III</u>		

Locations where References may be found:

USEPA Region III
Waste and Chemical Mgmt. 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

(name)	<u>Grant Dufficy</u>
(phone#)	<u>215-814-3455</u>
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