

**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: 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 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).

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2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be “contaminated”<sup>1</sup> 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	<b>X</b>			LNAPL was identified in the basement of a restaurant and is localized. COCs were not detected in downgradient groundwater samples.
Air (indoors) <sup>2</sup>		<b>X</b>		LNAPL detected in monitoring well. None of the constituents evaluated were predicted to exceed the PADEP non-residential soil vapor criteria.
Surface Soil (e.g., <2 ft)		<b>X</b>		No soil samples were collected from the surface, as the interval did not exhibit elevated PID readings, and/or visible/olfactory evidence of fuel oil impact
Surface Water		<b>X</b>		There are no surface water bodies located onsite or in the immediate vicinity of the facility.
Sediment		<b>X</b>		There are no surface water bodies located onsite or in the immediate vicinity of the facility.
Subsurf. Soil (e.g., >2 ft)	<b>X</b>			With the exception of benzo(a)pyrene detected in two locations (below a depth of 8 feet), the concentrations of the detected SVOCs were below the PADEP residential soil MSCs.
Air (outdoors)		<b>X</b>		No record of contamination during operations. Facility no longer operating.

<sup>1</sup> “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).

<sup>2</sup> 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.

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\_\_\_\_\_ 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):**

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 PAD070283023. 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 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

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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 a 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 renewed.

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 manifests; 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.

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

Note: 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, pavement, and concrete surfaces). No landscaped or vegetated areas were observed on the property. The well points installed in the IHOP basement by the facility 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, record show two additional documents that 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.

#### 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 by the facility contractor from 2006 through 2010, and is discussed in the following sections. The

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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, 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, a sample of the LNAPL from the two sumps located in the basement floor of the IHOP was collected. 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 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	<b>0.5 J</b>
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*	<b><u>25,800</u></b>
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 these 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

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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.

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&lt;10</i>	<i>ND&lt;12</i>	<i>10 J</i>	<u><i>570</i></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

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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)

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.

**Soil** - A Phase 1 ESA was conducted by the facility in 2005 to identify RECs at the property. During the site reconnaissance, apparent petroleum staining was observed on the basement floor of the IHOP, and LNAPL was observed in the basement sumps. Their contractor initiated Phase 2 intrusive investigation activities in 2005/2006 during which six soil samples (including a duplicate sample collected at SB-2) were collected from the boreholes of the monitoring wells installed onsite. The soil samples were collected from intervals exhibiting elevated PID readings, and/or visible/olfactory evidence of fuel oil impact and were analyzed for SVOCs and DRO. They initially compared the results to the PADEP non-residential used aquifer soil MSCs, and then later compared them to the residential used aquifer soil MSCs. None of the detected SVOCs were above either the residential or non-residential MSCs. The facility contractor had demonstrated attainment of the residential statewide health standard for soils containing SVOCs, and PADEP granted liability relief to Imperial/Aramingo for SVOCs in soils in January 2011.

The PADEP residential and non-residential MSCs were revised in January 2008. The soil sample results were compared to the most current MSCs for this EI report as shown in the following table.



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Parameter	Residential Soil MSCs (mg/kg)	Sample Identification, Sample Depth (ft bgs), Concentration (mg/kg)				
		SB-1	SB-1	SB-2	SB-3	SB-4
		13-13.5	19-19.5	8-8.5	10-10.5	10-10.5
2,4-dimethylphenol	73	ND<0.41	ND<0.44	ND<0.5	0.21 J	0.086 J
2-methylnaphthalene	600	ND<0.41	ND<0.44	0.045 J	2.3	0.084 J
4-methylphenol	18	ND<0.41	ND<0.44	0.015 J	0.028 J	0.0082 J
Acenaphthene	2,700	0.02 J	0.009 J	0.17 J	0.36 J	0.061 J
Acenaphthylene	2,500	ND<0.41	0.015 J	0.06 J	0.27 J	0.026 J
Anthracene	350	0.038 J	0.032 J	0.44 J	1.2	0.088 J
Benzo(a)anthracene	5.7	0.057	0.11	1	2.1	0.21
Benzo(a)pyrene	0.57	0.045	0.13	<u>0.87</u>	<u>1.9</u>	0.18
Benzo(b)fluoranthene	5.7	0.031 J	0.088	0.74	1.4	0.16
Benzo(g,h,i)perylene	180	0.019 J	0.073 J	0.27 J	0.89	0.085 J
Benzo(k)fluoranthene	57	0.049	0.12	1	1.6	0.19
Bis(2-ethylhexyl)phthalate	130	0.16 J	0.29 J	0.26 J	0.13 J	0.81
Carbazole	21	ND<0.41	ND<0.44	0.12 J	0.098 J	0.026 J
Chrysene	230	0.052 J	0.11 J	1	2.2	0.23 J
Dibenzo(a,h)anthracene	0.57	ND<0.041	0.026 J	0.13	0.31	0.037
Dibenzofuran	95	ND<0.41	ND<0.44	0.087 J	0.36 J	0.053 J
Fluoranthene	3,200	0.1 J	0.14 J	2	4.6	0.44
Fluorene	3,000	0.02 J	0.012 J	0.16 J	0.65	0.1 J
Indeno(1,2,3-cd)pyrene	5.7	0.019 J	0.068	0.29	0.79	0.081
Naphthalene	25	0.01 J	0.012 J	0.072 J	0.29 J	0.017 J
Phenanthrene	10,000	0.094 J	0.092 J	1.7	4.5	0.47
Pyrene	2,200	0.099 J	0.16 J	1.8	4.6	0.45
DRO	NE	21.5	20.9	1,750	442	89.1

Note: Results reported for SB-2 are the higher of the parent sample and the duplicate sample collected from 8 to 8.5 feet below ground surface (bgs).  
ND – Not detected above the laboratory detection limit  
J – Results is less than the quantitation limit but greater than zero. The concentration listed is an approximate value.

With the exception of benzo(a)pyrene detected at SB-2 and SB-3, the concentrations of the detected SVOCs were below the updated residential soil MSCs. Soil samples SB-2 and SB-3 were collected from depths greater than 8 feet bgs in areas that are paved.

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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

Contaminated Media	Potential <u>Human Receptors</u> (Under Current Conditions)						
	<u>Residents</u>	<u>Workers</u>	<u>Day-Care</u>	<u>Construction</u>	<u>Trespassers</u>	<u>Recreation</u>	<u>Food<sup>3</sup></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.)	No	No	No	No	No	No	No
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):**

**Groundwater:** 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 (NUS, 1990).

The Trenton Gravel aquifer that underlies the facility has high porosity and high permeability, and is hydraulically

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

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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 (NUSreport, 1990).

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 bgs.

Residents within a three-mile radius of the facility obtained their water from three public water suppliers at the time of the PA (NUS report, 1990). 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 report, 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.

An Environmental Covenant was recorded in the City Recorder of Deeds office in April 2011 that requires regular maintenance of the existing impermeable surfaces where the contaminated groundwater and LNAPL was identified (the eastern portion of the property). Excavation in this area, including the concrete floor of the IHOP basement, is prohibited without the written consent of PADEP, with the exception of landscaped areas and any temporary disturbance related to routine maintenance, including repairing and/or replacing subsurface utilities. Depth to groundwater beneath the site is approximately 7 feet bgs; therefore, utility workers may potentially come in contact with LNAPL and/or contaminated groundwater. Implementation of health and safety measures for these workers may be required. Use of groundwater and installation of wells on the property is also prohibited. There is currently no groundwater usage at or in the vicinity of the facility. The source of water for the property is the PWD public water system. Based on this information, it is concluded that no further exposure or release controls are required for groundwater at this time.

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**Soil:** The facility is located within the Atlantic Coastal Physiographic Province of southeastern Pennsylvania. The geologic framework of the Coastal Plain consist of underlying, gently southeastward-dipping unconsolidated marine and fluvial deposits of clay, silt, sand, and gravel of late Cretaceous and Tertiary age.

The facility is underlain by 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 (NUS, 1990). Soils beneath the facility are classified urban land soils (Ub - 0 to eight percent slopes). Identification of urban land soils is considered impractical due to the density of urban structures. Most areas have been disturbed such that the native soil materials have been filled over or otherwise destroyed during construction.

The subsurface materials encountered by their contractor during installation of the monitoring wells on the eastern portion of the property were described as fill materials consisting primarily of sand and gravel from approximately 10 to 12 feet bgs. Cinders and trace amounts of glass, porcelain, brick, and concrete were also observed within the fill materials. Native soils encountered below the fill material consisted of silty sand with varying amounts of peat and clay to approximately 12 feet bgs, followed by sandy silt. The facility property is covered entirely with impermeable surfaces (e.g., building foundations, asphalt, and concrete). There are no landscaped or vegetative areas onsite.

An Environmental Covenant was recorded in the City Recorder of Deeds office in April 2011 that requires regular maintenance of the existing impermeable surfaces in the area where the SVOCs were detected in subsurface soil (the eastern portion of the property). Excavation in this area is prohibited without the written consent of PADEP, with the exception of landscaped areas and any temporary disturbance related to routine maintenance, including repairing and/or replacing subsurface utilities which may require implementation of health and safety measures for these workers. As such, it does not appear that additional exposure pathway or release controls are necessary at this time.

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4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be "significant"<sup>4</sup> (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):**

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<sup>4</sup> 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.

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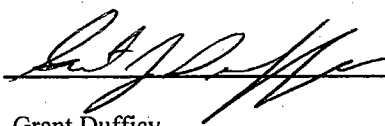
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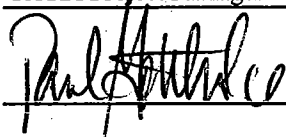
6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

  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 Imperial Metal and Chemical Company facility, EPA ID # PAD070283023, located at 3400 Aramingo Avenue, Philadelphia, PA 19134 under current and reasonably expected conditions. This determination will be reevaluated 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)  Date 8/6/2013  
(print) Grant Dufficy  
(title) RCRA Project Manager

Supervisor (signature)  Date 8-8-13  
(print) Paul Gotthold  
(title) Assoc. Dir., PA Remediation, LCD

(EPA Region or State) EPA Region III

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) Grant Dufficy  
(phone) 215-814-3455  
(e-mail) Dufficy.grant@epa.gov

**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.**