#### 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:ISG (Formerly Lukens Steel Company Electric Arc Furnace Dust Disposal Area)Facility Address:50 S. First Ave, Coatesville, PA 19320Facility EPA ID #:PAD002326908

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?

<u> </u>	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). Current Human Exposures under Control

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### **Facility Background**

ISG's former Lukens Electric Arc Furnace (EAF)Dust Disposal Area is located in Coatesville, Chester County, Pennsylvania. The parcel (also known as the Monofill) was transferred to ISG when they purchased assets from the bankrupt Bethlehem Steel Corporation in May 2003; which Bethlehem had purchased through the acquisition of Lukens Steel in 1998. The site was owned by Lukens Steel from approximately 1810 to 1998. The waste furnace slag and furnace dust were disposed on the property prior to 1980 by Lukens Steel. The site covers approximately 71 acres, of which approximately 3.5 acres were used for electric arc furnace dust storage/disposal. Waste slags and furnace dusts may contain elevated levels of Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

The Lukens Steel Company Electric Arc Furnace Dust Disposal Area was originally used for the disposal of blast furnace slag from 1810 until approximately 1955. The slag was later mined for use as a ballast in road construction. The mining operation created an approximately four acre pit on the site. Lukens Steel Company then dumped electric arc furnace dust (KO61) into the pit from 1962 until October 1980. Since 1980 the KO61 waste generated by the Coatesville Steel facility has been transported to a metals recovery firm for reclamation. PADEP made an official Coproduct Determination on the waste slag on March, 1996.

The parcel is bordered to the east by Newlinville Road and to the Northeast by the City Construction Company property. Adjacent property to the north, west, and south of the property is wooded, undeveloped land. To the east is an electrical substation and the main ISG steel mill. The predominant uses of the land within the vicinity of the subject property are steel manufacturing, residential, agricultural and undeveloped.

The ISG property is undeveloped with the exception of a small area previously used occasionally as a shooting range for target practice, two abandoned buildings associated with the mining of the slag for road construction, and PECO high tension power lines. An unpaved road traverses the property in a westerly direction from Newlinville Road past the Monofill and then turns to the south towards the shooting range. The remainder of the property contains small ponds and a creek, undeveloped areas with trees and underbrush, and areas of residual slag with vegetation and trees growing out of them.

The final Remedial Investigation, Risk Assessment and Cleanup Plan for the ISG/Lukens electric arc furnace dust Monofill site was approved by the Pennsylvania Department of Environmental Protection on May 4, 2000. The plan includes a Final Design of the proposed remedy and a Post-remediation Care Plan, which addresses monitoring and maintenance of continued treatment, and any utilized engineered or institutional controls. This plan proposes buttressing the dust pile side slopes with fill at thicknesses ranging from ten to twenty feet, then covering with six inches of vegetated topsoil. Work is yet to begin on the landfill cap.

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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)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	<u>X</u>			Chromium and Vanadium above health-based screening levels
Air (indoors) <sup>2</sup>		X	_	Not applicable
Surface Soil (e.g.,<2 ft)	X		_	Lead and Vanadium above health-based screening levels
Surface Water		X	_	No
Sediment		X	_	No
Subsurface Soil(e.g.,>2 ft)		X	_	No
Air (outdoors)		X	_	Below industrial screening levels

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.

<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 Department 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 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 contaminates) does not present unacceptable risks.

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# **Groundwater**

The Remedial Investigation Risk Assessment and Clean-up plan (done between 1998 and 2000) for the Electric Arc Furnace dust Monofill included the installation of four monitoring wells (wells MW-1 through MW-4) to assess groundwater quality and the potential impacts the Monofill might have to groundwater. The wells include one upgradient (MW-1) and three side/downgradient (MW-2, MW-3, and MW-4) locations. Wells MW-1 through MW-4 range in depth from 24.5 to 81 feet below ground surface. All wells are screened in the uppermost water bearing layer. The groundwater in the vicinity of the Electric Arc Furnace Dust Monofill is approximately 30 feet or more below the Electric Arc Furnace Monofill and 20 feet or more below the underlying fill.

The Electric Arc Furnace Dust Monofill pile, along with wells MW-1 through MW-4, are located in the southeast section of the property, which has the most hydraulically down gradient portion of the aquifer beneath the property.

Groundwater in the vicinity of the EAF Dust Pile is approximately 30 feet or more below the fill. Groundwater in the shallow bedrock at the site flows from west to east, towards the West Branch of the Brandywine Creek, at a rate of approximately 255 ft/yr. Flow direction is based on topographical observations and data collected from the November 17, 1998 and September 7, 1999 sampling events. The four wells on the site are used for monitoring only, the groundwater is not used for consumption or process water.

During the RI RA two groundwater sampling events were performed at the four wells to evaluate metals concentrations in the groundwater. The groundwater in the upper-most water-bearing layer is effected locally near the Electric Arc Furnace Dust Monofill with chromium and vanadium at levels above the nonresidential Pennsylvania Medium Specific Concentration (MSC) and the EPA Region III Risk based Concentration (RBC). The RI RA concluded that the on-site groundwater contamination has not migrated off-site, and the PADEP has agreed that groundwater remediation is not currently required in the vicinity of the Monofill pile based on an approved PADEP Cleanup Plan for the EAF Dust Monofill.

The groundwater in well MW-2 had chromium levels above the nonresidential Pennsylvania MSC and above the EPA Region III RBC for tap water. It should be noted that while chromium levels exceeded the groundwater MSC and RBC levels in MW-2, this constituent was not detected in downgradient well MW-4, and therefore any exceedences of the MSC and RBC levels are most likely limited to on-site groundwater. Those concentrations exceeding the MSC and RBC levels for extraction well WM-2 are given below (11/17/98 and 9/7/99 data).

#### Groundwater Sampling Results (ppb)

Well	Sample Date	<u>Contaminant</u>	Concentration	<u>MSC</u>	<u>RBC</u>
WM-2	11/17/98	Chromium	207	100	110
WM-2	9/7/99	Chromium	137	100	110

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# Air (Indoors)

Indoor air is not an issue at this site because the two buildings on the property are abandoned. No volatiles, semivolatiles, pesticides, herbicides, or PCB contaminants above screening levels were detected. This is to be expected because these types of contaminants are not associated with the generation of slag and furnace dust.

# SURFACE SOIL (e.g. < 2 feet):

On September 22, 1998, six soil samples were collected from the 0 to 4 inches below grade surface interval. Three samples were collected from the EAF Dust Monofill pile. Three additional samples were collected from culverts and drainageways located in the utility ROW east of Newlinville Road. The two sets of samples were collected from two distinctly different areas, one area where no storage of EAF dust was know to have occurred; and one from a known EAF dust storage area. All six samples were analyzed for TAL metals.

Analytical results of the six soil samples detected elevated levels of the naturally occurring metals; calcium, magnesium, potassium, and sodium. The soil sampling results from the September 22,1998 and previous 1996 sampling event indicate that site related metals in excess of the MSC non residential values will not be encountered beyond the boundaries of the site.

Those concentrations exceeding the MSC for samples taken in close proximity to the EAF Monofill pile are given below (9/22/98 data). Note: there are no RBC values associated with lead contamination in soil, but in general, EPA uses 1000-1200 ppm for non-residential properties.

		Drainageway Soil Sampling Results (ppm)			
Location	Contaminant	Concentration	<u>MSC</u>		
SED-1	Lead	3630	1000		
SED-2	Lead	9030	1000		
SED-6	Lead	7090	1000		

# **SURFACE WATER/SEDIMENT:**

The latest surface water samples were collected at four locations on November 17 and 18, 1998. Sample SRW-1 was collected from the pond located just to the southwest of the EAF Dust Monofill; sample SRW-3 from a culvert in the utility right-of-way east of Newlinville Road; sample SRW-4 from a seep in the utility right-of-way east of Newlinville Road; and sample SRW-5 from a culvert at the intersection of Newlinville Road and First Avenue. Naturally occurring metals such as calcium, magnesium, potassium, and sodium were detected in all of the samples. The surface water results were compared to the EPA Drinking Water Standards and Health Advisories as referenced in Pennsylvania's Criteria Maximum Concentration (CMC) for human Health, acute aquatic and chronic aquatic for Water Quality Criteria for Toxic Substances. There were no exceedences in any of the surface water samples from locations SRW-1 and SRW-5. There was an exceedences for one parameter, chromium from sample locations SRW-4.

Those concentrations exceeding the MCL for samples taken in close proximity to the EAF Monofill pile are given below (11/17/98 and 11/18/98 data).

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		Surface Water Sampling Results (ppm)			
Location	<u>Contaminant</u>	Concentration	<u>MSC</u>		
SRW-3	Chromium	443	100		
SRW-4	Chromium	104	100		

Groundwater and surface water eventually discharge into the West Branch of the Brandywine Creek. The West Branch of the Brandywine Creek has a use designation as recreational and a U.S. Geological Survey stream quality assessment of slightly impacted. The only downstream surface water intake for drinking water is the Wilmington Water Dept., Wilmington Delaware, located 29 river miles downstream. The Monofill pile should have no effect on human health through the uptake of surface water downstream of this site.

# SUBSURFACE2 SOIL (e.g. > 2 feet):

Pennsylvania's non-residential MSC direct contact values for lead and vanadium found 2-15 feet below the surface are much higher than are the direct contact surface soil values. Direct contact with humans is much less likely with soil that is located 2-15 feet below the surface, than it is with soil that is less than two feet below the surface. To date, there have been no samples taken of the Monofill pile from the 2-15 Feet range. The only monofill sample values are those taken from the less than 2 feet depth. The steelmaking processes that generated the waste furnace slag and furnace dust in the Monofill pile generates a material that has relatively homogenous properties. Comparing the lead and vanadium values found in the less than 2 feet range to the action levels in the PA MSC subsurface soil. As data from the subsurface soil becomes available in the near future, the values will be compared to the PA MSC subsurface values.

# AIR (outdoors):

No volatiles, semi-volatiles, pesticides, herbicides, or PCB contaminants above screening levels were detected in the outdoor air. This is to be expected because in the generation of slag and furnace dust, metals are generated, and not volatiles and/or semi-volatiles. The 1987 Preliminary Assessment by PADEP stated that air was not a route for migration because the EAF Dust Monofill surface appeared to have characteristics that would prevent generation of airborne dust, unless the surface was disturbed.

# **References:**

Remedial Investigation Risk assessment and Clean-up Plan for the Electric Arc Furnace Dust Monofill, South Coatesville, Pennsylvania, Golder Associates Inc., March 2000, prepared for Bethlehem Steel Corporation

<u>Removal Site Assessment for the Lukens Steel Company Site, South Coatesville, Chester County</u>, Roy F. Weston Inc., May 22, 1996, prepared for the U.S. EPA, Hazardous Site Control Division, TDD No. 96-02-13, Contract No. 68-S5-3002

Site Inspection of Lukens Steel Company Electric Arc Furnace Dust Disposal Area, NUS Corporation, March 12.1990, prepared for the U.S. EPA , Hazardous Site Control Division, TDD No. F3-8811-23. EPA PA-468, Contract No. 68-01-7346

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Assessment of Stream Quality using Biological Indices at Selected Sites in the Brandywine Creek Basin, Chester County, Pennsylvania, prepared in cooperation with the Chester County Water Resources Authority, by the U.S. Geological Survey, 1981-1997

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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**

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

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

Instructions for <u>Summary Exposure Pathway Evaluation Table</u>:

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.

- 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).
- X 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. (Uncertainties are summarized below)

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

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#### **Rationale and Reference(s):**

#### **GROUNDWATER:**

#### A. RESIDENTIAL WELLS:

Based on information contained in the Phase I ESA EDR database report, and the State and Federal Well Databases, there are several wells within 1.0 mile of the subject properties that are used for potable domestic water supplies. Previous groundwater studies performed in connection with the Electric Arc Furnace Dust Monofill closure plan have determined that these wells were not downgradient from groundwater affected by the Monofill.

#### **B. WORKERS**:

Neither groundwater nor public water supply is used at this site by ISG/Lukens. Field technicians do have the potential of being in contact with the contaminated groundwater during sampling events of the groundwater monitoring wells. However, since they wear protective clothing/gloves during each groundwater sampling event, the likelihood of exposure is minimized.

#### SURFACE SOIL (e.g. < 2 feet):

#### **TRESPASSERS:**

As part of the final Remedial Investigation, Risk Assessment and Cleanup Plan a health risk assessment was performed in accordance with the requirements of Pennsylvania Act 2 to evaluate risks to potential receptors exposed to regulated substances at this site. The assessment included consideration of the various exposure and transport pathways and trespassers exposed to EAF Dust, drainageway soils and surface water, as well as hypothetical residential exposure to groundwater. The results of the toxilogical review show that the only potential risk above Act 2 thresholds at the site would to a teenage trespasser exposed to lead from the EAF dust. This site does have a limited access entrance with a wire across the site entrance, and the site itself is isolated from surrounding residential areas. However the site is within walking distance to surrounding homes. Therefore it has been established that the pathway is complete for the "Contaminated" Media - Human Receptor combination for Lead to a teenage trespasser.

#### **REFERENCES:**

<u>Remedial Investigation Risk assessment and Clean-up Plan for the Electric Arc Furnace Dust Monofill, South</u> <u>Coatesville, Pennsylvania, Golder Associates Inc., March 2000, prepared for Bethlehem Steel Corporation</u>

<u>Removal Site Assessment for the Lukens Steel Company Site, South Coatesville, Chester County</u>, Roy F. Weston Inc., May 22, 1996, prepared for the U.S. EPA, Hazardous Site Control Division, TDD No. 96-02-13, Contract No. 68-S5-3002

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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" levels 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".

X 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):**

# SURFACE SOIL (e.g. < 2 feet):

#### **TRESPASSERS:**

For teenage trespassers, the Hazardous Quotient ratio for the EAF dust (compared to PADEP's non-residential exposure factors and MSC) is 1.47. This factor indicates that the potential risk to a teenage trespasser exposed to EAF dust is approximately 50% more than the allowable exposure based on PADEP non-residential scenarios. This Hazardous Quotient number for a teenager becomes significant beyond that of an adult trespasser because in the calculation of a teenages' ratio, a higher exposure frequency of 60 days per year was assumed versus 30 days of exposure for an adult, and the weight for a teenager is also adjusted down from 158 lbs. for an adult to 130 lbs. Therefore there is a potentially significant risk above Pennsylvania Act 2 thresholds to teenage trespassers from exposure to lead in the EAF dust.

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<sup>&</sup>lt;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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- 5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?
  - X 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):**

# SURFACE SOIL (e.g. < 2 feet):

#### **TRESPASSERS:**

Our analysis indicates that "teenage" trespassers represent the only complete exposure pathway under current site conditions. Current plans for the site include re-grading and capping of the monofill and re-development of the property under the direction of Chester County. These actions will prevent exposure permanently. In the interim, there is limited site security to control trespassing and the individuals most exposed (teenage trespassers) are unlikely to ingest soil in sufficient quantities to qualify as a real current risk.

EPA is assisting both the county and PADEP in remedy construction and redevelopment, so Agency involvement is assured for the next several years. For these reasons, EPA believes the criteria for human health under control are met.

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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):

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 ISG (Formerly Lukens Steel Company
Electric Arc Furnace Dust Disposal Area) facility, EPA ID # PAD002326908, located at
50 S. First Ave, Street, Coatesville, PA 19320 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	/s/	Date 6/15/05
	Grant Dufficy	
	RCRA Project Manager	
Supervisor	/s/	Date 6/15/05
1	Paul Gotthold	
	PA Operations Branch Chief	
	EPA, Region III	

# Locations where References may be found:

PADEP Southeast Regional Office 2 Main Street, Norristown, PA 19401 EPA Region III 1650 Arch Street, Philadelphia, PA 19103-2029

#### Contact telephone and e-mail numbers:

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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.