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:	**Ephrata Manufacturing Company**
Facility Address:	**104 West Pine Street Ephrata, PA 17522**
Facility EPA ID#:	**PAD061105441**

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?

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

   [ ] If no – re-evaluate existing data, or

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

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Current Human Exposures Under Control" EI

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

Relationship of EI to Final Remedies

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

Duration / Applicability of EI Determinations

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

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

	Yes	No	?	Rationale/Key Contaminants
Groundwater			**X**	Groundwater was not encountered during the 2006 Phase II Investigation to a depth of 16 feet bgs. Disposal pit contains hazardous constituents that may migrate in the environment. In 1991, lead exceeded its current standard in a groundwater spring sample. Groundwater springs were not present during 2008 and 2009 site visits.
Air (indoors) [2]		**X**		There are no ongoing operations and the building is not currently used for daily worker use. Based on limited sampling (one composite sample) of soil, low concentrations of volatile organic compounds (VOCs) do not pose a human health concern.
Surface Soil (e.g., <2 ft)			**X**	The extent of waste disposal at the site is not known. Spring sediment (now considered soil) is not contaminated above acceptable standards.
Surface Water			**X**	Creek water was not adversely affected by hazardous constituents in groundwater springs in the past. Spring water contained lead exceeding current drinking-water standards. Springs were not visible during the 2008 and 2009 site visits
Sediment		**X**		Previously recorded contamination (phthalates and PAHs) in creek that may have originated from the site did not pose a human health concern.
Subsurf. Soil (e.g., >2 ft)	**X**			Disposal pit contains cadmium, lead and mercury that caused it to be hazardous by EP toxicity.
Air (outdoors)		**X**		There are no current releases to outdoor air.

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

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

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

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

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

Rationale and Reference(s): Operations at the facility resulted in the deposition of heavy-metal contaminated sludge and foundry sands at the site. A site investigation following the placement of a clay cover over the foundry sands and disposal pit revealed the presence of metal contaminants in groundwater springs and the receiving Cocalico Creek. The site investigation also revealed the presence of phthalates and PAHs in the sediment samples in the spring and Cocalico Creek. No groundwater was apparent during the subsurface investigation conducted as part of a Phase II investigation. The evaluation presented herein includes a summary of the comparison of the environmental data to criteria used in the Site Investigation (SI) report (NUS, 1991), and Medium Specific Concentrations (MSCs) under current Pennsylvania Act 2 Statewide Health Standards (SHSs).

Groundwater: Groundwater was not encountered during the Phase II ESA investigation in August 2006 (AES, September 2006). Twenty borings were advanced in the vicinity of the USTs, of which 15 were advanced to maximum depths ranging from 12 to 16 feet bgs.

Historically, sludge, wastewater, and flyash that were disposed in the disposal pit contained hazardous levels of lead, mercury and cadmium. The depth of the disposal pit is reported to be approximately 13 feet bgs, which is shallower than the deepest boring at the site (16 feet bgs) that did not encounter shallow groundwater. Given the absence of groundwater to a depth of the deepest boring, the spring water samples collected along the northern hillside may be considered as being representative of groundwater. Of the hazardous constituents, the spring water samples collected during the SI contained lead (35.3 µg/L and 4.3 µg/L), but no detectable concentrations of mercury (less than 0.2 µg/L) or cadmium (less than 3 µg/L). The lead concentration in the springs did not exceed the National Interim Primary Drinking Water Regulations of 50 µg/L (1991); however, the lead concentration in one sample exceeds the current residential and non-residential MSC for Used Aquifers (5 µg/L).

The spring water data were also compared to ambient water quality criteria (AWQCs) as described further in Surface Water.

Although springs were encountered northeast of the facility in 1990, shortly following the capping of the disposal area, their presence may have been the result of the remnant of drainage from saturated soil and groundwater. The existing clay cover and pavement likely limits the infiltration of rain into the area of the sludge disposal pit where sources of metal contamination are present.

The continued presence of maintained pavement covering the cap and surrounding area, and reduction in potential areas of ponded water because of the presence of the onsite storm-water drainage has likely reduced the shallow groundwater recharge, and may be the reason for the absence of groundwater springs in 2008 and 2009. However, the absence of groundwater springs should be verified after a period of precipitation, and during the Spring season.

The nearest domestic well was reported to be located approximately 0.5 miles east of the site (NUS, 1991), and therefore not directly within the potential shallow groundwater migration pathway. Nearby residents adjacent to the northern portion of the property, who may be the most likely receptors of any migration of contaminants are provided with public water supply.

Therefore, exposure to potential human receptors via groundwater is unlikely.

Groundwater was not encountered during the documented subsurface investigations. However, past disposal of wastewater and sludge in the disposal pit may have allowed contaminants to migrate to bedrock and subsequently groundwater. The groundwater quality is unknown.

Air (indoors): The potential for volatile organic compounds to pose an indoor air concern was evaluated using the limited VOC analysis at the facility. On August 25, 2008, a Document Review and Limited Phase II Soil Investigation for the former EMCO facility was reported by RETTEW of Lancaster, PA. One composite sample collected beneath the asphalt pavement at each of "eight proposed lots" just south of the facility buildings was analyzed for priority pollutant metals, and one grab sample from proposed Lot 1 was also analyzed for VOCs and SVOCs. The sample from proposed Lot 1 contained two VOCs (2-butanone at 144 µg/kg and methylene chloride at 26.4 µg/kg) and one SVOC (fluoranthene at 87 µg/kg). Of the three organic compounds detected in the soil sample, 2-butanone and methylene chloride are identified as being sufficiently volatile and toxic to warrant evaluation of potential subsurface vapor to indoor air. Both 2-butanone and methylene chloride were detected at concentrations below corresponding Residential MSCs for soil-to-groundwater criteria for used aquifers (280 mg/kg and 0.5 mg/kg, respectively). In accordance with PADEP's technical guidance manual, since the Soil-to-Groundwater MSCs for used aquifers are met for 2-butanone and methylene chloride, those volatile compounds are not of concern for the indoor air pathway. Therefore, it can be concluded that the subsurface vapor to indoor air pathway is incomplete. Details are provided in the accompanying Vapor Intrusion Pathway worksheet.

Soil: The toxicological review in the SI report discussed the presence of organic contaminants in the on-site soil samples. Phthalates (mainly di-n-butyl phthalate and bis[2-ethyl hexyl]phthalate) were detected in the on-site soil (up to 4,480 µg/kg). It was noted that phthalates were generally recognized as having low acute and low chronic toxicity, with the exception of bis[2-ethyl hexyl]phthalate, which is classified as a probable human carcinogen. The evaluation concluded that no significant noncarcinogenic impacts were expected from direct contact with soil. Additionally, these concentrations do not exceed USEPA's current risk-based Regional screening levels (SLs) used for screening chemicals to determine if they pose a threat to human health.

Polycyclic aromatic hydrocarbons (PAHs) were detected in the on-site soil samples up to a concentration of 530 µg/kg. It was noted that some PAHs are classified as probable carcinogens. The evaluation used toxicity criteria available at that time to approximate a cancer risk for soil PAHs. Estimates of potential human carcinogenic risks from exposure to PAHs were given as 2×10^{-7} for on-site soil, and 2×10^{-7} for background, with caveats of uncertainties regarding the quantitation of cancer risks from soil.

The low concentrations of cyanide in the on-site soil samples did not indicate a potential concern in the toxicological summary.

Soil borings were advanced from the locations of the four USTs and samples were selected based on the reported depths of the USTs or elevated PID readings, if any. Samples were analyzed for the PADEP No. 2 fuel oil parameter list, and found to be either below practical quantitation limits (PQLs) or Residential MSCs (AES, August 2008). No borings were located in the vicinity of the previous SWMU 5 (foundry sand and slag pile) and SWMU 6 (disposal pit) outside the building or the other SWMUs within the building.

Surface soil in an area in the southern portion of the property contains arsenic contamination. Concentrations of arsenic exceed the Residential MSC (12 mg/kg) and USEPA's Regional Industrial SL (1.6 mg/kg), but are less than the Non-Residential MSC (53 mg/kg).

The complete extent and exact location of the disposal pit and the foundry sands disposal area in the rear of the property is not known. The disposal location of the sludge and wastewater from the scrubber during the operation of the air-pollution controls scrubber from approximately 1967 until 1975 is unknown. A sump pit of unknown purpose and discharge location

is present within the facility building within the air-pollution controls room.

Surface Water: The groundwater springs discharge to a tributary of Cocalico Creek. Therefore, the SI report evaluated the spring water samples in addition to creek samples as surface water. Among the hazardous constituents present in the disposal pit, spring water samples collected during the SI contained lead (35.3 µg/L and 4.3 µg/L) and arsenic (up to 3.1 µg/L), but no detectable concentrations of mercury (less than 0.2 µg/L) or cadmium (less than 3 µg/L). Lead was not detected in the Creek samples above its detection limit of 2 µg/L.

Arsenic was also not detected in the Creek samples, although the detection limit was not stated. Phthalates were not detected in the surface water, although they were detected in the sediment, as discussed further in the following paragraphs.

The toxicological summary in the SI report stated that significant noncarcinogenic effects were not indicated because of the low concentrations of arsenic and lead in the spring samples.

The potential migration of contaminants from the site to surface water via groundwater springs was not an apparent pathway during the site visits in 2008 and 2009. The human exposure pathway via the EAJA surface water intake downstream of the site is currently not expected to be adversely affected by contaminants present at the site. As stated previously, the continued presence of maintained pavement covering the cap and surrounding area, and reduction in potential areas of ponded water because of the presence of the onsite storm-water drainage has likely reduced the shallow groundwater recharge, and may be the reason for the absence of groundwater springs in 2008 and 2009. Therefore, the human exposure pathway via the EAJA surface water intake downstream of the site is currently not expected to be adversely affected by contaminants present at the site. If groundwater springs reappear, the springs and the tributary may be accessed by trespassers and recreational users.

Sediment: Sediment samples were collected in 1990 from the groundwater springs discharging from the site and from Cocalico Creek, as reported in the SI report (NUS, April 1991). The samples were reported to have contained phthalates and PAHs at elevated concentrations in the spring compared to the creek. The toxicological review discussed the presence of organic contaminants in the sediment samples from the springs and creek. Phthalates (mainly di-n-butyl phthalate and bis[2-ethyl hexyl]phthalate) were detected in the spring sediment (8,500 µg/kg), upstream creek sediment (4,430 µg/kg), and downstream creek sediment (3,400 µg/kg). It was noted that phthalates were generally recognized as having low acute and low chronic toxicity, with the exception of bis[2-ethyl hexyl]phthalate, which is classified as a probable human carcinogen. The evaluation concluded that no significant noncarcinogenic impacts were expected from direct contact with sediment. Additionally, these concentrations do not exceed USEPA's current risk-based Regional screening levels (SLs) used for screening chemicals to determine if they pose a threat to human health.

Polycyclic aromatic hydrocarbons (PAHs) (mainly phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, and benzo(b)fluoranthene), were detected in the spring sediment (1,720 µg/kg) and in upstream creek sediment (280 µg/kg) and downstream sediment (110 µg/kg). It was noted that some PAHs are classified as probable carcinogens. The evaluation used toxicity criteria available at that time to approximate a cancer risk for sediment PAHs. Estimates of potential human carcinogenic risks from exposure to PAHs were given as 2×10^{-6} for spring sediment with caveats of uncertainties regarding the quantitation of cancer risks from soil. However, it was noted that PAHs appear to be extensively metabolized by aquatic life, limiting their bioconcentration potential and potential indirect exposure to fish consumers.

The low concentrations of cyanide in the spring sediment samples did not indicate a potential concern in the toxicological summary in the SI (NUS, 1991). Cyanide was not detected in the creek sediment samples.

The springs no longer exist and the sediments are now considered soil. As discussed above, the concentrations of phthalates, PAHs, and metals in the spring sediment (now considered surface soil) are less than their Residential Act 2 MSCs.

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[3]
Groundwater	No	No	No	No	No	No	No
~~Air (indoors)~~							
Soil (surface, e.g., <2 ft.)	No	No	No	Yes	No	No	No
Surface Water	No	No	No	No	Yes	Yes	No
~~Sediment~~							
Soil (subsurface e.g., >2 ft.)	No	No	No	Yes	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.

___ 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.

Rationale and Reference(s):

Groundwater: Groundwater is not being used as a potable source by the nearest neighbors because of the availability of EAJA supply. The nearest domestic well was reported to be located approximately 0.5 miles east of the site (NUS, 1991), and therefore not directly within the potential shallow groundwater migration pathway. Nearby residents adjacent to the northern portion of the property, who may be the most likely receptors of any migration of contaminants are provided with

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

public water supply. Therefore, exposure to potential human receptors via groundwater is unlikely. None of the other receptors are likely to be directly exposed to groundwater at the site because there are no water supply wells on site. The Borough of Ephrata requires connection to public water system for improved properties, according to Article I adopted on December 14, 1987 by Ordinance Number 1167. Chapter 311-2 of the Borough of Ephrata General Legislation Part II requires improved properties abutting the municipal water system to connect and use the public water. Therefore, it is expected that the previous finding of the absence of private wells within a 0.5 mile radius of the facility (NUS, 1989) should continue to be valid.

Soil: Land use to the east and south is residential, and west is commercial and industrial. A former farm located north of the neighboring residential property appeared to be undergoing development for potential residential housing in 2009. The borough personnel present during the site visits in 2008 and 2009 indicated that the facility's property is located within an industrial zone. Therefore, it is expected that residential, daycare, and recreational receptors are unlikely to have complete pathway of exposure to contaminants in the soil at the facility's property. The land is not being used for agricultural purposes; therefore, exposure via the food intake pathway is not likely.

Future workers (not involved in construction) and trespassers are unlikely to have a complete pathway of exposure to soil contaminants because of the presence of the clay cover and pavement over the former SWMU 5 and SWMU 6 areas, Pathways of exposure to construction workers are complete because there are no known health and safety precautions at the site. Access to the former SWMU 5 and 6 soil is further restricted for trespassers by a fence with a locked gate. Potential exposure to soil at the locations of the other former SWMUs is minimized by the presence of a pavement or the building floor slab. However, no deed restrictions are currently in place; therefore, future human receptors require protection by continued enforcement of industrial zoning, maintenance of cover, building floor slab; and restrictions on excavation on the property.

Surface Water and Sediment: Assuming that groundwater springs reappear and contribute to the migration of site-related contamination, it is likely that trespassers and recreational users could be exposed to contaminated surface water in the springs and tributary.

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

X 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):
Offsite receptors (trespassers and recreational users) may be exposed to contaminants in the springs and tributary north of the facility where groundwater springs may reappear and contribute to contamination. However, assuming contaminant concentrations are similar to historic levels, and assuming a limited exposure frequency and duration because the springs and tributary are not within a public recreational area, the exposures are not reasonably expected to be significant.

Construction workers may be exposed to surface and subsurface soils on site. Assuming that the frequency and duration of excavation are limited under typical construction activities, the exposures are not reasonably expected to be significant.

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

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

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

____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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 **Ephrata Manufacturing Company** facility, EPA ID # **PAD061105441**, located at **104 West Pine Street Ephrata, PA 17522** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO – "Current Human Exposures" are NOT "Under Control."

____ IN – More information is needed to make a determination.

Completed by (signature) */s/* Date 5/1/09

(print) Kevin Bilash

(title) RCRA Project Manager

Supervisor (signature) */s/* Date 5/5/09

(print) Paul J. Gotthold

(title) Associate Director

(EPA Region or State) EPA Region 3

Locations where References may be found:

USEPA Region III
Waste and Chemical Mgmt. Division
1650 Arch Street
Philadelphia, PA 19103

PADEP
Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110

Contact telephone and e-mail numbers
(signature) _____
(print) _____
(title) _____

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.