

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: INDSPEC
Facility Address: 133 Main Street, Petrolia, Pennsylvania
Facility EPA ID #: PAD004336731

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, GPRRA). 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”**¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	X			See Rationale and References Below
Air (indoors) ²			X	“
Surface Soil (e.g., <2 ft)	X			“
Surface Water			X	“
Sediment			X	“
Subsurf. Soil (e.g., >2 ft)	X			“
Air (outdoors)		X		“

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):

Introduction

The primary source of data regarding contaminant levels and environmental conditions at the INDSPEC facility (“the facility”), as referenced in this EI CA 725, is an Environmental Indicator Forms and Supporting Documentation Report for Beazer/INDSPEC Properties (Langan Engineering, 9/16/04). The investigative data in this report has been developed in accordance with a Workplan for Site Characterization approved by the Pennsylvania Department of Environmental Protection (PADEP) on April 15, 2004, and referenced in a “Facility Lead Agreement” entered into by the facility and EPA on May 6, 2004. Unless otherwise indicated below, this report is the source of data referenced in this EI 725. While the analytical results in this report are still being validated at this time, the unvalidated results are consistent with past sampling results (see Summary of Environmental Investigations and Conditions, HMI, 8/31/01) and considered representative of facility conditions. While the subject report considers Media Specific Concentrations (MSCs) under PA Act 2 to be risk-based levels, this EI 725 primarily refers to EPA Region III Risk-Based Concentrations (RBCs) as risk-based levels. For certain contaminants, a Public Health Assessment of the Bear Creek Chemical Area (Agency for Toxic Substances and Disease Registry (ATSDR), 2004) has also been considered in defining risk-based levels.

Groundwater

Contaminants detected in groundwater at levels above RBCs and apparently due to releases from the facility include benzene, trichloroethene, vinyl chloride, arsenic, beryllium, phenol, 2-chlorophenol, bis(2-chloroethyl)ether, 4-methylphenol, 4-chlorophenyl-phenylether, pentachlorophenol, 3-3'-dichlorobenzidine, nitrobenzene, thallium, vanadium and tetrachloroethene.

In addition, the following additional contaminants associated with facility processes have been detected at substantial levels - resorcinol, 2,4,3-trihydroxydiphenyl (THD), meta¶-phenolsulfonic acid (m-PSA/p-PSA), meta-benzene disulfonic acid (m-BDSA), and benzene sulfonic acid (BSA). There are no RBCs or MSCs for these compounds. While ATSDR (2004) discusses the toxicity of these compounds, it does not provide risk-based levels for these compounds in groundwater or other media.

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Air (Indoors)

Toxic volatile compounds detected in groundwater (and/or soils) include benzene, trichloroethene, vinyl chloride, 2-chlorophenol, bis(2-chloroethyl)ether, 4-chlorophenyl-phenylether, 4-methylphenol and nitrobenzene. However, only 4-chlorophenyl phenyl ether (see monitoring well GM-12) and vinyl chloride (see monitoring well GM-1a) are reasonably expected to be present in groundwater under or within 100' feet of a building. In each case, the buildings are part of the facility. Per Draft EPA Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (11/02), both compounds are volatile and could intrude into a facility building as a vapor.

m-BDSA and p-PSA, and to a lesser extent, BSA and THD, have been detected in groundwater underlying the facility and/or potentially, residences adjacent to the facility. However, based on their physical properties (see ATSDR(2004)), these compounds are not volatile, are very soluble in water and are not expected to migrate into buildings via vapor intrusion.

Surface Soil

Arsenic has been detected in surface soils within a limited portion of the production area of the facility at levels exceeding above RBCs for soils under industrial use. In addition, elevated arsenic levels have been detected in a surface seep on facility property at a location where surface soils have yet to be characterized. Based on the detected arsenic levels in an aqueous sample from the seep, surface soils in the vicinity of the seep may be contaminated with arsenic above RBCs.

m-BDSA and p-PSA have been detected at substantial levels in surface soils at certain locations on facility property. However, there are no risk-based levels for these compounds.

Surface Water

Resorcinol, m-BDSA, p-PSA, BSA and THD have been detected in the South Branch of Bear Creek, which flows through the facility. However, there are no risk-based levels for these compounds in surface water.

Sediment

There is no known available data regarding the quality of sediment potentially impacted by the facility.

Subsurface Soil

Subsurface soils on facility property have been reported to contain levels of benzene, 2-chlorophenol, arsenic and/or dibenzofuran above MSCs protective of groundwater quality and/or industrial RBCs. Substantial levels of resorcinol, m-BDSA, p-PSA, BSA and THD have also been detected at certain locations. However, there are no risk-based levels for these compounds.

Outdoor Air

Based on the discussion under Indoor Air (see above), environmental media impacted by the facility are not adversely impacting outdoor air quality.

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Footnotes:

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.

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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)

<u>“Contaminated” Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	yes	yes	?	yes	no	no	no
Air (indoors)	no	yes	no	no	no	no	no
Soil (surface, e.g., <2 ft)	no	yes	no	no	no	no	no
Surface Water	no	no	no	no	no	no	no
Sediment	no	no	no	no	no	no	no
Soil (subsurface e.g., >2 ft)	no	yes	no	yes	no	no	no

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):

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

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General Discussion

In response to areawide impacts on groundwater with resorcinol, m-BDSA, p-PSA, BSA and THD, in 2003, a Consent Order and Agreement (COA) was entered into by PADEP and Beazer East, former owner of the facility and current owner of part of facility property. The groundwater addressed by the COA includes groundwater impacted by disposal of facility waste on non-contiguous properties, groundwater impacted by the releases at the facility, as well as groundwater impacted by other facilities and/or their waste disposal practices. The COA identifies the impacted area as the "Bear Creek Area Chemical Site". Per the COA, all homes within an area identified as the "OU2 Public Water Supply Remedial Response Area" ("the Response Area") are currently being provided bottled water by Beazer/PADEP and will be connected to a public water supply system. As part of the COA, Beazer is also conducting additional groundwater investigation work to confirm that no additional residences should receive bottled water/ public water and thus be within the Response Area. If additional residences are determined to be impacted, per the COA, PADEP will provide public water to the residence.

Groundwater

The extent of the Response Area is based on PADEP's evaluation of groundwater data available at the time of the issuance of COA and includes all private residences with wells impacted by releases of resorcinol, m-BDSA, p-PSA, BSA and THD at the facility. This groundwater data included, but was not necessarily limited to, the "Bear Creek Data Base" of private well sampling results obtained and tabulated by PADEP. These residences are still being provided bottled water at this time and may be using impacted groundwater for non-potable purposes such as bathing and washing.

As noted above, additional groundwater investigations are being conducted to confirm that no additional residences require bottled water/ public water. Results of this investigation work are in Langan (9/16/04) and include monitoring well sampling, water level measurements and an evaluation of groundwater flow directions in multiple water bearing zones. Based on these results, there are no apparent private wells outside of the Response Area which are impacted by releases of these compounds from the facility. In this case, there appear to be no residents ingesting groundwater impacted by the facility.

Other compounds detected in groundwater at levels above RBCs and apparently due to releases from the facility include benzene, trichloroethene, vinyl chloride, arsenic, beryllium, phenol, 2-chlorophenol, bis(2-chloroethyl)ether, 4-methylphenol, 4-chlorophenyl-phenylether, pentachlorophenol, 3-3'-dichlorobenzidine, nitrobenzene, thallium, vanadium and tetrachloroethene. However, based on water level measurements and associated groundwater flow maps, these groundwater contaminants are not expected to migrate to or impact any residential wells.

Shallow groundwater underlying the active operations area of the facility is currently being recovered by a groundwater interceptor system and treated at the facility. As a result, there is potential for incidental exposure of workers to impacted groundwater. Construction workers may also incidentally contact this groundwater, which occurs at 1' to 2' below ground surface at certain locations.

Air (Indoors)

Based on available information, 4-chlorophenyl phenylether and vinyl chloride vapors from impacted groundwater may migrate into buildings at the facility. In this case, facility workers may be exposed to the vapor phase of these compounds in indoor air.

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Surface Soil

While arsenic has been detected in surface soils at levels of up to 1000 mg/kg in the Beta-Resorcylic Acid Production Area and Warehouse Area, per a Response to Recent Environmental Inquiries (Langan, 9/28/04), these samples were collected below paving and any similarly impacted soils are also paved. As a result, there is no complete exposure pathway for these soils. However, a seep with elevated arsenic and potential arsenic impacted surface soils is within an unpaved area.

Surface Water and Sediment

Surface water has been impacted by releases of resorcinol, m-BDSA, p-PSA, BSA and THD at the facility. However, the production area of the facility is fully fenced (see EPA memo re: INDSPEC Fencing dated 9/29/04) and downstream surface water reportedly flows through rugged and inaccessible terrain and is not used for recreational purposes, in part due to historic impacts of upstream mining and industrial operations (see EI 725 for Crompton Corporation RCRA facility in Petrolia, PA dated 9/25/03). In this case, for purposes of this EI 725, the pathway from surface water and sediment to human exposure is considered incomplete.

Subsurface Soils

Subsurface soils have been impacted and incidental short-term exposure to these soils and/or shallow groundwater by workers is possible.

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):

Groundwater and Subsurface Soils

As noted above, there is a potential for human exposure via non-ingestion pathways to groundwater which contains resorcinol, m-BDSA, p-PSA, BSA and/or THD. Based on the PADEP’s Bear Creek Data Base and data in Langan (9/16/04), for purposes of this EI 725, it is assumed the groundwater in use and impacted by the facility may contain up to 901 ug/l m-BDSA and 4220 ug/l p-PSA. Based on ATSDR (2004), exposure to such groundwater via non-ingestion pathways should not present an unacceptable risk to human health. In this case, any ongoing exposure of to groundwater impacted by the facility is not expected to present an unacceptable risk.

Shallow groundwater underlying the active operations area of the facility is currently being recovered by via a groundwater interceptor system and treated at the facility. Per Langan (9/28/04), the facility’s Hazard Communication Program identifies health and safety measures for controlling worker exposure to recovered groundwater. These controls should mitigate any unacceptable risk associated with exposure of workers to groundwater.

Construction workers may incidentally contact impacted facility groundwater. Per Langan (9/28/04), facility policy provides that the facility Environmental Manager be notified of any activities which involve disturbance of subsurface materials (i.e., excavations or dewatering activities). This policy should mitigate any unacceptable risks associated with exposure of construction workers on facility property to groundwater or subsurface soils.

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.

Indoor Air

Per Draft EPA Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (11/02), the primary groundwater screening level protective of residential use at a target for carcinogenic risk of 10^{-5} for vinyl chloride is 2.5 ug/l. The detected level of vinyl chloride in monitoring well GM-1A was 9.8 ug/l. However, the EPA screening level is very conservative for assessing risk under industrial use. In particular, the OSHA standard for vinyl chloride in workplace indoor air is 1000ug/m³ while the target level for this compound in residential air (at 10^{-5}) per the subject guidance is 2.8ug/m³. In this case, no exceedance of a risk based level for vinyl chloride in the work place is expected. The subject EPA guidance provides no screening levels for 4-chlorophenyl phenyl ether and there is no RBC, MSC or other known risk-based level for this compound in indoor air. In this case, the risk associated with potential intrusion of this compound to indoor air cannot be assessed with available information. The facility, which is regulated under OSHA, will be notified of this EI 725 and thus notified of this information.

Surface Soils

Per the Response to Recent Environmental Inquiries (Langan, 9/28/04), the facility is undertaking measures to control access of employees to the seep and soils in the vicinity of the seep (see above). In addition, fencing around the perimeter of the facility controls access of non-workers to the subject soils (see EPA memo re: INDSPEC Fencing dated 9/29/04).

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):

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 INDSPEC facility, EPA ID # PAD-004-336-731, located at 133Main Street, Petrolia, Pennsylvania, 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 9/30/04
(print) Darius Ostrauskas
(title) Remedial Project Manager

Supervisor (signature) _____ /s/ _____ Date 9/30/04
(print) Paul Gotthold, Chief
(title) PA Operations Branch
(EPA Region or State) EPA Region III

Locations where References may be found:

PA Operations Branch (3WC22)
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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.