

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: BASF (formerly Cognis Corporation, Amchem Products and Henkel Corporation)
Facility Address: 300 Brookside Avenue, Ambler, PA 19002
Facility EPA ID #: PAD 002 348 324

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 Controls" 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"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	<u>X</u>	<u> </u>	<u> </u>	<u>volatile organic compounds (VOCs)</u>
Air (indoors) ²	<u> </u>	<u>X</u>	<u> </u>	<u>Currently inactive</u>
Surface Soil (e.g., <2 ft)	<u>X</u>	<u> </u>	<u> </u>	<u>Arsenic, lead, under engineered cover</u>
Surface Water	<u> </u>	<u>X</u>	<u> </u>	<u>No releases recorded</u>
Sediment	<u> </u>	<u>X</u>	<u> </u>	<u>No releases recorded</u>
Subsurface Soil (e.g., >2 ft)	<u>X</u>	<u> </u>	<u> </u>	<u>Arsenic, 2-4-D, 2,4,5-T under engineered cover</u>
Air (outdoors)	<u> </u>	<u>X</u>	<u> </u>	<u>Currently inactive</u>

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

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.

X

If unknown (for any media) – skip to #6 and enter "IN" status code. (In order to present a more complete picture of site conditions, the reviewer has chosen not to skip to #6.)

Rationale and Reference(s):

BASF, owns a former metal-treatment and herbicide/pesticide manufacturing facility located in Ambler, Pennsylvania. One or both of these operations were generally performed between 1914 and 2003. Since then, operations have been reduced to general business and site-support services. Several of the buildings have been lease to tenants for commercial operations. Originally, this site encompassed 44-acres, however in 2002, 18 acres were transferred to Lower Gwynedd Township.

PADEP provided relief from liability under Pennsylvania's Act 2 program on May 3, 2006 for work associated with closure and transfer of the 18 acres to Lower Gwynedd Township in 2002. Relief from liability was provided for the other 26 acres on June 17, 2009.

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.

Question #2 (Current Human Exposures Under Control)

Response:

Groundwater

Groundwater beneath the property has been evaluated since the early 1990s for VOCs, SVOCs and metals. Certain VOCs; 1,1-Dichloroethene (1,2-DCE), 1,2-Dichloroethane (1,2-DCA), 1,2-Dichloropropane (1,2-DCP), trichloroethene (TCE), were found in the overburden and bedrock aquifers above Maximum Contaminant Levels (MCLs) for drinking water.

1, 2-DCA is the primary contaminant, and in 2007 was found at levels above 100,000ug/l in the bedrock aquifer, at the source area near the former Tank Area 3.

Two types of treatment technologies have been employed at the site to address the contamination. The first phase consisted of low-flow extraction and ex-situ ozone-peroxide treatment of contaminants from the bedrock aquifer. This step removed much of the most highly contaminated parts of the plume. The first phase was carried out between 2007 and 2009.

The second phase uses hydraulic and pneumatic fracturing in conjunction with in-situ injections of a biodegradation product which stimulates chemical reduction of organic contaminants. The effectiveness of this second phase, started in 2010, will be evaluated periodically to determine if modifications need to be made to the system. The 2012 sampling data shows considerable reduction in the concentration of 1,2-DCE as well as the size of the plume. In 2012, the most contaminated well showed a level of 76,000 ug/l and the extent of contamination was reduced by half. Perimeter monitoring shows that the plume is contained within the property boundary and does not extend off-site.

Air (indoors & outdoors)

The facility is currently inactive. The only air emission sources are boilers, which are covered under the facility's State Only (Synthetic Minor) Operating Permit.

In soils, of the constituents of concern at the site, only ethylbenzene and xylene have the potential for volatilization to air. Ethylbenzene and xylene levels slightly exceed the criteria for potential volatilization at two isolated areas which are more than 100ft from buildings and were detected more than 5 ft below ground surface.

An assessment of the potential for vapor intrusion from groundwater was conducted at the site using data gathered between 2007 and 2012. Data representing the highest concentrations obtained for all VOCs detected at the overburden aquifer wells along the property boundary, downgradient from the source area was evaluated. The data shows the maximum levels of VOCs in these wells are below their respective criteria for volatilization to air. Groundwater does not pose a vapor intrusion risk at the downgradient property boundary. The on-site plume extends to beneath some of the site buildings. However, data shows that the levels of contamination beneath the buildings do not exceed their criteria for volatilization to air. Groundwater does not pose a vapor intrusion risk to on-site buildings.

Surface Soil (e.g., <2 feet) and Subsurface Soil (e.g., > 2 feet)

A number of soils investigations and remedial activities have taken place on the site. Investigations in 2003/2004 focused on the most likely industrial-impacted areas of the site. The 2006 investigation was a more comprehensive evaluation of the entire site. In total the 2003/2004 and 2006 investigations included 286 samples collected from 167 locations and included analysis for metals, Volatile Organic Compounds, (VOCs), semi volatile organic compounds (SVOCs), pesticides, herbicides, PCBs, cyanide and dioxin. Only 31 samples identified compounds at levels above the applicable non-residential Statewide Health Standards (SHS) under Act 2. These 31 detections were found at 13 sampling points. BASF used the Act 2 non-residential and used aquifer SHSs for all evaluations except for the Building 14 Area, as described below.

Excavations at the two areas that exceeded Act 2 standards removed 265 cu yd of contaminated soils. Post-excavation confirmation sampling at these areas did not show any exceedances of the applicable Act 2 standards for direct contact or soil to groundwater transport.

Question #2 (Current Human Exposures Under Control)

Response: (continued)

Building 14 Area

As a special project, BASF directed several investigation and remediation tasks associated with soil around Building 14 and railroad (RR) siding that formerly existed along the southwestern side of Building 14. The majority of the actions related to the RR siding occurred between 1983 and 1994, and involved dioxin (2,3,7,8-TCDD) and arsenic in soil. Approximately 380 cu yd of dioxin-contaminated soil were excavated from the RR siding area under a 1986 Administrative Consent Order (ACO) by EPA. The excavation ranged between 1 and 3-feet deep over an area of approximately 5,500 sq ft. Dioxin cleanup tasks were successfully performed to meet an EPA mandated cleanup criteria of 0.246 mg/kg. Arsenic cleanup tasks were successfully performed to meet an EPA and PADEP-approved, risk-based screening level of 3,066 mg/kg. In a letter dated January 22, 1999, EPA approved the clean-up and the ACO was satisfied.

2,4,6-trichlorophenol (2,4,6-TCP), 2,4-dechlorophenol (2,4-DCP), 2,4-dichlorophenoxy acetic acid (2,4-D), 2,4,5-trichlorophenoxy acetic acid (2,4,5-T), naphthalene, dioxin and arsenic exist at levels above the most stringent applicable Statewide Health Standards in the Building 14 Area. Based on historical findings and previous EPA/PADEP approvals for the Building 14 Area, attainment of SHS was not feasible and additional efforts were necessary to remediate the Area through engineering controls and risk assessment evaluation.

Remedial action through the installation of 4-inch thick asphalt cap on top of 1 ft deep fill along the entire south-southwestern side of the Building 14 was completed. Building 14 is roofed and constructed of concrete, brick, and steel. With the addition of the asphalt cap, the Building 14 area is completely surrounded by asphalt and concrete, which serves as an engineering control for the area.

A risk assessment was developed using landscape and outdoor maintenance workers as the anticipated receptors. The assessment indicates that the remaining concentrations of constituents at the Building 14 Area do not pose a risk to receptors.

An environmental covenant dated June 20, 2011 was appropriately recorded in Montgomery County. This covenant requires BASF or any future "owner" (title holder) of the property to restrict land and groundwater use activities to those compatible with non-residential, land-use categories. In addition, the covenant requires inspection, maintenance and record-keeping of the integrity of the engineered cap that overlies Building 14 Area.

Surface Water / Sediment

No releases to Houston Creek have been reported, and is located side-gradient to the groundwater plume, therefore no investigation of the surface water or sediments was deemed necessary.

References:

- Final Environmental Indicator Inspection Report For Cognis Corporation (formerly Amchem Products and Henkel Corporation), October 2004
- Final Report: Site Investigation Results & Remedial Action Report for Soil, Cognis Corporation, October 2008
- Environmental Covenant for Cognis Corporation, June 20, 2011
- Down-Gradient Groundwater Summary, BASF Corporation, March 01, 2013
- Order on Consent, Docket No. III-86-16-DC, Amchem Products, Inc. and Union Carbide Agricultural Products Company, Inc., August 19, 1986

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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	Food³
Groundwater	NO	NO	N/A	NO	NO	N/A	NO
Air (indoors)							
Soil (surface, e.g., <2 ft)	NO	NO	N/A	NO	NO	N/A	NO
Surface Water							
Sediment							
Soil (subsurface e.g., >2 ft)	NO	NO	N/A	NO	NO	N/A	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.
_____	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):

See following page for response to Question 3 (Rationale and Reference(s))

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

Question #3 (Current Human Exposures Under Control)

Response:

Residents

The facility is located in a primarily residential area. Monitoring shows that the groundwater plume does not extend off-site. Off-site soil is not expected to be contaminated and residents do not have access to on-site contaminated soils.

Workers

There are very few workers at the facility. They are not anticipated to come into contact with contaminated soil or groundwater.

Day-Care

There are no known day-care facilities near the facility.

Construction Workers

The environmental covenant restricts disturbance of the engineered cover at Building 14, therefore exposure to contaminated soil is not anticipated. Any work being done on the groundwater treatment system will have an appropriate Health and Safety plan to reduce/eliminate exposure to contamination.

Trespassers

The facility is fenced for access control. Trespassers are not expected to gain entry to the site to be exposed to contaminated media.

Recreation

There are no known recreational areas near the facility.

Food

Since contaminated groundwater does not extend into the residential area, it is not anticipated that that food (i.e., vegetable gardens) would be exposed to contaminated groundwater.

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4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"** (i.e., potentially⁴ "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 cannot 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):

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.

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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 a "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 a "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): _____

