

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Cytec Industries Inc. Warners Plant  
Facility Address: Foot of Tremley Point Road, Linden, NJ  
Facility EPA ID #: NJD 002173144

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.

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 contaminations 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 programs 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).

**Rational and References:** The site is located at the eastern limit of Tremley Point Road in Linden, New Jersey. The site and surrounding area have been in industrial use for the past 80 years and are expected to continue to be used as same for the foreseeable future. The site was used for chemical manufacturing until 1998. In late 1998, the chemical manufacturing operations were shut down. The following 5 SWMUs and 2 AOCs were found.

### Summary of SWMUs

**SWMU #1, Building 69:** The southern side of the building is adjacent to the Rahway River and is separated by a pile bulkhead. The building was used for dry mixes. Floor wash water was discharged through floor drains. Although these drains were sealed in 1986, soil was contaminated and contaminants leached to the groundwater affecting the fill unit, and the tidal marsh unit.

**SWMU #2, Diphenylguanidine (DPG) Waste Treatment System:** This unit consisted of 2 concrete tanks in which cyanide waste water was treated with alkaline chloride. Soil was contaminated with chlorobenzene and sodium hydroxide but was excavated and required no further action.

**SWMU # 3, Liquid Aerofloats Production Area (LAP area):** The LAP area had been used for the production of liquid aerofloats. The storage facility consisted of three aerofloat tanks and one cresylic acid tank, which had a rupture and spill.

**SWMU #4, Laboratory Waste Sump:** this unit transferred laboratory waste water from the lab to an effluent collection system. Soil was contaminated with mercury, toluene, malathion/cyathion and 2,4 -dimethylphenol. The sump and soil were excavated, backfilled and paved and required no further action.

**SWMU #5, Building 132:** The building was used for the production of malathion. Toluene was used in this process. The building had a cast iron floor drain system which collected reactor and floor drain wash water. The drain leaked. The cast iron floor drain system was eliminated, the building was demolished and post removal soil sampling revealed no contamination. Therefore, no further action was required.

**2 AOCs :** Tile Leach fields, acid Spill Area s required no further action, since sampling indicated no contamination.

**Reference(s):** RFI Phase I Report 1992, and CMS Report Revised 1995.

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2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be contaminated 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>	---	See "Migration of Groundwater Under Control" EI
Air (indoors) <sup>2</sup>	--	<u>X</u>	---	
Surface Soil (e.g., <2 ft)	<u>X</u>	--	---	VOC, Pesticides, Inorganics
Surface Water	--	<u>X</u>	---	See CMS Report (Reference 4), Sections 3.2.1.2 and 3.6.1.2
Sediment	<u>X</u>	--	---	VOC, Pesticides, Inorganics
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	--	---	VOCs, Pesticides, Inorganics
Air (outdoors)	--	<u>X</u>	---	See CMS Report, Section 3.3.3

----- 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:**

**Surface Soil:** Contaminated surface soil refers to concentrations of constituents that exceed NJDEP's Direct Contact Screening Criteria (DCSC).

**SWMU #1 (Building 69)**

Soil, under the building, was contaminated and leached to the groundwater, affecting the unsaturated fill unit, and the tidal marsh unit. The soil was contaminated with chlorobenzene, xylenes, DDT, DDD, DDE, and Thimet. Concentrations above background were detected for arsenic, chromium, copper, lead, and zinc. Two feet below the ground surface (BGS), contamination was not detected.

**SWMU #3 (LAP Area)**

Soil was contaminated with methylene chloride, total xylenes and benzo(a)pyrene, and 2,4-dimethylphenol.

**Subsurface Soil:** contaminated subsurface soil refers to concentrations of constituents that exceed NJDEP's Impact to Ground Water Screening Criteria (IGWC) in samples lower than two feet below ground surface.

**SWMU #3 (LAP Area):** Soil was contaminated with methylene chloride, total xylenes and benzopyrene, and 2-4 dimethyl phenol.

**Sediment (Rahway River):**

**SWMU#1 (Building 69):** Rahway River sediments sampled approximately 30 feet adjacent to Building 69 were found to be contaminated above site-specific sediment criteria (SSC) for VOCs: (methylene chloride, chlorobenzene, benzene, toluene, and xylenes); pesticides or pesticide metabolites (DDT, DDD, and DDE) and inorganics (antimony, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc). SSC are presented in Table 3-16 of the CMS Report (Reference 4). Tables 3-16 and 3-17 of the CMS Report present the analytical results of sediment analyses from four samples for volatile organic compounds and pesticides (Table 3-16) and inorganic compounds (Table 3-17), which were taken from the Rahway River sediments adjacent to Building 69. A complete discussion of this topic can be found in Section 3.5.3 of the CMS Report. Additional Rahway River sediment sampling occurred as part of a supplemental Corrective Measures Study Report (Reference 5). Sections 2.2.1 and 3.1 of this document contain a complete discussion of this topic.

**Groundwater :**

The groundwater at Cytec was determined to be saline and therefore, not suitable for potable purposes. NJDEP designated the groundwater as class III-B and therefore, site specific standards were developed. The compounds of concern (COCs) detected in samples taken from groundwater at the site are arsenic, lead, methylene chloride, benzene, chlorobenzene and total xylene. All are below the NJDEP Class III-B standards.

**Surface Water:**

NJDEP designated the Rahway River and Arthur Kill as SE3 surface water, which means that these waters are primarily used for secondary recreational purposes, such as boating and fishing. Based on this designation Cytec developed Site-Specific Media Cleanup Standards (MCSs); (Section 3 of the CMS Report), which are consistent with the SE3 designation. Analytical results show that all volatiles and total metals are below MCSs.

**Reference(s):** Checklist for “Migration of Contaminated Groundwater Under Control” CA 750

**Air (Outdoors):**

As stated in Section 3.3.3 of the CMS Report, outdoor air quality is not a concern due to a high degree of air mixing in the area of the Site.

**Air (Indoors):**

The Johnson-Ettinger Model was used to calculate the incremental risk-based groundwater concentration on indoor air. There are few buildings left on the site and there is no groundwater data for wells in close proximity with the buildings. As a conservative assumption, we used the highest groundwater concentrations in the upper Sand and Gravel Aquifer and assumed that these concentrations were under a building. The results of the model indicated that the groundwater concentrations do not pose an unacceptable risk to the quality of the indoor air. See attached, the worst case result of running the Model.

**Footnotes:**

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

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests 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 <sup>3</sup>
<del>Groundwater</del>							
<del>Air (indoors)</del>							
Soil (surface, e.g., <2 ft)	N	N	N	N	N	N	N
<del>Surface Water</del>							
Sediment	N	N	N	N	N	N	
Soil (sub surface e.g., >2 ft)	N	N	N	N	N	N	N
<del>Air (outdoors)</del>							

Instruction for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not “contaminated”) as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“\_\_\_”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- \_\_X\_\_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- \_\_\_\_\_ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- \_\_\_\_\_ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

**Rationale and Reference(s):**

**Surface Soil:**

The surface soils were remediated to NJ Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC). There is a deed restriction requiring that the use of the property remain non-residential.

**Building 69:** The contaminated soil under Building 69 is located under a pile supported platform at the Rahway River side of the building. The bulkhead was replaced by steel sheet piles as part of a 1996–1997 remedial action and the platform removed. The contaminated soil was covered with Pozzolanic fill and capped. These activities are fully discussed in the Remedial Action Report (RAR, Reference 7).

These measures, eliminate direct contact with the soil contamination and effectively mitigate potential transport exposure pathways, including leaching into surface waters by tidal activity.

**LAP Area:** The affected LAP area was capped with asphalt as part of a 1995 remedial action. An area approximately 150 feet by 160 feet was paved with continuous asphalt paving as described in the LAP Area Closure Certification. This remedy effectively mitigates potential exposure pathways, including direct contact, erosion to surface water bodies, and migration to ground water by infiltration.

**Subsurface Soil:**

**LAP Area:** The affected LAP area was capped with asphalt as part of a 1995 remedial action. An area approximately 150 feet by 160 feet was paved with continuous asphalt paving as described in the LAP Area Closure Certification

**Sediments (Rahway River):**

**Building 69:** Approximately 0.5 acre of Rahway River sediments adjacent to the Building 69 was capped as part of a 1996–1997 final remedial action. The cap consists of 2 geotextile layers with a sand layer in between. Rip-rap was placed on top of the geotextile layers. The rip-rap was designed with a lip on the perimeter to reduce water velocity and induce sedimentation. This cap is developed to immobilize contaminated sediments and thereby significantly reduce the potential for migration and exposure to human health and the environment. This corrective measure is fully discussed in the Remedial Action Report, Reference 7. Sediments outside the cap are being sampled semiannually for 5 years from 1996 to 2000.

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

**X** 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):**

There are no complete pathways identified in # 3.

<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?

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

There are no “significant” exposures identified in #4.

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA 725), 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 **Cytec Industries Inc. Warners Plant** facility, EPA ID # **NJD 002173144**, located **at the Foot of Tremley Road in Linden, NJ** 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.

**Locations where References may be found:**

The following documents have been prepared by Basland, Bouck, & Lee on behalf of Cytec Industries, Inc. for the Site. The documents can be found at USEPA Region 2, Division of Environmental Planning and Program, RCRA Programs Branch, New Jersey Section.

- (1) Remedial Investigation Work Plan – Vol. 1, Vol. 2 – January 1991
  - (2) Remedial Investigation Phase I Report (Revised) – August 1992
  - (3) Corrective Measures Study Work Plan – July 1994
  - (4) Corrective Measures Study Report – July 1994 (Revised 1995)
  - (5) Data Review For Supplemental Investigation and Supplemental Corrective Measures Study Investigation – March 1995
  - (6) Remedial Action Plan Addendum for Building 69 and Rahway River – March 1996
  - (7) Remedial Action Report Building 69 and Rahway River Area Closure Certification – April 1997
  - (8) Remedial Action Plan – July 25, 1995
  - (9) Liquid Aroclor Production Area Closure Certification – October 4, 1995
  - (10) Diphenylguanidine Area Closure Certification – November 9, 1995
  - (11) Results of Perimeter Ground-water Monitoring for 1996 – February 27, 1997
  - (12) Annual Monitoring Report for 1997 – January 15, 1998
  - (13) Annual Monitoring Report for 1998 – January 25, 1999
  - (14) Phase II Remedial Investigation Report (Revised) – September 1999
  - (15) 9/99 EI 750 determination of Migration of Contaminated Groundwater under Control.
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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.**

**Completed by:** original signed by \_\_\_\_\_ **Date:** 08/23/00  
Agathe Nadai, Project Manager  
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original signed by \_\_\_\_\_ **Date:** 08/23/00  
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Raymond Basso, Chief  
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Attachments truncated, see facility file (MSS, 06/13/02)