

US EPA ARCHIVE DOCUMENT

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: Solutia Inc.
Facility Address: 500 Monsanto Avenue, Sauget, IL 62206-1198
Facility EPA ID #: ILD 000 802 702

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).

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 2

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			VOCs and SVOCs, <i>see Table in 5/26/04 EI</i>
Air (indoor & outdoor) ²	X			VOCs
Surface Soil (e.g., <2 ft)	X			VOCs, SVOCs, Lead, PCBs
Surface Water			X	Discharge of VOCs to Mississippi River being evaluated to determine if the discharge is “acceptable”
Sediment			X	Plume is partially captured by Groundwater Migration Control System (GCMS) installed under the CERCLA program. Uncaptured discharge to river shows variable ppb concentrations of benzene and chlorinated benzenes at one sediment sample location.
Subsrf. Soil (e.g., >2 ft)	X			VOCs, SVOCs, Lead, PCBs

_____ 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):

See references and discussion in 5/26/04 EI. Below are updates to the 2004 EI based on new information obtained during the Corrective Measures Study (CMS), Statement of Basis, Final Decision, and post-remedy investigations.

Groundwater - The July 2007, *Statement of Basis* describes the groundwater cleanup levels that are

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.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 3

exceeded throughout-the-plume in the shallow hydrogeologic unit (SHU), middle hydrogeologic unit (MHU) and deep hydrogeologic unit (DHU) for 18 organic contaminants, including benzene, chlorinated benzenes, chlorinated phenols, and PCBs.

Air (Indoors and Outdoors) - No updates to 2004 EI.

Surface and Subsurface Soil - The July 2007, *Statement of Basis* describes the soil remediation objectives that are exceeded at various areas at the Solutia facility for 22 organic and inorganic contaminants, including benzene, chlorinated benzenes, chlorinated phenols, PCBs, lead, and mercury.

After implementation of the final remedy, EPA conducted off-site surface soil sampling to investigate the potential air deposition pathway of PCBs from the Solutia facility and CERCLA Sites. Residential areas were sampled in East St. Louis and Sauget. Six of the 34 sample locations exceeded the soil remediation objective of 1 ppm PCB in surface soil (see March 23, 2010, notification letters).

Solutia investigations conducted pursuant to the February 2008, *Final Decision* found off-site concentrations of PCBs along railroad and highway property exceeding soil remediation objectives (see Solutia 9/1/09 letter to Alton & Southern Railway Company and 8/26/10 letter to Illinois Department of Transportation).

Surface Water and Sediment - On May 27, 2008, Solutia submitted an analysis that the discharge of contaminated groundwater to the Mississippi River was "acceptable". EPA and Illinois EPA have not yet made a determination of Solutia's analysis.

A portion of the Solutia facility plume(s) is captured by the Groundwater Migration Control System (GMCS). The portion that is not captured and discharges to the river is monitored semiannually. Recent sediment results presented in the *Long-Term Groundwater Monitoring Program* reports show varying results at one sample location just north of the GMCS. Chlorobenzene was found at 2.9 ppb in 1st quarter 2009; in 3rd quarter, 2009, benzene was 3.5 ppb, chlorobenzene was 72 ppb, and 1,4-dichlorobenzene was 1.6 ppb; and in 1st quarter 2010, no contaminants were detected.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 4

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	Yes	No	No	No
Air (indoors)	No	Yes	No	No	No	No	No
Soil (surface, e.g., <2 ft)	Yes	Yes	No	Yes	No	No	No
Surface Water	No	No	No	No	No	No	No
Sediment	No	No	No	No	No	No	Yes
Soil (subsurface e.g., >2 ft)	No	Yes	No	Yes	No	No	No
Air (outdoors)	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):

See references and discussion in 5/26/04 EI. Below are updates to the 2004 EI based on new information

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

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 5

obtained during the CMS, Statement of Basis, Final Decision, and post-remedy investigations.

Groundwater - The groundwater contaminant plume is partially captured by the GCMS with a portion discharging to the river. In April 2008, Solutia provided a *Regional Groundwater Flow and Contaminant Transport Model* (Regional Model) to EPA. Data presented in the model showed that the actual plume based on chlorobenzene concentrations exceeding groundwater cleanup levels was at least 2,500-feet further north of PSMW-06, the northerly well used to define the northern extent. Also, the model reported the presence of dewatering wells operated by the Illinois Department of Transportation (IDOT) that could influence contaminant migration to the north based on the assumed pumping rates and resulting groundwater gradients.

Air (Indoors and Outdoors) - No updates.

Surface and Subsurface Soil – On-site workers are further protected from exposures through implementation of the final remedy. Mercury, lead, and PCB contamination has been cleaned up and/or covered with asphalt to further limit exposure (see *Construction Completion Reports for Lead and Mercury*, February 27, 2009 and *Interim Construction Report for PCBs*, December 11, 2009).

Off-site workers may come into contact with PCB-contaminated surface and subsurface soil when working along right-of-ways on IDOT and railroad property in the southwest corner of the Solutia facility. Significant concentrations of PCBs (greater than 100 ppm) were found in off-site soil, likely from site runoff. The exposure pathway is potentially complete for off-site workers and construction workers.

Some residential soils in East St. Louis and Sauget, including a park, were found to have PCB concentrations greater than 1 ppm in surface samples (0 to 6-inches). Residents may come into contact with these soils when in their yards and the exposure pathway is complete.

Surface Water and Sediment – No updates.

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)?

— 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

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)
Page 6

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.”

X

If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

See references and discussion in 5/26/04 EI. Updates to this EI are provided below.

On-site Groundwater, Air, and Soil - Pursuant to 35 Ill. Adm. Code 742, Solutia recorded an Environment Land Use Control (ELUC) at the Office of Recorder of Deeds for St. Clair County on April 30, 2009, that ordered specific land use limitations or requirements at the Solutia facility. The limitations and requirements protect against exposure to contaminated soil and groundwater, and restricts use for industrial purposes only. Solutia recorded an amendment to the ELUC on April 28, 2010, that documented the installation of covers over the PCB remediation areas. The recording of the ELUC pursuant to the EPA February 2008, Final Decision ensures the on-site protection of human health and the environment related to groundwater, air, and soil.

Off-site Surface and Subsurface Soil – Adjacent landowners have been notified of PCB results. Solutia has reached agreement with IDOT to clean up the Rte. 3 right-of-way in early-summer 2011 to protective cleanup goals, with an ELUC to be recorded, as necessary. Additional sampling and remediation is still being worked out with the railway.

The full extent of PCB contamination in residential areas of East St. Louis and Sauget must still be determined. A January 2011, EPA Model indicates an area of potential off-site impact due to historical air emissions of PCBs from the Solutia facility. This area requires further sampling to better determine the extent of PCB concentrations exceeding the soil remediation objective of 1,000 ppb or site-specific concentration based on a human health risk assessment. A potentially complete pathway via site runoff/discharge from the Solutia facility to the historic northern extension of Dead Creek into East St. Louis should also be investigated.

Off-site Indoor Air – The full northern extent of the groundwater contaminant plume(s) from the Solutia facility has not been adequately defined. If the plume is found to extend under residential areas, Solutia will need to determine whether site VOCs are contributing to indoor vapor air intrusion and posing a potential unacceptable risk. The off-site plume is typically found at great depth in the DHU.

Sediment – No updates.

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

Page 7

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):

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)
Page 8**

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

_____ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the _____ facility, EPA ID # _____, located at _____ 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."

 X _____ IN - More information is needed to make a determination.

Completed by	(signature)	<i>Kenneth S. Bardo</i>	Date	April 25, 2011
	(print)	Kenneth S. Bardo		
	(title)	Environmental Scientist		

Supervisor	(signature)	<i>George Hamper</i>	Date	4-27-2011
	(print)	George Hamper		
	(title)	Section Chief		
	(EPA Region or State)	EPA Region 5		

Locations where References may be found:
RCRA 7 th Floor File Room - Administrative Record for RCRA 3008(h) Consent Order
Cahokia Public Library - 140 Cahokia Park Drive, Cahokia, IL

Contact telephone and e-mail numbers

(name)	Kenneth S. Bardo
(phone #)	(312) 886-7566
(e-mail)	bardo.kenneth@epa.gov

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.