

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:** Lakeshore Foundry  
**Facility Address:** 653 Market Street, Waukegan, IL  
**Facility EPA ID #:** ILR 000 111 591

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
- 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, GPRAs). 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"**<sup>1</sup> 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)?

<b>Media of Concern</b>	<b>Yes</b>	<b>No</b>	<b>?</b>	<b>Rationale / Key Contaminants</b>
Groundwater	x			Several inorganic contaminants were above the MCL. No organic contaminants were found in the groundwater.
Air (indoors) <sup>2</sup>		x		There were no contaminants of concern for the indoor air pathway.
Surface Soil (e.g., <2 ft)	x			Lead was found in one sample, SP-02, to be above the screening level of 800 mg/kg. Several samples showed arsenic in the surface soil above the screening level of 13 mg/kg.
Surface Water		x		See discussion below.
Sediment		x		Sediment samples were taken at two different beach areas that border the facility to the north and south and the results were below the screening criteria.
Subsurface Soil (e.g., >2 ft)	x			Lead was the only contaminant found in the subsurface soil above screening levels.
Air (outdoors)		x		Arsenic did not exceed the inhalation screening level at the facility.

- If no (for all media) - skip to #6, and enter a YE status code after providing or citing appropriate "levels", and referencing sufficient supporting 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.

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

Rationale and Reference(s): *Current Conditions Addendum for the Lakeshore Foundry Facility, August 2008  
Interim Measures Report for the Lakeshore Foundry, August 2007*

Lakeshore Foundry (LSF) is located in Waukegan, Illinois and encompasses 0.77 acre. The eastern boundary of LSF is Lake Michigan. The Elgin, Joliet and Eastern railroad borders the facility on the west and north side. The property to the south of property is owned by the City of Waukegan as a road right of way. In addition, the surrounding properties have a 100+ year history of heavy industrial use and many of the surrounding properties are now abandoned Brownfield sites including: former Fansteel/V.R. Wesson Site, former Waukegan Paint and Lacquer Site, and the former Diamond Scrap Yard site.

In 2006, LSF and the U. S. EPA entered into an Administrative Order on Consent in order to address contamination found at the facility by RCRA enforcement. Part of the Order required LSF to perform interim measures in order to control the source of contamination. Interim measures included excavating lead contaminated soil and treating the excavated soil in order to dispose of it as an Illinois Special Waste. A total of 528 tons of contaminated soil was removed during this interim measure. The area was then backfilled with clean soil.

The screening criteria used in this determination were the following: 1) surface soil-USEPA Region 9 PRGs for industrial soil and Illinois Tiered Approach C Objectives (TACO) for industrial use; 2) subsurface soil-Illinois TACO for industrial worker; 3) groundwater-maximum contaminant level (MCL) 4) surface water-Illinois Water Quality Standards; 5) sediment-USEPA Region 9 PRGs for industrial use as a surrogate for the recreational user; 6) outdoor air-USEPA Region 9 for particulates. Below is a discussion of how the site sampling results compared to each of the screening criteria.

Groundwater

Total arsenic, cadmium, copper, lead, vanadium, antimony, and zinc were found in the groundwater above maximum contaminant levels (the drinking water standard). Table 1 lists the maximum concentrations of contaminants found in the groundwater.

**Table 1-Maximum Concentrations of Contaminants in the Groundwater**

Well Number	Contaminant (totals)	MCL (mg/L)	Concentration (mg/L)
MW-01	Arsenic	0.05	0.17
MW-02	Cadmium	0.005	0.017
MW-02	Copper	0.65	9.0
MW-02	Lead	0.0075	2.8
MW-01	Nickel	0.1	0.27
MW-01	Vanadium	0.049	0.16
MW-02	Zinc	5.0	5.3
MW-01	Antimony	0.006	0.013

Indoor Air

No volatile organic constituents were found in the groundwater nor were any found in the soil. Therefore screening for volatilization from soil and groundwater into indoor air was not necessary.

Surface Soil

Interim measures were performed at the facility to remove lead-contaminated soil from past operations at the site. The interim measures removed lead-contaminated soil in the top 3 feet of soil at the source area. The excavated area was backfilled with clean concrete aggregate and soil. One sample that was outside of the interim measure area was found to be above 800mg/kg, the Region 9 PRG for lead. The sample location is SP-02 with a concentration of 2,100 mg/kg of lead. There are also two beach areas bordering the facility. These areas were also sampled;

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however, there were no exceedances of screening values (Figure 1). In addition to lead, arsenic was also found above industrial land use screening value. The maximum concentration of arsenic was 22 mg/kg compared to the industrial screening level of 13 mg/kg. This was found in the area that did not require interim measures on site. Figure 1 depicts the area where interim measures were performed.

Surface Water

Since it was not possible to collect direct surface water samples from Lake Michigan and groundwater flows into the Lake, dissolved groundwater results were compared against Illinois Surface Water Quality Standards for recreational user. It was found that the results were below this value for human contact.

Sediment

Sediment samples were collected at the two beach areas that border the facility to the north and south. The results were compared against industrial screening levels that were used as a surrogate for the recreational and trespasser scenario. No exceedances were found in the samples.

Subsurface Soil

Confirmatory samples performed in the excavated area in the sidewalls and bottom before the area was backfilled. Several of the sample results were above the Region 9 PRG of 800 mg/kg. The maximum concentration found in this area was 1900 mg/kg. In the other areas of the facility outside of the excavation area, LSF-SP-07 showed the maximum concentration of lead in the surface soil (1.5-2 foot interval) of 1,100 mg/kg.

Outdoor Air

Arsenic levels in the surface soil were below the screening criteria for the inhalation by the industrial worker.

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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)

<b>“Contaminated” Media</b>	<b>Residents</b>	<b>Workers</b>	<b>Day-Care</b>	<b>Construction</b>	<b>Trespassers</b>	<b>Recreation</b>	<b>Food<sup>3</sup></b>
Groundwater	No	No	No	Yes	No	No	No
Air (indoors)							
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	Yes	No	No
Surface Water							
Sediment							
Soil (subsurface e.g., >2 ft)	No	No	No	Yes	No	No	No
Air (outdoors)							

Instructions for Summary Exposure Pathway Evaluation Table:

- Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated” as identified in #2 above.
- 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): *Current Conditions Addendum for the Lakeshore Foundry Facility, August 2008*  
*Interim Measures Report for the Lakeshore Foundry, August 2007*

Residential/Daycare Land Use Scenario

The residential pathway is not complete for the Lakeshore Foundry site. There are no residential areas around the site and the future anticipated use is to remain industrial. In addition, there are no daycare centers at the facility or in the immediate surrounding area.

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

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**Industrial Land Use Scenario**

- Surface Soil:** Surface soil is a potentially complete pathway as there is one sample location that exceeds the Region 9 PRG for industrial soil that is outside of the excavated area.
- Subsurface Soil:** The industrial worker is not expected to come into contact with subsurface soil throughout the work day and therefore this pathway is incomplete.
- Groundwater:** There is a drinking water restriction on groundwater at the facility and the industrial worker is not expected to be in direct contact with the groundwater. Therefore, this pathway is incomplete. In addition, organics were not found in the groundwater, so indoor air pathway is not complete for industrial workers.

**Construction Worker Scenario**

- Surface Soil:** Surface soil is a potentially complete pathway as there is one sample location that exceeds the TACO level for lead in industrial land use.
- Subsurface Soil:** This is a potentially complete pathway for the construction worker as there are several exceedances of the screening criteria for lead at depths greater than six inches at the site.
- Groundwater:** Although groundwater is not used for drinking water at the site, it is possible for the construction worker to come into direct contact with the groundwater during excavation activities.

**Recreational User/Trespasser Land Use Scenario**

- Soil:** There is one surface soil sample location on the facility that is above the lead screening level for lead. The two bordering beach areas were sampled and the results were below screening criteria.

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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)?
- 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):**

Industrial and Construction Worker Exposure to Surface Soil

When the mean concentration of lead in the surface soil is calculated, it is found to be 243 mg/kg, which is below the TACO level for industrial land use of 800 mg/kg. Therefore, despite the one surface soil sample that had a concentration of lead at 2,100 mg/kg, it is unlikely that an industrial worker will spend his/her entire work day at the location with the maximum concentration of lead. Therefore, the lead concentrations in the surface soil are not considered significant. Arsenic was found in the surface soil above the screening criteria for industrial land use. A 95% upper confidence level (UCL) was calculated and found to be 11 mg/kg, which is below the screening value of 16 mg/kg. Therefore, the concentration of arsenic in the surface soil is not significant.

Construction Worker Exposure to Subsurface Soil

There are several subsurface soil sample results that had lead concentration above the TACO level of 700 mg/kg for construction worker. The mean concentration of lead in the subsurface was calculated and found to be approximately 910 mg/kg in the remedial area. The TACO remedial level of 700 mg/kg for a construction worker is based on one year exposure to subsurface lead contamination applying the adult lead model. When applied to Midwestern population, the exposure frequency of 170 days averaged in one year estimates the preliminary remedial level of 700 mg/kg. Applying TACO tier II criteria, a site specific remedial level was calculated for the construction worker scenario. Since the site occupies less than an acre, an exposure frequency of 45 days averaged to one year was considered as a reasonable exposure and remedial level was calculated using adult lead model. The remediation level was estimated to be 2, 625 mg/kg which was lesser than the subsurface average concentration of 910 mg/kg.

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<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):

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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 Lakeshore Foundry facility, EPA ID # ILR 000 111 591, located at 653 Market Street Waukegan, Illinois under current and reasonably expected conditions. This determination will be re-evaluated when the Agency or the 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) <u>Jill Groboski</u>	Date <u>12/30/08</u>
	(print) <u>Jill Groboski</u>	
	(title) <u>Project Manager</u>	
Supervisor	(signature) <u>George Hamper</u>	Date <u>12-23-08</u>
	(print) <u>George Hamper</u>	
	(title) <u>Chief, Corrective Action Section 2</u>	
	(EPA Region or State) <u>5</u>	

Locations where References may be found:

U. S. EPA Region 5  
77 W. Jackson Blvd.  
7<sup>th</sup> Floor Records Center  
Chicago, IL 60604

*B. Sundar*  
*12/23/08*

Contact telephone and e-mail numbers

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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.**

**Figure 1-Sample Locations and Excavated Area Location**

