

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

Revised 11/8/00

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

**Current Human Exposures Under Control**

**Facility Name:** Vickers Inc.  
**Facility Address:** 6600 North 72<sup>nd</sup> Street  
**Facility EPA ID #:** NED007286198

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).

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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 [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act] from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?)

	Yes	No	?	Rationale / Key Contaminants
Groundwater	<u>X</u>	___	___	<u>Trichlorethene (TCE), 1,1,1-Trichlorethane</u>
Air (indoors) <sup>2</sup>	___	<u>X</u>	___	<u>(1,1,1-TCA), and 1,1-Dichlorethene (1,1-DCE) (2<sup>nd</sup> Quarter 2000 Groundwater Monitoring Report)</u>
Surface Soil (e.g., <2 ft)	___	<u>X</u>	___	<u>Quarter 2000 Groundwater Monitoring Report)</u>
Surface Water	___	<u>X</u>	___	_____
Sediment	___	<u>X</u>	___	_____
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	___	___	<u>TCE, 1,1,1-TCA, 1,1-DCE (October 2000 RCRA</u>
Air (outdoors)	___	<u>X</u>	___	<u>Facility Investigation Final Draft)</u>

\_\_\_\_\_ 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): Past investigations and quarterly groundwater monitoring at the Vickers facility have shown concentrations of TCE, 1,1,1-TCA, 1,1-DCE and their degradation products above Maximum Contaminant Levels(MCLs). The highest concentrations of TCE, 1,1,1-TCA, and 1,1-DCE found in groundwater during the most recent sampling events are 1800, 20000, and 6000 micrograms/liter (ug/l), respectively. The MCLs for TCE, 1,1,1-TCA, and 1,1-DCE are 5, 200, and 7 ug/L, respectively. Past investigations have also found concentrations of these compounds in subsurface soils above risk based standards. The highest concentrations of TCE, 1,1,1-TCA, and 1,1-DCE found in subsurface soils are 4700, 960, 7.4 milligrams/kilogram (mg/kg) (1mg = 1000ug). This information can be found in the Focused RCRA Facility Investigation and Corrective Measures Study (final draft October 2000).

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) 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)

<b>“Contaminated” Media</b>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	<u>yes</u>	<u>yes</u>	<u>no</u>				<u>no</u>
Air (indoors)	_____	_____	_____				
Soil (surface, e.g., <2 ft)	_____	_____	_____	_____	_____	_____	_____
Surface Water	_____	_____	_____	_____	_____	_____	_____
Sediment	_____	_____	_____	_____	_____	_____	_____
Soil (subsurface e.g., >2 ft)	_____	_____	_____	<u>yes</u>	_____	_____	<u>no</u>
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).
- Yes 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): Investigations have found that the groundwater contaminants are volatilizing (changing from liquid to vapor) and as a result vapors have contaminated the air within the subsurface soil. The subsurface vapors are also likely to migrate upwards. Since groundwater contamination is underneath a residential neighborhood, there is a potential for contaminants to migrate upward into homes since soil vapors could come into contact with the foundations.. Investigations have found TCE, 1,1,1-TCA, and 1,1-DCE vapors 5 to 10 feet below ground surface. Note that the foundations of the houses in the neighborhood are known to extend several feet below ground surface. This information can be found in the May 2000 Phase III Interim Measures Report (Technical Memorandum No. 4). In addition construction workers (including utility workers) and facility workers could come into contact with contaminated groundwater or subsurface soil. Regular maintenance activities on the groundwater remediation system or utility work could lead to exposures on-site. Also, utility workers working on underground utilities could become exposed.

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

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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 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): A risk assessment was performed to find if soil vapors underneath home were causing indoor air contamination above health based levels. The study used the EPA approved Johnson-Ettinger model to determine the concentrations of soil vapors that would migrate into a house from beneath its foundation. The results of the study revealed no unacceptable risks to residents. This information can be found in Technical Memorandum No.4. In addition, no drinking water wells are located within 1,000 feet of impacted groundwater. The residential neighborhood uses a municipal water system for drinking water (January 2000 Phase I Interim Measure Results Report) Exposures to maintenance and construction workers are also not expected to be significant under current conditions. Calculated risks to maintenance and construction workers are below health-based standards (See Focused RCRA Facility Investigation and Corrective Measures Study). Exposures would be minimal based on the short duration of construction and utility work. It is expected that these exposures would be even more minimized with the imposition of on-site deed restrictions and that the land immediately off-site is already developed. Both would significantly limit construction activities within the contaminated areas, thereby reducing exposure.

<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): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

