

US EPA ARCHIVE DOCUMENT

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

Interim Final 2/5/99

**RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA750)****Migration of Contaminated Groundwater Under Control**

<b>Facility Name:</b>	<u>Lacks Industries, Inc</u>
<b>Facility Address:</b>	<u>6138 Riverside Drive, Saranac, Ionia County, Michigan</u>
<b>Facility EPA ID #:</b>	<u>MID 080 359 433</u>

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 "Migration of Contaminated Groundwater Under Control" EI**

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

**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. Is **groundwater** known or reasonably suspected to be “contaminated”<sup>1</sup> above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

  X   If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

       If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

       If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

The facility is located approximately 750 feet west of Crooked Creek and 1,400 feet south of the Grand River. A marsh area is located to the west of the facility adjacent to the Grand River. There have been releases from the facility’s surface impoundments which were formerly used for management of electroplating sludges and are currently undergoing closure and post-closure. Also, in 1978 a release of approximately 3,000 gallons of chromium solution occurred at the main plating area from the plant building. In addition, past practices at the facility have involved the use of organic solvents. As a consequence, there is groundwater contamination associated with nickel, chromium, tetrachloroethene (PCE), trichloroethene (TCE), 1,2-cis dichloroethene (1,2-DCE) and vinyl chloride (VC). Following the occurrence of the chromium spill, contaminated soils were excavated from the plating area and an extraction well was put into operation for extraction of contaminated groundwater in combination with groundwater treatment at the WWTP. This system was in operation until this present year of 2003 when closure of the WWTP was initiated under National Priority Discharge Elimination System (NPDES) requirements.

Based on monitoring results from August 2003, the maximum contaminant concentrations in groundwater from the upper and lower aquifers are approximately 6110 parts per billion (ppb) for nickel, 200 ppb for hexavalent chromium, 20 ppb for VC, 22 ppb for PCE, 180 ppb for 1,2-DCE and 390 ppb for TCE. Although the 2003 monitoring results are preliminary pending validation, the data seems to be consistent with the overall expectation based on previous quarterly monitoring that constituent concentrations in groundwater would attenuate over time since there is no longer a contaminant source. The concentrations of these constituents in groundwater exceed maximum contaminant levels (MCLs), with the exception of nickel for which there is no designated MCL. However, nickel concentrations exceed State drinking water criteria. In addition, the maximum concentrations of some of the constituents detected in groundwater at the marsh are the following: arsenic (11 ppb), hexavalent chromium (1.1 ppb), copper (5.1 ppb), lead (1.1 ppb), nickel (380 ppb), cis 1,2-DCE (3.5 ppb) and TCE (0.35 as estimated).

Refer to figures illustrating the site and related groundwater information.

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<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 appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”<sup>2</sup> as defined by the monitoring locations designated at the time of this determination)?

- X   If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the “existing area of groundwater contamination”<sup>2</sup>).
- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”<sup>2</sup>) - skip to #8 and enter “NO” status code, after providing an explanation.
- If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

Groundwater quarterly monitoring data have shown that concentrations of chromium, PCE, TCE and 1,2-DCE are below MCLs at inland wells located at a distance of at least 400 feet from the Grand River. This indicates that groundwater contamination from chromium, PCE, TCE and 1,2-DCE has been stabilized before reaching the Grand River.

Based on gradient measurements from the site investigation, the portion of the Grand River by the facility is considered a losing stream representing a hydraulic barrier. Information from vertical profiling indicates that a single aquifer extends east of MW-26 while an upper and lower aquifer separated by an intermediate confining layer extend westward from MW-26 to MW-37. As suggested by the profiling information, the upper and lower aquifer are hydraulically connected to the river and the marsh, except for the area between MW-26 and MW-37 where the lower aquifer is confined. Further, the absence of underflow of contaminated groundwater beneath the Grand River was confirmed for the western discharge area (south of MW-37) based on monitoring results from wells MW-41, MW-42 and MW-43 located to the west on the other side of the river. Monitoring results from these wells indicated the presence of nickel at concentrations similar to background levels or undetectable. At the discharge area east of MW-26, monitoring results from MW-23 indicated that VC concentrations were undetected at the lower portion of the single aquifer which suggests the absence of underflow beneath the Grand River. Cross Creek is a losing stream and it is not expected to receive discharges of contaminated groundwater from the facility.

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<sup>2</sup> “existing area of contaminated groundwater” is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of “contamination” that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of “contaminated” groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

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4. Does “contaminated” groundwater **discharge** into **surface water** bodies?

  X   If yes - continue after identifying potentially affected surface water bodies.

       If no - skip to #7 (and enter a “YE” status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater “contamination” does not enter surface water bodies.

       If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

Under the hydraulic barrier conditions previously described, the following discharges to surface water of the Grand River exist: a discharge of nickel above MCLs with a maximum concentration of 486 ppb occurring from MW-22 to MW-26 at the upper aquifer and at the lower aquifer from MW-37 to south of MW- 44; and a discharge of VC above MCLs with a maximum concentration of 20 ppb occurring from MW-21 to MW-23 at the upper aquifer.

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5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater “level,” and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

  X   If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of key contaminants discharged above their groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

       If no - (the discharge of “contaminated” groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of each contaminant discharged above its groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater “levels,” the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

       If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

It is expected that the concentrations of nickel in the upper and lower aquifers and of VC in the upper aquifer will be attenuated by at least a factor of 10 prior to entry into surface water from the Grand River, achieving concentrations below MCLs and State drinking water criteria. Therefore, the estimated concentrations prior to discharge would be 48 ppb for nickel at the upper and lower aquifers and 2 ppb for VC at the upper aquifer. Therefore, the discharges of nickel and VC into surface water are likely to be insignificant in the context of short-term goals associated with this EI determination.

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<sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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6. Can the **discharge** of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented<sup>4</sup>)?

\_\_\_\_\_ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,<sup>5</sup> appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

\_\_\_\_\_ If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

\_\_\_\_\_ If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

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<sup>4</sup> Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

<sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

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7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the “existing area of contaminated groundwater?”

  X   If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the “existing area of groundwater contamination.”

       If no - enter “NO” status code in #8.

       If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

Groundwater monitoring is currently being conducted under the MDEQ’s closure and post-closure requirements.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control



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EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

- X   YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Lacks Industries facility, EPA ID # MID 080 359 433, located in Saranac, Ionia County, Michigan. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
- NO - Unacceptable migration of contaminated groundwater is observed or expected.
- IN - More information is needed to make a determination.

Completed by	(signature) _____	Date	_____
	(print) _____		
	(title) Environmental Scientist		
Supervisor	(signature) _____	Date	_____
	(print) _____		
	(title) Chief, Corrective Action Section		
	(EPA Region or State) Region 5		

Locations where References may be found:

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

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