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:	Lacks Industries, Inc.
Facility Address:	6138 Riverside Drive, Saranac, Ionia County, Michigan
Facility EPA ID #:	MID 080 359 433

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).

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)?

	Yes	No	?		Notes
Groundwater	X			Tetrachloroethene (PCE), Trichloroethene (TCE), 1,2-dichloroethene (1,2-DCE),vinyl chloride (VC), arsenic, hexavalent chromium and nickel	A
Air (indoors)[2]	X			TCE	E
Surface Soil (on-site)	X			Hexavalent chromium, lead, copper and TCE	B
Surface Soil (marsh from Lacks'property)	X			Arsenic	B
Surface Water (marsh from Lacks'property)	X			Mercury	C
Sediment (Grand River)			?	No sediment data is available- sediment is assumed to be contaminated	D
Subsurf. Soil (on-site)	X			Hexavalent chromium, lead and copper	B
Subsurf. Soil (marsh from Lacks'property)	X			Arsenic	B
Air (outdoors)		X		—	E

____ 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):

[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.

Lacks Industries, Inc. (Lacks) is a former electroplating/metal finishing facility subject to corrective action under a Consent Decree. In addition, the facility is conducting closure and post-closure of five hazardous waste surface impoundments as well as groundwater monitoring pursuant to the requirements from the Michigan Department of Environmental Quality (MDEQ). The RFI investigation has addressed releases from various solid waste management units, including the surface impoundments. Releases have impacted media from on- and off-site areas. On-site areas include plant areas and a marsh located in Lacks's property. Off-site areas include the marsh from a Rustic Park owned by the Village of Saranac, Crooked Creek and the Grand River. A railroad line and ditch extend from east to west across on- and off-site areas.

The migration pathways associated with the site include migration of contaminants from former surface impoundment sludges and soil into groundwater through leaching; migration of contaminants in groundwater into soil/sediment and surface water from marsh areas, the Grand River, and the gaining-stream reach of Crooked Creek; and migration of contaminants in runoff (via a railroad ditch) into soil/sediment and surface water from marsh areas, Crooked Creek and the Grand River. The current land use for on-site is industrial while the marsh from Lacks's property is subject to agricultural use (cattle grazing). The marsh area that extends downgradient from the Lacks's property provides grounds for a Rustic Park. Refer to attached figures showing the site and investigation areas.

A) Groundwater

The table below summarizes information on contaminants that exceed drinking water criteria in groundwater based on quarterly groundwater monitoring since 1998. Groundwater concentrations do not exceed the MDEQ's Part 201groundwater contact or volatilization to indoor/ambient air criteria.

Contaminant in groundwater	**Pathway**	**Safe Drinking Water Act Maximum Contaminant Levels (ppb)**	**Maximum concentration in groundwater (ppb)**
VC	Drinking water	2	20
PCE		5	22
1,2-DCE		5	180
TCE		5	390
Arsenic		10	14
Hexavalent chromium		100	200
Nickel		100	7,190

B) Surface and subsurface soil

The table below summarizes those contaminant concentrations in surface and subsurface soil that exceed Part 201 generic criteria based on the RFI results.

Area	**Contaminant**	**Pathway**	**Part 201 Criteria (mg/kg)**	**Maximum concentration (mg/kg) exceeding criteria**

				Surface	Subsurface
On-site plant area	Hexavalent chromium	Industrial direct contact	9,200	13,600 (SB-21)	---
	Lead		900	---	5,860 (SB-5)
	Hexavalent chromium	Industrial particulate soil inhalation	240	13,600 (SB-21)	1220 (SB-5) estimated value
	Copper		59,000	---	62,100 (SB-52)
	TCE	Industrial soil volatilization to indoor air inhalation	37	110	---
On-site marsh at Lacks's property	Arsenic	Residential direct contact	7.6	10 (MSB-7)	68 (MSB-7)
		Uptake by grazing beef cattle and game/ Consumption of beef and game	No generic criteria		

- - - No samples exceed criteria

Contaminants concentrations in surface and subsurface soil from the railroad ditch are below Part 201 Direct Contact Criteria.

Data from the RFI and closure indicate that the former sludges and contaminated soils from the surface impoundment area may have been a source of runoff. Therefore, arsenic contamination in runoff may have migrated via the railroad ditch into the marsh at Lacks's property. Also, arsenic may have migrated into the marsh at Lacks's property via groundwater discharge and adsorption into marsh soils. The surface impoundments are undergoing closure pursuant to MDEQ requirements.

Available soil data appear to indicate that arsenic contamination present in the marsh soil at the Rustic Park is not likely related to operations from the Lacks facility. The Rustic Park is adjacent to the Lacks's marsh and located further west at a greater distance from the site. The maximum arsenic concentration in surface soil from the Lacks's marsh is 10 mg/kg. In contrast, the arsenic contamination in surface soil from the Rustic Park consists of elevated concentrations of up to 76 mg/kg. This appears to indicate that runoff from sources unrelated to the Lacks site in the vicinity of a local industrial park may have impacted soils from the Rustic Park. Therefore, the arsenic contamination from the Rustic Park is not considered in this EI evaluation. At the Rustic Park, arsenic is the only contaminant detected in media that exceeds Part 201 criteria and no contaminant concentrations in surface water exceed the Michigan Water Quality Criteria.

C) Surface water

Mercury contamination potentially related to the Lacks facility has impacted surface water from the marsh at Lacks's property as shown in the table below based on the RFI results. It is noted that mercury concentrations in surface water from the Lacks's marsh do not exceed the Part 201groundwater contact criteria for mercury of 56 ppb or the corresponding Safe Drinking Water Act Maximum Contaminant Level of 2 ppb.

Area	Contaminant	Pathways	Part 201 Criteria (mg/kg)	MDEQ Rule 57 Water Quality Criteria- human non-cancer value drink/non-drink (ppb) *	Maximum concentration (µg/l)
On-site marsh at Lacks's property	Mercury	Uptake by grazing beef cattle and game/ Consumption of beef and game	No generic criteria	0.0018	0.0217

Contaminant concentrations in surface water from Crooked Creek and the Rustic Park do not exceed the most stringent MDEQ Rule 57 Water Quality Criteria for human protection. The marsh and Crooked Creek do not support a recreational fishery (no appeal to recreational anglers).

The migration pathway related to discharge of groundwater into surface water from the Grand River is being addressed through the MDEQ's November 4, 2003, Mixing Zone Evaluation determination for the Lacks facility. Contamination in runoff from the Lacks facility may have migrated into surface water from the Grand River. However, there are no present releases of runoff into surface water because the contaminant sources from the surface impoundments have been removed through excavation. It is expected that any contamination from past runoff into the Grand River has been contained in river sediments (refer to sediment evaluation).

D) Sediments

Contaminants in runoff from the former surface impoundments and in groundwater have migrated into Crooked Creek and the Grand River. Based on the RFI data, contaminant concentrations in sediments from Crooked Creek do not exceed Part 201 Direct Contact Criteria for residential land use. There are no sediment data available from the Grand River. Although it would be less likely that contamination from volatile organic compounds (VOCs) would have migrated into sediments of the Grand River due to potential volatilization during migration, this evaluation will conservatively assume that there may be potential contamination from metals, as well as VOCs, in sediments from the Grand River (related to pathways of contaminant migration from groundwater discharge and runoff into sediment)

E) Air (indoors and outdoors)

Surface soil at location SB-25A exceeds the Part 201 industrial soil volatilization to indoor air criteria for TCE. Therefore, there may be migration of TCE from soil into indoor air at the plant building.

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
Surface soil (on-site)	no	no	no	no	no	no	no
Surface soil (Lacks's marsh)	no	no	no	no	yes	yes	yes
Surface Water (Lacks's marsh)	no	no	no	no	yes	yes	yes
Sediment (Grand River)	no	no	no	no	no	no	yes
Subsurface soil (on-site)	no	no	no	no	no	no	no
Subsurface soil (Lacks's marsh) ~~Air (outdoors)~~	no	no	no	no	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):

Incomplete pathways

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

The site does not include any residential use and it does not house any health- or day-care facilities. Drinking water is supplied by the Village of Saranac (a municipal drinking water source located 1300 feet away from the facility is no longer in use). There is no use of groundwater as drinking water or for industrial operations at the site. Construction workers are not expected to get in contact with groundwater since the water table is found at a depth of approximately 25 feet (see also description of groundwater-related pathway associated with closure activities). Contaminated areas at the plant building are covered by flooring and areas outside of the building are covered by concrete floor and asphalt preventing contact to soil contamination by workers. Access to the surface impoundments area (subject to closure) has been limited by security fencing, lockable doors and signs until a cap is constructed.

The marsh at Lacks's property is used for cattle grazing and hunting by former land owners through a purchase agreement. However, a hunting lease disallows living in the hunting cabin at the site. Cattle grazing, recreation and hunting activities at the Lacks's marsh will not result on any type of exposure to subsurface soil.

Exposure to contamination in sediment from the Grand River through contact is not expected since swimming in the Grand River is not likely due to the relatively strong river flow in the area (daily mean flow of 877 ft^3/sec based on 53 years of record at USGS Ionia Station). Recreation in the river would likely include boating (see discussion on fishing in narrative below regarding complete pathways). There are no communities in the Grand River that have public drinking water intakes (no Internet information is available on Michigan public water intakes due to security reasons).

Complete pathways

Workers at the plant would be exposed to concentrations of TCE in indoor air. Also, workers conducting closure activities may be exposed to soil and groundwater contamination at the surface impoundments.

Cattle raisers, hunters and trespassers at the marsh from Lacks's property will be exposed to soil contamination from arsenic through dermal contact. Also, cattle raisers and hunters could experience exposure to arsenic contamination in soil and mercury contamination in surface water via beef and game consumption.

The recreation-type receptor may potentially become exposed to contamination from metals and VOCs in sediments from the Grand River via fish consumption.

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 and contaminant concentrations could result in greater than acceptable risks)?

X If no (exposures can not be reasonably expected to be "significant" 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" are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" for any complete exposure pathway - continue after providing a description and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" are not expected to be "significant."

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

Rationale and Reference(s):

Concentrations of TCE in indoor air from the plant are expected to be below OSHA required levels. At the Lacks's marsh, the concentration of arsenic in soil exceeds the Part 201 direct contact criteria for residential land use by less than a factor of two. Also, exposure to arsenic in sediment by the cattle raisers, trespassers and hunters is expected to be for a limited number of days per year. It is noted that there is no generic standard for evaluating exposure to arsenic in sediment and mercury in surface water through food consumption pathways (e.g., beef and game) associated with the Lacks's marsh. However, the exposure to arsenic and mercury through food consumption is based on an indirect consumption pathway which is not expected to result in significant exposure to the cattle raisers and hunters (this assumption will be confirmed in a future risk assessment in support of a final remedy decision).

Closure activities for the surface impoundments involves specialized trained personnel using appropriate protective and safety gear.

Information from the Michigan fish contaminant monitoring program online database at http://www.deq.state.mi.us/fcmp/ indicates that mercury is being monitored in caged fish and edible portions at various locations from the Grand River. Based on the monitoring data, mercury concentration found in fish from the Grand River does not warrant the initiation of fish consumption guidelines by the State of Michigan. It is expected that other site-related metal contaminants (such as arsenic) would have less tendency to bioaccumulate than mercury. Because of the bioaccumulative properties of mercury, fish tissue monitoring data for mercury could serve as an indicator of a worst case scenario of fish tissue contamination from metals in the Grand River. It is expected that no significant exposures may currently exist from metal contamination through fish consumption in the Grand River.

The Michigan fish contaminant monitoring program does not include monitoring for VOCs. However, it includes monitoring for polychlorinated biphenyls (PCBs) and there is a Michigan fish advisory on PCBs for the Grand River

[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.

(PCBs are not constituents of concern associated with the Lacks facility - refer to note below). The fish consumption guidelines on PCBs for the Grand River include restricted consumption for the general population and women and children. Unlike PCBs, VOCs do not have bioaccumulative properties. Therefore, these guidelines are expected to allow safe fish consumption at locations from the Grand River where sediment may be impacted by VOC contamination from the Lacks facility, as well as any potential metal contamination.

Note: The only detection of PCBs at the site is an estimated concentration of Aroclor-1242 of 0.031 mg/kg in surface soil from location SB-14 at the Hydraulic Oil Storage Area. Other sampling locations from this and other solid waste management units did not indicate the presence of PCB at detectable levels. Therefore, there is no indication that a release of PCBs has occurred from the site into the Grand River via runoff or groundwater discharge.

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):

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):

X 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 Lacks Industries facility , EPA ID # MID 080 359 433, located in Saranac, Ionia County, 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.

Completed by (signature) _____ Date _____
(print) Mirtha Cápiro
(title) Environmental Scientist

Supervisor (signature) _____ Date _____
(print) George Hamper
(title) Chief, ECAB Corrective Action Section
(EPA Region or State) U.S. EPA Region 5

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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.