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:	Mead Storage Depot
Facility Address:	Chillicothe, OH
Facility EPA ID #:	OHD 043 730 209

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	?	Rationale / Key Contaminants
Groundwater	x			TCE, cis 1,2 DCE, vinyl chloride
Air (indoors)[2]		x		No structures above the plume
Surface Soil (e.g., <2 ft)		x		Do not exceed PRGs for Resid. Soil
Surface Water	x			TCE, vinyl chloride, 1,2 DCE
Sediment		x		
Subsurf. Soil (e.g., >2 ft)	x			TCE
Air (outdoors)	x			TCE in soil & groundwater might migrate to air

____ 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):
The Mead Storage Depot is located in Londonberry, Ohio twelve miles southeast of the Mead Paper Plant in Chillicothe, OH. The Depot was formerly owned by the Navy, which had released VOCs in a burn area, which subsequently buried by Mead's paper waste. The Depot has no structures over the plume area.

The following table highlights the maximum concentration of contaminants found in Groundwater and surface water as per the recent monitoring data (*May/June 2004*). The concentration is compared against the most stringent drinking water standard termed as maximum contaminant level (MCL).

The screening criteria used in this Environmental Indicator Report are as follows: 1.) U.S. EPA Safe Drinking Water Act Maximum Contaminant Levels (MCLs); 2.) U.S. EPA Region 9 Preliminary Remediation Goals (PRGs); 3.) Ohio EPA Ohio River Basin Aquatic Life and Human Health Criteria, 8/5/04; 4.) Michigan Department of Environmental Quality (MDEQ) Part 201 risk based screening criteria for ground water direct contact, for residential infinite source volatile soil inhalation, and for groundwater contact criteria for residents and industrial or commercial workers. The MDEQ criteria was developed using U.S. EPA Guidance.

[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).

Media Contaminant	Maximum Concentration (ppb)	MCL (ppb)
Ground Water		
Trichlorethylene	11	5
Cis- 1,2 Dichlorethylene	656	70
Vinyl Chloride	31	2
Surface Water		
Vinyl Chloride	4.2	2

Surface Water: Report of Findings Addendum to Task 2 Plume Delineation, September 1995, results indicate seeps and the unnamed Tributary to Walnut Creek with TCE in exceedance of drinking water MCLs. The March 12, 2003 report also shows vinyl chloride in the surface water exceeding the MCLs (2.5µg/l and 4.2 µg/l).

Subsurface soils : TCE was found at a concentration of 1.3mg/Kg at a soil depth of 5-7 ft near pumping well RW-1/RW-2 that resulted from surface application from the alleged Navy Operations. This concentration exceeds the Region 9 residential soil direct contact criteria of 0.053 mg/kg.

The following table compares the highest concentration of volatiles found in sediment/surface soil in marsh area against the most stringent residential direct contact criteria which might provide a conservative risk estimate for other receptors such as construction workers and trespassers. As seen from the table, none of the contaminants exceed the screening criteria and thereby less likely pose significant health risk to recreational receptors and trespassers or maintenance workers.

Sediment/ surface soil Contaminant	Maximum Concentration(ppb)	Residential direct contact criteria (ppb)
TCE	30	53
Cis, 1,2- Dichloroethylene	363	43000
Trans, 1,2- Dichlorethylene	100	69000
Vinyl Chloride	50	79

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	Y	_N__	_N__	Y	_N__	__N_	_N_
~~Air (indoors)~~	___	___	___	___	___	___	___
~~Soil (surface, e.g., <2 ft)~~	___	___	___	___	___	___	___
Surface Water	_N__	Y	_N__	_N__	Y	Y	_N_
~~Sediment~~	___	___	___	___	___	___	___
Soil (subsurface e.g., >2 ft)	_N__	_N__	_N__	Y	_N__	_N__	_N_
Air (outdoors)	_N__	_N__	_N__	Y	Y	Y	_N_

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): Although ground water is not a source of drinking water, it may be used for non potable purposes and may result in complete exposure pathway for residents. Contaminated surface water contact is another complete pathway for maintenance workers, trespassers and recreational receptors. A potentially complete pathway is present through inhalation, ingestion and dermal exposures associated with future subsurface repair or construction that occurs in locations where shallow ground water (5-10 ft bgs) or contaminated subsurface soil is present. Volatilization in to ambient air from contaminated subsurface soil may provide a complete pathway for construction workers, trespassers and recreational receptors.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be

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

"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)?

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):
As the residents in the area receive city water to their homes, they apparently do not use groundwater as a drinking water source. There is a possibility they use wells for non-potable uses. The possible exposure from well water used for non-potable purposes is best analyzed using the worst case "kiddie pool scenario". This analysis was conducted using the first quarter 2004 groundwater monitoring data, using wells nearest the Schooley Road homes. The following table shows that none of the ground water contaminant exceed the criteria based on the non potable use of ground water and thereby less likely to pose a significant health risk to residents.

Ground water contaminant	Maximum Concnetration (ppb)	Risk or Hazard based Criteria(ppb)
Cis 1,2 DCE	48	23000
TCE	16	9600
VC	6.7	9000

The exposures for construction workers, on-site workers, trespassers, and recreators to surface water is a complete pathway, yet the maximum exposure levels (4.2 µg/l of vinyl chloride at sample location S-3) in ambient surface water is below the OEPA Ohio River Basin non-drink (direct contact) human health criteria for surface water in the Ohio River Basin (5,300 µg/l for vinyl chloride).

The on-site workers sampling groundwater and construction workers also have a complete pathway, yet the most elevated groundwater results in the shallow aquifer is 32 µg/l of vinyl chloride at well D500-11. This concentration

[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.

is significantly below the groundwater contact criteria for residents and industrial or commercial workers as per MDEQ's risk based screening value which is 570 µg/l .

The maximum results for subsurface soils contamination is in an area near the pumping wells which is the former Navy Burn Area. The highest subsurface soil results EPA has are from 1989 and indicate at well 100 at 5-7 feet a TCE result of 1.32 mg/kg. The subsurface contamination presents a complete pathway for trespassers through inhalation of vapors through volatalization of soil vapors in to ambient air. Further, construction workers may be exposed to subsurface contamination through direct contact. When compared to MDEQ's risk based concentration of 7.8 mg/kg which is residential infinite source volatile soil inhalation criteria, the ambient air concentration of TCE through soil volatalization from this subsurface contamination would less likely result in significant exposure to trespassers or construction workers.. The construction workers exposure to the subsurface TCE contamination may be insignificant, when compared to MDEQ's risk based ground water direct contact criteria for TCE which is 50 mg/kg.

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 Mead Storage Depot facility, EPA ID # OHD 043-730-209, located at Chillicothe, OH 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) Christopher J. Black
(title) Environmental Scientist

Supervisor (signature) _____ Date _____
(print) George Hamper
(title) RCRA Corrective Action Chief
(EPA Region or State) Region 5

Locations where References may be found:
RCRA File Room, 7th Floor
77 W. Jackson
U.S. EPA Region 5
Chicago, IL 60604

Contact telephone and e-mail numbers

(name) Christopher J. Black
(phone #) (312) 886-1451
(e-mail) black.christopher@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.