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:	Former Teledyne Monarch Plant 1
Facility Address:	10 Lincoln Park, Hartville, Ohio
Facility EPA ID #:	OHD 068 901 610

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			Volatiles
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft)		X		
Surface Water		X		
Sediment		X		
Subsurface. Soil (e.g., >2 ft)	X			Volatiles
Air (outdoors)	X			Volatiles

____ 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): Key groundwater contaminants include: 1,1,1-trichloroethene 240,000 micro grams per liter (µg/L), 1,1-dichloroethane 15,000 µg/L, tetrachloroethene 13,000 µg/L, cis-1,2-dichlorethene 220,000 µg/L, acetone 632,000ug/l and vinyl chloride 4500J µg/L (J = estimated value) (Unsaturated Zone and Perched Unit Aquifer Remediation Pre-Design Study, MACTECH 2004). Sampling of offsite residential wells was undertaken vinyl chloride was deleted at 3.2 µg/L (Final Interim Report, IT, 1993).

Key subsurface soil contaminants include: 1,1,1-trichloroethane 45,000 micrograms per kilogram (µg/kg), 1,1-dichloroethane 57,000 µg/kg, acetone 3,600 µg/kg, ethylbenzene 3,300 µg/kg,

[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.

xylenes (total) 27,000 µg/kg, tetrachloroethene 130,000 µg/kg, trichloroethene 46,000 µg/kg, cis-1,2-dichchloroethene 340,000 µg/kg, vinyl chloride 13,000 µg/kg, and methylene chloride 18,000 µg/kg (Unsaturated Zone and Perched Unit Aquifer Remediation Pre-Design Study, MACTECH 2004).

Key air (outdoor) contaminants cumulative maximum 24-hour concentration include: tetrachloroethene 2.55 µg/m^3, trichloroethene 4.82 µg/m^3, methylene chloride 0.06 µg/m^3, and vinyl chloride 0.78 µg/m^3 (Final Corrective Measure Study, August 5, 2004, MACTEC Engineering and Consulting, Inc. Revision 1).

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)~~							
~~Soil (surface, e.g., <2 ft)~~							
~~Surface Water~~							
~~Sediment~~							
Soil (subsurface e.g., >2 ft)	No	No	No	Yes	No	No	No
Air (outdoors)	Yes	Yes	No	Yes	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.

X 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): Contaminated groundwater is within the confines of the facility's industrial complex, which is zoned for industrial use. The groundwater does not intersect any surface water within the perimeter of the plume. The depth to groundwater is five feet (Unsaturated Zone and Perched Unit Aquifer Remediation Pre-Design Study MACTECH 2004). The site is not used for habitation, has no full time residents, and does not house any recreational, healthcare, day-care, or playground facilities. No recreational areas are located within the facilities boundary, and no growth of crops, grazing of livestock, or harvesting of fish occurs on the property. There are no

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

human exposures to contaminated groundwater on- or off-site. Verification that the Human Exposure and Migration of Contaminated Groundwater Environmental Indicators associated with the presence of volatile organic compounds (VOCs) in site groundwater are under control is based on the following factors:

Although concentrations of groundwater constituents in site monitoring wells exceed Maximum Containant Levels and Region 5 Risk Base Screening Levels (RBSLs). TDY installed a groundwater pumping and soil gas recovery system in 1984 to prevent further migration of VOC-impacted groundwater off-site and to remediate VOC-impacted soil (Description of Current Conditions, Teledyne Monarch Rubber Plant No. 1, Hartville, Ohio, IT, 1991). Approximately 20 years of data indicate that the current pumping system effectively prevents off-site migration of VOC's in groundwater. VOC concentrations in groundwater have decreased since system startup, and groundwater elevation measurements indicate hydraulic control has been achieved in the unconsolidated aquifer (IT, 1996). Therefore, no additional corrective measures for the unconfined aquifer, other than continued operation of the current Interim Measure, are indicated.

One off-site well located at 241 Jefferson Street, S.E. had detectable levels of vinyl chloride. Bottled water was immediately provided to the resident and another well was installed and completed in a deeper aquifer. Subsequent sampling and analysis indicate that the replacement well does not contain detectable levels of VOCs (Final Interim Report, IT, 1993).

Outdoor air pathway exposure pathway was identified, i.e., the emissions from groundwater treatment systems. The potential risk and hazards associated with emissions from the groundwater treatment system were evaluated using standard USEPA risk assessment assumptions and factors. As a conservative measure, the SCREEN3 model was used to calculate estimated cumulative 24 hour maximum concentrations for both industrial and residential receptors since the site is surrounded by industrial and rural land use to the north, east, and south, and by residential land use to the west.

The emission rates for the air stripper represent contributions from the upper unconsolidated aquifer hydraulic control system (HCS) and the perched unit HVDPE system. The HCS emission rates are based on actual daily averages determined from monthly sampling over the last 12-month period (July 2003 – June 2004). The HVDPE water contribution is based on sampling and analytical data from a sampling event in May 2004. The HVDPE blower exhaust emission rates are based on sampling and analytical data from November 2003. Stack parameters, building wake effect and meteorological variables. Several of the carcinogens exceed 1x10-6 incremental risk, the EPA's point of departure for risk management (Final Corrective Measures Study August 5, 2004, MACTEC Engineering and Consulting, Inc. Revision 1).

Indoor air exposure pathway was identified. The VOC's identified from soil samples were tetrachloroethene 11,000 µg/l, trichloroethene 24,000 µg/l, methylene chloride 1,100 µg/l, and vinyl chloride 600 µg/l (Soil Vapor Intrusion Model Former Degreasing Area, Former Teledyne Monarch Rubber Plant 1, MACTECH July 2004).

No major streams or rivers exist near the plant, but surface water and sediment are present in Swartz Ditch. The Revised Corrective Measures Study (RCMS) included direct contact with sediments in Swartz ditch as a potential exposure pathway, which also constituted a potential ecological risk. That pathway was eliminated by the excavation of sediments and piping of the position of Swartz Ditch on the western side of the railroad tracks during 2002. Currently, the only potential ecological risk pathway is the infiltration of impacted perched aquifer groundwater into the storm sewer and its ultimate discharge to Middle Branch Nimishillen Creek approximately 3 miles south of the site. Storm sewer sampling data indicate that the VOC concentrations in the pipe discharging the site meet the December 2002 OEPA Aquatic Life Criteria (OAC 3745-1). The ditch is potentially interconnected with the perched groundwater in the southern portion of the site. Analytical results indicated the presence of constituents in the sediment downstream of the Facility. In 2001 Swartz Ditch was excavated sediments were excavated as part of a flood control project for the Village of Hartville. The project involved channelization of Swartz Ditch and installation of a 29-inch by 45-inch elliptical concrete storm water line to replace the open ditch.

As part of the flood control project, impacted ditch sediments were excavated to a depth of approximately six feet from the point of storm sewer discharge into Swartz Ditch to approximately 475 feet downstream. A total of 2,249 tons of sediment/soils was excavated and disposed of at an approved landfill (Construction Oversight Report Swartz Ditch Improvements, January 2002). Therefore, there is no unacceptable risk to human receptors associated with direct contact with sediment in Swartz Ditch.

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 (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):
Indoor air exposure pathway was evaluated. The Johnson and Ettinger Model Version 3.0 was used to assess the risk to workers from the presence of VOC's beneath the under the floor of the former degreaser area in the main plant. The VOC's identified from soil samples were tetrachloroethene 11,000 µg/l, trichloroethene 24,000 µg/l, methylene chloride 1,100 µg/l, and vinyl chloride 600 µg/l. The results of the modeling are for the following carcinogens:

Constituent	Soil Incremental Risk	Groundwater Incremental Risk
Tetrachloroethene	3.0×10^{-5}	1.1×10^{-6}
Trichloroethene	4.8×10^{-6}	2.6×10^{-7}
Vinyl chloride	7.9×10^{-6}	1.2×10^{-6}
Methylene Chloride	9.8×10^{-6}	3.1×10^{-8}
Cumulative Incremental Risk		**4.53×10^{-5}**

Since several of the carcinogens exceed 1×10^{-6} incremental risk, a multi chemical assessment was conducted according to OHIO risk assessment guidance. The result is that the cumulative incremental risk from all identified carcinogens in the soil is 4.53×10^{-5}, which is less than the cumulative risk of 1×10^{-4} deemed acceptable for

[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.

commercial/industrial receptors according to the Ohio risk assessment guidance. The soils beneath the building do not pose an unacceptable risk or hazard for commercial/industrial land use (Soil Vapor Intrusion Model Former Degreasing Area, Former Teledyne Monarch Rubber Plant 1, MACTECH July 2004.

Outdoor air pathway exposure pathway was identified, i.e., the emissions from groundwater treatment systems. The potential risk and hazards associated with emissions from the groundwater treatment system were evaluated using standard USEPA risk assessment assumptions and factors. As a conservative measure, the SCREEN3 model was used to calculate estimated cumulative 24 hour maximum concentrations for both industrial and residential receptors since the site is surrounded by industrial and rural land use to the north, east, and south, and by residential land use to the west. The SCREEN3 model, version 95250, was utilized for this modeling evaluation. It is a computerized version of the techniques described in USEPA's SCREEN3 Model User's Guide (EPA 454/B-95-004, 1995). The model calculates concentrations of pollutants in the cavity region of buildings, in the wake region of buildings, in flat and rolling (below stack top) terrain, and on terrain above stack top. The model uses actual building dimensions and can be used to calculate concentrations at the property boundary. The stack parameters used in the SCREEN3 model for the air stripper and blower exhaust stacks are discussed below.

The emission rates for the air stripper represent contributions from the upper unconsolidated aquifer hydraulic control system (HCS) and the perched unit HVDPE system. The HCS emission rates are based on actual daily averages determined from monthly sampling over the last 12-month period (July 2003 – June 2004). The HVDPE water contribution is based on sampling and analytical data from a sampling event in May 2004. The HVDPE blower exhaust emission rates are based on sampling and analytical data from November 2003. Stack parameters, building wake effect and meteorological variables. Since several of the carcinogens exceed 1x10-6 incremental risk, the EPA's point of departure for risk management, the model includes the results of a multi chemical assessment to determine total cumulative carcinogenic risk in accordance with the EPA National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR part 300. Utilizing the risk and hazard ratio approach is appropriate since the PRGs are developed based on a 1 x 10-6 risk and the calculations used to determine risk and hazards are linear. According to EPA Lanier risk policy, the total acceptable cumulative risks for carcinogens in the range of 10-4 to 10-6 are acceptable and less than 10-6 is negligible. For hazard (noncarcinogens) estimates, the hazards can be summed (assuming additively of like effects on organ systems) and compared to unity. Total hazards less than unity would not be expected to produce adverse effects. The estimate lifetime total cumulative risks and total hazards are acceptable since they are less than 1 x 10-4 and 1, respectively. Therefore, the estimated total cumulative lifetime risks for both residential and industrial receptors are acceptable (Final Corrective Measures Study August 5, 2004, MACTEC Engineering and Consulting, Inc. Revision 1).

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):

Not Applicable

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 Former Teledyne Monarch Plant 1 facility, EPA ID #OHD 068 901 610, located at 10 Lincoln Park, Hartville, Ohio 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) John Nordine
(title) Geologist

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