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:	Delphi Corporation, Energy & Chassis Systems, and Safety & Interior Systems
Facility Address:	480 North Dixie Highway, and 250 Northwoods Blvd., Vandalia, OH
Facility EPA ID #:	OHD 052 151 701, and OHD 000 048 454

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			VOCs: cis-1,2-DCE, TCE, 1,1,1-TCA, and vinyl chloride.
Air (indoors)[2]		X		Direct measurement of indoor air in on-site buildings; no exceedances of OSHA PELs.
Surface Soil (e.g., <2 ft)	X			TCE, bis (2-ethylhexyl)phthalate, benzo(a)pyrene, 2-methylnaphthalene, and naphthalene.
Subsrf. Soil (e.g., >2 ft)	X			TCE and ethylbenzene.
Sediment	X			PAHs and TCE.
Surface Water	X			PAHs, cis-1,2-DCE, TCE, and lead.
Air (outdoors)		X		Air permits for all potential sources.

____ 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.

References:

Description of Current Conditions (Volumes I - IV). May 1999. Haley & Aldrich, Inc.

RCRA CA725 Environmental Indicators Report. December 18, 2003. ENVIRON International Corporation.

Rationale: **Groundwater** - A large groundwater contaminant plume is present in deeper bedrock beneath the northeastern portion of the facility. It extends eastward and southeastward over one-mile where it

[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.

discharges as springs from a bedrock outcrop along the western valley wall of the Great Miami River. Contaminants exceeding MCLs for drinking water are cis-1,2-DCE, TCE, and vinyl chloride.

Shallow groundwater in overburden beneath most of the facility also contains cis-1,2-DCE, 1,1,1-TCA, TCE, and vinyl chloride, exceeding their respective MCL. DNAPL is present in the more permeable overburden in the north-central portion of the facility and consists primarily of TCE and 1,1,1-TCA.

Air (indoors) - The potential for vapor intrusion into on-site industrial buildings was evaluated due to the presence of VOCs in soil and shallow groundwater in overburden beneath the facility buildings. The only soil sample having a TCE concentration exceeding industrial soil volatilization to indoor air criteria was found at AOI 50 which is in the immediate vicinity of the East Tunnel. As described below, direct measurement of indoor air met occupational air quality standards.

Indoor air was sampled at four areas most likely to exhibit vapor intrusion due to their location above contamination and/or below-grade setting. The areas sampled were the East Tunnel, Building 36, the Pump Room, and the Hydraulic Lift Pit. Phased sampling was performed using a PID/FID and diffusion tubes, then passive organic vapor monitors and summa canisters. Results were generally similar to ambient air or below detection limit. Cis-1,2-DCE and TCE were detected in the East Tunnel at a concentration around $1 mg/m^3$ which is well below the respective OSHA PEL of 790 and $537 mg/m^3$. Based on the direct measurement of indoor air concentrations in on-site buildings identified as most likely to be impacted by VOC vapor intrusion, indoor air concentrations met occupational air quality standards under current operating conditions.

No contaminated groundwater in overburden was determined to be present beneath off-site residential areas. However, to the east and southeast, contaminated groundwater is present in the deeper bedrock beneath a residential area of Vandalia and unincorporated residences along Cassel Road. However, groundwater contamination is limited to the “Sugar Rock” aquifer which is isolated and overlain by at least 60-feet of overburden and somewhat impermeable shales and dolomite. There is no possibility for vapor intrusion into residential buildings to exist because of the great depth to contaminated groundwater and the presence of competent bedrock above the contaminated groundwater. The “Sugar Rock” and contaminated groundwater are exposed at the surface east of Cassel Road and along the west valley wall of the Great Miami River. However, there are no buildings or residences within several hundred feet of this area which is undeveloped woodland.

Air (outdoors) - Title V air permits exist for regulated air emission units at the facility. The groundwater treatment system installed pursuant to the corrective action Consent Order uses an air stripper to remove VOCs from contaminated groundwater. The VOCs emitted to ambient air have an Ohio EPA permit.

Surface and Subsurface Soil - Soil data was compared to risk-based screening levels (RBSLs) that were calculated using the methodology and conservative exposure factors for deriving Region 9 PRGs for industrial land use and set at a 10^{-5} cancer risk. Of the 50 Areas of Interest (AOI) investigated on-site, 12 or 24% had TCE concentrations greater than the RBSL of 1.2 mg/kg. For benzo(a) pyrene, 3 or 6% had concentrations greater than the RBSL of 2.1 mg/kg. Only 1 AOI each had a concentration of bis (2-ethylhexyl)phthalate or 2-methylnaphthalene and naphthalene which exceeded the RBSL of 1200 mg/kg and 190 mg/kg.

Surface Water and Sediment - The North Creek tributary and East Creek receive runoff and groundwater discharge from the facility. Contaminant concentrations in surface water were compared to drinking water criteria and direct contact criteria for industrial use (10^{-5} cancer risk). Both criteria were exceeded for PAHs

in East Creek and the drinking water criteria was exceeded for lead. In the North Creek tributary, cis-1,2-DCE and TCE exceeded drinking water criteria. Where contaminated groundwater in the "Sugar Rock" discharges and becomes springs at the rock outcrop area above the Great Miami River, drinking water criteria were exceeded for cis-1,2-DCE and TCE.

RBSLs for sediment were calculated using the methodology and conservative exposure factors for deriving Region 9 PRGs for industrial land use and set at a 10^{-5} cancer risk. PAH concentrations exceeded the RBSLs (2.1 or 21 mg/kg) in both creeks and the RBSL for TCE (1.2 mg/kg) was exceeded in the North Creek tributary.

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

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

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.

References: *RCRA CA725 Environmental Indicators Report.* December 18, 2003. ENVIRON International Corporation.

E-mail from John Ridd, Delphi, to Ken Bardo, EPA. 12/31/03. Access to East Creek.

Rationale: **Groundwater** - Potential on-site exposure to contaminated overburden groundwater and DNAPL is limited to direct contact during excavation activities. Potential exposure of contaminated groundwater in the deep "Sugar Rock" bedrock aquifer is limited to workers at the groundwater pump and treat system installed in the northeast corner of the facility to capture the contaminant plume and prevent continuing migration off-site.

Potential off-site exposure to contaminated groundwater exists in two residential areas; to the far west along Cassel Road and just to the northeast along Engle Road. A water well survey program and sampling was conducted in both areas to determine potential human receptors.

At Cassel Road where site-related contaminants were historically detected above MCLs in potable wells and where the potable wells were in use, Delphi provided connection to the Vandalia municipal water system for most residences. In addition, wells at these properties were abandoned and deed restrictions were imposed to preclude installation of a new well. A total of 19 wells were abandoned along Cassel Road. Groundwater continues to be used for outdoor nonpotable use only at three residences and for potable use at one residence. No contaminants were detected in water from the potable use well in four sampling events from July 2001 to November 2003 due to the installation of a water treatment system.

At Engle Road, ten residences and businesses had no contaminants detected in well water. One residential well had cis-1,2-DCE and TCE detected but concentrations were consistently below MCLs in sampling performed over the past three years.

An industrial well at Smiths Aerospace is located to the southeast of the facility at the southeast corner of I-75 and National Road. It has not been sampled by Delphi but monitoring wells installed in the immediate area suggest that TCE, and possibly cis-1,2-DCE and vinyl chloride, is likely present in the industrial well in excess of the MCL.

Surface and subsurface soil - The direct exposure of workers to contaminated soil exceeding RBSLs is not reasonably expected under current conditions since the impacted AOIs are either located at existing operational buildings underlain by concrete floors or are located beneath paved areas outdoors. Exposure of workers during subsurface construction in these areas is possible, if such activities were to occur.

Surface water - At East Creek, potential exposures include occasional contact by workers performing maintenance activities. Trespasser access is prevented by a fenceline adjacent to I-75 and site security (fencing, gates, signs, security patrols). Off-site exposure is not considered to be reasonably likely since the off-site portion of East Creek is located within the right-of-way for I-75 and commercial properties to the east. East Creek is culverted under I-75 and commercial driveways to the east.

At the North Creek tributary, potential on-site exposures include occasional contact by workers performing maintenance activities and incidental contact by trespassers. Off-site exposure to surface water is possible by adolescent recreators.

Contaminated seepage water was identified at several springs found in the rock outcrop area east of Cassel Road and above the Great Miami River. The seep areas are generally inaccessible due to dense vegetation, steep slopes, and railroad tracks. Therefore, direct exposure to VOC contaminants found at the springs by residents along Cassel Road or trespassers is unlikely. However, potential exposure to recreators exists downstream of the springs along a bike trail above the Great Miami River.

Sediment - The area of sediment identified as contaminated in East Creek is found on-site in the NPDES outfall area. Potential on-site exposures include occasional contact by workers performing maintenance activities. Potential exposure to trespassers is unlikely due to site security. Off-site exposure is not reasonably likely since the off-site portion of East Creek is located within the right-of-way for I-75 and commercial properties to the east. East Creek is culverted under I-75 and commercial driveways to the east.

The area of sediment identified as contaminated in the North Creek tributary is found in the NPDES outfall area and on-site portion of the creek. Potential on-site exposures include occasional contact by workers performing maintenance activities and incidental contact by trespassers. Off-site exposure is possible by adolescent recreators.

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."

[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.

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

References: *RCRA CA725 Environmental Indicators Report.* December 18, 2003. ENVIRON International Corporation.

E-mail from John Ridd, Delphi, to Ken Bardo, EPA. 1/26/04. Groundwater use and assessment of current risk at Smiths Aerospace.

Rationale: **Groundwater** - Workers at the facility may be exposed to contaminated groundwater and DNAPL in the overburden during excavation activities. Conservative screening criteria for TCE, vinyl chloride, and benzo(a)fluoranthene are exceeded in overburden groundwater for the excavation worker receptor. However, Delphi has a written excavation permit policy provided in Appendix H of the *RCRA CA725 Environmental Indicators Report* which requires a site-specific health and safety plan, monitoring, and HAZWOPER training for personnel that conduct any excavation at the facility.

Potential on-site exposure of contaminated groundwater in the deep "Sugar Rock" bedrock aquifer is limited to workers at the groundwater pump and treat system. However the system is designed to keep the groundwater within pipes and tanks, and only clean water is discharged. There is a written health and safety plan that limits exposure during operation and maintenance activities.

Potential off-site exposure of contaminated groundwater in the deep "Sugar Rock" bedrock aquifer is possible at three residences along Cassel Road which use the groundwater for outdoor nonpotable use, such as watering and washing cars. Cis-1,2-DCE and TCE concentrations found in the nonpotable use wells were evaluated using a conservative swimming pool or "kiddie pool" scenario (see Appendix G of the *RCRA CA725 Environmental Indicators Report*). The maximum concentration of cis-1,2-DCE in an active nonpotable well was 276 ppb. The conservative nonpotable criterion is 33,000 ppb. The maximum concentration of TCE in an active nonpotable well was 741 ppb. The conservative nonpotable criterion is 5680 ppb. Therefore, exposures are not reasonably expected to be unacceptable.

Potential off-site exposure of contaminated groundwater in the deep "Sugar Rock" bedrock aquifer is also possible at Smiths Aerospace located to the southeast of the facility at the southeast corner of I-75 and National Road. Smiths Aerospace has two production wells used to supply non-contact cooling water in a closed-loop system. The Vandalia municipal water supply is used for all other purposes. The non-contact cooling water is discharged under an NPDES permit to a stormwater outfall located near the southwest corner of the facility

Recent data from monitoring wells near Smiths Aerospace indicates potential concentrations of approximately 100 ppb of TCE and cis-1,2-DCE in the non-contact cooling water. These concentrations are less than the nonpotable criteria developed for the facility (i.e., "kiddie pool scenario"). Estimated hypothetical cancer risk and non-cancer HI associated with potential exposures of trespassers, maintenance workers, and recreators with the discharge of the non-contact cooling water are 1E-07 and 0.001. Therefore, non-contact cooling water usage at Smiths Aerospace does not present an unacceptable risk under reasonably expected current exposure conditions.

Surface and subsurface soil - The significance of potential exposures to soil contamination under current conditions was evaluated by estimating the cumulative cancer and noncancer risks associated with potential exposures and comparing them to the acceptable cancer risk and noncancer hazard index (HI). The potential significance of exposure to soil by excavation workers was conservatively evaluated based

on an assessment of risks to routine workers using the maximum detected constituent concentration in soil at each AOI investigated. The acceptable cancer risk or noncancer HI was exceeded at six AOIs (4, 16, 43, 45, 47, and 50).

The surface and subsurface soil at the six AOIs is typically contaminated with unacceptable levels of TCE. Benzo(a)pyrene is also found at AOI 16 and only 2-methylnaphthalene and naphthalene is found at AOI 43. However under current conditions, these unacceptable concentrations would not be expected to pose a significant risk to workers because concrete building floors or outdoor pavement prevent direct contact exposure to impacted soil. Additionally, Delphi has a written excavation permit policy which requires a site-specific health and safety plan, monitoring, and HAZWOPER training for personnel that conduct any excavation at the facility.

Surface water and sediment - Current human health risks were evaluated for potential exposures at East Creek, North Creek tributary, and rock outcrop seeps. Cumulative risks were quantified at East Creek for on-site trespasser and maintenance worker receptors; at the North Creek tributary for on-site trespasser and maintenance worker, and off-site recreator receptors; and at the rock outcrop seeps for off-site recreator. In all cases, the cumulative cancer risk and noncancer HIs are acceptable. The specific methodology and calculations are provided in Appendix F of the *RCRA CA725 Environmental Indicators Report.*

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 Delphi Corporation facility, EPA ID Nos. OHD 052 151 701 and OHD 000 048 454, located at Vandalia, 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 Feb. 24, 2004
(print) Kenneth S. Bardo
(title) Environmental Scientist

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

Locations where References may be found:

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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.