ENVIRON

TRANSMITTAL LETTER

TO: Ms. Patricia J. Polston USEPA - Region 5 Corrective Action Section, DW-8J 77 West Jackson Chicago, Illinois 60604	**RE:** Vernay Laboratories, Inc. OHD 004 243 002 **ENVIRON Case #0211247A**

WE ARE SENDING YOU HEREWITH THE FOLLOWING:

☐ Specifications | **Reports** | Samples | **Letters** | Other | Drawings

Quantity	Description
4	**RCRA CA725 Environmental Indicators Report** **Vernay Laboratories, Inc.** **875 Dayton Street** **Yellow Springs, Ohio**
4	**Response to USEPA Comments on Draft RCRA CA 725**

NOTE: As requested, on behalf of Doug Fisher please find enclosed RCRA CA725 Environmental Indicators Report for Vernay Laboratories, Inc.

BY: Christopher M. Buzgo	**DATE: July 14, 2004**

VIA: ☐ First Class | **Federal Express** | Messenger | UPS | **Regular Mail**

COPIES TO:
Mr. Doug Fisher, Vernay Laboratories, Inc.
Mr. David Contant, The Payne Firm
Mr. Rob Hillard, Village of Yellow Springs
Ms. Connie Collett, Yellow Springs Community Library
Joe Lonardo, Vorys, Sater, Seymour & Pease
Mr. Mark Nielsen, Battelle Memorial Institute
Mr. David Back

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Responses to U.S. EPA's Comments

Environmental Indicator Report for Human Health CA 725
Vernay Laboratories, Inc.
Yellow Springs, Ohio

EPA ID: OHD 004 243 002

1. At the Vernay facility, two consolidated bedrock aquifers are used by some private well users for potable and non-potable purposes in the Yellow Springs area. It would seem that a discussion of both aquifers is relevant to this CA725 determination, yet the statement is made on page 6 that "a discussion is not pertinent of the lowermost aquifer (and aquitards) since the nature and extent of contamination has been defined to risk-based levels in the uppermost aquifer." There has been no decision on whether or not to proceed with the Phase II of the RCRA Facility Investigation (RFI) which would include the lowermost aquifer. That is to be decided after completion of the Cedarville aquifer and storm sewer investigation and submittal of the Phase I RFI Report. Please clarify this statement and provide a provision to review and/or modify the EI Report for Human Health depending on the decision whether or not to pursue the Phase II investigation of the lowermost aquifer.

Response 1

The CA725 states that the two consolidated bedrock aquifers are used by some private well users for potable and non-potable purposes in the Yellow Springs area. However, based on the results of the water well survey presented in the RFI Phase I Report, the lowermost aquifer is not used by any private well users within the Vernay water well survey area. Further, based on the results of the RFI Phase I investigation, Vernay has concluded that investigation of the lowermost aquifer is not warranted. Therefore, even if a Brassfield Aquifer investigation is conducted, there is not a complete pathway for human exposure to the lowermost aquifer within the identified survey area.

2. It is stated that "seasonal grass mowing" takes place at AOI-1 as a routine facility activity. Although this exposure pathway is mentioned throughout this CA725 document, it isn't specifically described in the routine worker comment section of the site conceptual model in Table 1-1. Is the "inhalation of particulates in air from surface soil" exposure pathway based on the exposure of a worker mowing the grass or the exposure of a worker simply walking in the unpaved areas? Please include statements in the site conceptual model to clarify these routine worker activities and identify whether this exposure pathway was covered by the existing screening procedures and risk calculations.

Response 2

Table 1-1 has been modified to include a reference to seasonal grass mowing. The inhalation of particulates in air from surface soil during seasonal grass mowing was considered as an exposure pathway in the existing screening procedures and risk calculations as follows. The screening criteria and risk calculations used to evaluate potential exposures to routine workers in AOI-1 are the USEPA Region IX Preliminary Remediation Goals (PRGs), which in addition to incidental ingestion and dermal contact, include inhalation of soil vapors and particulates. The PRGs assume an exposure frequency of 250 days/year and a concentration of respirable soil particulates (10 µm or smaller, i.e., PM_{10}) of 0.008 mg/m^3, which is based on 50% bare soil. Vernay estimates that seasonal grass mowing occurs approximately ten times per year, which is considerably less than the 250 days/year exposure frequency assumed for the PRGs. Further, as the lawn in the undeveloped portions of the site is well established, exposure to PM_{10} concentrations is expected to be minimal and, therefore, is reasonably estimated by the concentration of 0.008 mg/m^3 assumed in the PRGs. Therefore, exposures to workers during seasonal grass mowing is conservatively estimated by the screening criteria and risk calculations.

3. Bolded statements in this document refer to work that was being done at the time that this document was submitted to EPA. These statements are in regards to whether current human exposures to off-site groundwater contamination were under control. For example:

$ page ES-1: "To be verified for off-Facility Cedarville Aquifer ground water."
$ page 10: "Abandonment of wells and connection to the public water supply will be performed for certain residences by Vernay." "Potable water well sampling results are currently being evaluated to verify that VOC concentrations are below the drinking water standards." "Non-potable use water well sampling results are currently being evaluated to verify that VOC concentrations are below acceptable risk-based levels."

The next draft of this CA725 document should include an update on the status of these potential off-site exposures. Further, this document cannot be approved in order to make the CA725 determination until it is shown that these exposures are under control.

Response 3

The CA 725 document has been updated to reflect the current status of off-site exposures, which are as follows. Based on the results of the water well survey and private water well sampling conducted by Vernay, VOC concentrations are below the drinking water standards in each of the potable water wells sampled and below the conservative non-potable "kiddie pool" criteria in each of the non-potable water wells sampled.

4. Please be sure to specify when adjustments have been made to screening levels. For instance, on page 14, the statement is made that "As discussed above, the screening criteria used to identify "contamination" in this evaluation are based on the EPA Region 9 preliminary remediation goals (PRGs) for soil at industrial and residential sites." The assumption is that the PRGs have been adjusted to a TCRL of 10^{-5}, but this fact is not included in the statement above. Also, see page 19 and page 24, where the same correction needs to be made.

Response 4

The CA 725 document has been modified to indicate when adjustments have been made to screening levels.

5. The activities of the maintenance worker need to be better defined, either in the site conceptual model or in some other appropriate section within the document, in order for EPA to understand the 5 day/year exposure frequency.

Response 5

The site conceptual site model (Table 1-1) has been modified to include activities of the maintenance worker. According to information provided by Vernay, quarterly maintenance inspections of the utility tunnel are performed (duration of approximately 15-20 minutes per inspection) and the sump pump situated in the utility tunnel is occasionally repaired (repair takes one day or less) as needed. In addition, Vernay's records indicate that in the past approximately 15 years the following four excavations were performed at the site, each limited to a duration of approximately 5 days or less:

- UST removal
- Replacement of power line to Fire suppression system pump
- Dentist office septic tank removal
- Excavation in Maintenance department for bridge crane base

Therefore, the exposure frequency of 5 days per year assumed for the excavation/maintenance worker is conservative.

6. On page 19, a discussion of Table 2-12 includes the statement "For inorganics, such ratios are highlighted to facilitate identification of AOIs where sediment is considered to meet the definition of "contaminated". Table 2-12 doesn't list inorganics. Is it possible that part of the table is missing?

Response 6

The inclusion of the "For inorganics" portion of the statement is a typographical error and has been deleted from the CA 725 document. Sampling for inorganics in sediment was not performed.

7. On page 28, "off-Facility recreators" are discussed under Section 2.4.3, Surface Waters/Sediments. This receptor population was not included in the site conceptual model in Table 1-1. In fact, it appears that this is the first mention of this particular scenario. More detail needs to be provided on this scenario and it should be included in Table 1-1.

Response 7

The off-Facility recreator scenario has been added to Table 1-1. The evaluation of potential exposures to surface water and sediment in the Unnamed Creek of an off-Facility recreator is described in detail in Appendix F.

8. Trespassers are included as a receptor population in Table 1-1, but don't appear to be discussed throughout the document. This scenario must be addressed in the CA725 document.

Response 8

A discussion regarding trespassers has been added to the CA725 document. However, exposures to trespassers would be than less than routine workers. Potential trespasser exposures are not evaluated separately, however, potential routine worker exposures discussed in the CA 725 can be assumed to represent a highly conservative estimate of potential trespasser exposures.

9. The last column of Table 2-1 is labeled "Ratio of Maximum Detect to Industrial Screening Criteria." This column label is a misnomer for calculations involving metals because the maximum concentration is not the actual number that is being used in the numerator. For metals, the listed site-specific background is subtracted from the maximum concentration in the specific AOI and the difference is used as the numerator in the ratio. The problem with this methodology is that, in the August 7, 2003 meeting between GM, Environ, and EPA, there was an agreement that background concentrations of metals could be subtracted from site-specific concentrations prior to risk-based screening on the condition that two types of information are provided: 1) a table that shows all metals concentrations in background samples and; 2) a table accounting for HI and cancer risks on a constituent-by-constituent basis for each metal due to background for each GM facility. Although a table listing cancer risks and hazard quotients for background metals in surface soil is provided (Table B-2), it is impossible to incorporate those values into Question 2 because risk calculations aren't performed until Question 4. The result is that AOI's may be eliminated from further consideration in Question 2 as a result of screening, when these AOI's should have been carried forward until Question 4. Therefore, the agreed upon resolution of providing tables with background values doesn't appear to be functional in the CA725 document.

EPA would like to know which AOI's were eliminated in Question 2 from further consideration in Question 3 and Question 4 based upon the subtraction of background concentrations for metals from site-specific maximum concentrations for metals and the subsequent lower numerator that results in a lower ratio.

Response 9

Regarding Table 2-1, a footnote will be added to clarify that "Ratios of metal concentrations to the screening criteria include only site-related contributions."

The background contribution to metal concentrations in soil was addressed in the EI CA725 Report consistent with the agreements from the August 7, 2003 meeting, and with the format that USEPA Region 5 has found acceptable for other RFI and EI reports that ENVIRON submitted after the meeting. The format of Table B-2 is designed to allow USEPA to see the cancer and noncancer risk estimates associated with the background metals concentrations, and to consider their magnitude relative to the site-related cancer and noncancer risk estimates for each AOI. Specifically, the results on Table B-2 show that the estimates of background cancer and noncancer risks are 9×10^{-6} and 0.06, respectively. If it desires, USEPA can compare these estimates (and even add them) to the estimates for all the AOIs evaluated in the EI CA725 Report, which are summarized on Table 2-16a.

As other contaminants were identified in each AOI, none of the AOIs were eliminated in Question 2 from further consideration in Question 3 and Question 4 based upon the subtraction of background concentrations for metals from site-specific maximum concentrations for metals.

10. Appendix E, Vernay Health & Safety Policy for On-Facility Excavations, was not included in the draft EI Report for Human Health. This policy is referenced in the Section 2.4, Significance of Potential Exposures, and used in making the decision that contamination "does not pose an unacceptable risk to potential on-Facility receptors under current conditions". This statement cannot be approved without review of the Appendix E policy. Please submit the Health & Safety Policy for On-Facility Excavations for review.

Response 10

Appendix E has been included in the revised CA725 document.

Recommendations:

The Region 5 RCRA program has conducted additional discussion with a number of Region 5 state agencies on acceptable approaches for risk-based screening of indoor air contaminant concentrations within on-site industrial buildings. As a result of these discussions, the Region 5 RCRA program is adopting the following policy for addressing the risk-based screening of indoor air contaminant concentrations within on-site industrial buildings:

A) For Environmental Indicator determinations (i.e., CA 725 - Current Human Exposures Under Control and CA 750 - Migration of Contaminated Groundwater Under Control), the Region 5 RCRA program will recognize the use of OSHA-PEL values as appropriate health based screening levels for indoor air within on-site industrial buildings under the direct control of the Responsible Party (RP). This recognition is based on a policy adopted by the Office of Solid Waste at EPA Headquarters. If the site also contains a building(s) which is not obviously industrial (e.g., cafeteria, day-care center, commercial space) or not obviously under the control of the RP, then Region 5 may request the RP to provide evidence that the building(s) is regulated under OSHA for the contaminants of concern.

B) For site remedial decisions beyond the EI determinations (e.g., RFI determinations; CMS requirements; Statement of Basis), OSHA-PEL values will not be recognized as the appropriate health based screening levels for indoor air within on-site industrial buildings. EPA's risk-based screening levels for exposure to air contaminants will be applied according to the document titled: "DRAFT GUIDANCE FOR EVALUATING THE VAPOR INTRUSION TO INDOOR AIR PATHWAY FROM GROUNDWATER AND SOILS" (http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf). The RP may apply this guidance to demonstrate that vapor intrusion to indoor air is not a complete exposure pathway for an on-site building(s). If vapor intrusion of all applicable contaminants cannot be eliminated as a pathway of concern by the screening procedures recommended in the guidance, then additional work to address the pathway will be required. The additional work could include vapor migration modeling using site-specific parameters, soil gas sampling, sub-slab sampling, indoor air sampling, or a combination of these approaches.

Response to Recommendations:

A) The site does not contain a building that is not obviously industrial or not obviously under the control of the RP. Therefore, the CA 725 is based on the use of OSHA-PEL values as appropriate health based screening levels for indoor air within the on-site industrial buildings

B) This recommendation does not explain EPA's rationale for accepting the use of OSHA PELs for EI determinations and then not accepting their use in determining when corrective measures are warranted. Vernay is also not aware of any written EPA policy that explains the rationale for this position. In principle, Vernay believes that the use of OSHA PELs should be evaluated in the same manner as other aspects of future land use in decisions about the need for corrective measures. The evaluation would be analogous to the evaluation of whether an assumption of future industrial land use rather than residential land use is appropriate in making remedial decisions at a particular site. Just as the assumption of future industrial land use is not rejected automatically in RCRA corrective action decisions, the assumption of OSHA applicability also should not be rejected automatically.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 23 2004

REPLY TO THE ATTENTION OF:

Douglas L. Fisher
Environmental Affairs and
Safety Manager
Vernay Laboratories, Inc.
120 E. South College
Yellow Springs, Ohio 45387-1623

RE: Approval with Conditions EI 725 Report
Vernay Laboratories, Inc.
Yellow Springs, Ohio
OHD 004 243 002

Dear Mr. Fisher:

The United States Environmental Protection Agency (U.S. EPA) received and reviewed your responses to our June 18, 2004, comments on your Environmental Indicator (EI) Report for Human Health (CA 725), dated April 9, 2004. The U.S. EPA will be approving the EI Report and form for Human Health (CA 725) with conditions.

Our previous comment in regards to the subtraction of site-specific background levels from detected soil concentrations for inorganics in Question #2 on the EI CA 725 form has not been completely resolved by your response. At this time, it does not appear that Vernay Laboratories, Inc., eliminated any AOI's in Question #2 from further consideration in Questions #3 and #4. Screening procedures should still be done by comparing chemical concentrations that include both contaminant and background concentrations to risk based screening levels. The concern is that Areas of Interest (AOI's) may be eliminated from further consideration as a result of screening, when these AOI's should be carried through and further evaluated in Questions #3 and #4 of the EI form. The following condition will provide a solution and still provide us with the necessary information on all AOI's where there might be exposure issues:

- If Vernay Laboratories, Inc. subtracts out background for inorganics at AOI's in Question #2 (prior to risk based screening);
- Then Vernay Laboratories, Inc. will be required to provide us with a list of all AOI's where this subtraction of background was the driver for elimination of the AOI in Question #2 from further consideration in Questions #3 and #4; and
- If there are AOI's where this subtraction resulted in elimination of a specific AOI in Question #2, that we may require additional exposure information in order to make a determination on whether that AOI is an exposure concern.

The CA 725 Environmental Indicators Form for Human Health will be finalized based on the EI Report for Human Health dated April 9, 2004; U.S. EPA's comments dated June 18, 2004; Vernay's Response to U.S. EPA's comments dated July 16, 2004; and the e-mail including further clarifications from Chris Buzgo, Environ Corp., dated August 24, 2004. Once the EI form is officially approved, signed, and dated a copy will be sent to you for your records.

The comments that highlight our policy on evaluating indoor air using appropriate health based screening levels for environmental indicator purposes and for site remedial decisions beyond the EI determinations has not changed. If you have any questions, please do not hesitate to contact me at 312-886-8093.

Sincerely,

Patricia J. Polston
Corrective Action Project Manager

cc: C. Olsberg, U.S. EPA, WMB
J. Morris, U.S. EPA, ORC
D. Contant, The Payne Firm

COPY

David C. Contant

From: Chris Buzgo [CBuzgo@environcorp.com]

Sent: Tuesday, August 24, 2004 6:26 PM

To: Polston.Patricia@epamail.epa.gov

Cc: David C. Contant; DougFisher@Vernay.com; Kevin D. Kallini; Nielsen, Jon M (Mark); Steve Washburn

Subject: Vernay Laboratories, Inc. - Response to USEPA Additional Comments on CA725

Trish -

ENVIRON's response to EPA's additional comments on the CA725 for Vernay Laboratories, Inc. are provided below. I've included Colleen's email in italics so you can see her comments. Our response follows Colleen's email.

Please feel free to contact me if you have any additional comments or questions.

Thanks

Chris

Christopher M. Buzgo, Ph.D.
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Trish-

I have reviewed Vernay's response to EPA comments on the CA725. In general, the responses were adequate. However, I do require some additional information on some of these comments.

For response #1, Vernay needs to include more explanation about the results of the RFI Phase I investigation that leads them to conclude that there is no further need for investigation of the lowermost aquifer. For response #7- Vernay needs to recheck Table 1-1 for inclusion of the recreator scenario. For response #8- Vernay needs to include more explanation regarding exposure of the potential trespasser. At this point, there is no way to tell if the routine worker is a conservative surrogate for the trespasser in terms of assessment of risk. For response #9- The column label should be changed, as specified in EPA comments, to appropriately describe the numerator. Despite the fact that no AOI's were eliminated in Question 2 from consideration in Question 3 and 4, the screening procedure in Question 2 should still be done by comparing chemical concentrations that include both contaminant and background concentrations to risk based screening levels. Discussions of background would be more appropriate to include in question #4.

Let me know if you have any questions on the above recommendations.

Colleen Olsberg, Ph.D.
Environmental Health Scientist
U.S. Environmental Protection Agency- Region 5
Waste, Pesticides and Toxics Division (DW-8J)
77 West Jackson Blvd.
Chicago, Illinois 60604
Telephone: (312) 353-4686

Response to Comments

For response #7- Vernay needs to recheck Table 1-1 for inclusion of the recreator scenario.

Table 1-1 was modified previously to include a brief discussion of the Recreator scenario in the comments section of the Table. The attached revised Table 1-1 has been modified to include the Recreator as a separate row under "Receptor Population".

<<Tables1VernayLaboratoriesrev081704.pdf>>

For response #8- Vernay needs to include more explanation regarding exposure of the potential trespasser.

The attached documents provide additional information regarding trespasser exposures.

<<RWvsTresComp081704.pdf>> <<XFactorsIndust.pdf>>

For response #9- The column label should be changed, as specified in EPA comments, to appropriately describe the numerator.

The referenced column was modified previously to include a footnote. The attached table modifies the column to appropriately describe the numerator.

<<Table2-1_rev082304.pdf>>

With respect to the adjustment of detected soil concentrations for background, Question #2 of the Environmental Indicators CA725 form specifically asks "Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"** 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)?" According to Footnote 1 to Question #2 "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).

The phrases "subject to RCRA Corrective Action" and "subject to RCRA" in these excerpts from EPA's CA725 Form refer to concentrations in excess of natural or anthropogenic background levels that may be attributable to site activities (i.e., site-related). These are the same concentrations that are subject to RCRA corrective measures (see OSWER Directive 9355.0-30). As such, site-specific background levels were established for certain metals at the Vernay facility to ensure that decisions regarding the need for characterization and remediation recognize the difference between a release of a hazardous constituent which requires action and the natural or non-site-related occurrence of the same constituent which requires no action on the part of the Vernay facility. In this approach for assessing the need for corrective action and to avoid unnecessary data collection and/or evaluation needed to complete later portions of the CA725 assessment, only the site-related component of metals in the soil characterization data is accounted for in Question #2 to assess those constituent concentrations that are subject to RCRA corrective action to identify if complete pathways (Question #3) exist, and if so, the significance of potential exposures (Question #4).

Table 1-1: Scenarios for Potential Human Exposure
Vernay Laboratories, Inc. - 875 Dayton Street, Yellow Springs, Ohio

Exposure Area & Exposure Point(s)	Receptor Population	Exposure Route	Exposure Medium	Possible Currently	Possible in Future	Comments
On-Facility						
Vernay Laboratories, Inc. -- 875 Dayton Street Facility	Routine Workers	ingestion and dermal contact	surface soil	Yes	Yes	The main (eastern) portion of the facility is covered with building and pavement. The largest unpaved area is in the unused western portion of the facility. Potential exposure of workers may occur at unpaved areas, and (in the future) at areas where pavement is removed. Potential inhalation exposures of workers may also occur due to vapor migration to ambient air and indoor air from VOCs in soil, subsurface water and Cedarville Aquifer ground water. Potential exposure may occur as part of routine activities and/or seasonal grass mowing (grass mowing occurs approximately ten times per year).
		inhalation	particulates in air from surface soil	Yes	Yes	
		inhalation	vapor released to ambient air from soil (surface and subsurface), subsurface water and Cedarville Aquifer ground water	Yes	Yes	
		inhalation	vapor intrusion to indoor air from soil (surface and subsurface), subsurface water and Cedarville Aquifer ground water	Yes	Yes	
	Trespassers	ingestion and dermal contact	surface soil	Yes	Yes	The facility is not fully fenced, therefore, trespassers may cross the property. The main (eastern) portion of the facility is covered with building and pavement. The largest unpaved area is in the unused western portion of the facility. Potential exposure of trespassers may occur at unpaved areas, and (in the future) at areas where pavement is removed. Potential inhalation exposures may also occur due to vapor migration to ambient air from VOCs in soil, subsurface water and Cedarville Aquifer ground water (in unpaved areas).
		inhalation	particulates in air from surface soil	Yes	Yes	
		inhalation	vapor released to ambient air from soil (surface and subsurface), subsurface water and Cedarville Aquifer groundwater	Yes	Yes	
	Occasional Excavation/Maintenance Workers	ingestion, dermal contact and inhalation	surface and subsurface soil	Yes	Yes	Potential exposure of Vernay maintenance workers is possible to soil and subsurface water and Cedarville Aquifer ground water during excavation activities; to subsurface water during maintenance in the utility tunnel; and to surface water during maintenance of the on-Facility sewer system. Current maintenance activities consist of quarterly inspections (15-20 minutes per inspections) of the utility tunnel and occasional repair of the sump pump in the tunnel as need. Excavation activities have been limited to four events in past 15 years, each limited to approximately 5 days or less. Thus, exposure frequency is conservatively assumed to be 5 days per year for Vernay maintenance worker.
		ingestion, dermal contact and inhalation	subsurface water, sewer backfill water, and Cedarville Aquifer ground water	Yes	Yes	
		ingestion, dermal contact and inhalation	surface water (storm sewer system)	Yes	Yes	
	One-Time Building Construction Workers	ingestion, dermal contact and inhalation	surface and subsurface soil	No	Yes	Vernay has no current plans for building construction. Future commercial/industrial site use could include the construction of a new building.
		ingestion, dermal contact and inhalation	subsurface water, sewer backfill water and Cedarville Aquifer	No	Yes	

Table 1-1: Scenarios for Potential Human Exposure
Vernay Laboratories, Inc. - 875 Dayton Street, Yellow Springs, Ohio

Exposure Area & Exposure Point(s)	Receptor Population	Exposure Route	Exposure Medium	Possible Currently	Possible in Future	Comments
Off-Facility						
Local Off-Facility Residential Area	Residents	ingestion, dermal contact and inhalation	Cedarville Aquifer ground water during potable household use	Yes	Yes	Residential areas border the facility to the east and south. Several of these residential properties have ground water wells. Potential exposure of residents may occur from potable and nonpotable (e.g., lawn watering) use; emissions from unpaved on-Facility soils; vapor intrusion into indoor air from subsurface water; and Cedarville Aquifer ground water in areas where VOCs exist.
			Cedarville Aquifer ground water during nonpotable/outdoor use	Yes	Yes	
		Inhalation	vapor intrusion to indoor air from subsurface water and Cedarville Aquifer ground water	Yes	Yes	
		Inhalation	vapor and particulates in ambient air from soils on the facility	Yes	Yes	
	Recreator	ingestion, dermal contact and inhalation	surface water and sediments in Unnamed Creek	Yes	Yes	The Off-Facility Recreator scenario evaluates potential residential exposures to surface water and sediments in an Unnamed Creek located in the study area as described in detail in Appendix F.
	Occasional Excavation/Maintenance Workers	ingestion, dermal contact and inhalation	subsurface water, sewer backfill water, and Cedarville Aquifer ground water	Yes	Yes	A municipal storm sewer line crosses the facility property and discharges to an Unnamed Creek northeast of the facility. Potential exposure of off-facility utility maintenance and construction workers is possible to subsurface water, sewer backfill water and Cedarville Aquifer ground water in excavations; to surface water in maintenance of the off-Facility storm sewer system; and in sediments and surface water in the Unnamed Creek .
		ingestion, dermal contact and inhalation	surface water and sediments	Yes	Yes	

Comparison of Exposure Assumptions in EPA Region 9 Soil PRGs for Industrial Land Use with Potential Exposures of Routine Workers and Trespassers

Comparison of Exposure Assumptions in EPA Region 9 Soil PRGs for Industrial Land Use with Potential Exposures of Routine Worker and Trespassers

The EPA Region 9 Preliminary Remediation Goals (PRGs) for soil at industrial sites are based on standard default exposure factors that EPA (1991) recommends for evaluating reasonable maximum exposures (RME) to soil in commercial/industrial settings. As such, the PRGs are appropriate for evaluating potential exposures of workers to soil during routine activities at industrial facilities. In addition, the PRGs are also appropriate for evaluating potential exposure of other receptors that may be present at industrial facilities and have lower potential exposures to soil such as trespassers. The purpose of this document is to describe the typical activities of such receptors at the Vernay facility and to show that their potential exposures to soil are unlikely to exceed the exposures assumed in deriving the PRGs.

The typical activities of routine workers and trespassers at the Vernay facility are described below.

Routine Workers

The largest receptor population at the Vernay facility consists of workers who are engaged in routine manufacturing and related activities. Most of these workers spend most of their work day indoors within the site manufacturing buildings. During their limited time outdoors, these workers could contact surface soil in unpaved areas. Potential routes of exposure to surface soil would include incidental ingestion, dermal contact, and inhalation of soil vapor and airborne particulates.

Trespassers

Based on the location of the facility and information provide by site personnel, trespassing at the Vernay property is not common. The duration of any unauthorized access as well as the types of activities while on-site are expected to be limited. Trespassers are assumed to be adolescents between ages 9 to 18. While trespassing, they could come into contact with surface soil in unpaved areas. Potential routes of exposure would include incidental ingestion, dermal contact, and inhalation of soil vapor and airborne particulates.

Exposure factors appropriate for quantifying these receptors' potential exposures are summarized on Table A1 and discussed below. Also included on Table A1 for comparison are the exposure factors used in deriving the PRGs for commercial/industrial settings.

Routine Workers

Ingestion rate: The soil ingestion rate of 50 mg/day is EPA's recommended value for evaluating RME in industrial settings (EPA 1991).

Dermal contact rate: The dermal contact rate is the product of the exposed skin surface area and the soil adherence factor. The surface area of 3,300 cm^2 and adherence factor of 0.2 mg/cm^2 are EPA's recommended values for evaluating RME in industrial settings (EPA 2001).

Breathing rate: The breathing rate of 20 m^3/day is EPA's recommended value for evaluating RME in industrial settings (EPA 1991).

Fraction contacted: The fraction contacted term is less than 1 because workers at the Vernay facility generally do not spend an entire work day outdoors, and are unlikely to work without absences due to sickness, holidays, and inclement weather.

Exposure frequency: The frequency of 250 days/year is EPA's recommended value for evaluating RME in industrial settings (EPA 1991). The value is based on a 5-day work week and 50 weeks per year.

Exposure duration: The duration of 25 years is EPA's recommended value for evaluating RME in industrial settings (EPA 1991). The value is the 95th percentile number of years workers work at one location.

Body weight: The body weight of 70 kg is the standard EPA-recommended value for assessing exposure of adults (EPA 1989).

Averaging time: The averaging time for evaluating exposures to carcinogens is 70 years. The averaging time for evaluating exposures to noncarcinogens is the exposure duration (EPA 1989).

Trespassers

Ingestion rate: The soil ingestion rate of 50 mg/day is based on EPA's recommended value for evaluating RME in industrial settings (EPA 1991).

Dermal contact rate: The exposed skin surface area of 5,700 cm^2 is conservatively based on EPA's recommend value for evaluating RME of adults in residential settings (EPA 1991). The adherence factor of 0.2 mg/cm^2 is EPA's recommended value for evaluating RME in industrial settings (USEPA 2001).

Breathing rate: The breathing rate of 20 m^3/day is EPA's recommended value for evaluating RME in industrial settings (EPA 1991).

Fraction contacted: The fraction contacted term is 0.25 (or 2/8) because trespassers are assumed not to spend more than a couple hours in one particular area.

Exposure frequency: The frequency of 100 days/year is based on professional judgment considering the Vernay facility location and reported infrequency of trespassers. This value assumes 2 days per week and 50 weeks per year.

Exposure duration: The duration of 10 years corresponds to the number of years from ages of 9 to 18.

Body weight: The body weight of 51 kg is the average for adolescents between the ages of 9 to 18 (EPA 1997).

Averaging time: The averaging time for evaluating exposures to carcinogens is 70 years. The averaging time for evaluating exposures to noncarcinogens is the exposure duration (EPA 1989).

Using these exposure factors, the doses per mg/kg of chemical in soil or per mg/m^3 in air have been calculated and are shown on Table A1 to facilitate comparison of the exposures assumed for each receptor with the exposures assumed in the PRGs. These cancer- and noncancer-based doses are shown on Table A1 in bold and are labeled as normalized lifetime average daily dose (LADD) and average daily dose (ADD), respectively.

For the purposes of determining whether the PRGs are adequately protective, the normalized cancer- and noncancer-based doses for each receptor can be compared with the corresponding normalized doses assumed in the PRGs. A direct comparison of the normalized doses on Table A1 shows that the normalized cancer- and noncancer-based doses for each route and receptor are lower than the corresponding normalized doses assumed in derivation of the PRGs. For routine workers, the normalized doses are lower than those assumed in the PRGs because these workers do not spend an entire work day at one area of exposed soil. For trespassers, the normalized LADDs are approximately 10 to 20 times lower than those assumed in the PRGs, and the normalized ADDs are approximately 4 to 7 times lower.

These comparisons show that the exposure frequency (EF) and/or exposure duration (ED) for trespassers shown on Table A1 can be increased significantly without affecting the outcome of the comparisons. A trespasser would have to have an exposure frequency higher than the routine worker in order to equal the exposure of a routine worker.

References

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Table A1
Comparison of Exposure Factors for Receptors at the Vernay Facility

			EPA Region 9 PRGs		Routine Workers		Adolescent Trespassers	
Soil Ingestion								
Ingestion Rate	mg-soil/day	**IR**	50	b	50	b	50	e
Conversion Factor	kg/mg	**CF**	1E-06		1E-06		1E-06	
Fraction Contacted	unitless	**FC**	1		< 1		0.25	
Exposure Frequency	days/year	**EF**	250	b	250	b	100	e
Exposure Duration	years	**ED**	25	b	25	b	10	e
Body Weight	kg	**BW**	70	a	70	a	51	c
Averaging Time, cancer	days	$\mathbf{AT_c}$	25,550	a	25,550	a	25,550	a
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$	9,125	a	9,125	a	3,650	a
Normalized LADD	kg-soil/kg/day		**1.75E-07**		**< 1.75E-07**		**9.59E-09**	
Normalized ADD	kg-soil/kg/day		**4.89E-07**		**< 4.89E-07**		**6.72E-08**	
Soil Dermal Contact								
Adherence Factor	mg-soil/cm^2	**AF**	0.2	d	0.2	d	0.2	d
Exposed Skin Surface Area	cm^2/day	**SA**	3,300	d	3,300	d	5,700	b
Conversion Factor	kg/mg	**CF**	1E-06		1E-06		1E-06	
Absorption Fraction	unitless	$\mathbf{ABS_d}$	0.1	f	0.1	f	0.1	f
Fraction Contacted	unitless	**FC**	1		< 1		0.25	
Exposure Frequency	days/year	**EF**	250	b	250	b	100	e
Exposure Duration	years	**ED**	25	b	25	b	10	e
Body Weight	kg	**BW**	70	a	70	a	51	c
Averaging Time, cancer	days	$\mathbf{AT_c}$	25,550	a	25,550	a	25,550	a
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$	9,125	a	9,125	a	3,650	a
Normalized LADD	kg-soil/kg/day		**2.31E-07**		**< 2.31E-07**		**2.19E-08**	
Normalized ADD	kg-soil/kg/day		**6.46E-07**		**< 6.46E-07**		**1.53E-07**	
Ambient Air Inhalation								
Breathing Rate	m^3/day	**BR**	20	b	20	b	20	b
Fraction Contacted	unitless	**FC**	1		< 1		0.25	
Exposure Frequency	days/year	**EF**	250	b	250	b	100	e
Exposure Duration	years	**ED**	25	b	25	b	10	e
Body Weight	kg	**BW**	70	a	70	a	51	c
Averaging Time, cancer	days	$\mathbf{AT_c}$	25,550	a	25,550	a	25,550	a
Averaging Time, noncancer	days	$\mathbf{AT_{nc}}$	9,125	a	9,125	a	3,650	a
Normalized LADD	m^3-air/kg/day		**6.99E-02**		**< 6.99E-02**		**3.84E-03**	
Normalized ADD	m^3-air/kg/day		**1.96E-01**		**< 1.96E-01**		**2.69E-02**	

References:

a. RAGS, Volume I: Human Health Evaluation Manual, Part A (EPA 1989)
b. Standard default exposure factors. OSWER Directive 9285.6-03 (EPA 1991)
c. Exposure Factors Handbook (EPA 1997)
d. RAGS, Volume I: Human Health Evaluation Manual: Part E (EPA 2001)
e. Based on professional judgment and site-specific considerations discussed in the text
f. The default value is 0.1 for semivolatile organics and 0 for all other chemicals.

Table 2-1: On-Facility Soil Screening Results
Vernay Laboratories Inc., Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screening Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site-Related Detect to Industrial Screening Criteria*
1	VOC	Acetone	67-64-1	ID	34	6	9.80E-03	2.30E-02	4.60E-02		1.4E+06	6.0E+03	nc	3.4E-08	7.7E-06
1	VOC	Benzene	71-43-2	A	38	1	2.90E-03	2.90E-03	2.90E-03		1.4E+02	1.3E+01	c	2.1E-05	2.2E-04
1	VOC	2-Butanone	78-93-3	ID	36	1	3.80E-03	3.80E-03	3.80E-03			2.7E+04	nc		1.4E-07
1	VOC	cis-1,2-Dichloroethene	156-59-2	D	38	3	1.20E-03	3.50E-02	6.00E-02		3.1E+04	1.5E+02	nc	2.0E-06	4.0E-04
1	VOC	trans-1,2-Dichloroethene	156-60-5		38	1	4.90E-04	4.90E-04	4.90E-04		2.0E+04	2.3E+02	nc	2.5E-08	2.1E-06
1	VOC	1,2-Dichloropropane	78-87-5	B2	38	3	4.30E-03	5.70E+01	1.70E+02		2.3E+04	7.4E+00	c	7.4E-03	2.3E+01
1	VOC	Ethyl Benzene	100-41-4	D	38	1	4.60E-04	4.60E-04	4.60E-04		7.5E+04	2.0E+02	c	6.2E-09	2.3E-06
1	VOC	Methylene Chloride	75-09-2	B2	38	8	1.00E-03	1.10E-02	7.82E-02		2.7E+03	2.1E+02	c	2.9E-05	3.7E-04
1	VOC	Tetrachloroethene	127-18-4	C-B2	37	5	6.70E-04	7.90E-01	2.50E+00		2.3E+04	3.4E+01	c	1.1E-04	7.4E-02
1	VOC	Toluene	108-88-3	D	38	6	3.80E-04	7.00E-04	1.30E-03		7.9E+04	2.2E+03	nc	1.7E-08	5.9E-07
1	VOC	Trichloroethene	79-01-6	C-B2	37	4	3.60E-03	1.60E-01	5.10E-01		3.4E+04	1.2E+00	c	1.5E-05	4.3E-01
1	VOC	Vinyl Chloride	75-01-4	A	38	1	3.70E-03	3.70E-03	3.70E-03		1.4E+01	7.5E+00	c	2.6E-04	4.9E-04
1	VOC	Xylenes (total)	1330-20-7	ID	38	1	1.10E-03	1.10E-03	1.10E-03		9.2E+04	9.0E+02	nc	1.2E-08	1.2E-06
1	SVOC	Acenaphthylene	208-96-8	D	35	2	3.90E-01	4.20E-01	4.40E-01			2.9E+04	nc		1.5E-05
1	SVOC	Anthracene	120-12-7	D	35	4	2.70E-02	1.30E-01	2.50E-01			2.4E+05	nc		1.0E-06
1	SVOC	Benzo(a)anthracene	56-55-3	B2	35	20	1.30E-02	1.00E+00	4.60E+00			2.1E+01	c		2.2E-01
1	SVOC	Benzo(a)pyrene	50-32-8	B2	35	18	1.10E-02	1.20E+00	4.50E+00			2.1E+00	c		2.1E+00
1	SVOC	Benzo(b)fluoranthene	205-99-2	B2	35	20	2.20E-02	1.40E+00	4.80E+00			2.1E+01	c		2.3E-01
1	SVOC	Benzo(g,h,i)perylene	191-24-2	D	35	15	1.20E-02	6.80E-01	2.10E+00			2.9E+04	nc		7.2E-05
1	SVOC	Benzo(k)fluoranthene	207-08-9	B2	35	20	9.10E-03	6.20E-01	2.10E+00			2.1E+02	c		1.0E-02
1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	28	3	5.50E-02	1.20E-01	1.90E-01		2.7E+12	1.2E+03	c	7.0E-14	1.6E-04
1	SVOC	Carbazole	86-74-8	B2	28	1	1.80E-01	1.80E-01	1.80E-01			8.6E+02	c		2.1E-04
1	SVOC	Chrysene	218-01-9	B2	35	19	1.40E-02	1.10E+00	3.60E+00			2.1E+03	c		1.7E-03
1	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	35	9	1.10E-02	7.10E-01	1.60E+00			2.1E+00	c		7.6E-01
1	SVOC	Di-n-octylphthalate	117-84-0		28	2	6.90E-02	1.10E-01	1.60E-01			2.5E+04	nc		6.4E-06
1	SVOC	Fluoranthene	206-44-0	D	35	22	3.50E-02	2.40E+00	1.30E+01			2.2E+04	nc		5.9E-04
1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	35	18	1.70E-02	8.30E-01	2.80E+00			2.1E+01	c		1.3E-01
1	SVOC	Phenanthrene	85-01-8	D	35	10	4.80E-02	1.00E+00	3.10E+00			2.9E+04	nc		1.1E-04
1	SVOC	Pyrene	129-00-0	D	35	23	2.70E-02	2.50E+00	1.80E+01			2.9E+04	nc		6.2E-04
1	PDIST	Petroleum Hydrocarbons (recoverable)	68334-30-5R		14	14	1.00E+01	1.70E+02	8.00E+02						
1	P/PCB	PCBs (total)	1336-36-3	B2	7	1	5.50E-02	5.50E-02	5.50E-02		2.2E+05	7.4E+00	c	2.6E-07	7.4E-03
1	P/PCB	4,4'-DDE	72-55-9	B2	7	1	7.40E-03	7.40E-03	7.40E-03			7.0E+01	c		1.1E-04
1	INORG	Arsenic	7440-38-2	A	20	20	5.50E+00	7.40E+00	1.07E+01	1.5E+01		1.6E+01	c		
1	INORG	Barium	7440-39-3	D	14	14	4.68E+01	8.30E+01	1.99E+02			6.7E+04	nc		3.0E-03
1	INORG	Chromium (total)	7440-47-3		14	14	7.50E+00	1.10E+01	1.68E+01			2.5E+03	nc		6.7E-03
1	INORG	Copper	7440-50-8	D	6	6	1.18E+01	1.50E+01	1.97E+01	2.5E+01		4.1E+04	nc		
1	INORG	Lead	7439-92-1	B2	14	14	1.12E+01	2.40E+01	4.82E+01			7.5E+02	nc		6.4E-02
1	INORG	Mercury	7439-97-6	D	14	1	1.20E-01	1.20E-01	1.20E-01		2.2E+03	1.4E+01	nc	5.5E-05	8.8E-03
1	INORG	Selenium	7782-49-2	D	14	1	8.00E-01	8.00E-01	8.00E-01			5.1E+03	nc		1.6E-04
1	INORG	Zinc	7440-66-6	D	6	6	3.62E+01	4.80E+01	5.83E+01	7.1E+01		3.1E+05	nc		
2	VOC	Acetone	67-64-1	ID	184	27	9.50E-03	1.00E-01	6.80E-01		1.4E+06	6.0E+03	nc	5.0E-07	1.1E-04
2	VOC	Benzene	71-43-2	A	190	4	4.50E-04	1.30E-03	2.40E-03		1.4E+02	1.3E+01	c	1.7E-05	1.8E-04
2	VOC	2-Butanone	78-93-3	ID	188	14	2.00E-03	1.50E-02	4.50E-02			2.7E+04	nc		1.7E-06
2	VOC	Carbon Disulfide	75-15-0		190	2	1.40E-03	7.70E-03	1.40E-02		2.6E+02	1.2E+03	nc	5.3E-05	1.2E-05
2	VOC	Chloroethane	75-00-3		190	1	6.00E-02	6.00E-02	6.00E-02			6.5E+01	c		9.2E-04
2	VOC	Cumene	98-82-8	D	52	2	1.80E-03	6.40E-03	1.10E-02			2.0E+03	nc		5.5E-06
2	VOC	Cyclohexane	110-82-7	ID	52	1	7.70E-04	7.70E-04	7.70E-04			3.2E+04	nc		2.4E-08
2	VOC	1,2-Dichlorobenzene	95-50-1	D	111	3	2.20E-03	2.50E-02	7.00E-02		1.8E+05	4.1E+03	nc	3.9E-07	1.7E-05

Table 2-1: On-Facility Soil Screening Results
Vernay Laboratories Inc., Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screening Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site-Related Detect to Industrial Screening Criteria*
2	VOC	1,1-Dichloroethane	75-34-3	C	190	4	1.50E-03	1.70E-02	5.00E-02		1.1E+04	1.7E+03	nc	4.8E-06	2.9E-05
2	VOC	1,1-Dichloroethene	75-35-4	C	190	1	6.20E-03	6.20E-03	6.20E-03		2.2E+02	4.1E+02	nc	2.8E-05	1.5E-05
2	VOC	1,2-Dichloroethene (total)	540-59-0		138	34	5.20E-03	8.10E-01	5.60E+00		2.0E+04	1.5E+02	nc	2.9E-04	3.7E-02
2	VOC	cis-1,2-Dichloroethene	156-59-2	D	190	73	9.00E-04	1.50E+00	2.20E+01		3.1E+04	1.5E+02	nc	7.2E-04	1.5E-01
2	VOC	trans-1,2-Dichloroethene	156-60-5		190	17	1.10E-03	3.40E-02	2.10E-01		2.0E+04	2.3E+02	nc	1.1E-05	9.1E-04
2	VOC	1,2-Dichloropropane	78-87-5	B2	190	5	1.70E-03	1.50E-02	3.20E-02		2.3E+04	7.4E+00	c	1.4E-06	4.3E-03
2	VOC	Ethyl Benzene	100-41-4	D	190	2	4.20E-04	1.90E-02	3.80E-02		7.5E+04	2.0E+02	c	5.1E-07	1.9E-04
2	VOC	Methyl Acetate	79-20-9		52	2	8.50E-02	8.90E-02	9.30E-02			9.2E+04	nc		1.0E-06
2	VOC	4-Methyl-2-pentanone	108-10-1	ID	190	5	2.00E-03	1.40E-02	5.60E-02			2.8E+03	nc		2.0E-05
2	VOC	Methylcyclohexane	108-87-2		52	2	1.10E-03	1.80E-03	2.50E-03			8.7E+03	nc		2.9E-07
2	VOC	Methylene Chloride	75-09-2	B2	190	11	2.10E-03	2.40E-01	2.30E+00		2.7E+03	2.1E+02	c	8.7E-04	1.1E-02
2	VOC	Tetrachloroethene	127-18-4	C-B2	190	75	6.50E-04	5.70E+00	8.20E+01		2.3E+04	3.4E+01	c	3.6E-03	2.4E+00
2	VOC	Toluene	108-88-3	D	190	16	5.40E-04	1.30E-02	1.60E-01		7.9E+04	2.2E+03	nc	2.0E-06	7.3E-05
2	VOC	Trichloroethene	79-01-6	C-B2	190	59	9.00E-04	2.90E+00	4.00E+01		3.4E+04	1.2E+00	c	1.2E-03	3.3E+01
2	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		52	16	1.60E-03	4.70E+00	4.90E+01		9.3E+04	6.9E+04	nc	5.3E-04	7.1E-04
2	VOC	Vinyl Chloride	75-01-4	A	190	25	1.40E-03	1.50E-01	9.50E-01		1.4E+01	7.5E+00	c	6.7E-02	1.3E-01
2	VOC	Xylenes (total)	1330-20-7	ID	190	7	1.40E-03	2.80E-02	1.00E-01		9.2E+04	9.0E+02	nc	1.1E-06	1.1E-04
2	SVOC	Acenaphthene	83-32-9		125	1	9.30E-02	9.30E-02	9.30E-02			2.9E+04	nc		3.2E-06
2	SVOC	Acenaphthylene	208-96-8	D	125	4	3.30E-02	1.30E-01	2.30E-01			2.9E+04	nc		7.9E-06
2	SVOC	Anthracene	120-12-7	D	125	2	2.10E-02	3.30E-02	4.40E-02			2.4E+05	nc		1.8E-07
2	SVOC	Benzo(a)anthracene	56-55-3	B2	125	20	5.60E-03	4.60E-01	5.60E+00			2.1E+01	c		2.7E-01
2	SVOC	Benzo(a)pyrene	50-32-8	B2	125	16	5.40E-03	6.00E-01	5.60E+00			2.1E+00	c		2.7E+00
2	SVOC	Benzo(b)fluoranthene	205-99-2	B2	125	22	1.80E-03	4.20E-01	5.40E+00			2.1E+01	c		2.6E-01
2	SVOC	Benzo(g,h,i)perylene	191-24-2	D	125	12	7.80E-03	2.90E-01	1.60E+00			2.9E+04	nc		5.5E-05
2	SVOC	Benzo(k)fluoranthene	207-08-9	B2	125	20	2.00E-03	1.80E-01	2.20E+00			2.1E+02	c		1.0E-02
2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	39	9	6.90E-02	6.70E-01	3.30E+00		2.7E+12	1.2E+03	c	1.2E-12	2.8E-03
2	SVOC	Chrysene	218-01-9	B2	125	25	7.50E-04	4.10E-01	6.00E+00			2.1E+03	c		2.9E-03
2	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	125	4	9.70E-02	8.70E-01	2.40E+00			2.1E+00	c		1.1E+00
2	SVOC	Di-n-butylphthalate	84-74-2	D	39	1	8.20E-02	8.20E-02	8.20E-02		6.4E+11	6.2E+04	nc	1.3E-13	1.3E-06
2	SVOC	Di-n-octylphthalate	117-84-0		39	1	6.60E-02	6.60E-02	6.60E-02			2.5E+04	nc		2.6E-06
2	SVOC	Fluoranthene	206-44-0	D	125	30	1.10E-03	9.40E-01	1.70E+01			2.2E+04	nc		7.7E-04
2	SVOC	Fluorene	86-73-7	D	125	2	8.40E-03	2.20E-02	3.60E-02			2.6E+04	nc		1.4E-06
2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	125	18	2.50E-03	3.80E-01	3.50E+00			2.1E+01	c		1.7E-01
2	SVOC	2-Methylnaphthalene	91-57-6	ID	119	1	2.30E+01	2.30E+01	2.30E+01			1.9E+02	nc		1.2E-01
2	SVOC	Naphthalene	91-20-3	C	143	4	4.50E-03	4.30E-02	7.40E-02		7.5E+05	1.9E+02	nc	9.8E-08	3.9E-04
2	SVOC	Phenanthrene	85-01-8	D	125	10	7.55E-03	2.20E+00	1.90E+01			2.9E+04	nc		6.6E-04
2	SVOC	Pyrene	129-00-0	D	125	44	5.90E-03	7.50E-01	2.10E+01			2.9E+04	nc		7.2E-04
2	PDIST	Petroleum Hydrocarbons (recoverable)	68334-30-5R		68	35	1.00E+01	2.00E+03	1.30E+04						
2	INORG	Arsenic	7440-38-2	A	117	117	1.10E+00	8.60E+00	2.28E+01	1.5E+01		1.6E+01	c		5.1E-01
2	INORG	Barium	7440-39-3	D	98	97	1.22E+01	6.50E+01	1.66E+02			6.7E+04	nc		2.5E-03
2	INORG	Cadmium	7440-43-9	B1	98	9	3.70E-02	3.10E-01	1.60E+00			4.5E+02	nc		3.6E-03
2	INORG	Chromium (total)	7440-47-3		98	98	4.00E+00	1.20E+01	2.32E+01			2.5E+03	nc		9.3E-03
2	INORG	Copper	7440-50-8	D	22	22	4.10E+00	1.60E+01	2.41E+01	2.5E+01		4.1E+04	nc		
2	INORG	Lead	7439-92-1	B2	98	98	1.20E+00	1.20E+01	1.02E+02			7.5E+02	nc		1.4E-01
2	INORG	Mercury	7439-97-6	D	98	6	3.40E-02	1.50E-01	5.50E-01		2.2E+03	1.4E+01	nc	2.5E-04	4.0E-02
2	INORG	Selenium	7782-49-2	D	98	10	5.00E-01	6.60E-01	9.30E-01			5.1E+03	nc		1.8E-04
2	INORG	Zinc	7440-66-6	D	22	22	8.30E+00	4.90E+01	7.38E+01	7.1E+01		3.1E+05	nc		9.3E-06
2A	VOC	Acetone	67-64-1	ID	165	27	6.40E-03	5.50E-02	4.84E-01		1.4E+06	6.0E+03	nc	3.6E-07	8.1E-05

Table 2-1: On-Facility Soil Screening Results
Vernay Laboratories Inc., Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site-Related Detect to Industrial Screening Criteria*
2A	VOC	Benzene	71-43-2	A	170	2	4.40E-04	7.00E-04	9.60E-04		1.4E+02	1.3E+01	c	6.8E-06	7.4E-05
2A	VOC	2-Butanone	78-93-3	ID	169	7	2.30E-03	5.70E-02	3.76E-01			2.7E+04	nc		1.4E-05
2A	VOC	Carbon Disulfide	75-15-0		170	1	2.40E-03	2.40E-03	2.40E-03		2.6E+02	1.2E+03	nc	9.1E-06	2.0E-06
2A	VOC	Chloroform	67-66-3	B2	170	1	9.30E-03	9.30E-03	9.30E-03		2.3E+03	1.2E+01	nc	4.1E-06	7.8E-04
2A	VOC	Chloromethane	74-87-3	D	170	1	2.90E-02	2.90E-02	2.90E-02		8.0E+02	2.7E+01	c	3.6E-05	1.1E-03
2A	VOC	Cumene	98-82-8	D	63	5	6.50E-04	6.00E-02	1.70E-01			2.0E+03	nc		8.5E-05
2A	VOC	Cyclohexane	110-82-7	ID	63	1	2.00E-03	2.00E-03	2.00E-03			3.2E+04	nc		6.3E-08
2A	VOC	Dichlorodifluoromethane	75-71-8		63	2	3.60E-03	7.70E-02	1.50E-01		1.9E+04	3.1E+02	nc	8.0E-06	4.8E-04
2A	VOC	1,1-Dichloroethane	75-34-3	C	169	6	8.70E-04	2.70E-02	9.85E-02		1.1E+04	1.7E+03	nc	9.4E-06	5.8E-05
2A	VOC	1,1-Dichloroethene	75-35-4	C	170	1	2.00E-03	2.00E-03	2.00E-03		2.2E+02	4.1E+02	nc	9.0E-06	4.9E-06
2A	VOC	1,2-Dichloroethene (total)	540-59-0		107	25	5.60E-03	2.00E+00	8.30E+00		2.0E+04	1.5E+02	nc	4.3E-04	5.5E-02
2A	VOC	cis-1,2-Dichloroethene	156-59-2	D	170	59	7.00E-04	1.50E+00	8.30E+00		3.1E+04	1.5E+02	nc	2.7E-04	5.5E-02
2A	VOC	trans-1,2-Dichloroethene	156-60-5		170	10	3.80E-03	4.40E-02	1.10E-01		2.0E+04	2.3E+02	nc	5.6E-06	4.8E-04
2A	VOC	1,2-Dichloropropane	78-87-5	B2	170	5	1.90E-03	2.20E-02	9.79E-02		2.3E+04	7.4E+00	c	4.3E-06	1.3E-02
2A	VOC	Ethyl Benzene	100-41-4	D	170	3	4.80E-04	9.10E-02	2.70E-01		7.5E+04	2.0E+02	c	3.6E-06	1.4E-03
2A	VOC	2-Hexanone	591-78-6		170	1	1.00E-03	1.00E-03	1.00E-03						
2A	VOC	4-Methyl-2-pentanone	108-10-1	ID	170	5	1.90E-03	3.80E-03	9.30E-03			2.8E+03	nc		3.3E-06
2A	VOC	Methylcyclohexane	108-87-2		63	1	2.70E-03	2.70E-03	2.70E-03			8.7E+03	nc		3.1E-07
2A	VOC	Methylene Chloride	75-09-2	B2	170	7	1.00E-03	2.00E-02	1.07E-01		2.7E+03	2.1E+02	c	4.0E-05	5.1E-04
2A	VOC	Tetrachloroethene	127-18-4	C-B2	169	99	7.30E-04	3.90E+01	1.10E+03		2.3E+04	3.4E+01	c	4.8E-02	3.2E+01
2A	VOC	Toluene	108-88-3	D	170	23	4.20E-04	2.00E-02	3.00E-01		7.9E+04	2.2E+03	nc	3.8E-06	1.4E-04
2A	VOC	Trichloroethene	79-01-6	C-B2	170	43	5.60E-04	1.80E+00	3.10E+01		3.4E+04	1.2E+00	c	9.2E-04	2.6E+01
2A	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		63	20	2.08E-03	7.30E+01	1.20E+03		9.3E+04	6.9E+04	nc	1.3E-02	1.7E-02
2A	VOC	Vinyl Chloride	75-01-4	A	170	14	1.40E-03	2.30E-01	1.00E+00		1.4E+01	7.5E+00	c	7.0E-02	1.3E-01
2A	VOC	Xylenes (total)	1330-20-7	ID	170	3	3.00E-03	5.40E-01	1.60E+00		9.2E+04	9.0E+02	nc	1.7E-05	1.8E-03
2A	SVOC	Acenaphthylene	208-96-8	D	75	6	3.80E-02	6.30E-01	2.40E+00			2.9E+04	nc		8.3E-05
2A	SVOC	Anthracene	120-12-7	D	75	1	8.10E-03	8.10E-03	8.10E-03			2.4E+05	nc		3.4E-08
2A	SVOC	Benzo(a)anthracene	56-55-3	B2	75	10	7.30E-03	4.60E-02	2.40E-01			2.1E+01	c		1.1E-02
2A	SVOC	Benzo(a)pyrene	50-32-8	B2	75	10	8.20E-03	4.00E-02	1.30E-01			2.1E+00	c		6.2E-02
2A	SVOC	Benzo(b)fluoranthene	205-99-2	B2	75	15	5.80E-03	4.30E-02	2.10E-01			2.1E+01	c		1.0E-02
2A	SVOC	Benzo(g,h,i)perylene	191-24-2	D	75	7	1.10E-02	3.80E-02	6.70E-02			2.9E+04	nc		2.3E-06
2A	SVOC	Benzo(k)fluoranthene	207-08-9	B2	75	17	2.40E-03	2.00E-02	9.50E-02			2.1E+02	c		4.5E-04
2A	SVOC	Chrysene	218-01-9	B2	75	12	2.20E-03	4.10E-02	2.50E-01			2.1E+03	c		1.2E-04
2A	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	75	4	6.20E-03	5.40E-02	1.60E-01			2.1E+00	c		7.6E-02
2A	SVOC	Fluoranthene	206-44-0	D	75	16	8.20E-04	1.20E-01	7.10E-01			2.2E+04	nc		3.2E-05
2A	SVOC	Fluorene	86-73-7	D	75	1	2.30E-02	2.30E-02	2.30E-02			2.6E+04	nc		8.8E-07
2A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	75	11	5.80E-03	3.80E-02	1.00E-01			2.1E+01	c		4.8E-03
2A	SVOC	Naphthalene	91-20-3	C	92	3	4.20E-02	1.10E+00	3.20E+00		7.5E+05	1.9E+02	nc	4.2E-06	1.7E-02
2A	SVOC	Phenanthrene	85-01-8	D	75	7	2.50E-03	1.00E-01	5.50E-01			2.9E+04	nc		1.9E-05
2A	SVOC	Pyrene	129-00-0	D	75	25	4.50E-03	1.20E-01	1.20E+00			2.9E+04	nc		4.1E-05
2A	PDIST	Petroleum Hydrocarbons (recoverable)	68334-30-5R		48	22	1.20E+01	1.30E+03	9.60E+03						
2A	INORG	Arsenic	7440-38-2	A	89	89	2.80E+00	8.20E+00	2.53E+01	1.5E+01		1.6E+01	c		6.6E-01
2A	INORG	Barium	7440-39-3	D	64	60	1.78E+01	6.60E+01	1.22E+02			6.7E+04	nc		1.8E-03
2A	INORG	Cadmium	7440-43-9	B1	64	3	7.90E-02	1.30E-01	1.70E-01			4.5E+02	nc		3.8E-04
2A	INORG	Chromium (total)	7440-47-3		64	64	4.00E+00	1.20E+01	2.07E+01			2.5E+03	nc		8.3E-03
2A	INORG	Copper	7440-50-8	D	31	31	8.40E+00	1.50E+01	2.87E+01	2.5E+01		4.1E+04	nc		8.8E-05
2A	INORG	Lead	7439-92-1	B2	64	64	3.70E+00	9.60E+00	1.64E+01			7.5E+02	nc		2.2E-02
2A	INORG	Mercury	7439-97-6	D	64	3	2.30E-02	3.10E-02	3.90E-02		2.2E+03	1.4E+01	nc	1.8E-05	2.9E-03

Table 2-1: On-Facility Soil Screening Results
Vernay Laboratories Inc., Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site-Related Detect to Industrial Screening Criteria*
2A	INORG	Selenium	7782-49-2	D	64	3	6.50E-01	6.90E-01	7.30E-01			5.1E+03	nc		1.4E-04
2A	INORG	Zinc	7440-66-6	D	31	31	2.92E+01	5.10E+01	8.98E+01	7.1E+01		3.1E+05	nc		6.1E-05

Notes:

The Screening Criteria for residential and industrial soil is the lower of the integrated Screening Criteria at:

target cancer risk = **1E-05**

target hazard quotient = **1**

*For the Ratio of Max Site-Related Detect to Industrial Screening Criteria the ratios of metal concentrations to the screening criteria include only site-related contributions

The soil screening level for soil to ground water is presented in the PRG table for migration to ground water with a **DAF = 20**

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for Phenol were used as surrogates for Phenols (total).

The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.

The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

The Screening Criteria for Mercury was calculated by ENVIRON to account for the vapor inhalation pathway using:

EPA Region 9 equations, RfC from IRIS, and chemical properties from EPA's Soil Screening Guidance.

NA - The calculated C_{dw}· DAF is greater than the Solubility.

c - The Screening Criterion is based on cancer risk.

nc - The Screening Criterion is based on noncancer effects.

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

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Supplemental Response to USEPA Comments
Resource Conservation and Recovery Act
CA725 Environmental Indicators Report

Vernay Laboratories, Inc.
Plant 2/3 Facility
875 Dayton Street
Yellow Springs, Ohio

OHD 004 243 002

September 23, 2004

The Environmental Indicators (EI) CA725 Report for the Vernay Laboratories, Inc. ("Vernay") Facility (the "Facility") located in the Village of Yellow Springs, Ohio was submitted to USEPA on July 14, 2004. This submittal included responses to USEPA's June 29, 2004 comments on the draft EI CA 725 Report provided to USEPA on April 9, 2004. The EI CA725 Report evaluated and discussed information that is pertinent to the RCRA CA725 determination, and included data collected during the Phase I Facility Investigation and from prior investigations that were summarized in the Facility Current Conditions Report. Based on these data, and a consideration of potential exposure pathways and site-specific conditions, current human exposures were determined to be under control according to the provisions of CA725.

On August 5, 2004, USEPA requested additional information and/or clarification of the responses to the June 29, 2004 comments. The requested information/clarification was submitted to USEPA on August 24, 2004. Based on subsequent discussions between USEPA and Vernay, Vernay understands that USEPA is requesting that, despite the fact that no areas of interest (AOIs) were eliminated in CA725 Question 2 from consideration in CA725 Questions 3 and 4, the screening procedure for responding to Question 2 should include comparison of soil concentrations with risk based screening levels without accounting for background contributions to these concentrations.

Supplemental Response to USEPA Comments

In the approach presented in the July 2004 EI CA725 Report for the Vernay Facility, only the site-related component of metals in the soil was accounted for in Question 2 to identify those metal concentrations that are subject to RCRA corrective action and warranted further evaluation in the CA725 determination. Those AOIs with constituents concentrations identified in Question

2 for further evaluation were then assessed to identify if complete pathways (Question 3) exist, and if so, the significance of potential exposures (Question 4). However, to address USEPA's additional comments on the approach used for the Vernay Facility, Vernay is providing supplemental information for CA725 Question 2, specifically, the results of the screening of soil concentrations with risk-based screening criteria without accounting for background contributions to these concentrations.

As described in the EI CA 725 Report, the identification of contamination for soil is based on comparison of the Phase I RFI characterization data with generic risk-based screening criteria. The following is a list of screening criteria that were selected based on the conceptual site model for current human exposures to identify contamination in each of the environmental media investigated during the Phase I Facility Investigation:

<u>Soil</u>

- Risk-based screening levels calculated using the methodology and conservative exposure factors for deriving USEPA Region 9 Preliminary Remediation Goals (PRGs) for industrial and/or residential land use (set at a TCRL of 10^{-5} for carcinogenic constituents and a target HQ of 1 for non-carcinogenic constituents); and
- For on-Facility areas, risk-based screening levels for evaluating soil vapor migration to indoor air based on meeting OSHA criteria for industrial chemical exposures, or in the absence of an OSHA criterion, risk-based screening levels calculated using the methodology and conservative exposure factors published by Michigan Department of Environmental Quality (MDEQ) for evaluating the soil to indoor air pathway for industrial land use (set at a TCRL of 10^{-5} for carcinogenic constituents and a target HQ of 1 for non-carcinogenic constituents) (see Appendix C of the July 2004 EI CA725 Report).

The results of the comparison of detected constituent concentrations in on-Facility and off-Facility soil with these criteria are discussed below. In addition, the significance of these screening results is also evaluated taking into consideration background concentrations of three commonly occurring metals (As, Cu and Zn) in soil (see Appendix B of the July 2004 EI CA725 Report).

The Phase I RFI soil characterization data are summarized on Table 2-1a and Table 2-2a by AOI for on-Facility and off-Facility soils, respectively. The data on Tables 2-1a and 2-2a include only valid data (i.e., no R-qualified data), and concentrations among duplicate pairs have been averaged to obtain a representative concentration for each pair. For each AOI, Table 2-1a and

Table 2-2a lists the detected constituents, the detection frequencies, the ranges of detected concentrations, and the ratios of the highest measured concentrations to the screening criteria.

Constituents are identified for further evaluation in each AOI when the ratio of the highest measured Facility-related concentration at the AOI to the screening criterion exceeds 1. Such ratios are highlighted on Table 2-1a and Table 2-2a. The constituents with concentrations exceeding screening criteria in each of the AOIs are:

AOI-1 – Undeveloped Western Fill Area[1]

- 1,2-dichloropropane
- benzo(a)pyrene
- arsenic

AOI-2 – Developed Area of Facility

- tetrachloroethene
- trichloroethene
- benzo(a)pyrene
- dibenz(a,h)anthracene
- arsenic

AOI-2A – On-Facility Sewer Lines Area

- tetrachloroethene
- trichloroethene
- arsenic

AOI-3 – Off-Facility Soils

- arsenic

AOI-3A – Off-Facility Sewer Lines Area

- tetrachloroethene
- trichloroethene

"Contamination" as defined in the EI CA725 form is identified in each AOI when the ratio of the highest measured Facility-related concentration at the AOI to the screening criterion exceeds 1 (for inorganics, Facility-related concentrations are those that are higher than the site-specific

[1] Note that certain delineation data for AOI-1 are identified as Off-Facility soil samples and are reported on Table 2-2a.

background levels). Such ratios are highlighted on Table 2-1b and Table 2-2b to facilitate identification of AOIs where soil is considered to meet the definition of "contaminated" for further evaluation under Questions 3 and 4 of the CA725. Question 3 of the CA725 form asks whether there are complete exposure pathways between "contamination" identified under Question 2 and human receptors such that exposures can be reasonably expected under current conditions. Question 4 of the CA725 form asks whether exposures from the complete exposure pathways identified under Question 3 can be reasonably expected to be "significant" or unacceptable.

As indicated on Table 2-1b, when background soil concentrations are considered in the risk-based data screening, potential Facility-related contributions of arsenic in AOI 2 and 2A soils are below these risk-based screening criteria. As a result, arsenic concentrations in these AOIs do not meet the definition of Facility-related "contamination" warranting further evaluation under Questions 3 and 4 of the CA725. Similarly, as indicated on Table 2-2b, when background soil concentrations are considered in the risk-based data screening, potential Facility-related contributions of arsenic in AOI 1 and 3 soils are below these risk-based screening criteria. As a result, arsenic concentrations in these AOIs do not meet the definition of Facility-related "contamination" warranting further evaluation under Questions 3 and 4 of the CA725.

It should be noted that all of the AOIs listed above as having constituent concentrations above screening criteria were evaluated under Question 4 of the CA725; the significance of any potential exposures to Facility-related concentrations is discussed in Section 2.4 of the July 2004 EI CA725 Report, and the cumulative cancer risk and hazard index for all AOIs are presented on Tables 2-16a and 2-16b of the EI CA725 Report. Therefore, the conclusion of the EI CA725 evaluation is unaffected by the adjustment for background concentrations in the screening level assessment conducted for the purpose of answering Question 2 of the CA725 form.

ATTACHED TABLES

Table 2-1a:	On-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Table 2-1b:	On-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc
Table 2-2a:	Off-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Table 2-2b:	Off-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc

Table 2-1a: On-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Detect to Industrial Screening Criteria
1	VOC	Acetone	67-64-1	ID	34	6	9.80E-03	2.30E-02	4.60E-02		1.4E+06	6.0E+03	nc	3.4E-08	7.7E-06
1	VOC	Benzene	71-43-2	A	38	1	2.90E-03	2.90E-03	2.90E-03		1.4E+02	1.3E+01	c	2.1E-05	2.2E-04
1	VOC	2-Butanone	78-93-3	ID	36	1	3.80E-03	3.80E-03	3.80E-03			2.7E+04	nc		1.4E-07
1	VOC	cis-1,2-Dichloroethene	156-59-2	D	38	3	1.20E-03	3.50E-02	6.00E-02		3.1E+04	1.5E+02	nc	2.0E-06	4.0E-04
1	VOC	trans-1,2-Dichloroethene	156-60-5		38	1	4.90E-04	4.90E-04	4.90E-04		2.0E+04	2.3E+02	nc	2.5E-08	2.1E-06
1	VOC	1,2-Dichloropropane	78-87-5	B2	38	3	4.30E-03	5.70E+01	1.70E+02		2.3E+04	7.4E+00	c	7.4E-03	2.3E+01
1	VOC	Ethyl Benzene	100-41-4	D	38	1	4.60E-04	4.60E-04	4.60E-04		7.5E+04	2.0E+02	c	6.2E-09	2.3E-06
1	VOC	Methylene Chloride	75-09-2	B2	38	8	1.00E-03	1.10E-02	7.82E-02		2.7E+03	2.1E+02	c	2.9E-05	3.7E-04
1	VOC	Tetrachloroethene	127-18-4	C-B2	37	5	6.70E-04	7.90E-01	2.50E+00		2.3E+04	3.4E+01	c	1.1E-04	7.4E-02
1	VOC	Toluene	108-88-3	D	38	6	3.80E-04	7.00E-04	1.30E-03		7.9E+04	2.2E+03	nc	1.7E-08	5.9E-07
1	VOC	Trichloroethene	79-01-6	C-B2	37	4	3.60E-03	1.60E-01	5.10E-01		3.4E+04	1.2E+00	c	1.5E-05	4.3E-01
1	VOC	Vinyl Chloride	75-01-4	A	38	1	3.70E-03	3.70E-03	3.70E-03		1.4E+01	7.5E+00	c	2.6E-04	4.9E-04
1	VOC	Xylenes (total)	1330-20-7	ID	38	1	1.10E-03	1.10E-03	1.10E-03		9.2E+04	9.0E+02	nc	1.2E-08	1.2E-06
1	SVOC	Acenaphthylene	208-96-8	D	35	2	3.90E-01	4.20E-01	4.40E-01			2.9E+04	nc		1.5E-05
1	SVOC	Anthracene	120-12-7	D	35	4	2.70E-02	1.30E-01	2.50E-01			2.4E+05	nc		1.0E-06
1	SVOC	Benzo(a)anthracene	56-55-3	B2	35	20	1.30E-02	1.00E+00	4.60E+00			2.1E+01	c		2.2E-01
1	SVOC	Benzo(a)pyrene	50-32-8	B2	35	18	1.10E-02	1.20E+00	4.50E+00			2.1E+00	c		2.1E+00
1	SVOC	Benzo(b)fluoranthene	205-99-2	B2	35	20	2.20E-02	1.40E+00	4.80E+00			2.1E+01	c		2.3E-01
1	SVOC	Benzo(g,h,i)perylene	191-24-2	D	35	15	1.20E-02	6.80E-01	2.10E+00			2.9E+04	nc		7.2E-05
1	SVOC	Benzo(k)fluoranthene	207-08-9	B2	35	20	9.10E-03	6.20E-01	2.10E+00			2.1E+02	c		1.0E-02
1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	28	3	5.50E-02	1.20E-01	1.90E-01		2.7E+12	1.2E+03	c	7.0E-14	1.6E-04
1	SVOC	Carbazole	86-74-8	B2	28	1	1.80E-01	1.80E-01	1.80E-01			8.6E+02	c		2.1E-04
1	SVOC	Chrysene	218-01-9	B2	35	19	1.40E-02	1.10E+00	3.60E+00			2.1E+03	c		1.7E-03
1	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	35	9	1.10E-02	7.10E-01	1.60E+00			2.1E+00	c		7.6E-01
1	SVOC	Di-n-octylphthalate	117-84-0		28	2	6.90E-02	1.10E-01	1.60E-01			2.5E+04	nc		6.4E-06
1	SVOC	Fluoranthene	206-44-0	D	35	22	3.50E-02	2.40E+00	1.30E+01			2.2E+04	nc		5.9E-04
1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	35	18	1.70E-02	8.30E-01	2.80E+00			2.1E+01	c		1.3E-01
1	SVOC	Phenanthrene	85-01-8	D	35	10	4.80E-02	1.00E+00	3.10E+00			2.9E+04	nc		1.1E-04
1	SVOC	Pyrene	129-00-0	D	35	23	2.70E-02	2.50E+00	1.80E+01			2.9E+04	nc		6.2E-04
1	P/PCB	PCBs (total)	1336-36-3	B2	7	1	5.50E-02	5.50E-02	5.50E-02		2.2E+05	7.4E+00	c	2.6E-07	7.4E-03
1	P/PCB	4,4'-DDE	72-55-9	B2	7	1	7.40E-03	7.40E-03	7.40E-03			7.0E+01	c		1.1E-04
1	INORG	Arsenic	7440-38-2	A	20	20	5.50E+00	7.40E+00	1.07E+01	1.5E+01		1.6E+01	c		6.7E-01
1	INORG	Barium	7440-39-3	D	14	14	4.68E+01	8.30E+01	1.99E+02			6.7E+04	nc		3.0E-03
1	INORG	Chromium (total)	7440-47-3		14	14	7.50E+00	1.10E+01	1.68E+01			2.5E+03	nc		6.7E-03
1	INORG	Copper	7440-50-8	D	6	6	1.18E+01	1.50E+01	1.97E+01	2.5E+01		4.1E+04	nc		4.8E-04
1	INORG	Lead	7439-92-1	B2	14	14	1.12E+01	2.40E+01	4.82E+01			7.5E+02	nc		6.4E-02
1	INORG	Mercury	7439-97-6	D	14	1	1.20E-01	1.20E-01	1.20E-01		2.2E+03	1.4E+01	nc	5.5E-05	8.8E-03
1	INORG	Selenium	7782-49-2	D	14	1	8.00E-01	8.00E-01	8.00E-01			5.1E+03	nc		1.6E-04
1	INORG	Zinc	7440-66-6	D	6	6	3.62E+01	4.80E+01	5.83E+01	7.1E+01		3.1E+05	nc		1.9E-04
2	VOC	Acetone	67-64-1	ID	184	27	9.50E-03	1.00E-01	6.80E-01		1.4E+06	6.0E+03	nc	5.0E-07	1.1E-04
2	VOC	Benzene	71-43-2	A	190	4	4.50E-04	1.30E-03	2.40E-03		1.4E+02	1.3E+01	c	1.7E-05	1.8E-04
2	VOC	2-Butanone	78-93-3	ID	188	14	2.00E-03	1.50E-02	4.50E-02			2.7E+04	nc		1.7E-06
2	VOC	Carbon Disulfide	75-15-0		190	2	1.40E-03	7.70E-03	1.40E-02		2.6E+02	1.2E+03	nc	5.3E-05	1.2E-05
2	VOC	Chloroethane	75-00-3		190	1	6.00E-02	6.00E-02	6.00E-02			6.5E+01	c		9.2E-04
2	VOC	Cumene	98-82-8	D	52	2	1.80E-03	6.40E-03	1.10E-02			2.0E+03	nc		5.5E-06
2	VOC	Cyclohexane	110-82-7	ID	52	1	7.70E-04	7.70E-04	7.70E-04			3.2E+04	nc		2.4E-08
2	VOC	1,2-Dichlorobenzene	95-50-1	D	111	3	2.20E-03	2.50E-02	7.00E-02		1.8E+05	4.1E+03	nc	3.9E-07	1.7E-05
2	VOC	1,1-Dichloroethane	75-34-3	C	190	4	1.50E-03	1.70E-02	5.00E-02		1.1E+04	1.7E+03	nc	4.8E-06	2.9E-05

Table 2-1a: On-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screening Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Detect to Industrial Screening Criteria
2	VOC	1,1-Dichloroethene	75-35-4	C	190	1	6.20E-03	6.20E-03	6.20E-03		2.2E+02	4.1E+02	nc	2.8E-05	1.5E-05
2	VOC	1,2-Dichloroethene (total)	540-59-0		138	34	5.20E-03	8.10E-01	5.60E+00		2.0E+04	1.5E+02	nc	2.9E-04	3.7E-02
2	VOC	cis-1,2-Dichloroethene	156-59-2	D	190	73	9.00E-04	1.50E+00	2.20E+01		3.1E+04	1.5E+02	nc	7.2E-04	1.5E-01
2	VOC	trans-1,2-Dichloroethene	156-60-5		190	17	1.10E-03	3.40E-02	2.10E-01		2.0E+04	2.3E+02	nc	1.1E-05	9.1E-04
2	VOC	1,2-Dichloropropane	78-87-5	B2	190	5	1.70E-03	1.50E-02	3.20E-02		2.3E+04	7.4E+00	c	1.4E-06	4.3E-03
2	VOC	Ethyl Benzene	100-41-4	D	190	2	4.20E-04	1.90E-02	3.80E-02		7.5E+04	2.0E+02	c	5.1E-07	1.9E-04
2	VOC	Methyl Acetate	79-20-9		52	2	8.50E-02	8.90E-02	9.30E-02			9.2E+04	nc		1.0E-06
2	VOC	4-Methyl-2-pentanone	108-10-1	ID	190	5	2.00E-03	1.40E-02	5.60E-02			2.8E+03	nc		2.0E-05
2	VOC	Methylcyclohexane	108-87-2		52	2	1.10E-03	1.80E-03	2.50E-03			8.7E+03	nc		2.9E-07
2	VOC	Methylene Chloride	75-09-2	B2	190	11	2.10E-03	2.40E-01	2.30E+00		2.7E+03	2.1E+02	c	8.7E-04	1.1E-02
2	VOC	Tetrachloroethene	127-18-4	C-B2	190	75	6.50E-04	5.70E+00	8.20E+01		2.3E+04	3.4E+01	c	3.6E-03	2.4E+00
2	VOC	Toluene	108-88-3	D	190	16	5.40E-04	1.30E-02	1.60E-01		7.9E+04	2.2E+03	nc	2.0E-06	7.3E-05
2	VOC	Trichloroethene	79-01-6	C-B2	190	59	9.00E-04	2.90E+00	4.00E+01		3.4E+04	1.2E+00	c	1.2E-03	3.3E+01
2	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		52	16	1.60E-03	4.70E+00	4.90E+01		9.3E+04	6.9E+04	nc	5.3E-04	7.1E-04
2	VOC	Vinyl Chloride	75-01-4	A	190	25	1.40E-03	1.50E-01	9.50E-01		1.4E+01	7.5E+00	c	6.7E-02	1.3E-01
2	VOC	Xylenes (total)	1330-20-7	ID	190	7	1.40E-03	2.80E-02	1.00E-01		9.2E+04	9.0E+02	nc	1.1E-06	1.1E-04
2	SVOC	Acenaphthene	83-32-9		125	1	9.30E-02	9.30E-02	9.30E-02			2.9E+04	nc		3.2E-06
2	SVOC	Acenaphthylene	208-96-8	D	125	4	3.30E-02	1.30E-01	2.30E-01			2.9E+04	nc		7.9E-06
2	SVOC	Anthracene	120-12-7	D	125	2	2.10E-02	3.30E-02	4.40E-02			2.4E+05	nc		1.8E-07
2	SVOC	Benzo(a)anthracene	56-55-3	B2	125	20	5.60E-03	4.60E-01	5.60E+00			2.1E+01	c		2.7E-01
2	SVOC	Benzo(a)pyrene	50-32-8	B2	125	16	5.40E-03	6.00E-01	5.60E+00			2.1E+00	c		2.7E+00
2	SVOC	Benzo(b)fluoranthene	205-99-2	B2	125	22	1.80E-03	4.20E-01	5.40E+00			2.1E+01	c		2.6E-01
2	SVOC	Benzo(g,h,i)perylene	191-24-2	D	125	12	7.80E-03	2.90E-01	1.60E+00			2.9E+04	nc		5.5E-05
2	SVOC	Benzo(k)fluoranthene	207-08-9	B2	125	20	2.00E-03	1.80E-01	2.20E+00			2.1E+02	c		1.0E-02
2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	39	9	6.90E-02	6.70E-01	3.30E+00		2.7E+12	1.2E+03	c	1.2E-12	2.8E-03
2	SVOC	Chrysene	218-01-9	B2	125	25	7.50E-04	4.10E-01	6.00E+00			2.1E+03	c		2.9E-03
2	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	125	4	9.70E-02	8.70E-01	2.40E+00			2.1E+00	c		1.1E+00
2	SVOC	Di-n-butylphthalate	84-74-2	D	39	1	8.20E-02	8.20E-02	8.20E-02		6.4E+11	6.2E+04	nc	1.3E-13	1.3E-06
2	SVOC	Di-n-octylphthalate	117-84-0		39	1	6.60E-02	6.60E-02	6.60E-02			2.5E+04	nc		2.6E-06
2	SVOC	Fluoranthene	206-44-0	D	125	30	1.10E-03	9.40E-01	1.70E+01			2.2E+04	nc		7.7E-04
2	SVOC	Fluorene	86-73-7	D	125	2	8.40E-03	2.20E-02	3.60E-02			2.6E+04	nc		1.4E-06
2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	125	18	2.50E-03	3.80E-01	3.50E+00			2.1E+01	c		1.7E-01
2	SVOC	2-Methylnaphthalene	91-57-6	ID	119	1	2.30E+01	2.30E+01	2.30E+01			1.9E+02	nc		1.2E-01
2	SVOC	Naphthalene	91-20-3	C	143	4	4.50E-03	4.30E-02	7.40E-02		7.5E+05	1.9E+02	nc	9.8E-08	3.9E-04
2	SVOC	Phenanthrene	85-01-8	D	125	10	7.55E-03	2.20E+00	1.90E+01			2.9E+04	nc		6.6E-04
2	SVOC	Pyrene	129-00-0	D	125	44	5.90E-03	7.50E-01	2.10E+01			2.9E+04	nc		7.2E-04
2	INORG	Arsenic	7440-38-2	A	117	117	1.10E+00	8.60E+00	2.28E+01	1.5E+01		1.6E+01	c		1.4E+00
2	INORG	Barium	7440-39-3	D	98	97	1.22E+01	6.50E+01	1.66E+02			6.7E+04	nc		2.5E-03
2	INORG	Cadmium	7440-43-9	B1	98	9	3.70E-02	3.10E-01	1.60E+00			4.5E+02	nc		3.6E-03
2	INORG	Chromium (total)	7440-47-3		98	98	4.00E+00	1.20E+01	2.32E+01			2.5E+03	nc		9.3E-03
2	INORG	Copper	7440-50-8	D	22	22	4.10E+00	1.60E+01	2.41E+01	2.5E+01		4.1E+04	nc		5.9E-04
2	INORG	Lead	7439-92-1	B2	98	98	1.20E+00	1.20E+01	1.02E+02			7.5E+02	nc		1.4E-01
2	INORG	Mercury	7439-97-6	D	98	6	3.40E-02	1.50E-01	5.50E-01		2.2E+03	1.4E+01	nc	2.5E-04	4.0E-02
2	INORG	Selenium	7782-49-2	D	98	10	5.00E-01	6.60E-01	9.30E-01			5.1E+03	nc		1.8E-04
2	INORG	Zinc	7440-66-6	D	22	22	8.30E+00	4.90E+01	7.38E+01	7.1E+01		3.1E+05	nc		2.4E-04
2A	VOC	Acetone	67-64-1	ID	165	27	6.40E-03	5.50E-02	4.84E-01		1.4E+06	6.0E+03	nc	3.6E-07	8.1E-05
2A	VOC	Benzene	71-43-2	A	170	2	4.40E-04	7.00E-04	9.60E-04		1.4E+02	1.3E+01	c	6.8E-06	7.4E-05
2A	VOC	2-Butanone	78-93-3	ID	169	7	2.30E-03	5.70E-02	3.76E-01			2.7E+04	nc		1.4E-05

Table 2-1a: On-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Detect to Industrial Screening Criteria
2A	VOC	Carbon Disulfide	75-15-0		170	1	2.40E-03	2.40E-03	2.40E-03		2.6E+02	1.2E+03	nc	9.1E-06	2.0E-06
2A	VOC	Chloroform	67-66-3	B2	170	1	9.30E-03	9.30E-03	9.30E-03		2.3E+03	1.2E+01	nc	4.1E-06	7.8E-04
2A	VOC	Chloromethane	74-87-3	D	170	1	2.90E-02	2.90E-02	2.90E-02		8.0E+02	2.7E+01	c	3.6E-05	1.1E-03
2A	VOC	Cumene	98-82-8	D	63	5	6.50E-04	6.00E-02	1.70E-01			2.0E+03	nc		8.5E-05
2A	VOC	Cyclohexane	110-82-7	ID	63	1	2.00E-03	2.00E-03	2.00E-03			3.2E+04	nc		6.3E-08
2A	VOC	Dichlorodifluoromethane	75-71-8		63	2	3.60E-03	7.70E-02	1.50E-01		1.9E+04	3.1E+02	nc	8.0E-06	4.8E-04
2A	VOC	1,1-Dichloroethane	75-34-3	C	169	6	8.70E-04	2.70E-02	9.85E-02		1.1E+04	1.7E+03	nc	9.4E-06	5.8E-05
2A	VOC	1,1-Dichloroethene	75-35-4	C	170	1	2.00E-03	2.00E-03	2.00E-03		2.2E+02	4.1E+02	nc	9.0E-06	4.9E-06
2A	VOC	1,2-Dichloroethene (total)	540-59-0		107	25	5.60E-03	2.00E+00	8.30E+00		2.0E+04	1.5E+02	nc	4.3E-04	5.5E-02
2A	VOC	cis-1,2-Dichloroethene	156-59-2	D	170	59	7.00E-04	1.50E+00	8.30E+00		3.1E+04	1.5E+02	nc	2.7E-04	5.5E-02
2A	VOC	trans-1,2-Dichloroethene	156-60-5		170	10	3.80E-03	4.40E-02	1.10E-01		2.0E+04	2.3E+02	nc	5.6E-06	4.8E-04
2A	VOC	1,2-Dichloropropane	78-87-5	B2	170	5	1.90E-03	2.20E-02	9.79E-02		2.3E+04	7.4E+00	c	4.3E-06	1.3E-02
2A	VOC	Ethyl Benzene	100-41-4	D	170	3	4.80E-04	9.10E-02	2.70E-01		7.5E+04	2.0E+02	c	3.6E-06	1.4E-03
2A	VOC	2-Hexanone	591-78-6		170	1	1.00E-03	1.00E-03	1.00E-03						
2A	VOC	4-Methyl-2-pentanone	108-10-1	ID	170	5	1.90E-03	3.80E-03	9.30E-03			2.8E+03	nc		3.3E-06
2A	VOC	Methylcyclohexane	108-87-2		63	1	2.70E-03	2.70E-03	2.70E-03			8.7E+03	nc		3.1E-07
2A	VOC	Methylene Chloride	75-09-2	B2	170	7	1.00E-03	2.00E-02	1.07E-01		2.7E+03	2.1E+02	c	4.0E-05	5.1E-04
2A	VOC	Tetrachloroethene	127-18-4	C-B2	169	99	7.30E-04	3.90E+01	1.10E+03		2.3E+04	3.4E+01	c	4.8E-02	3.2E+01
2A	VOC	Toluene	108-88-3	D	170	23	4.20E-04	2.00E-02	3.00E-01		7.9E+04	2.2E+03	nc	3.8E-06	1.4E-04
2A	VOC	Trichloroethene	79-01-6	C-B2	170	43	5.60E-04	1.80E+00	3.10E+01		3.4E+04	1.2E+00	c	9.2E-04	2.6E+01
2A	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		63	20	2.08E-03	7.30E+01	1.20E+03		9.3E+04	6.9E+04	nc	1.3E-02	1.7E-02
2A	VOC	Vinyl Chloride	75-01-4	A	170	14	1.40E-03	2.30E-01	1.00E+00		1.4E+01	7.5E+00	c	7.0E-02	1.3E-01
2A	VOC	Xylenes (total)	1330-20-7	ID	170	3	3.00E-03	5.40E-01	1.60E+00		9.2E+04	9.0E+02	nc	1.7E-05	1.8E-03
2A	SVOC	Acenaphthylene	208-96-8	D	75	6	3.80E-02	6.30E-01	2.40E+00			2.9E+04	nc		8.3E-05
2A	SVOC	Anthracene	120-12-7	D	75	1	8.10E-03	8.10E-03	8.10E-03			2.4E+05	nc		3.4E-08
2A	SVOC	Benzo(a)anthracene	56-55-3	B2	75	10	7.30E-03	4.60E-02	2.40E-01			2.1E+01	c		1.1E-02
2A	SVOC	Benzo(a)pyrene	50-32-8	B2	75	10	8.20E-03	4.00E-02	1.30E-01			2.1E+00	c		6.2E-02
2A	SVOC	Benzo(b)fluoranthene	205-99-2	B2	75	15	5.80E-03	4.30E-02	2.10E-01			2.1E+01	c		1.0E-02
2A	SVOC	Benzo(g,h,i)perylene	191-24-2	D	75	7	1.10E-02	3.80E-02	6.70E-02			2.9E+04	nc		2.3E-06
2A	SVOC	Benzo(k)fluoranthene	207-08-9	B2	75	17	2.40E-03	2.00E-02	9.50E-02			2.1E+02	c		4.5E-04
2A	SVOC	Chrysene	218-01-9	B2	75	12	2.20E-03	4.10E-02	2.50E-01			2.1E+03	c		1.2E-04
2A	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	75	4	6.20E-03	5.40E-02	1.60E-01			2.1E+00	c		7.6E-02
2A	SVOC	Fluoranthene	206-44-0	D	75	16	8.20E-04	1.20E-01	7.10E-01			2.2E+04	nc		3.2E-05
2A	SVOC	Fluorene	86-73-7	D	75	1	2.30E-02	2.30E-02	2.30E-02			2.6E+04	nc		8.8E-07
2A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	75	11	5.80E-03	3.80E-02	1.00E-01			2.1E+01	c		4.8E-03
2A	SVOC	Naphthalene	91-20-3	C	92	3	4.20E-02	1.10E+00	3.20E+00		7.5E+05	1.9E+02	nc	4.2E-06	1.7E-02
2A	SVOC	Phenanthrene	85-01-8	D	75	7	2.50E-03	1.00E-01	5.50E-01			2.9E+04	nc		1.9E-05
2A	SVOC	Pyrene	129-00-0	D	75	25	4.50E-03	1.20E-01	1.20E+00			2.9E+04	nc		4.1E-05
2A	INORG	Arsenic	7440-38-2	A	89	89	2.80E+00	8.20E+00	2.53E+01	1.5E+01		1.6E+01	c		1.6E+00
2A	INORG	Barium	7440-39-3	D	64	60	1.78E+01	6.60E+01	1.22E+02			6.7E+04	nc		1.8E-03
2A	INORG	Cadmium	7440-43-9	B1	64	3	7.90E-02	1.30E-01	1.70E-01			4.5E+02	nc		3.8E-04
2A	INORG	Chromium (total)	7440-47-3		64	64	4.00E+00	1.20E+01	2.07E+01			2.5E+03	nc		8.3E-03
2A	INORG	Copper	7440-50-8	D	31	31	8.40E+00	1.50E+01	2.87E+01	2.5E+01		4.1E+04	nc		7.0E-04
2A	INORG	Lead	7439-92-1	B2	64	64	3.70E+00	9.60E+00	1.64E+01			7.5E+02	nc		2.2E-02
2A	INORG	Mercury	7439-97-6	D	64	3	2.30E-02	3.10E-02	3.90E-02		2.2E+03	1.4E+01	nc	1.8E-05	2.9E-03
2A	INORG	Selenium	7782-49-2	D	64	3	6.50E-01	6.90E-01	7.30E-01			5.1E+03	nc		1.4E-04
2A	INORG	Zinc	7440-66-6	D	31	31	2.92E+01	5.10E+01	8.98E+01	7.1E+01		3.1E+05	nc		2.9E-04

Table 2-1a: On-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)	Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Detect to Industrial Screening Criteria
	Notes:													
	The Screening Criteria for residential and industrial soil is the lower of the integrated Screening Criteria at:													
		target cancer risk =	1E-05											
		target hazard quotient =	1											
	The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.													
	The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.													
	The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).													
	The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).													
	The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects													
	and Aroclor 1254 for noncancer effects.													
	The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.													
	The Screening Criteria for Mercury was calculated by ENVIRON to account for the vapor inhalation pathway using:													
	EPA Region 9 equations, RfC from IRIS, and chemical properties from EPA's Soil Screening Guidance.													
	c - The Screening Criterion is based on cancer risk.													
	nc - The Screening Criterion is based on noncancer effects.													
	Chem Group - Chemical Group													
	Carc Class - EPA Weight-of-Evidence Cancer Classification													

Table 2-1b: On-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site Related Detect to Industrial Screening Criteria
1	VOC	Acetone	67-64-1	ID	34	6	9.80E-03	2.30E-02	4.60E-02		1.4E+06	6.0E+03	nc	3.4E-08	7.7E-06
1	VOC	Benzene	71-43-2	A	38	1	2.90E-03	2.90E-03	2.90E-03		1.4E+02	1.3E+01	c	2.1E-05	2.2E-04
1	VOC	2-Butanone	78-93-3	ID	36	1	3.80E-03	3.80E-03	3.80E-03			2.7E+04	nc		1.4E-07
1	VOC	cis-1,2-Dichloroethene	156-59-2	D	38	3	1.20E-03	3.50E-02	6.00E-02		3.1E+04	1.5E+02	nc	2.0E-06	4.0E-04
1	VOC	trans-1,2-Dichloroethene	156-60-5		38	1	4.90E-04	4.90E-04	4.90E-04		2.0E+04	2.3E+02	nc	2.5E-08	2.1E-06
1	VOC	1,2-Dichloropropane	78-87-5	B2	38	3	4.30E-03	5.70E+01	1.70E+02		2.3E+04	7.4E+00	c	7.4E-03	2.3E+01
1	VOC	Ethyl Benzene	100-41-4	D	38	1	4.60E-04	4.60E-04	4.60E-04		7.5E+04	2.0E+02	c	6.2E-09	2.3E-06
1	VOC	Methylene Chloride	75-09-2	B2	38	8	1.00E-03	1.10E-02	7.82E-02		2.7E+03	2.1E+02	c	2.9E-05	3.7E-04
1	VOC	Tetrachloroethene	127-18-4	C-B2	37	5	6.70E-04	7.90E-01	2.50E+00		2.3E+04	3.4E+01	c	1.1E-04	7.4E-02
1	VOC	Toluene	108-88-3	D	38	6	3.80E-04	7.00E-04	1.30E-03		7.9E+04	2.2E+03	nc	1.7E-08	5.9E-07
1	VOC	Trichloroethene	79-01-6	C-B2	37	4	3.60E-03	1.60E-01	5.10E-01		3.4E+04	1.2E+00	c	1.5E-05	4.3E-01
1	VOC	Vinyl Chloride	75-01-4	A	38	1	3.70E-03	3.70E-03	3.70E-03		1.4E+01	7.5E+00	c	2.6E-04	4.9E-04
1	VOC	Xylenes (total)	1330-20-7	ID	38	1	1.10E-03	1.10E-03	1.10E-03		9.2E+04	9.0E+02	nc	1.2E-08	1.2E-06
1	SVOC	Acenaphthylene	208-96-8	D	35	2	3.90E-01	4.20E-01	4.40E-01			2.9E+04	nc		1.5E-05
1	SVOC	Anthracene	120-12-7	D	35	4	2.70E-02	1.30E-01	2.50E-01			2.4E+05	nc		1.0E-06
1	SVOC	Benzo(a)anthracene	56-55-3	B2	35	20	1.30E-02	1.00E+00	4.60E+00			2.1E+01	c		2.2E-01
1	SVOC	Benzo(a)pyrene	50-32-8	B2	35	18	1.10E-02	1.20E+00	4.50E+00			2.1E+00	c		2.1E+00
1	SVOC	Benzo(b)fluoranthene	205-99-2	B2	35	20	2.20E-02	1.40E+00	4.80E+00			2.1E+01	c		2.3E-01
1	SVOC	Benzo(g,h,i)perylene	191-24-2	D	35	15	1.20E-02	6.80E-01	2.10E+00			2.9E+04	nc		7.2E-05
1	SVOC	Benzo(k)fluoranthene	207-08-9	B2	35	20	9.10E-03	6.20E-01	2.10E+00			2.1E+02	c		1.0E-02
1	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	28	3	5.50E-02	1.20E-01	1.90E-01		2.7E+12	1.2E+03	c	7.0E-14	1.6E-04
1	SVOC	Carbazole	86-74-8	B2	28	1	1.80E-01	1.80E-01	1.80E-01			8.6E+02	c		2.1E-04
1	SVOC	Chrysene	218-01-9	B2	35	19	1.40E-02	1.10E+00	3.60E+00			2.1E+03	c		1.7E-03
1	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	35	9	1.10E-02	7.10E-01	1.60E+00			2.1E+00	c		7.6E-01
1	SVOC	Di-n-octylphthalate	117-84-0		28	2	6.90E-02	1.10E-01	1.60E-01			2.5E+04	nc		6.4E-06
1	SVOC	Fluoranthene	206-44-0	D	35	22	3.50E-02	2.40E+00	1.30E+01			2.2E+04	nc		5.9E-04
1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	35	18	1.70E-02	8.30E-01	2.80E+00			2.1E+01	c		1.3E-01
1	SVOC	Phenanthrene	85-01-8	D	35	10	4.80E-02	1.00E+00	3.10E+00			2.9E+04	nc		1.1E-04
1	SVOC	Pyrene	129-00-0	D	35	23	2.70E-02	2.50E+00	1.80E+01			2.9E+04	nc		6.2E-04
1	P/PCB	PCBs (total)	1336-36-3	B2	7	1	5.50E-02	5.50E-02	5.50E-02		2.2E+05	7.4E+00	c	2.6E-07	7.4E-03
1	P/PCB	4,4'-DDE	72-55-9	B2	7	1	7.40E-03	7.40E-03	7.40E-03			7.0E+01	c		1.1E-04
1	INORG	Arsenic	7440-38-2	A	20	20	5.50E+00	7.40E+00	1.07E+01	1.5E+01		1.6E+01	c		
1	INORG	Barium	7440-39-3	D	14	14	4.68E+01	8.30E+01	1.99E+02			6.7E+04	nc		3.0E-03
1	INORG	Chromium (total)	7440-47-3		14	14	7.50E+00	1.10E+01	1.68E+01			2.5E+03	nc		6.7E-03
1	INORG	Copper	7440-50-8	D	6	6	1.18E+01	1.50E+01	1.97E+01	2.5E+01		4.1E+04	nc		
1	INORG	Lead	7439-92-1	B2	14	14	1.12E+01	2.40E+01	4.82E+01			7.5E+02	nc		6.4E-02
1	INORG	Mercury	7439-97-6	D	14	1	1.20E-01	1.20E-01	1.20E-01		2.2E+03	1.4E+01	nc	5.5E-05	8.8E-03
1	INORG	Selenium	7782-49-2	D	14	1	8.00E-01	8.00E-01	8.00E-01			5.1E+03	nc		1.6E-04
1	INORG	Zinc	7440-66-6	D	6	6	3.62E+01	4.80E+01	5.83E+01	7.1E+01		3.1E+05	nc		
2	VOC	Acetone	67-64-1	ID	184	27	9.50E-03	1.00E-01	6.80E-01		1.4E+06	6.0E+03	nc	5.0E-07	1.1E-04
2	VOC	Benzene	71-43-2	A	190	4	4.50E-04	1.30E-03	2.40E-03		1.4E+02	1.3E+01	c	1.7E-05	1.8E-04
2	VOC	2-Butanone	78-93-3	ID	188	14	2.00E-03	1.50E-02	4.50E-02			2.7E+04	nc		1.7E-06
2	VOC	Carbon Disulfide	75-15-0		190	2	1.40E-03	7.70E-03	1.40E-02		2.6E+02	1.2E+03	nc	5.3E-05	1.2E-05
2	VOC	Chloroethane	75-00-3		190	1	6.00E-02	6.00E-02	6.00E-02			6.5E+01	c		9.2E-04
2	VOC	Cumene	98-82-8	D	52	2	1.80E-03	6.40E-03	1.10E-02			2.0E+03	nc		5.5E-06
2	VOC	Cyclohexane	110-82-7	ID	52	1	7.70E-04	7.70E-04	7.70E-04			3.2E+04	nc		2.4E-08
2	VOC	1,2-Dichlorobenzene	95-50-1	D	111	3	2.20E-03	2.50E-02	7.00E-02		1.8E+05	4.1E+03	nc	3.9E-07	1.7E-05
2	VOC	1,1-Dichloroethane	75-34-3	C	190	4	1.50E-03	1.70E-02	5.00E-02		1.1E+04	1.7E+03	nc	4.8E-06	2.9E-05

Table 2-1b: On-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screening Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site Related Detect to Industrial Screening Criteria
2	VOC	1,1-Dichloroethene	75-35-4	C	190	1	6.20E-03	6.20E-03	6.20E-03		2.2E+02	4.1E+02	nc	2.8E-05	1.5E-05
2	VOC	1,2-Dichloroethene (total)	540-59-0		138	34	5.20E-03	8.10E-01	5.60E+00		2.0E+04	1.5E+02	nc	2.9E-04	3.7E-02
2	VOC	cis-1,2-Dichloroethene	156-59-2	D	190	73	9.00E-04	1.50E+00	2.20E+01		3.1E+04	1.5E+02	nc	7.2E-04	1.5E-01
2	VOC	trans-1,2-Dichloroethene	156-60-5		190	17	1.10E-03	3.40E-02	2.10E-01		2.0E+04	2.3E+02	nc	1.1E-05	9.1E-04
2	VOC	1,2-Dichloropropane	78-87-5	B2	190	5	1.70E-03	1.50E-02	3.20E-02		2.3E+04	7.4E+00	c	1.4E-06	4.3E-03
2	VOC	Ethyl Benzene	100-41-4	D	190	2	4.20E-04	1.90E-02	3.80E-02		7.5E+04	2.0E+02	c	5.1E-07	1.9E-04
2	VOC	Methyl Acetate	79-20-9		52	2	8.50E-02	8.90E-02	9.30E-02			9.2E+04	nc		1.0E-06
2	VOC	4-Methyl-2-pentanone	108-10-1	ID	190	5	2.00E-03	1.40E-02	5.60E-02			2.8E+03	nc		2.0E-05
2	VOC	Methylcyclohexane	108-87-2		52	2	1.10E-03	1.80E-03	2.50E-03			8.7E+03	nc		2.9E-07
2	VOC	Methylene Chloride	75-09-2	B2	190	11	2.10E-03	2.40E-01	2.30E+00		2.7E+03	2.1E+02	c	8.7E-04	1.1E-02
2	VOC	Tetrachloroethene	127-18-4	C-B2	190	75	6.50E-04	5.70E+00	8.20E+01		2.3E+04	3.4E+01	c	3.6E-03	2.4E+00
2	VOC	Toluene	108-88-3	D	190	16	5.40E-04	1.30E-02	1.60E-01		7.9E+04	2.2E+03	nc	2.0E-06	7.3E-05
2	VOC	Trichloroethene	79-01-6	C-B2	190	59	9.00E-04	2.90E+00	4.00E+01		3.4E+04	1.2E+00	c	1.2E-03	3.3E+01
2	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		52	16	1.60E-03	4.70E+00	4.90E+01		9.3E+04	6.9E+04	nc	5.3E-04	7.1E-04
2	VOC	Vinyl Chloride	75-01-4	A	190	25	1.40E-03	1.50E-01	9.50E-01		1.4E+01	7.5E+00	c	6.7E-02	1.3E-01
2	VOC	Xylenes (total)	1330-20-7	ID	190	7	1.40E-03	2.80E-02	1.00E-01		9.2E+04	9.0E+02	nc	1.1E-06	1.1E-04
2	SVOC	Acenaphthene	83-32-9		125	1	9.30E-02	9.30E-02	9.30E-02			2.9E+04	nc		3.2E-06
2	SVOC	Acenaphthylene	208-96-8	D	125	4	3.30E-02	1.30E-01	2.30E-01			2.9E+04	nc		7.9E-06
2	SVOC	Anthracene	120-12-7	D	125	2	2.10E-02	3.30E-02	4.40E-02			2.4E+05	nc		1.8E-07
2	SVOC	Benzo(a)anthracene	56-55-3	B2	125	20	5.60E-03	4.60E-01	5.60E+00			2.1E+01	c		2.7E-01
2	SVOC	Benzo(a)pyrene	50-32-8	B2	125	16	5.40E-03	6.00E-01	5.60E+00			2.1E+00	c		2.7E+00
2	SVOC	Benzo(b)fluoranthene	205-99-2	B2	125	22	1.80E-03	4.20E-01	5.40E+00			2.1E+01	c		2.6E-01
2	SVOC	Benzo(g,h,i)perylene	191-24-2	D	125	12	7.80E-03	2.90E-01	1.60E+00			2.9E+04	nc		5.5E-05
2	SVOC	Benzo(k)fluoranthene	207-08-9	B2	125	20	2.00E-03	1.80E-01	2.20E+00			2.1E+02	c		1.0E-02
2	SVOC	bis(2-Ethylhexyl)phthalate	117-81-7	B2	39	9	6.90E-02	6.70E-01	3.30E+00		2.7E+12	1.2E+03	c	1.2E-12	2.8E-03
2	SVOC	Chrysene	218-01-9	B2	125	25	7.50E-04	4.10E-01	6.00E+00			2.1E+03	c		2.9E-03
2	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	125	4	9.70E-02	8.70E-01	2.40E+00			2.1E+00	c		1.1E+00
2	SVOC	Di-n-butylphthalate	84-74-2	D	39	1	8.20E-02	8.20E-02	8.20E-02		6.4E+11	6.2E+04	nc	1.3E-13	1.3E-06
2	SVOC	Di-n-octylphthalate	117-84-0		39	1	6.60E-02	6.60E-02	6.60E-02			2.5E+04	nc		2.6E-06
2	SVOC	Fluoranthene	206-44-0	D	125	30	1.10E-03	9.40E-01	1.70E+01			2.2E+04	nc		7.7E-04
2	SVOC	Fluorene	86-73-7	D	125	2	8.40E-03	2.20E-02	3.60E-02			2.6E+04	nc		1.4E-06
2	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	125	18	2.50E-03	3.80E-01	3.50E+00			2.1E+01	c		1.7E-01
2	SVOC	2-Methylnaphthalene	91-57-6	ID	119	1	2.30E+01	2.30E+01	2.30E+01			1.9E+02	nc		1.2E-01
2	SVOC	Naphthalene	91-20-3	C	143	4	4.50E-03	4.30E-02	7.40E-02		7.5E+05	1.9E+02	nc	9.8E-08	3.9E-04
2	SVOC	Phenanthrene	85-01-8	D	125	10	7.55E-03	2.20E+00	1.90E+01			2.9E+04	nc		6.6E-04
2	SVOC	Pyrene	129-00-0	D	125	44	5.90E-03	7.50E-01	2.10E+01			2.9E+04	nc		7.2E-04
2	INORG	Arsenic	7440-38-2	A	117	117	1.10E+00	8.60E+00	2.28E+01	1.5E+01		1.6E+01	c		5.1E-01
2	INORG	Barium	7440-39-3	D	98	97	1.22E+01	6.50E+01	1.66E+02			6.7E+04	nc		2.5E-03
2	INORG	Cadmium	7440-43-9	B1	98	9	3.70E-02	3.10E-01	1.60E+00			4.5E+02	nc		3.6E-03
2	INORG	Chromium (total)	7440-47-3		98	98	4.00E+00	1.20E+01	2.32E+01			2.5E+03	nc		9.3E-03
2	INORG	Copper	7440-50-8	D	22	22	4.10E+00	1.60E+01	2.41E+01	2.5E+01		4.1E+04	nc		
2	INORG	Lead	7439-92-1	B2	98	98	1.20E+00	1.20E+01	1.02E+02			7.5E+02	nc		1.4E-01
2	INORG	Mercury	7439-97-6	D	98	6	3.40E-02	1.50E-01	5.50E-01		2.2E+03	1.4E+01	nc	2.5E-04	4.0E-02
2	INORG	Selenium	7782-49-2	D	98	10	5.00E-01	6.60E-01	9.30E-01			5.1E+03	nc		1.8E-04
2	INORG	Zinc	7440-66-6	D	22	22	8.30E+00	4.90E+01	7.38E+01	7.1E+01		3.1E+05	nc		9.3E-06
2A	VOC	Acetone	67-64-1	ID	165	27	6.40E-03	5.50E-02	4.84E-01		1.4E+06	6.0E+03	nc	3.6E-07	8.1E-05
2A	VOC	Benzene	71-43-2	A	170	2	4.40E-04	7.00E-04	9.60E-04		1.4E+02	1.3E+01	c	6.8E-06	7.4E-05
2A	VOC	2-Butanone	78-93-3	ID	169	7	2.30E-03	5.70E-02	3.76E-01			2.7E+04	nc		1.4E-05

Table 2-1b: On-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screening Criteria (mg/kg)		Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site Related Detect to Industrial Screening Criteria
2A	VOC	Carbon Disulfide	75-15-0		170	1	2.40E-03	2.40E-03	2.40E-03		2.6E+02	1.2E+03	nc	9.1E-06	2.0E-06
2A	VOC	Chloroform	67-66-3	B2	170	1	9.30E-03	9.30E-03	9.30E-03		2.3E+03	1.2E+01	nc	4.1E-06	7.8E-04
2A	VOC	Chloromethane	74-87-3	D	170	1	2.90E-02	2.90E-02	2.90E-02		8.0E+02	2.7E+01	c	3.6E-05	1.1E-03
2A	VOC	Cumene	98-82-8	D	63	5	6.50E-04	6.00E-02	1.70E-01			2.0E+03	nc		8.5E-05
2A	VOC	Cyclohexane	110-82-7	ID	63	1	2.00E-03	2.00E-03	2.00E-03			3.2E+04	nc		6.3E-08
2A	VOC	Dichlorodifluoromethane	75-71-8		63	2	3.60E-03	7.70E-02	1.50E-01		1.9E+04	3.1E+02	nc	8.0E-06	4.8E-04
2A	VOC	1,1-Dichloroethane	75-34-3	C	169	6	8.70E-04	2.70E-02	9.85E-02		1.1E+04	1.7E+03	nc	9.4E-06	5.8E-05
2A	VOC	1,1-Dichloroethene	75-35-4	C	170	1	2.00E-03	2.00E-03	2.00E-03		2.2E+02	4.1E+02	nc	9.0E-06	4.9E-06
2A	VOC	1,2-Dichloroethene (total)	540-59-0		107	25	5.60E-03	2.00E+00	8.30E+00		2.0E+04	1.5E+02	nc	4.3E-04	5.5E-02
2A	VOC	cis-1,2-Dichloroethene	156-59-2	D	170	59	7.00E-04	1.50E+00	8.30E+00		3.1E+04	1.5E+02	nc	2.7E-04	5.5E-02
2A	VOC	trans-1,2-Dichloroethene	156-60-5		170	10	3.80E-03	4.40E-02	1.10E-01		2.0E+04	2.3E+02	nc	5.6E-06	4.8E-04
2A	VOC	1,2-Dichloropropane	78-87-5	B2	170	5	1.90E-03	2.20E-02	9.79E-02		2.3E+04	7.4E+00	c	4.3E-06	1.3E-02
2A	VOC	Ethyl Benzene	100-41-4	D	170	3	4.80E-04	9.10E-02	2.70E-01		7.5E+04	2.0E+02	c	3.6E-06	1.4E-03
2A	VOC	2-Hexanone	591-78-6		170	1	1.00E-03	1.00E-03	1.00E-03						
2A	VOC	4-Methyl-2-pentanone	108-10-1	ID	170	5	1.90E-03	3.80E-03	9.30E-03			2.8E+03	nc		3.3E-06
2A	VOC	Methylcyclohexane	108-87-2		63	1	2.70E-03	2.70E-03	2.70E-03			8.7E+03	nc		3.1E-07
2A	VOC	Methylene Chloride	75-09-2	B2	170	7	1.00E-03	2.00E-02	1.07E-01		2.7E+03	2.1E+02	c	4.0E-05	5.1E-04
2A	VOC	Tetrachloroethene	127-18-4	C-B2	169	99	7.30E-04	3.90E+01	1.10E+03		2.3E+04	3.4E+01	c	4.8E-02	3.2E+01
2A	VOC	Toluene	108-88-3	D	170	23	4.20E-04	2.00E-02	3.00E-01		7.9E+04	2.2E+03	nc	3.8E-06	1.4E-04
2A	VOC	Trichloroethene	79-01-6	C-B2	170	43	5.60E-04	1.80E+00	3.10E+01		3.4E+04	1.2E+00	c	9.2E-04	2.6E+01
2A	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1		63	20	2.08E-03	7.30E+01	1.20E+03		9.3E+04	6.9E+04	nc	1.3E-02	1.7E-02
2A	VOC	Vinyl Chloride	75-01-4	A	170	14	1.40E-03	2.30E-01	1.00E+00		1.4E+01	7.5E+00	c	7.0E-02	1.3E-01
2A	VOC	Xylenes (total)	1330-20-7	ID	170	3	3.00E-03	5.40E-01	1.60E+00		9.2E+04	9.0E+02	nc	1.7E-05	1.8E-03
2A	SVOC	Acenaphthylene	208-96-8	D	75	6	3.80E-02	6.30E-01	2.40E+00			2.9E+04	nc		8.3E-05
2A	SVOC	Anthracene	120-12-7	D	75	1	8.10E-03	8.10E-03	8.10E-03			2.4E+05	nc		3.4E-08
2A	SVOC	Benzo(a)anthracene	56-55-3	B2	75	10	7.30E-03	4.60E-02	2.40E-01			2.1E+01	c		1.1E-02
2A	SVOC	Benzo(a)pyrene	50-32-8	B2	75	10	8.20E-03	4.00E-02	1.30E-01			2.1E+00	c		6.2E-02
2A	SVOC	Benzo(b)fluoranthene	205-99-2	B2	75	15	5.80E-03	4.30E-02	2.10E-01			2.1E+01	c		1.0E-02
2A	SVOC	Benzo(g,h,i)perylene	191-24-2	D	75	7	1.10E-02	3.80E-02	6.70E-02			2.9E+04	nc		2.3E-06
2A	SVOC	Benzo(k)fluoranthene	207-08-9	B2	75	17	2.40E-03	2.00E-02	9.50E-02			2.1E+02	c		4.5E-04
2A	SVOC	Chrysene	218-01-9	B2	75	12	2.20E-03	4.10E-02	2.50E-01			2.1E+03	c		1.2E-04
2A	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	75	4	6.20E-03	5.40E-02	1.60E-01			2.1E+00	c		7.6E-02
2A	SVOC	Fluoranthene	206-44-0	D	75	16	8.20E-04	1.20E-01	7.10E-01			2.2E+04	nc		3.2E-05
2A	SVOC	Fluorene	86-73-7	D	75	1	2.30E-02	2.30E-02	2.30E-02			2.6E+04	nc		8.8E-07
2A	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	75	11	5.80E-03	3.80E-02	1.00E-01			2.1E+01	c		4.8E-03
2A	SVOC	Naphthalene	91-20-3	C	92	3	4.20E-02	1.10E+00	3.20E+00		7.5E+05	1.9E+02	nc	4.2E-06	1.7E-02
2A	SVOC	Phenanthrene	85-01-8	D	75	7	2.50E-03	1.00E-01	5.50E-01			2.9E+04	nc		1.9E-05
2A	SVOC	Pyrene	129-00-0	D	75	25	4.50E-03	1.20E-01	1.20E+00			2.9E+04	nc		4.1E-05
2A	INORG	Arsenic	7440-38-2	A	89	89	2.80E+00	8.20E+00	2.53E+01	1.5E+01		1.6E+01	c		6.6E-01
2A	INORG	Barium	7440-39-3	D	64	60	1.78E+01	6.60E+01	1.22E+02			6.7E+04	nc		1.8E-03
2A	INORG	Cadmium	7440-43-9	B1	64	3	7.90E-02	1.30E-01	1.70E-01			4.5E+02	nc		3.8E-04
2A	INORG	Chromium (total)	7440-47-3		64	64	4.00E+00	1.20E+01	2.07E+01			2.5E+03	nc		8.3E-03
2A	INORG	Copper	7440-50-8	D	31	31	8.40E+00	1.50E+01	2.87E+01	2.5E+01		4.1E+04	nc		8.8E-05
2A	INORG	Lead	7439-92-1	B2	64	64	3.70E+00	9.60E+00	1.64E+01			7.5E+02	nc		2.2E-02
2A	INORG	Mercury	7439-97-6	D	64	3	2.30E-02	3.10E-02	3.90E-02		2.2E+03	1.4E+01	nc	1.8E-05	2.9E-03
2A	INORG	Selenium	7782-49-2	D	64	3	6.50E-01	6.90E-01	7.30E-01			5.1E+03	nc		1.4E-04
2A	INORG	Zinc	7440-66-6	D	31	31	2.92E+01	5.10E+01	8.98E+01	7.1E+01		3.1E+05	nc		6.1E-05

Table 2-1b: On-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	ENVIRON Industrial Soil Volatilization to Indoor Air Criteria (mg/kg)	Industrial Screen-ing Criteria (mg/kg)	Ratio of Max Conc to ENVIRON Industrial Soil Volatilization to Indoor Air Criteria	Ratio of Max Site Related Detect to Industrial Screening Criteria
	Notes:													
	The Screening Criteria for residential and industrial soil is the lower of the integrated Screening Criteria at:													
		target cancer risk =	1E-05											
		target hazard quotient =	1											
	The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.													
	The Screening Criteria for Naphthalene were used as surrogates for 2-Methylnaphthalene.													
	The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).													
	The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).													
	The concentrations for all PCB isomers were summed before comparing to Polychlorinated biphenyls (PCBs) for cancer effects													
	and Aroclor 1254 for noncancer effects.													
	The concentrations for the Xylene isomers (m/p and o) were summed before comparing to the Screening Criteria.													
	The Screening Criteria for Mercury was calculated by ENVIRON to account for the vapor inhalation pathway using:													
	EPA Region 9 equations, RfC from IRIS, and chemical properties from EPA's Soil Screening Guidance.													
	c - The Screening Criterion is based on cancer risk.													
	nc - The Screening Criterion is based on noncancer effects.													
	Chem Group - Chemical Group													
	Carc Class - EPA Weight-of-Evidence Cancer Classification													

Table 2-2a: Off-Facility Soil Screening Results - Without Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Residential Screen-ing Criteria (mg/kg)		Ind Screen-ing Criteria (mg/kg)		Ratio of Max Detect to Residential Screening Criteria	Ratio of Max Detect to Ind Criteria
1	VOC	Toluene	108-88-3	D	3	2	3.90E-04	4.10E-04	4.20E-04		6.6E+02	nc	2.2E+03	nc	6.4E-07	1.9E-07
1	SVOC	Acenaphthylene	208-96-8	D	2	1	9.40E-02	9.40E-02	9.40E-02		2.3E+03	nc	2.9E+04	nc	4.1E-05	3.2E-06
1	SVOC	Anthracene	120-12-7	D	2	1	4.90E-02	4.90E-02	4.90E-02		2.2E+04	nc	2.4E+05	nc	2.2E-06	2.0E-07
1	SVOC	Benzo(a)anthracene	56-55-3	B2	2	1	6.40E-01	6.40E-01	6.40E-01		6.2E+00	c	2.1E+01	c	1.0E-01	3.0E-02
1	SVOC	Benzo(a)pyrene	50-32-8	B2	2	1	9.10E-01	9.10E-01	9.10E-01		6.2E-01	c	2.1E+00	c	1.5E+00	4.3E-01
1	SVOC	Benzo(b)fluoranthene	205-99-2	B2	2	1	1.10E+00	1.10E+00	1.10E+00		6.2E+00	c	2.1E+01	c	1.8E-01	5.2E-02
1	SVOC	Benzo(g,h,i)perylene	191-24-2	D	2	1	5.90E-01	5.90E-01	5.90E-01		2.3E+03	nc	2.9E+04	nc	2.6E-04	2.0E-05
1	SVOC	Benzo(k)fluoranthene	207-08-9	B2	2	1	4.80E-01	4.80E-01	4.80E-01		6.2E+01	c	2.1E+02	c	7.7E-03	2.3E-03
1	SVOC	Chrysene	218-01-9	B2	2	1	8.30E-01	8.30E-01	8.30E-01		6.2E+02	c	2.1E+03	c	1.3E-03	4.0E-04
1	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	2	1	1.70E-01	1.70E-01	1.70E-01		6.2E-01	c	2.1E+00	c	2.7E-01	8.1E-02
1	SVOC	Fluoranthene	206-44-0	D	2	1	1.30E+00	1.30E+00	1.30E+00		2.3E+03	nc	2.2E+04	nc	5.7E-04	5.9E-05
1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	2	1	5.20E-01	5.20E-01	5.20E-01		6.2E+00	c	2.1E+01	c	8.4E-02	2.5E-02
1	SVOC	Phenanthrene	85-01-8	D	2	1	2.30E-01	2.30E-01	2.30E-01		2.3E+03	nc	2.9E+04	nc	1.0E-04	7.9E-06
1	SVOC	Pyrene	129-00-0	D	2	1	1.10E+00	1.10E+00	1.10E+00		2.3E+03	nc	2.9E+04	nc	4.8E-04	3.8E-05
1	INORG	Arsenic	7440-38-2	A	2	2	6.00E+00	8.30E+00	1.06E+01	1.5E+01	3.9E+00	c	1.6E+01	c	2.7E+00	6.6E-01
1	INORG	Copper	7440-50-8	D	2	2	9.80E+00	1.10E+01	1.26E+01	2.5E+01	3.1E+03	nc	4.1E+04	nc	4.1E-03	3.1E-04
1	INORG	Zinc	7440-66-6	D	2	2	3.10E+01	3.70E+01	4.35E+01	7.1E+01	2.3E+04	nc	3.1E+05	nc	1.9E-03	1.4E-04
3	VOC	2-Butanone	78-93-3	ID	7	1	1.90E-03	1.90E-03	1.90E-03		7.3E+03	nc	2.7E+04	nc	2.6E-07	7.0E-08
3	VOC	Methylene Chloride	75-09-2	B2	7	4	3.90E-03	6.90E-03	1.10E-02		9.1E+01	c	2.1E+02	c	1.2E-04	5.2E-05
3	VOC	Toluene	108-88-3	D	7	1	5.80E-04	5.80E-04	5.80E-04		6.6E+02	nc	2.2E+03	nc	8.8E-07	2.6E-07
3	INORG	Arsenic	7440-38-2	A	1	1	6.80E+00	6.80E+00	6.80E+00	1.5E+01	3.9E+00	c	1.6E+01	c	1.7E+00	4.3E-01
3	INORG	Barium	7440-39-3	D	1	1	3.25E+01	3.30E+01	3.25E+01		5.4E+03	nc	6.7E+04	nc	6.0E-03	4.9E-04
3	INORG	Chromium (total)	7440-47-3		1	1	9.60E+00	9.60E+00	9.60E+00		2.2E+02	nc	2.5E+03	nc	4.4E-02	3.8E-03
3	INORG	Lead	7439-92-1	B2	1	1	6.90E+00	6.90E+00	6.90E+00		4.0E+02	nc	7.5E+02	nc	1.7E-02	9.2E-03
3A	VOC	1,3-Dichlorobenzene	541-73-1	D	33	1	1.67E-03	1.70E-03	1.67E-03		1.6E+01	nc	6.3E+01	nc	1.0E-04	2.7E-05
3A	VOC	1,4-Dichlorobenzene	106-46-7	C	33	1	1.68E-03	1.70E-03	1.68E-03		3.5E+01	c	7.9E+01	c	4.8E-05	2.1E-05
3A	VOC	1,1-Dichloroethene	75-35-4	C	33	1	2.10E-03	2.10E-03	2.10E-03		1.2E+02	nc	4.1E+02	nc	1.8E-05	5.1E-06
3A	VOC	cis-1,2-Dichloroethene	156-59-2	D	33	2	2.90E-03	5.50E-03	8.10E-03		4.3E+01	nc	1.5E+02	nc	1.9E-04	5.4E-05
3A	VOC	trans-1,2-Dichloroethene	156-60-5		33	1	1.00E-03	1.00E-03	1.00E-03		7.0E+01	nc	2.3E+02	nc	1.4E-05	4.3E-06
3A	VOC	Tetrachloroethene	127-18-4	C-B2	33	8	1.10E-02	5.10E+01	4.00E+02		1.5E+01	c	3.4E+01	c	2.7E+01	1.2E+01
3A	VOC	Toluene	108-88-3	D	33	12	4.30E-04	7.90E-04	1.50E-03		6.6E+02	nc	2.2E+03	nc	2.3E-06	6.8E-07
3A	VOC	Trichloroethene	79-01-6	C-B2	33	3	4.20E-04	4.00E+00	1.20E+01		5.3E-01	c	1.2E+00	c	2.3E+01	1.0E+01

Notes:

The Screening Criteria for residential and industrial soil is the lower of the integrated Screening Criteria at:

target cancer risk = **1E-05**

target hazard quotient = **1**

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

c - The Screening Criterion is based on cancer risk.

nc - The Screening Criterion is based on noncancer effects.

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

Table 2-2b: Off-Facility Soil Screening Results - With Adjustment for Background Levels of Arsenic, Copper and Zinc
Vernay Laboratories Inc. Yellow Springs, Ohio

Area	Chem Group	Chemical	CASRN	Carc Class	Analyzed	Detected	Min Detected (mg/kg)	Mean Detected (mg/kg)	Max Detected (mg/kg)	Site Specific Background (mg/kg)	Residential Screening Criteria (mg/kg)		Ind Screening Criteria (mg/kg)		Ratio of Max Detect to Residential Screening Criteria	Ratio of Max Detect to Ind Criteria
1	VOC	Toluene	108-88-3	D	3	2	3.90E-04	4.10E-04	4.20E-04		6.6E+02	nc	2.2E+03	nc	6.4E-07	1.9E-07
1	SVOC	Acenaphthylene	208-96-8	D	2	1	9.40E-02	9.40E-02	9.40E-02		2.3E+03	nc	2.9E+04	nc	4.1E-05	3.2E-06
1	SVOC	Anthracene	120-12-7	D	2	1	4.90E-02	4.90E-02	4.90E-02		2.2E+04	nc	2.4E+05	nc	2.2E-06	2.0E-07
1	SVOC	Benzo(a)anthracene	56-55-3	B2	2	1	6.40E-01	6.40E-01	6.40E-01		6.2E+00	c	2.1E+01	c	1.0E-01	3.0E-02
1	SVOC	Benzo(a)pyrene	50-32-8	B2	2	1	9.10E-01	9.10E-01	9.10E-01		6.2E-01	c	2.1E+00	c	1.5E+00	4.3E-01
1	SVOC	Benzo(b)fluoranthene	205-99-2	B2	2	1	1.10E+00	1.10E+00	1.10E+00		6.2E+00	c	2.1E+01	c	1.8E-01	5.2E-02
1	SVOC	Benzo(g,h,i)perylene	191-24-2	D	2	1	5.90E-01	5.90E-01	5.90E-01		2.3E+03	nc	2.9E+04	nc	2.6E-04	2.0E-05
1	SVOC	Benzo(k)fluoranthene	207-08-9	B2	2	1	4.80E-01	4.80E-01	4.80E-01		6.2E+01	c	2.1E+02	c	7.7E-03	2.3E-03
1	SVOC	Chrysene	218-01-9	B2	2	1	8.30E-01	8.30E-01	8.30E-01		6.2E+02	c	2.1E+03	c	1.3E-03	4.0E-04
1	SVOC	Dibenz(a,h)anthracene	53-70-3	B2	2	1	1.70E-01	1.70E-01	1.70E-01		6.2E-01	c	2.1E+00	c	2.7E-01	8.1E-02
1	SVOC	Fluoranthene	206-44-0	D	2	1	1.30E+00	1.30E+00	1.30E+00		2.3E+03	nc	2.2E+04	nc	5.7E-04	5.9E-05
1	SVOC	Indeno(1,2,3-cd)pyrene	193-39-5	B2	2	1	5.20E-01	5.20E-01	5.20E-01		6.2E+00	c	2.1E+01	c	8.4E-02	2.5E-02
1	SVOC	Phenanthrene	85-01-8	D	2	1	2.30E-01	2.30E-01	2.30E-01		2.3E+03	nc	2.9E+04	nc	1.0E-04	7.9E-06
1	SVOC	Pyrene	129-00-0	D	2	1	1.10E+00	1.10E+00	1.10E+00		2.3E+03	nc	2.9E+04	nc	4.8E-04	3.8E-05
1	INORG	Arsenic	7440-38-2	A	2	2	6.00E+00	8.30E+00	1.06E+01	1.5E+01	3.9E+00	c	1.6E+01	c		
1	INORG	Copper	7440-50-8	D	2	2	9.80E+00	1.10E+01	1.26E+01	2.5E+01	3.1E+03	nc	4.1E+04	nc		
1	INORG	Zinc	7440-66-6	D	2	2	3.10E+01	3.70E+01	4.35E+01	7.1E+01	2.3E+04	nc	3.1E+05	nc		
3	VOC	2-Butanone	78-93-3	ID	7	1	1.90E-03	1.90E-03	1.90E-03		7.3E+03	nc	2.7E+04	nc	2.6E-07	7.0E-08
3	VOC	Methylene Chloride	75-09-2	B2	7	4	3.90E-03	6.90E-03	1.10E-02		9.1E+01	c	2.1E+02	c	1.2E-04	5.2E-05
3	VOC	Toluene	108-88-3	D	7	1	5.80E-04	5.80E-04	5.80E-04		6.6E+02	nc	2.2E+03	nc	8.8E-07	2.6E-07
3	INORG	Arsenic	7440-38-2	A	1	1	6.80E+00	6.80E+00	6.80E+00	1.5E+01	3.9E+00	c	1.6E+01	c		
3	INORG	Barium	7440-39-3	D	1	1	3.25E+01	3.30E+01	3.25E+01		5.4E+03	nc	6.7E+04	nc	6.0E-03	4.9E-04
3	INORG	Chromium (total)	7440-47-3		1	1	9.60E+00	9.60E+00	9.60E+00		2.2E+02	nc	2.5E+03	nc	4.4E-02	3.8E-03
3	INORG	Lead	7439-92-1	B2	1	1	6.90E+00	6.90E+00	6.90E+00		4.0E+02	nc	7.5E+02	nc	1.7E-02	9.2E-03
3A	VOC	1,3-Dichlorobenzene	541-73-1	D	33	1	1.67E-03	1.70E-03	1.67E-03		1.6E+01	nc	6.3E+01	nc	1.0E-04	2.7E-05
3A	VOC	1,4-Dichlorobenzene	106-46-7	C	33	1	1.68E-03	1.70E-03	1.68E-03		3.5E+01	c	7.9E+01	c	4.8E-05	2.1E-05
3A	VOC	1,1-Dichloroethene	75-35-4	C	33	1	2.10E-03	2.10E-03	2.10E-03		1.2E+02	nc	4.1E+02	nc	1.8E-05	5.1E-06
3A	VOC	cis-1,2-Dichloroethene	156-59-2	D	33	2	2.90E-03	5.50E-03	8.10E-03		4.3E+01	nc	1.5E+02	nc	1.9E-04	5.4E-05
3A	VOC	trans-1,2-Dichloroethene	156-60-5		33	1	1.00E-03	1.00E-03	1.00E-03		7.0E+01	nc	2.3E+02	nc	1.4E-05	4.3E-06
3A	VOC	Tetrachloroethene	127-18-4	C-B2	33	8	1.10E-02	5.10E+01	4.00E+02		1.5E+01	c	3.4E+01	c	2.7E+01	1.2E+01
3A	VOC	Toluene	108-88-3	D	33	12	4.30E-04	7.90E-04	1.50E-03		6.6E+02	nc	2.2E+03	nc	2.3E-06	6.8E-07
3A	VOC	Trichloroethene	79-01-6	C-B2	33	3	4.20E-04	4.00E+00	1.20E+01		5.3E-01	c	1.2E+00	c	2.3E+01	1.0E+01

Notes:

The Screening Criteria for residential and industrial soil is the lower of the integrated Screening Criteria at:

target cancer risk =	**1E-05**
target hazard quotient =	**1**

The Screening Criteria for Pyrene were used as surrogates for Phenanthrene and Benzo(g,h,i)perylene.

The Screening Criteria for cis-1,2-Dichloroethene were used as surrogates for 1,2-Dichloroethene (total).

The Screening Criteria for Chromium VI was used as a surrogate for Chromium (total).

c - The Screening Criterion is based on cancer risk.

nc - The Screening Criterion is based on noncancer effects.

Chem Group - Chemical Group

Carc Class - EPA Weight-of-Evidence Cancer Classification

David C. Contant

From: Mark Nielsen [MNielsen@environcorp.com]

Sent: Thursday, September 23, 2004 2:07 PM

To: Polston.Patricia@epamail.epa.gov

Cc: Chris Buzgo; nielsenj@battelle.org; dougfisher@vernay.com; David C. Contant

Subject: Vernay Laboratories - EI CA725 Report

Trish,

At the request of Doug Fisher of Vernay Laboratories, I have attached supplemental data screening results associated with Vernay's Environmental Indicators CA725 Report. Please call me if you should have any questions.

Thanks

Mark Nielsen

Office: (215) 504-5059
Cell: (215) 778-6586
e-Fax: (614) 458-6621

<<RCRACA725Report(VernayLab)Supplemental Response 09-23-04.pdf>>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

SEP 2 8 2004

REPLY TO THE ATTENTION OF:

Douglas L. Fisher
Environmental Affairs and
Safety Manager
Vernay Laboratories, Inc.
120 E. South College
Yellow Springs, Ohio 45387-1623

RE: Approval with Conditions EI 725 Report
Vernay Laboratories, Inc.
Yellow Springs, Ohio
OHD 004 243 002

Dear Mr. Fisher:

The United States Environmental Protection Agency (U.S. EPA) received and reviewed your responses to our June 18, 2004, comments on your Environmental Indicator (EI) Report for Human Health (CA 725), dated April 9, 2004. The U.S. EPA will be approving the EI Report and form for Human Health (CA 725) with conditions.

Our previous comment in regards to the subtraction of site-specific background levels from detected soil concentrations for inorganics in Question #2 on the EI CA 725 form has not been completely resolved by your response. At this time, it does not appear that Vernay Laboratories, Inc., eliminated any AOI's in Question #2 from further consideration in Questions #3 and #4. Screening procedures should still be done by comparing chemical concentrations that include both contaminant and background concentrations to risk based screening levels. The concern is that Areas of Interest (AOI's) may be eliminated from further consideration as a result of screening, when these AOI's should be carried through and further evaluated in Questions #3 and #4 of the EI form. The following condition will provide a solution and still provide us with the necessary information on all AOI's where there might be exposure issues:

- If Vernay Laboratories, Inc. subtracts out background for inorganics at AOI's in Question #2 (prior to risk based screening);
- Then Vernay Laboratories, Inc. will be required to provide us with a list of all AOI's where this subtraction of background was the driver for elimination of the AOI in Question #2 from further consideration in Questions #3 and #4; and
- If there are AOI's where this subtraction resulted in elimination of a specific AOI in Question #2, that we may require additional exposure information in order to make a determination on whether that AOI is an exposure concern.

The CA 725 Environmental Indicators Form for Human Health will be finalized based on the EI Report for Human Health dated April 9, 2004; U.S. EPA's comments dated June 18, 2004; Vernay's Response to U.S. EPA's comments dated July 16, 2004; and the e-mail including further clarifications from Chris Buzgo, Environ Corp., dated August 24, 2004. Once the EI form is officially approved, signed, and dated a copy will be sent to you for your records.

The comments that highlight our policy on evaluating indoor air using appropriate health based screening levels for environmental indicator purposes and for site remedial decisions beyond the EI determinations has not changed. If you have any questions, please do not hesitate to contact me at 312-886-8093.

Sincerely,

Patricia J. Polston
Corrective Action Project Manager

cc: C. Olsberg, U.S. EPA, WMB
J. Morris, U.S. EPA, ORC
D. Contant, The Payne Firm

COPY

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:	Vernay Laboratories, Inc.
Facility Address:	875 Dayton Street, Yellow Springs, Ohio 45387
Facility EPA ID #:	OHD 004 243 002

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

The following documents were considered:

- Current Conditions Report(Payne Firm 2002)
- First Quarter 2003 Progress Report (Payne Firm 2003a)
- Second Quarter 2003 Progress Report (Payne Firm 2003b)
- Third Quarter 2003 Progress Report (Payne Firm 2003c)
- Fourth Quarter 2003 Progress Report (Payne Firm 2004a)
- RCRA Corrective Action Technical Memorandum No. 3 Groundwater Monitoring (Payne Firm 2003d)
- RCRA Corrective Action Technical Memorandum No. 4 Soil Confirmation (Payne Firm 2004b)
- First Quarter 2004 Progress Report (Payne Firm 2004c)
- RCRA Phase I Facility Investigation Report (Payne Firm 2004d)
- EI Report for Human Health dated April 9, 2004
- U.S. EPA's comments dated June 18, 2004
- Vernay's Response to U.S. EPA's comments dated July 16, 2004
- e-mail including further clarifications from Chris Buzgo, Environ Corp., dated August 24, 2004

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 (Cedarville Aquifer)	X			See Section 2.2 of EI Report
Soil	X			See Section 2.2 of EI Report
Air (indoors)[2]		X		See Section 2.2 of EI Report
Subsurface Water(unconsolidated)	X			See Section 2.2 of EI Report
Surface Water	X			See Section 2.2 of EI Report
Sediment		X		See Section 2.2 of EI Report
Storm Sewer Water		X		See Section 2.2 of EI Report
Air (outdoors)		X		

____ 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): Contamination has been identified in on-Facility and off-Facility soils, unconsolidated subsurface water and Cedarville Aquifer groundwater, and surface water. Section 2.2 of the EI Report (Environ 2004) discusses screening criteria used to identify the presence of contamination in soil, subsurface water, groundwater and surface water. The primary contaminants identified include tetrachlorethene and trichloroethene. Section 2.2.1 identifies all constituents that meet the definition of "contamination" in soil. Section 2.2.2 identifies all constituents that meet the definition of "contamination" in the unconsolidated subsurface water and Cedarville Aquifer groundwater. Section 2.2.5 identifies all constituents that meet the definition of "contamination" in surface water.

Foot notes

[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.

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]
Soil	_No__	_Yes__	__No_	_Yes__	Yes	No	_No
Subsurface Water	_No__	_No__	__No_	Yes	No	No	No
Groundwater (Cedarville)	_Yes__	__No_	__No_	_No__	_No__	_No__	_No
Surface Water	__No_	__No_	No	No	__No_	_Yes__	_No
~~Sediment~~	___	___			___	___	___
~~Storm Sewer Water~~				___			___
~~Air (indoors and outdoors)~~	___	___	___	___	___		

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):

The potential for current human exposure to media that meet the definition of contamination is discussed in Section 2.3 of the EI Report (ENVIRON 2004). Section 2.3.1 addresses exposure pathways for soil. Section 2.3.2 addresses exposure pathways for subsurface water and groundwater. Section 2.3.3 addresses pathways for for surface water.

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

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): Under current conditions, exposures to site-related contamination for complete pathways has been determined to not be significant. Section 2.4 of the EI Report (ENVIRON 2004) discusses the significance of potential current exposures of excavation workers to contaminated soil and subsurface water, exposures of residents to groundwater, and exposures of recreators to surface water. The evaluation of potential exposure of on-Facility routine and excavation workers to contaminated soil and excavation workers to subsurface water determined that these exposures are not expected to be significant under current conditions. Evaluation of potential exposure of off-Facility recreators to contaminated surface water determined that these exposures are not expected to be significant under current conditions. Evaluation of potential exposures of residents to off-Facility potable and non-potable well water from the Cedarville Aquifer determined that these exposures are not to be significant under current conditions.

[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.

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 *Vernay Laboratories, Inc.* facility, EPA ID # OHD 004 243 002 located in *Yellow Springs, 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) [signature] Date 9/28/04
(print) Patricia J. Polston
(title) CA Project Manager

Supervisor	(signature) [signature]		Date 9/29/04
	(print)	Hak Cho	
	(title)	Section Chief	
	(EPA Region or State)	Region 5	

Locations where References may be found:

U.S. EPA Region 5 has the documents listed , which support this determination..

Current Conditions Report(Payne Firm 2002)
First Quarter 2003 Progress Report (Payne Firm 2003a)
Second Quarter 2003 Progress Report (Payne Firm 2003b)
Third Quarter 2003 Progress Report (Payne Firm 2003c)
Fourth Quarter 2003 Progress Report (Payne Firm 2004a)
RCRA Corrective Action Technical Memorandum No. 3 Groundwater Monitoring (Payne Firm 2003d)
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Vernay's Response to U.S. EPA's comments dated July 16, 2004
e-mail including further clarifications from Chris Buzgo, Environ Corp., dated August 24, 2004

Contact telephone and e-mail numbers

(name)	Patricia J. Polston
(phone #)	312-886-8093
(e-mail)	polston.patricia@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.