

**DOCUMENTATION OF ENVIRONMENTAL** Interim Final 2/5/99  
**INDICATOR DETERMINATION**

**RCRA Corrective Action**  
**Environmental Indicator (EI) RCRIS code (CA-725)**

**Current Human Exposures Under Control**

**Facility Name:** DTI Waynesboro Plant  
**Facility Address:** Waynesboro, Virginia  
**Facility EPA ID #:** VAD003114832

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?

- If yes – check here and continue with #2 below.  
 If no - re-evaluate existing data, or  
 If data are not available skip to #6 and enter “IN” (more information needed) status code.

**BACKGROUND**

**Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

**Definition of “Current Human Exposures Under Control” EI**

A positive “Current Human Exposures Under Control” EI determination (“YE” status code) indicates that there are no “unacceptable” human exposures to “contamination” (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all “contamination” subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

**Relationship of EI to Final Remedies**

While final remedies remain the long-term objective of the RCRA Corrective Action program, the EIs are near-term objectives that are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRAs). The “Current Human Exposures Under Control” EI is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does 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 determination 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”**<sup>1</sup> above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			Using the USEPA’s Maximum Concentration Levels (MCLs), USEPA Region III Risk-based Screening Concentrations (RBCs) for tap water, and Virginia Groundwater Standard (VGS) [DuPont Corporate Remediation Group (CRG), 2003], groundwater is identified for further evaluation. Mercury is the key constituent. Note that use of the drinking water values is a conservative measure since groundwater is not used as drinking water (see Section 4.1).
Air (indoors)		X		Groundwater with detected VOCs occurs only at Warehouse No. 3 near the Incinerator Area (SWMU 4). The levels in groundwater are not expected to cause exceedance of Occupational Health and Safety Administration (OSHA) permissible exposure levels (PELs). This has been confirmed with calculated target groundwater concentrations corresponding to acceptable indoor air concentrations (below PELs) using the USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (see Appendix C). No compounds were found to exceed the target groundwater concentrations. -Indoor air is not identified as a concern (see Section 4.2).
Surface Soil (e.g., <2 ft)	X			On site, analytical results for surface soil were compared to USEPA Region III RBCs for industrial direct contact with soil. Mercury exceeded this criterion at two areas in the plant and arsenic at one area. Off-site floodplain sample results were compared to the RBCs for residential direct contact. Off-site soils were identified for further evaluation based on mercury (see Section 4.3-).

<sup>1</sup> “Contamination” and “contaminated” describe 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).

	Yes	No	?	Rationale/Key Contaminants
Surface Water*		<b>X</b>		Analytical results for surface-water samples from the South River were compared to the Virginia water quality standard and/or the National Recommended Water Quality Criteria (see Appendix A). Analytical results for mercury (the key contaminant) do not exceed the surface-water screening criterion. However, surface water is retained for further evaluation based on professional judgment (see Section 4.4).
Sediment		<b>X</b>		Sediment sampling and analysis indicate detected mercury at elevated concentrations in core samples 1 to 2 feet below streambed. USEPA has not developed human health risk-based levels for sediments, and none are proposed here. The most likely exposure route is dermal. RAGS Part E advises against developing dermal criteria for metals other than arsenic and cadmium. Due to the presence of detectable mercury, sediments are identified for further evaluation (see Section 4.5).
Subsurf. Soil (e.g., >2ft)	<b>X</b>			Analytical results for subsurface soil were compared to USEPA Region III RBCs for industrial direct contact with soil. Analytical results that exceed screening levels include mercury, arsenic and one result for dioxin/furan (see Section 4.6).
Air (outdoors)		<b>X</b>		Emissions to outdoor air could result from volatilization of impacted soil and/or dust emission. As compared to the indoor air assessment, outdoor air involves greater mixing and dilution with ambient air, and, as such, volatile emissions to outdoor air are not expected to cause concentrations above applicable standards (see Section 4.7).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **“contaminated”**<sup>1</sup> 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)?

\_\_\_\_\_ 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):

Additional rationale and references are provided in Section 4 of this report.

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

<b>Contaminated Media</b>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food
Groundwater	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>			
Surface Soil (e.g., <2 ft)	<u>Yes</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>
Surface Water	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>
Sediment	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>No</u>
Subsurf. Soil (e.g., >2ft)	<u>No</u>	<u>No</u>	<u>No</u>	<u>Yes</u>			

<sup>2</sup>  
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):

Rationale and Reference(s):

Potential Human Receptors include:

- (1) On-site workers may have incidental contact with surface soils
- (2) On-site construction workers may have incidental contact with groundwater, surface and subsurface soils
- (3) Off-site residents may have incidental contact with surface floodplain soils
- (4) Recreational users may have incidental contact with floodplain soils

Potentially Complete Pathways by Media

- (1) **Groundwater:** On-site construction worker – potential direct contact with groundwater. The potential for exposure is low. Based on a review of existing information, there are no drinking water wells that draw water from the impacted aquifer. Waynesboro Plant policy and land-use controls prohibit construction-related excavation activities in areas of suspected shallow groundwater contamination without appropriate health and safety measures that control exposure (see Sections 5.1.4.3 and 5.1.4.4)
- (2) **Surface Soil (e.g., <2 feet):** On-site industrial workers, construction workers – direct contact. The Waynesboro Plant is an active industrial facility. Access to the Plant Area is controlled by a combination of fences and manned security gates, severely restricting access to these areas by trespassers or recreational users. On occasion both workers and construction workers could be exposed to surface soil at a few areas of the plant (see Sections 5.1.3 and 5.1.4).

Off-site residential and recreational users – direct contact. Potential residential and recreational exposure to surface soil is limited to downstream areas on the South River Floodplain (see Section 5.1.3). No licensed day care facilities have been identified in the impacted areas of the floodplain (see Section 5.1.1).

- (3) **Surface Water:** Recreation users via ingestion of fish. Recreational use of the South River (boating, fishing) at impacted areas is possible, resulting in potential exposure via “food” (see Section 5.1.3).

<sup>2</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

- (4) **Subsurface Soil (e.g., >2 feet):** Construction workers – direct contact. The Waynesboro Plant is an active industrial facility. On occasion, construction workers could be exposed to subsurface soil in areas where excavations have occurred (see Sections 5.1.3 and 5.1.4). However, the site has institutional controls in place that requires permission before excavation or working in the subsurface. The facility also has a specific procedure (which includes occupational air monitoring) for dealing with potential contact with mercury in the subsurface.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**<sup>3</sup> (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):

**Groundwater Water Exposure Pathways (Section 6.1.4):** The on-site excavation/utility worker is potentially exposed to constituents in groundwater during the repair of subsurface utility lines. The complete exposure pathway for the on-site excavation/utility worker includes incidental ingestion and dermal contact with groundwater. The Waynesboro Plant policy prohibits worker and construction disturbance of the subsurface (and groundwater) without appropriate health and safety measures that control exposure. Accordingly, although incidental exposure is possible, such exposures are considered insignificant.

**Surface Soil Exposure Pathways (Section 6.1.1):** On-site exposure to industrial and construction workers are not expected to be significant. Mercury and arsenic were detected in surface soil above screening criteria. The areas are covered with asphalt or gravel cover, and there is minimal exposure potential. The Waynesboro Plant policy and land-use controls prohibit worker disturbance of impacted surface soil areas without appropriate health and safety measures that control exposure. Accordingly, incidental worker or construction exposure to impacted surface soil is considered insignificant (see Section 6.1.1).

Current off-site exposures to floodplain soil are not considered significant due to low level mercury concentrations observed in the near surface soil and few exceedances of the residential RBC. The combination of potential exposure and average mercury concentrations support a finding that ‘residents’ and ‘recreation’ exposures are insignificant (see Section 6.1.1).

**Surface Water Exposure Pathways (Section 6.1.3):** Although surface water does not exceed the screening criteria, “contaminated” fish are present in the South River. There is a fish consumption advisory for mercury in place, and the river has a voluntary catch-and-release program. The advisory is enforced by the VA Dept of Health through posted signs and monitored by the VA Fish and Inland Game and the VADEQ. A recent creel study conducted by the VA Fish and Inland Game Commission indicated adherence to the catch-and-release program (Bowman, 1997)

**Subsurface Soil Exposure Pathways (Section 6.1.2):** Waynesboro Plant policy and land-use controls prohibit worker and construction disturbance of impacted subsurface soil areas without appropriate health and safety measures that control exposure. Site investigations and plant operational activities have identified the presence of free mercury in soil at SWMU 1, the Mercury Recovery Area and at SWMU 4, the Incineration Area. If encountered during excavation activities, free mercury would potentially present an exposure risk. Much of these areas are covered by pavement, gravel, and tank farm containment dikes, so the potential for exposure to soil is minimized. Furthermore, the plant has established controls on excavation and requires air space monitoring for mercury vapors during intrusive activities in these areas

and the use of appropriate personal protective equipment if free mercury is observed. With these controls in place, the potential for exposure is considered insignificant (see Section 6.1.2).

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<sup>3</sup> 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):**

