**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:** | **Honeywell Chesterfield** |
| **Facility Address:** | **4101 Bermuda Hundred Road, Chester, VA 23836** |
| **Facility EPA ID #:** | **VAD023690183** |

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 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 | ✓ | | | VOCs, SVOCs, and metals |
| Air (indoors) [2] | | ✓ | | No buildings located near waste management areas. |
| Surface Soil (e.g., <2 ft) | ✓ | | | Arsenic, VOCs |
| Surface Water | ✓ | | | See explanation below. |
| Sediment | ✓ | | | See explanation below. |
| Subsurf. Soil (e.g., >2 ft) | ✓ | | | Arsenic |
| Air (outdoors) | | ✓ | | No releases to outdoor air. |

___ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

✓ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

___ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

The Honeywell Chesterfield site is an active manufacturing facility that produces nylon 6 fiber and resin. The site has been used for industrial purposes since Allied Chemical Corporation purchased the property in 1954. The facility is performing RCRA Corrective Action as part of the Facility Lead Program. The first phase of the field work was completed in August 2001.

Soil sampling results were compared to EPA Region 3 Industrial Risk Based Concentrations (RBCs). Groundwater sampling results were compared to the lower of EPA Region 3 tapwater RBCs or Federal Maximum Contaminant Levels (MCLs).

**Groundwater**: Groundwater samples were collected from the following units: Spray Fields, Landfill, Acid Pond Woods Dump, Woods Storage Unit, Process Waste Sludge Pit, and Process Waste Ponds. Metals and volatile organic compounds (VOCs) were detected above the screening criteria at all the above units and semi-volatile organic compounds (SVOCs) were detected above criteria at the Spray Fields, Acid Pond, Process Waste Sludge Pit, and the Process Waste Ponds.

**Surface Soil**: The majority of waste management areas at the site were subsurface disposal units, so surface soil samples were collected at only two locations in August 2001 at the Sanitary Stabilization Pond Sludge Pit and Woods Dump. Of those samples, only arsenic was detected at levels above screening criteria. However, the concentrations appear to be representative of background concentrations when compared to the average concentration for arsenic (7.4 mg/kg reported for Eastern United States (USGS, 1984). Previous investigations have also detected elevated levels of VOCs in the surface soil at the inactive Spray Fields.

**Subsurface Soil**: Subsurface soil samples were collected from the Landfill, Acid Pond, Woods Dump, Woods Storage Unit, Process Waste Sludge Pit, and Filter Plant Sludge Drying Basin. At each SWMU, arsenic was detected above the screening criteria. However, like surface soil, concentrations appear to be representative of background concentrations when compared to the average concentration for arsenic (7.4 mg/kg reported for Eastern United States (USGS, 1984).

**Surface water/sediment**: Based on the analytical results for groundwater and soil, there is the potential for sediment/surface water to be impacted, although samples have not yet been collected. The interaction between the groundwater, surface water drainage channels, and the river systems will require additional investigation. Supplemental analytical sampling may be required to verify the presence or absence of impact to these media. For purposes of this EI determination, surface water and sediment could reasonably be expected to be contaminated.

For more information, please see the "Facility Lead RCRA Corrective Action Workplan" dated March 2001 and the "Facility Lead RCRA Corrective Action Data Summary Report" dated April 2002.

Footnotes:

[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** | Resident | Workers | Day-Care | Construction | Trespassers | Recreation | Food[3] |
|---|---|---|---|---|---|---|---|
| Groundwater | No | No | No | **Yes** | | | No |
| ~~Air (indoors)~~ | ~~======~~ | ~~======~~ | ~~=======~~ | ~~=========~~ | ~~========~~ | ~~=======~~ | ~~====~~ |
| Soil (surface, <2 | No | **Yes** | No | **Yes** | **Yes** | No | No |
| Surface Water | No | **Yes** | | **Yes** | **Yes** | **Yes** | No |
| Sediment | No | **Yes** | | **Yes** | **Yes** | **Yes** | No |
| Soil (subsurf, >2 ft) | | | | **Yes** | | | No |
| ~~Air (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).

✓ 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):

Current complete exposure pathways potentially exist for typical plant workers, construction workers in excavated areas, trespassers, and potential users of the adjacent recreational waterways. Since there are no residents, day-care facilities, or food production on the property, those exposure pathways are considered incomplete.

Groundwater is not used as a domestic or industrial water supply so all pathways associated with groundwater, except construction workers in excavated areas, are also considered incomplete. At this time, Honeywell does not anticipate planning any construction activities in the area of the investigation which would encounter groundwater, so construction worker exposure to groundwater is not anticipated at this time.

[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)?

✓ 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 (Construction worker)**: Construction workers could potentially be exposed to contaminants during excavation activities where groundwater is encountered. At the present time, Honeywell does not anticipate any excavation activities in the investigation area due to the isolated nature of the units. If any activities would be implemented, the facility requires that all excavation activities follow Chesterfield Plant Standard Operating Procedure (SOP) SOP-314-308-00 - "Excavation Procedure and Permit". The SOP identifies excavation procedures and backfill requirements that must be followed for each excavation at the site. Facility personnel from the Health, Safety and Environment Department, with knowledge of the on-going corrective action work, review and approve all excavation activities at the facility. Because construction workers are required to follow these plant procedures, potential exposure to contaminated groundwater is not expected to be significant.

**Surface Soil (Workers, Construction workers, Trespassers)**: With the exception of arsenic, chemicals have not been detected above industrial RBCs in surface soil. However, arsenic concentrations appear to be representative of background conditions and are not reasonably expected to pose a current human health concern. Honeywell intends to complete a more detailed background study in the second phase of the field investigation to further verify this assertion.

**Cont'd - Surface Soil (Workers, Construction workers, Trespassers)**: Previous investigations have shown elevated levels of VOCs in the surface soil at the inactive spray fields. These units are located away from the main plant operations, where there are limited routine plant activities (non-manufacturing areas). Access is difficult with "No Trespassing" signs posted frequently around the perimeter of the area but it is not completely fenced. The grass covering these units is about 4 feet tall. Plant personnel walk around the fields, but it is rare for anyone to walk the interior. With no spray activity since October 2000, additional concentrations contamination source has been removed and potential for exposure is extremely low. Two other units with residual present in soil, the Landfill and the Acid Pond, have intact cover material to minimize exposure to surface contaminants. For these reasons, surface soils do not currently pose a human health concern to workers, construction workers, or trespassers.

**On-site Surface Water (Workers, Construction workers, Trespassers, Recreation Use)/Sediment (Workers, Construction workers)**: On-site surface water and sediment areas include two cooling water ditches that discharge to the James River and Shand Creek. The surface water and sediment is not known to be contaminated, however, there is the potential for release of contaminated groundwater to the water bodies. The area of potential discharge of contaminated groundwater to on-site surface water bodies/sediment is very difficult to access by trespassers and is not used for recreation purposes. Also, worker and construction worker exposure to constituents above screening levels is likely insignificant because the areas of concern are located where there are no current or routine plant activities (non-manufacturing areas). "No Trespassing" signs are posted frequently around the perimeter of these areas.

**Off-site Surface Water (Trespassers, Recreation Use)/Sediment (Trespassers, Recreation Use)**: Off-site surface water bodies include the James and Appomattox Rivers, which border the facility. However, the area of potential discharge of contaminated groundwater adjacent to the facility is difficult to access by foot or boat due to very shallow water and tidal mud flats. It is likely that trespasser or recreational use exposure would be insignificant.

Honeywell will continue to evaluate these areas during the second phase of the field investigation. This EI will be reevaluated when additional information is collected.

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):

✓ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Honeywell Chesterfield facility, EPA ID # VAD023690183, located at 4104 Bermuda Hundred Road, Chester, VA 23836, under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by (signature) _____ Date 9/24/02

(print) Jennifer L. Shoemaker

(title) Remedial Project Manager

Supervisor (signature) _____ Date 10/1/02

(print) Robert E. Greaves

(title) Chief, RCRA General Operations Branch

(EPA Region or State) EPA Region 3

Locations where References may be found:

United States Environmental Protection Agency
Region 3
1650 Arch Street (Mailcode 3WC23)
Philadelphia, PA 19103

Contact telephone and e-mail numbers

(name) Jennifer L. Shoemaker
(phone #) 215-814-2772
(e-mail) shoemaker.jennifer@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.