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:	**Chester County Solid Waste Authority (CCSWA) - Lanchester Landfill**
Facility Address:	**Honey Brook, PA 19344**
Facility EPA ID #:	**PAD980550545**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.

____ If no - re-evaluate existing data, or

____ If data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Current Human Exposures Under Control" EI

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

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	**X**			Organic and inorganic chemicals - see below.
Air (indoors) [2]		X		Low levels of VOCs, below levels of concern - see below.
Surface Soil (e.g., <2 ft)		X		Property is secured by a locked fence. Former landfill areas are capped. Currently, only municipal waste is handled.
Surface Water		X		The Conestoga River is two miles northwest of the facility. Groundwater monitoring confirms that contamination does not extend to River or nearby unnamed tributary. Facility does not discharge to surface water.
Sediment		X		No discharge to surface water.
Subsurf. Soil (e.g., >2 ft)		X		Contaminated material is covered and capped in landfilling operation. Leachate is collected and treated.
Air (outdoors)		X		Landfill has gas management and treatment system.

____ 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):

The facility is an operating, state-permitted, municipal waste landfill. It has two closed landfills: the Mountaintop Landfill and the Stabilized Waste Landfill. It also has an active Municipal Waste Landfill. Quarterly groundwater monitoring is conducted to assess releases from the landfill areas. The monitoring system includes 39 wells and 3 sumps. In addition, 31 off-site wells are sampled quarterly.

Groundwater - The following groundwater contaminants have exceeded human-health, risk-based screening levels since 1/02. The screening standards used are the *EPA Drinking Water Standards Maximum Contaminant Level (MCL)*, and *Region III Risk-Based Concentration for tap water (RBC)* for chemicals without established MCLs. Concentrations are given in *parts per billion (ppb)* and *parts per million (ppm)*.

Mountain Top Landfill - monitored by 10 wells and 2 sumps

- Benzene (MCL: 5 ppb) - Wells MW-7A, 11, and 82 - Highest concentrations ranged from 9 ppb in MW-11 to 39 ppb. in MW-7A

- Vinyl Chloride (MCL: 2 ppb) - Well MW-71 - Concentrations averaged 6 ppb in 2002. In 2003, only 2.8 ppb was detected in May 2003.
- 1,2-Dichloroethane (MCL: 5 ppb) - Well MW-71 - Concentrations averaged 14 ppb in 2002 and 9 ppb in 2003

- Manganese (RBC: 730 ppb) - Wells 7A, 11, 12, and 82 - Highest concentrations, averaging 1,800 ppb, were found in MW-7A.

- Iron (RBC: 11,000 ppb) - Wells 7A, 9, 11, 12, and 82 - Highest concentrations were found in MW-11, averaging 110,000 ppb in 2002 and 33,000 in 2003.

Municipal Waste Landfill - Monitored by 24 wells

- Benzene (MCL: 5 ppb) - Wells MW-6 - Average concentration in 2002 was 6 ppb. No benzene detected in 2003

- Vinyl Chloride (MCL: 2 ppb) - Well MW-26 - Well was dry in 2002. 2.4 ppb detected in 2003.

- Manganese (RBC: 730 ppb) - Well 56 - Detected at up to 900 ppb.

- Iron (RBC: 11,000 ppb) - Wells 56 and 56D - Well 56 exceeded only in 2003 at 17,000 ppb average. Well 56D was sampled only one time in 2002/2003, with a concentration of 103,000 ppb.

Stabilized Waste Landfill - Monitored by 8 wells

- Lead (RBC: 15ppb) - Wells IUW-19, 20, and 23 - Average concentrations ranged from 23 ppb to 33 ppb. Concentrations in 2003 did not exceed MCLs.

Off-Site Wells - 31 wells monitored

- Trichloroethylene (MCL: 5 ppb) - well PS-4 (Baldwin Electric) - This well is equipped with an activated charcoal filter. Pre-filter data is available only for 6/03. A TCE concentration of 28 ppb was detected in the pre-filter sample. TCE was not detected in the post-filter samples.

- Vinyl Chloride (MCL: 2 ppb) - well PS-4 - Post-filter concentrations ranged from 21 ppb (6/02) declining to 1.7 ppb(6/03). Pre-filter data is available only for 6/03. A VC concentration of 1.3 ppb was detected in the post-filter sample.

- Nitrate-Nitrogen (MCL: 10 (ppm)) - Wells PS-5, 19, 27, and 32 - Concentrations ranged from 10.1 ppm to 16.5 ppm in 12/02. Nitrate-Nitrogen is not a contaminant associated with the landfill. Elevated levels are not found on-site. The contaminant is most likely associated with agricultural activity in the area.

Air (Indoor) - Current conditions were evaluated using Volatile Organic Chemical (VOC) data from the most recent 4 quarters (8/02 through 5/03) and the most recent 2 quarters (2/02 and 5/03) of groundwater monitoring, and EPA's "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils." Average VOC concentrations in groundwater were compared to the 10^{-5} target risk level contained in Table 2b and Table 3b of the draft guidance.

Using the generic screening values of Table 2b, and the scenario-specific screening values of Table 3b (using sandy soil and 25 meters depth to groundwater), only TCE and Vinyl Chloride were identified as a potential indoor air problem. Concentrations exceeded the Table 3b screening values only at the Baldwin Electric well (PS-4). Baldwin Electric is located adjacent to the southwest landfill property boundary. Groundwater contour maps from the 2002 annual monitoring report indicate that the groundwater beneath the Baldwin Electric facility was side-gradient or slightly up-gradient during that monitoring period.

Well PS-4 is equipped with an activated charcoal filter. Only one pre-filter sample was analyzed (5/03) during the evaluation period. Other quarterly analysis included only post-filter samples.

- TCE (Table 3b screening value: 5.0 ppb) - The pre-filter sample contained 28 ppb TCE. No TCE was detected in post-filter samples.

- Vinyl Chloride (Table 3b screening value: 8.3 ppb) - The 5/03 pre-filter and post-filter samples contained 1.3 ppb and 1.7 ppb of VC, respectively. The previous 3 quarterly samples contained 12 ppb, 13 ppb and 8.6 ppb of VC. The 4 quarter average concentration of 8.8 ppb slightly exceeds the screening value of 8.3 ppb. The most recent 2 quarter average concentration of 5.2 ppb is below the screening value. VC concentrations have trended downward since 12/01, therefore, the current exposure to workers from groundwater releases is within the acceptable risk range.

The Occupational Safety and Health Administration (OSHA) has the lead role in addressing potential occupational exposures. Using a very conservative groundwater to indoor air attenuation factor of 0.01, the estimated indoor air concentration for TCE is significantly below OSHA's permissible exposure limit.

- TCE at 28 g/l in groundwater corresponds to an indoor TCE air concentration of 0.12 mg/m^3 or 0.022 ppm. OSHA's permissible exposure limit (PEL) for TCE is 100 ppm. The National Institute for Occupational Safety and Health (NIOSH) time weighted average (TWA) for TCE is 25 ppm. Since these regulatory levels are at least three orders of magnitude greater than the very conservative estimate of the TCE concentration inside buildings at the Baldwin Electric facility, it is concluded that TCE does not pose a significant health risk to workers at the site.

Groundwater monitoring will continue on a quarterly basis. Both pre-filter and post-filter samples will be analyzed from the Baldwin Electric property, and the indoor air pathway will be reevaluated if conditions change substantially.

References:

Environmental Indicator Inspection Report for Chester County Solid Waste Authority Lanchester Landfill, prepared by Foster Wheeler for PADEP and USEPA, March 2002.

Lanchester Stabilized Waste Disposal Landfill CME-01, prepared by PADEP, 10/10/2001.

2002 Annual Monitoring Report, Chester County Solid Waste Authority Lanchester Landfill, prepared by Golder Associates for CCSWA, June 2003.

Thomas Miller, PG, PADEP Hydrogeologist, e-mail dated 4/29/03, containing Off-Site wells data.

Phone conversation memo, prepared by Maureen Essenthier, USEPA Project Manager, dated 8/14/03, regarding data assessment discussion with Tom Miller, PADEP.

Phone conversation memo, prepared by Maureen Essenthier, USEPA Project Manager, dated 9/16/03 and 9/24/03,

regarding discussions with Tom Miller, PADEP, and Theresa Divine, Lanchester Landfill, about contamination at Baldwin Electric.

Vapor Intrusion Evaluation worksheet, prepared by Maureen Essenthier, USEPA Project Manager, 9/03.

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	Residents	Workers	Day-Care	Construction	Trespassers	Recreation Food[3]
Groundwater	**No**	**No**	**No**	**No**		**No**
~~Air (indoors)~~	___	___	___			
~~Soil (surface, e.g., <2 ft)~~	___	___	___	___	___	___	___
~~Surface Water~~	___	___		___	___	___
~~Sediment~~	___	___		___	___	___
~~Soil (subsurface e.g., >2 ft)~~			___			___
~~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.

_X_ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Groundwater - There are no complete pathways for the groundwater contamination detailed in question 2, above.

On-site groundwater contamination - Bottled water is used for drinking water at the facility. Well water from uncontaminated areas and supplied water is used for other water uses. Well water is treated through activated carbon prior to use. Contaminant levels in facility perimeter wells are below screening levels, with the exception of wells 7A and 82, located adjacent to the Baldwin Electric property. A groundwater divide runs through the area of that property boundary, making the contaminant source difficult to evaluate.
Off-site groundwater contamination

Nitrate-Nitrogen is not a contaminant associated with the landfill. Elevated levels are not found on-site. The contaminant is most likely associated with agricultural activity in the area.

Groundwater used at the Baldwin Electric facility is not used as a potable water supply, rather, bottled water is provided. Also, water from the Baldwin Electric well (PS-4) is filtered with an activated carbon filter and current post-filter contaminant levels are below the drinking water MCLs.

References:

Environmental Indicator Inspection Report for Chester County Solid Waste Authority Lanchester Landfill, prepared by Foster Wheeler for PADEP and USEPA, March 2002.

2002 Annual Monitoring Report, Chester County Solid Waste Authority Lanchester Landfill, prepared by Golder Associates for CCSWA, June 2003.

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Phone conversation memo, prepared by Maureen Essenthier, USEPA Project Manager, dated 9/30/03, regarding discussions with Theresa Divine, Lanchester Landfill, about water supply sources at Baldwin Electric.

[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):_____

[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 the **Chester County Solid Waste Authority (CCSWA) - Lanchester Landfill facility, EPA ID #PAD # 980 550 545, located off Rt 322, Honey Brook, PA 19344,** 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) /s/ Date 9/30/03
(print) Maureen Essenthier
(title) Remedial Project Manager

Supervisor (signature) /s/ Date 9/30/03
(print) Paul Gotthold
(title) PA Operations Branch Chief
EPA Region 3

Locations where References may be found:

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.