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:	**Western Berks Refuse Authority**
Facility Address:	**Poplar Neck Road, off Rt. 724 West, Birdsboro, PA 19508**
Facility EPA ID #:	**PAD 00 044 3705**

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**			**Inorganic chemicals - see below.**
Air (indoors)[2]		X		Very low levels of VOCs, not in vicinity of buildings.
Surface Soil (e.g., <2 ft)		X		Contaminated material is covered and capped in landfilling operation - municipal waste currently handled.
Surface Water		X		Not at concentrations of concern - see below.
Sediment		X		Not at concentrations of concern - see below.
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 municipal waste landfill. Closed waste cells include municipal waste, commercial waste and a small hazardous waste disposal area. Two landfill areas exist: Area A with closed waste cells; and, Area B with closed cells and one operating cell. An extensive monitoring well system is in place around the fill areas, and the wells are sampled quarterly as a permit requirement. A hydraulic barrier and leachate collection system operate to control the release of contaminants.

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), Region III Risk-Based Concentration for tap water for chemicals without established MCLs, and EPA Drinking Water Health Advisory for chemicals without established MCLs or Risk-Based Concentrations.

- **Arsenic concentrations of 15 to 30 ppb in several wells in Areas A and B exceed the EPA drinking water MCL of 10 ppb.**
- **Cadmium concentrations of 10 to 30 ppb in one Area B well (MW-27) exceed the EPA drinking water MCL of 5 ppb.**
- **Nitrate-Nitrogen concentrations of 400 ppm in one Area B well (MW-27) exceed the EPA drinking water MCL of 10 ppm.**

- **Manganese concentrations of 2,000 to 8,000 ppb at several wells in Areas A and B exceed the EPA Region III Risk-Based Concentration of 730 ppb (no EPA MCL is established). A significantly higher concentration (23,000 ppb) was detected at one well (MW-19) in Area A.**

- **Boron concentrations of 14,000 to 24,000 ppb in one well (MW-27) in Area B exceed the EPA Region III Risk-Based Concentration of 3,300 ppb (no EPA MCL is established).**

- **Sodium concentrations of 25 to 400 ppm in several wells in Areas A and B exceed the EPA drinking water draft advisory (for individuals on a restricted sodium diet) of 20 ppm (no EPA MCL or Risk-Based concentrations are established). A significantly higher concentration (2,000 ppm) was detected at one well (MW-27) in Area B.**

- **Sulfate concentrations of 600 to 800 ppm in one well (MW-27) in Area B exceed the EPA drinking water draft advisory of 500 ppm (no EPA MCL or Risk-Based concentrations are established).**

Low levels of volatile organic chemicals are found in the groundwater. Concentrations are currently below risk-based screening levels, with a downward trend.

<u>Surface Water and Sediment</u> - The landfill is bound by the Schuylkill River to the south, east and west. Precipitation that infiltrates a disposal unit is collected and treated at a leachate treatment plant prior to discharge to the River. Groundwater discharge into the River is monitored by the monitoring wells surrounding the landfill areas. Groundwater contaminants found at concentrations above the health-based screening levels are generally in a few localized areas. All of the groundwater concentrations are within one order of magnitude (10X) of the health-based screening levels with the following exceptions.

> **Manganese in one well (MW-19) was detected at 23,000 ppb, about 30 times the EPA Region III Risk-Based Concentration of 730 ppb. However, the average concentration of manganese in the wells adjacent to the River is about 3,500 ppb, about 5 times the health-based screening level.**
>
> **Groundwater at MW-27 shows Nitrate-Nitrogen levels at 400 ppm, 40 times the EPA drinking water MCL of 10 ppm; and Sodium levels of 2,000 ppm, 100 times the EPA drinking water draft advisory (for individuals on a restricted sodium diet) of 20 ppm. However, MW-27 is an interior monitoring well. The wells at the bank of the River that are designed to monitor flow to the River have significantly lower levels of the contaminants, with an average concentration of about 60 ppm, 6 times the screening level.**

Given the localized occurrence of the contamination and the dilution by the Schuylkill River flow, contamination discharge into the River is not a concern.

<u>References</u>:

Western Berks Refuse Authority Groundwater monitoring data from 1995 to 2002 for on-site and off-site wells, electronic files (3 diskettes) submitted by Kurt Fritz, PADEP Hydrogeologist, in July 2002.

Western Berks Refuse Authority Landfill Review of Groundwater Data, memo dated 7/23/20, Maureen Essenthier, USEPA Region III.

Western Berks Refuse Authority Information Submittal for EPA, report dated 1/29/03, Charlene Sauls, PADEP Hydrogeologist.

Environmental Indicators Inspection Report, March 2002, prepared by Foster Wheeler for EPA and PADEP.

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 - Contaminated groundwater detailed in question 2, above, is not impacting any current water supply. The landfill is located adjacent to the Schuylkill River on three sides - south, east and west. Most of the water found in the aquifer at the site occurs near the surface. Groundwater discharges to the River through joints and fractures in the bedrock. Groundwater flow to into the bedrock is restricted by decreasing fracturing and closing of joints at depth. Three off-site wells are monitored on the north side of the landfill. No contaminants of concern were detected in the north-side wells.

References:

Western Berks Refuse Authority Groundwater, Surface Water, Leachate and Witness Tank Monitoring Plan, Motley Engineering Co., February 1996.

Western Berks Refuse Authority Groundwater monitoring data from 1995 to 2002 for on-site and off-site wells, electronic files (3 diskettes) submitted by Kurt Fritz, PADEP Hydrogeologist, in July 2002.

Western Berks Refuse Authority Landfill Review of Groundwater Data, memo dated 7/23/20, Maureen Essenthier, USEPA Region III.

Western Berks Refuse Authority Information Submittal for EPA, report dated 1/29/03, Charlene Sauls, PADEP Hydrogeologist.

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[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):_____

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

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 **Western Berks Refuse Authority** facility**,** EPA ID # **PAD 00 044 3705, located at Poplar Neck Road, off Rt. 724 West, Birdsboro, PA 19508** 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 04/15/03
(print) Maureen Essenthier
(title) Remedial Project Manager

Supervisor (signature) _____ Date 04/16/03
(print) Paul Gotthold
(title) PA Operations Branch Chief
EPA Region 3

Locations where References may be found:

EPA Region III
RCRA Fileroom - 11th Floor
1650 Arch Street
Philadelphia, PA 19103-2029

Contact telephone and e-mail numbers:

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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.