

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: Chester County Solid Waste Authority (CCSWA) – Lanchester Landfill
Facility Address: 7224 Division Highway, Narvon, PA 17555
Facility EPA ID #: PAD 980 550 545

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 #8 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 "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

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).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

2. Is **groundwater** known or reasonably suspected to be “contaminated”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

- If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.
- If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”
- If unknown - skip to #8 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 42 wells and 3 sumps. In addition, 27 off-site wells are sampled quarterly.

The following groundwater contaminants have exceeded human-health, risk-based screening during 2008 (four quarterly monitoring events). 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 11 wells and 2 sumps

- Benzene (MCL: 5 ppb) - Well 82: 103 ppb (3rd Q sample)
 - Below detection (5.0 ppb) for the other 3 quarters of 2008
- Mercury (MCL: 2 ppb) – Well MW-55: 3 ppb (3rd Q sample)
- Manganese (RBC for tap water: 880ppb) – Wells MW 7A, MW 12 and MW 82
 - Up to 1,590 ppb
- Iron (RBC for tap water: 26 ppm) – wells MW 9, MW 11, MW 12, and MW 82
 - Between 28 ppm and 48 ppm, with one sample at 109 ppm (MW-11)

Municipal Waste Landfill - Monitored by 23 wells

- Mercury (MCL: 2 ppb) - Wells IUW-21, MW-64, MW 68, MW 74, MW 77, MW 78, MW 84, MW 87
 - between 4 ppb and 19 ppb

Stabilized Waste Landfill - Monitored by 8 wells

- Lead (RBC: 15ppb) - Well IUW-20: 20 ppb (1st Q sample)

Off-Site Wells - 27 wells monitored

- Trichloroethylene (MCL: 5 ppb) - well PS-4 (Baldwin Electric)
 - 18 ppb to 37 ppb – pre-filter sample
 - This well is equipped with an activated carbon filter. TCE was not detected in the post-filter samples.

- Vinyl Chloride (MCL: 2 ppb) - well PS-4 (Baldwin Electric)
 - 2.2 ppb to 2.7 ppb (3 of 4 quarterly samples) – pre-filter samples
 - 2.5 ppb (4th Q sample) - post-filter sample
 - PADEP is taken action to modify the filter plan to prevent future post-filter exceedences.

- Nitrate-Nitrogen (MCL: 10 (ppm)) - Wells PS-5, 16, 19, and 27
 - Concentrations ranged from 10 ppm to 23 ppm
 - 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.

References:

PADEP Lanchester Landfill Exceedence Report, for 2008 – On-site wells

PADEP Lanchester Landfill Exceedence Report, for 2008 – Off-site wells

Report of Groundwater Monitoring at her Lanchester Landfill, 2008-Fourth Quarter, prepared for Chester County Solid Waste Authority by Atlantic Coast Laboratories, Inc., December 2008

Lanchester Landfill 2008 data summary, CD provided by PADEP

Charlene Sauls, PG, PADEP Hydrogeologist, e-mail dated 2/23/09, containing Off-Site wells data.

Charlene Sauls, PG, PADEP Hydrogeologist, e-mail dated 2/25/09 to Terry Divine, CCWSA

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 appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"² as defined by the monitoring locations designated at the time of this determination)?

- If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"².
- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"²) – skip to #8 and enter "NO" status code, after providing an explanation.
- If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The contaminants and the concentrations of the contaminants in on -site wells have generally declined since 2001.

Comparison of groundwater contamination in 2001-2002 versus 2008

Number of on-site wells exceeding human-health, risk-based screening:

	2001-2002	2008
Benzene	4 wells	1 well
Vinyl chloride	2 wells	none
1,2-Dichloroethane	1 well	none
Manganese	5 wells	3 wells
Iron	6 wells	4 wells
Lead	3 wells	1 well
Mercury	not sampled	8 wells

Number of off-site wells exceeding human-health, risk-based screening:

	2001-2002	2008
Trichloroethene	1 well	1 well
Vinyl chloride	1 wells	1 well
Nitrate-Nitrogen	4 wells	4 wells

References:

PADEP Lanchester Landfill Exceedence Report, for 2008 – On-site wells

PADEP Lanchester Landfill Exceedence Report, for 2008 – Off-site wells

Report of Groundwater Monitoring at her Lanchester Landfill, 2008-Fourth Quarter, prepared for Chester County Solid Waste Authority by Atlantic Coast Laboratories, Inc., December 2008

Lanchester Landfill 2008 data summary, CD provided by PADEP

Charlene Sauls, PG, PADEP Hydrogeologist, e-mail dated 2/23/09, containing Off-Site wells data.

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.

Footnotes:

² “existing area of contaminated groundwater” is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of “contamination” that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of “contaminated” groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

4. Does "contaminated" groundwater discharge into surface water bodies?

- If yes - continue after identifying potentially affected surface water bodies.
- X If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.
- If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The Conestoga River is located about 1 mile north of the Lanchester Landfill. The River is sampled at 3 locations and several monitoring wells are located between the landfill and the river. Monitoring data confirms that "contaminated" groundwater is not discharging to the river.

Twelve of the facility groundwater monitoring wells are located along the northern property perimeter, between the landfills and the Conestoga River. They are monitoring wells MW-26, 33, 42-D, 44-D, 52-D, 64, 65, 72, 77, 78, 83, 84. For samples collected in 2008, only Mercury levels exceeded the risk-based screening levels, and in only 4 of the 12 wells. Mercury concentrations that exceeded the MCL of 2 ppb:

- MW-64: 5.4 ppb
- MW-77: 4.1 ppb
- MW-78: 2.1 ppb
- MW-84: 6.4 ppb

Average concentration for the 12 northern perimeter wells are below the MCL for Mercury. In addition, expected attenuation/dilution over the one mile distance to the Conestoga River provides further protection against Mercury contamination of the River.

References:

Report of Groundwater Monitoring at her Lanchester Landfill, 2008-Fourth Quarter, prepared for Chester County Solid Waste Authority by Atlantic Coast Laboratories, Inc., December 2008

PADEP Lanchester Landfill Exceedence Report, for 2008 – on-site wells

Lanchester Landfill 2008 data summary, CD provided by PADEP

CCSWA Environmental Indication Evaluation, Evaluation of Groundwater Discharge to Surface Water, memo prepared by Maureen Essentier, EPA Project manager, 2/27/09

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater “level,” and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?
- If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration₃ of key contaminants discharged above their groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.
- If no - (the discharge of “contaminated” groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration₃ of each contaminant discharged above its groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations₃ greater than 100 times their appropriate groundwater “levels,” the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.
- If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

6. Can the discharge of “contaminated” groundwater into surface water be shown to be “currently acceptable” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

- If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR
2) providing or referencing an interim-assessment, appropriate to the potential for impact that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.
- If no - (the discharge of “contaminated” groundwater can not be shown to be “currently acceptable”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.
- If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

⁴Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

If no - enter "NO" status code in #8.

If unknown - enter "IN" status code in #8.

The facility is an operating, state-permitted, municipal waste landfill. Quarterly groundwater is required by the PADEP operating and post-closure permits. The monitoring system includes 42 wells and 3 sumps. In addition, 27 off-site wells are sampled quarterly. The Conestoga River is also sampled at three locations.

Rationale and Reference(s):

**Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)**

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Chester County Solid Waste Authority Lanchester Landfill facility, EPA ID # PAD 980 550 545, located at 7224 Division Highway, Narvon, Pennsylvania 17555. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

NO - Unacceptable migration of contaminated groundwater is observed or expected.

IN - More information is needed to make a determination.

Completed by (signature) *Maureen Essenthier* Date 3-3-09
(print) Maureen Essenthier
(title) RCRA Project Manager

Supervisor (signature) *Paul Gottbold* Date 3-3-09
(print) Paul Gottbold
(title) Associate Director
PA Remediation Branch
EPA Region 3

Locations where References may be found:

US EPA Region III
Land & Chemicals Management Division
1650 Arch Street
Philadelphia, PA 19103

Contact telephone and e-mail numbers

(name) Maureen Essenthier
(phone #) 215-814-3416
(e-mail) essenthier.maureen@epa.gov