

**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:** Shenango Coke Plant  
**Facility Address:** 200 Neville Rd, Pittsburgh, PA 15225  
**Facility EPA ID #:** PAD004337465

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).

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2. Is **groundwater** known or reasonably suspected to be “**contaminated**”<sup>1</sup> 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):**

An iterative assessment was begun in 2016 through 2018 that included the installation of a network of groundwater monitoring wells into the water table aquifer and the subsequent monitoring of groundwater at those wells. Groundwater samples were collected quarterly from each well for laboratory analysis of Volatile Organic Constituents (VOCs), Poly Aromatic Hydrocarbons (PAHs), dissolved metals, ammonia, free cyanide, phenolics and sulfate. Field tests were conducted for pH, conductivity, temperature, and oxidation-reduction potential at the time of sample collection. Of the initial network of wells two wells, MW-8 and MW-9, contained constituents exceeding Pennsylvania Department of Environmental Protection Medium Act 2 Medium Specific Concentrations (MSC) for groundwater, prompting the installation of additional groundwater monitoring wells.

Figure 13 from the REMEDIAL INVESTIGATION REPORT/FINAL REPORT FORMER SHENANGO COKE PLANT (April 2019) depicts the location of the groundwater monitoring wells and the list of constituents, per well, of Act 2 MSC exceedances. MW-14 is the most significantly contaminated monitoring well onsite. Benzene was reported at greater than 90000 micrograms per liter (ug/L); orders of magnitude greater than the MSC of 5 ug/l. Naphthalene was reported at concentrations greater than 3000 ug/L above the MSC of 100 ug/L. Other significant exceedances were toluene and arsenic.

The following constituents were statistically detected at the monitoring wells located in the former Byproducts Area: benzene and ammonia were detected from each of the wells installed in the former byproducts area (MW-8, MW-9 and MW-13 through MW-18) at concentrations that were greater than their respective Act 2 MSCs. With the exception of wells MW-8, MW-9 and MW-15 located along the easternmost and southernmost portion of the Byproducts Area, naphthalene was detected in groundwater samples collected from each of the wells in the former Byproducts Area at concentrations that were greater than its respective Act 2 MSC.

Other COCs detected at concentrations greater than their respective MSCs were: toluene and total phenolics at wells MW-14 and MW-18; styrene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and chrysene at MW-14; arsenic; nickel was detected in groundwater samples collected from all of the wells installed in the southern portion of the former Byproducts Area (MW-9 and MW-15 through MW-18) at concentrations that were greater than the Act 2 MSC; lead concentrations were detected in wells MW-14 and MW-15, exceedances for cadmium were limited to MW-15, and exceedances for chromium and zinc were limited to MW-17.

In addition to the above constituents, tetrachloroethene was detected each sampling event from MW-12 greater than its MSC at the former Coal/Coke Storage Yard in the northwest portion of the site

It is noted that a number of PAHs exceeded their respective MSCs in sampling conducted prior to the first quarter of 2018 at which time sampling methodology was switched from bailing to low-flow to restrict the introduction of sediments that were thought to be biasing sample results. Based on reported results this was most likely the situation, and this EI reflects the statistically significant concentrations versus the comprehensive results.

**Footnotes:**

<sup>1</sup>“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).

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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”<sup>2</sup> 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”<sup>2</sup>.
  - If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”<sup>2</sup>) – 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):**

Table 2 from the REMEDIAL INVESTIGATION REPORT/FINAL REPORT FORMER SHENANGO COKE PLANT (April 2019) depicts the occurrence of sampling events for each monitoring well installed. Wells installed in 2016 were sampled eight times and latter installed wells including MW-14 were sampled five times to as few as two. Table 6 of the report presents the results from each sampling event. A qualitative review of the data presented in Table 6 illustrates a constituent plume consisting primarily of benzene, naphthalene and toluene; all waste products of coal tar. While there is an event from November 2017 presenting semivolatile data, including naphthalene, at much greater than average well concentrations, the result is an obvious outlier and support the rationale of switching sampling methodology. Subsequent sampling events in 2018 depict results closer to the average (per constituent per well) and the concentrations are stable to declining.

Groundwater elevations were monitored across the site using pressure-transducers located in select monitoring wells, and by collection of static water levels from each monitoring well during the quarterly groundwater monitoring events. Results indicate that a water-table aquifer occurs within alluvium beneath the site at depths ranging from approximately 11 feet below ground surface (bgs) at well MW-11 in the former ore yard to approximately 27 feet bgs at well MW-6 in the former coal/coke storage yard located in the northwest portion of the site. The presence of dams located on both sides of Neville Island downstream has resulted in groundwater that flows radially into the island, prior to flowing in a northwestward direction down the axis of the island. Further west on the island in the area between the two sets of dams, the back channel recharges the groundwater system because it is maintained at a higher elevation than the main channel directly across the island. The resulting groundwater flow direction in this area is northward across the island, with discharge to the main channel of the Ohio River. In summary, groundwater flows into the island prior to flowing in a northwestward direction down the axis of the island except during brief periods when the river experiences a decrease in surface water elevation. During these periods' groundwater along the edges of the island temporarily discharges to the river, however where this temporary flow reversal occurs, groundwater is not impacted.

<sup>2</sup> “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.

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

- If yes - continue after identifying potentially affected surface water bodies.
- 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):**

As described in the previous section under most conditions groundwater across the site consistently flows from the Ohio River into the island prior to flowing in a northwestward direction down the axis of the island. In portions of the site where groundwater occasionally discharges to the river as a result of periodic fluctuations in river elevations (i.e. along the edge of the island), groundwater is not been impacted by historic operations.

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5. Is the discharge of “contaminated” groundwater into surface water likely to be “insignificant” (i.e., the maximum concentration<sup>3</sup> 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 concentration<sup>3</sup> 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 judgment/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 concentration<sup>3</sup> 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 concentrations<sup>3</sup> 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):**

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



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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 implemented<sup>4</sup>)?



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<sup>5</sup>, 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):**

<sup>4</sup> Note, 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.

<sup>5</sup> The 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.

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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. *See below*

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

**Rationale and Reference(s):**

Under the Pennsylvania Act 2 program, a facility demonstrates attainment based on a minimum of 8 quarters of gw monitoring. A facility can demonstrate attainment of pre-determined statewide health standards or can opt to derive a risk-based, site specific standard and demonstrating attainment with that standard.

Pennsylvania DEP approved Shenango's site-specific "pathway elimination" standard for groundwater contamination beneath the facility under PA Act 2. The groundwater contaminant plume is comprised primarily of benzene, toluene and naphthalene from the byproducts area. This plume in the shallow groundwater travels off-site in the downgradient (northwest) direction. The benzene and toluene concentrations are predicted to fall below MCLs on the adjacent Ashland chemical property (Parcels #159-E-50 or #159-E-100) at distances ranging from of 150 to 400 feet from the onsite, downgradient monitoring well(s). The Ashland property is subject to an environmental covenant prohibiting any groundwater use or residential development. A similar environmental covenant is planned for the Shenango facility.

The former Shenango facility is in a highly industrialized area-the nearest residential property is 2.7 miles from the plant. Groundwater beneath this portion of Neville Island has been impacted by several sources and the State and local officials, including the West View Water authority are all aware of the groundwater impacts throughout this section of the Island.

EPA believe this groundwater contamination is "under control" as the extent has been fully investigated, the plume is not expanding, and there are no pathways for exposure. EPA recognizes that the PADEP, under the Act 2 program, may not require groundwater monitoring to continue. EPA will evaluate the need for ongoing monitoring as part of its remedy selection process.

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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 Shenango Coke Plant, RCRA ID PAD004337465, located at 200 Neville Rd, Pittsburgh, PA 15225. 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) Erich Weissbart Date 07/15/2019  
 (print) Erich Weissbart  
 (title) Remedial Project Mgr.

Supervisor (signature) Paul Cottrell Date 8-2-2019  
 (print) P Cottrell  
 (title) Chief, Corrective Action Branch No 2  
 (EPA Region or State) Region III EPA

Locations where References may be found:

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