

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

February 2003  
Revised November 2006

**RCRA Corrective Action  
Environmental Indicator (EI) RCRIS code (CA750)**

**Migration of Contaminated Groundwater Under Control**

**Facility Name:** Tecumseh Redevelopment Inc (formerly Bethlehem Steel Corporation) – Riders Disposal Area  
**Facility Address:** East Taylor Township/Johnston PA  
**Facility EPA ID #:** PAD004344222

- 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 "Current Human Exposures Under Controls" 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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater 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 risk-based "levels" (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?

YES      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 (for any media) – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

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As noted above on the well summary tables and in the accompanying narrative discussion, several parameters exceed 25 Pa. Code Ch. 250 standards in downgradient wells: sulfate, iron, and manganese. While these parameters may be present in upgradient wells, they have been found to be significantly higher in some downgradient wells. Chloride and chromium have also been found to be elevated in some downgradient wells. This, combined with, BSC's reported statistically significant differences in several parameters over the past 10 years, indicates impact to groundwater in slag and bedrock at Riders from the waste disposal units, in addition to any other causes (e.g. past upgradient surface mining and the slag itself).

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<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)?

**YES**      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):

Based on the summary information presented above and the reports attached to this evaluation, there appears to be some connection between impacted groundwater, contamination of several seeps entering Hinckston Run and sediment deposited in Hinckston Run. Groundwater flows in the direction of and empties into Hinckston Run. While conditions appear to be improving over the past 10 years since closure and capping of the EAF Dust Landfill and clean closure of the Hot Forming Sludge Lagoon (and certainly compared to conditions in the 1970's and 1980's when the disposal units were in operation), impacted groundwater is expected to continue to migrate to Hinckston Run. **However, with the capping of the Site 4 landfill in 2005, the planned mining through part of the Riders site (including the entire SPL area) starting 2007, the continuing decreasing trends in contaminant concentrations in seep, and the marked decrease in individual contaminants at seep 553 adjacent to the HW units, it appears that the dimensions of the area of contamination are stabilized. DEP considers the capping of the Site 4, the existing capped EAF Dust landfill and the planned clean closure of the SPL are via mining are the Final Remedies for this site.**

<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?

       YES

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):

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Based on the information provided above, groundwater has been impacted by the waste disposal units and flows towards and discharges into Hinckston Run.

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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.

\_\_\_\_\_  
NO

If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration 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 "level(s)," and if 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.

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

Rationale and Reference(s):

Based on the information provided above, the concentrations of iron and manganese in downgradient wells and seeps is over 10 times greater than the standards set forth in 25 Pa. Code Ch. 250 and the zinc concentrations of some seeps is greater than 10 times the standard set forth in 25 Pa. Code Ch. 16. However, it appears that the concentrations of these and other key parameters do not appear to be increasing (compared to data over the past 10 years of routine monitoring and to data obtained from the 1970's assessment of Hinckston Run). In some cases (e.g. cyanide, chromium, sulfate, chloride, aluminum, and zinc), the concentrations are decreasing. **This trend is expected to continue.**

<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>)?

YES

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 a "NO" status, 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):

As evidenced above, the condition of several seeps and sediment/surface water sampling points point to an impact from the Riders site and there appears to be a correlation to the waste disposal units. The condition of Hinckston Run clearly suffers as it flows past the Riders site. Not only do the concentrations of chemical contaminants increase along this section of the stream, the benthic and fish population and diversity drop. The latter is due in part to poor habitat, but seems to be partly due to impacted environmental conditions as well. **However, DEP considers that the capping of the Site 4 landfill in 2005 and the planned mining of the a portion of the Riders Site, including mining through the SPL area (which will be in effect a clean closure action), are the Final Remedies for this site at this time. Contaminant concentrations continue to show a decreasing trend, which is expected to continue. TRI is required to continue groundwater, seep and surface water monitoring through the post-closure period so DEP will be able to determine if these Final Remedies are working as expected or other remedies may be needed.**

<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?"

YES

If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations that 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."

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

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

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Rationale and Reference(s):

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BSC is required to continue to monitor the site (groundwater, seeps and surface water) under the terms of the 1996 approved closure plan for Site 4 and the closure/post-closure permit for the hazardous waste units (**TRI has opted to stay with this permit and not enter into a COA with DEP**) to determine any changes and to conduct time-trend analyses of monitoring parameters.

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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 \_\_Bethlehem Steel Riders Disposal Area, EPA ID # PAD004344222 located in East Taylor Township and Johnstown PA. 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:	<u>Carl Spadaro</u>	Date	<u>2/20/2003</u>
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	<u>Annette T. Paluh</u>	Date	<u>2/24/03</u>
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*Handwritten signature and date: 11-16-06*

Locations where References may be found:

All reference documents can be found at PADEP's Southwest Regional Office in Pittsburgh

Contact telephone and e-mail numbers:

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