

**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

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

**Facility Name:** Eastman Specialties Corporation (Former Genovique Specialties)  
**Facility Address:** 10380 Worton Road Chestertown, MD  
**Facility EPA ID #:** MDD 001 890 060

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):

The facility manufactures organic chemicals, which are used as plasticizers and paint additives. An environmental investigation was conducted in Impoundment 314 from 1987 to 1988. Impoundment 314, part of the process wastewater treatment system (wastewater equalization), received effluent from an API oil/water separator and discharged to Impoundment 317. The investigation identified groundwater impacts with the primary constituents being phthalates (BEPH) and VOCs (primarily toluene) in the vicinity of impoundment 314.

In 1990, a closure plan for Impoundment 314 was implemented to solidify sludge (effluent from oil/water separator) and remove it for off-site disposal and utilize in-situ bioremediation for the underlying soil and groundwater. Huls – America, Inc. (now Evonik) installed and operated the groundwater recovery system until the site was purchased by Velsicol Chemical Corp. in December 1994. Velsicol operated the groundwater recovery and treatment system for Huls America (now Evonik) until 2003.

During 1993 an additional investigation was conducted to evaluate the effectiveness of the existing groundwater recovery system and groundwater conditions around Impoundment 314. The investigation concluded that impacted material remained in Impoundment 314 and constituents of concern (COCs) had migrated vertically down into groundwater and the horizontally along the soil groundwater interface. This investigation also concluded that the four recovery wells had created a zone of capture sufficient to recover the impacted shallow groundwater near Impoundment 314.

References:

- Groundwater Remedial Action Plan, done by GZA GeoEnvironmental, Inc. submitted to MDE in May, 2005.

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):

Groundwater issues have been addressed through a combination of removal of impacted soils and sludges that were a potential source of impact to groundwater, free product removal, groundwater extraction and treatment, and oxygen release compound (ORC) addition in the fire pond area.

Groundwater monitoring results show that contamination is limited in the vertical dimension by the upper confining unit. Monitoring wells are screened across the upper unconfined, surficial aquifer or the upper confined aquifer, known as the Monmoth Formation. Each of the upper confined aquifer wells (MW-22, MW-27, MW-29, MW-36, MW-38, MW-40) were non-detect for all constituents in two most recent sampling events dating back to 2009; the samples were analyzed for VOCs (Toluene) and SVOCs (BEHP). Two upper unconfined aquifer wells (MW-12 and MW-19) in the vicinity of Impoundment 314 exceeded the MCL for BEHP and Toluene in each of the past three sampling events.

Groundwater at the site flows west south west (WSW) to east north east (ENE). Unconfined unit monitoring well MW-8, north of the impoundment area off-site, has not exceeded MCLs for Toluene and has been below MCLs for BEHP since 1999. In 2009, Earth Data Inc. advanced one soil boring (GW-1), which was constructed into a temporary well, in the area east of MW-8 also off-site. The well was screened/sampled in the upper unconfined aquifer (6-11 ft bgs) and was non-detect for both Toluene and BEHP.

“Sentinel” unconfined monitoring wells located near the northeastern perimeter of the site (MW-33, MW-34 and MW-20) have been below MCLs for Toluene and BEHP in their past three sampling events. Also, an unconfined unit well (MW-17) downgradient and in the vicinity of Impoundment 314 was non-detect when analyzed for BEHP and Toluene in the past three sampling events. The available sampling results indicate that site-related VOCs and SVOCs are not migrating offsite to the north or east in the surficial portion of the aquifer.

As part of the Remedial Action Effectiveness Report completed in April 2013, a plume stability analysis was performed using time-series groundwater analytical data over the previous 20 years. Relative changes plume area, average concentration and mass were compared. Using the Mann-Kendall statistical test, temporal changes in these calculated values showed an overall stable or decreasing trend, demonstrating that the plume is stable for both BEHP and Toluene.

References:

- Groundwater Remedial Action Plan, done by GZA GeoEnvironmental, Inc., received by MDE May, 2005.
- Remedial Action Effectiveness Report, done by EarthCon Consultants Inc., received by MDE May 9, 2013
- Final RCRA Site Visit Report, done by Tetra Tech EC, Inc., received by MDE August 17, 2010
- Site Characterization Report, done by Premier Environmental Services Inc., received by MDE November 2009

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.

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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):

An unnamed tributary of Chester River is located approximately 1 mile northeast of the facility. Groundwater contamination localized in the shallow upper aquifer. At this distance, about a mile, it is unlikely that the contamination has reached the tributary.

A 5.5 acre pond is located about 500ft east of the facility. The pond receives treated wastewater via Outfall 001, which is regulated under an NPDES permit. Surface water samples were collected from the point of discharge from the 5.5 acre pond to an unnamed tributary on a monthly basis for three months. All samples were below MCLs for BEHP and Toluene.

References:

- Site Characterization Report, done by Premier Environmental Services Inc., received by MDE November 2009

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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 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 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-assessments, 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.
- If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

Monitoring wells listed below are sampled and analyzed for Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), chemical oxygen demand (COD), total organic carbon (TOC) and pH as required by the NPDES permit.

Groundwater Monitoring Schedule

Monitoring Well Location	Sampling Frequency: Base Neutrals	Sampling Frequency: Volitile Organic Compunds	Sampling Frequency for TOC, COD and pH
MW-5	Semi-annual	Annual	Semi-annual
MW-7	Annual	Annual	Semi-annual
MW-8	Annual	Annual	Semi-annual
MW-9	Annual	Annual	Semi-annual
MW-10	Semi-annual	Annual	Semi-annual
MW-11	Semi-annual	Annual	Semi-annual
MW-12	Quarterly	Quarterly	Semi-annual
MW-13	Quarterly	Annual	Semi-annual
MW-14	Annual	Annual	Semi-annual
MW-15	Quarterly	Annual	Semi-annual
MW-16	Annual	Annual	Semi-annual
MW-17	Annual	Annual	Semi-annual
MW-18	Annual	Quarterly	Semi-annual
MW-19	Quarterly	Quarterly	Semi-annual
MW-20	Annual	Annual	Semi-annual

References:

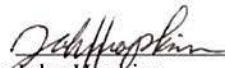
- NPDES groundwater monitoring schedule

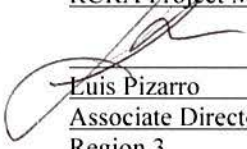


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8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting 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 Eastman Specialties Corporation facility, EPA ID # MDD001890060, located at 10390 Worton Road, Chestertown, MD. 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  Date 09/08/16  
John Hopkins  
RCRA Project Manager

Supervisor  Date 5/8/16  
Luis Pizarro  
Associate Director  
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) John Hopkins  
(phone #) (215) 814-3437  
(e-mail) Hopkins.John@epa.gov

