

US EPA ARCHIVE DOCUMENT

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Migration of Contaminated Groundwater Under Control

Facility Name: AK Steel Corporation, Zanesville Works
Facility Address: 1724 Linden Ave, Zanesville, Ohio 43702-1502
Facility EPA ID #: OHD 004 281 598

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?

 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 "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).

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?

 X 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):

Groundwater is contaminated at three areas on the facility as follows:

A) At the northeast boundary, release of pickle liquor at sump #4 (SWMU 1) resulted in a solution cavity extending approximately 25-30 feet into the limestone bedrock. The release occurred circa 1995. Subsequently, the Ohio EPA imposed closure activities which included source removal (i.e., the contaminated sump infrastructure and some soil) and groundwater monitoring. (The enforcement action is still open). Sampling results from monitoring wells, including those installed specifically to observe the extent of the release, show exceedances of constituents above primary drinking water standards for maximum contaminant levels (MCLs) as follows*:

Constituent	MCL mg/l	Concentration range mg/l
Fluoride	4.0	6.4 - 14.0

*For the purposes of the EI, the secondary MCLs are not considered.

B) A NAPL release from a hydraulic fluid line on the northwest side of the property (Repair Building #9) is identified within a perched zone. The NAPL is a light oil, predominantly total petroleum hydrocarbon and is either hydraulic fluid or diesel fuel. Efforts to identify any VOCs or SVOCs in the NAPL yielded negative results. Analyses for VOCs and SVOCs resulted in non-detects in a nearby perched zone monitoring well (MW-08), as well as in a downgradient well which is screened in the upper aquifer (MW-07).

C) A concentration of fluoride at 8.0 mg/l (MCL = 4.0 mg/l) was registered in MW-24 (screened in the water table aquifer) on the northwest side of the property.

D) Concentrations of metals above MCLs were detected at MW-23, which is screened in a perched zone above the water table aquifer. The perched zone is on the northwestern side of the property, and is the same zone which is identified in paragraph B, above.

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).

<u>Constituent</u>	<u>MCL mg/l</u>	<u>Region IX PRG for Tap Water mg/l</u>	<u>Maximum Concentration mg/l</u>
Arsenic	0.05	—	0.069
Hexavalent Chromium	—	0.11	0.14
Lead	0.015**	--	0.04

**U.S. EPA Action Level for Treatment Technique as substitute for MCL

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)?

 X 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):

A) Three key factors influence groundwater conditions in the area. First, the Lear/UTA property which shares the northern site boundary is a Superfund site with an active groundwater pump-and-treat system installed to control trichloroethylene (TCE). The pumping draws groundwater on the northern half of the AK property northward; the zone of influence extends to the southern boundary of the active portion of the AK facility. Second, the Muskingum River, which bounds the site to the east, is a losing stream during most periods of the year. Third, across the river is the Zanesville municipal water supply well field. Certain wells there are pumping to maintain hydraulic control of the regional groundwater system to control the TCE plume. The pumping is coordinated with Lear/UTA Superfund pumping rates.

Three sets of nested wells were installed downgradient of the release area (SWMU #1), off-site on the Lear/UTA

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.

property to the north to monitor plume migration. The concentrations of the constituents of concern from the release are below MCLs in these wells. Therefore, for the purposes of the EI, the contaminated groundwater plume is stabilized within the property boundary.

B) The lateral extent of the LNAPL around the suspected source area was determined through Geoprobe sampling and analysis. An assumption that the LNAPL is contained on top of the perched zone is supported by the lack of LNAPL in downgradient monitoring wells in the water table aquifer, thus defining the vertical extent. Therefore, the lateral and vertical extent of the LNAPL plume is within a discrete area of a perched zone, and is stabilized and contained within the property boundaries.

C) Concentrations of fluoride above MCLs do not appear in monitoring wells downgradient of MW-24, which registered an elevated level of this constituent. Therefore, for the purposes of the EI, the contaminated groundwater plume is stabilized within the property boundary.

D) Monitoring wells downgradient of MW-23 do not register elevated levels of these constituents. Therefore, for the purposes of the EI, the contaminated groundwater in this area is stabilized and contained within the property boundary.

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 adjacent Muskingum River is a losing stream for most of the year. The contaminated groundwater responds to the hydraulic gradient created by the groundwater pump-and-treat system at the Lear/UTA Superfund site which is adjacent to the site on the northern boundary. (The groundwater on the southern end of the property outside the zone of influence of the Lear/UTA property wells is not contaminated). Therefore, the groundwater does not discharge to the river. There are no other surface water bodies on the site.

5. (NA) 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

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

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):

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,⁵ 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

⁴ 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.

⁵ 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.

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):

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?”

 X 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):

Under an enforcement agreement with the Ohio EPA, wells around SWMU #1 are monitored quarterly. The facility has indicated that the agreement will be amended to include the monitoring of MW-25 and the new off-site, downgradient wells (MW-26A, MW-27A, and MW-28A). Through consultation with the Ohio EPA, the U.S. EPA will establish whether it is prudent to also monitor the deeper aquifer unit by sampling wells MW-26B, MW-27B, and MW-28B on a long-term basis.

U.S. EPA recognizes that the pumping at the Lear/UTA Superfund site draws the contamination plume northward, and that the diluting effects of the Muskingum River, which is a losing stream, is why the contamination levels downgradient of the release are below the MCLs. This plume will be tracked through monitoring results and changes to the pumping system at Lear/UTA. Additionally, because the public water supply is directly affected by the Lear/UTA plume, it is anticipated that the pump-and-treat system will be in operation and closely monitored for several years.

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).

 X - YES - “Migration of Contaminated Groundwater Under Control” has been verified.

Based on a review of the information contained in this EI determination and within the context of the EI determination, U.S. EPA has determined that the “Migration of Contaminated Groundwater” is “Under Control” at the AK Zanesville Ohio Works facility, EPA ID # OHD 004 281 598, Zanesville, Ohio.

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 in groundwater 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)	Date
	_____	_____
	Carolyn Bury	
	Environmental Scientist	

Supervisor	(signature)	Date
	_____	_____
	George Hamper, Chief	
	Corrective Action Section	
	U.S. EPA Region Five	

Location where References may be found:

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