

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: Osram Sylvania Products, Incorporated
Facility Address: 1 Jackson Street, Wellsboro, Pennsylvania 16901
Facility EPA ID #: PAD 00 304 6794

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 #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).

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

Page 2

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): Arsenic and hexavalent chromium have been identified as contaminants of concern in the groundwater beneath the Facility. A RCRA Facility Investigation (RFI) was performed in 1998 - 1999 to evaluate the nature and extent of releases of hazardous constituents at or from the Facility. Results of the RFI found concentrations of hexavalent chromium in the groundwater ranging from non detect to 4.72 mg/l. Arsenic levels in the groundwater ranged from non detect to 0.168 mg/l, and were found exceeding Maximum Contaminant Levels (MCLs) at only one well, monitoring well (MW-13). The MCLs for total chromium and arsenic are 0.1 mg/l and 0.05 mg/l, respectively.

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)

Page 3

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): Historical groundwater monitoring data demonstrates that the hexavalent chromium plume has not substantially moved in the past ten years, and that the plume remains within the Facility’s boundaries. The Charleston Creek is located approximately 550 feet away from the former dry well in the direction of groundwater flow. Given the average hydraulic conductivity (23 feet/day) and gradient (0.017), measured as part of the RFI, and the typically high mobility of hexavalent chromium in groundwater, the fact that chromium concentrations have remained stable over the past ten years is indicative of natural geochemical processes, which are deterring the mobility of the chromium plume at the Facility. Under normal subsurface conditions where the potential for oxidation-reduction is favorable, hexavalent chromium can be reduced to the less toxic trivalent chromium, which then precipitates out of the groundwater as an immobile, insoluble mineral. This process is enhanced by the presence of organic matter or clays in the subsurface and a neutral to slightly alkaline soil pH, such as is found at the Osram Facility. Once hexavalent chromium has been reduced to trivalent chromium and then precipitated as a mineral through this oxidation-reduction-precipitation process, it is no longer considered to be a threat to human health or the surrounding environment. EPA believes this process is occurring at Osram, given the low levels of hexavalent chromium in downgradient wells.

Arsenic in the groundwater is stabilized as defined by the presence of Charleston Creek to the North. All groundwater in the shallow aquifer at the Facility discharges to the Creek, which acts as a hydraulic boundary.

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)**

Page 4

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): Arsenic contaminated groundwater discharges to the Charleston Creek, which runs across the northern border of the Osram property.

The hexavalent chromium plume is not expected to reach Charleston Creek, and therefore does not discharge into a surface water body.

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

Page 5

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)?

 X 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): The highest concentration of arsenic in the groundwater at the Facility was found to be 0.168 mg/l, which is significantly less than ten times the MCL for arsenic (calculated to be 0.5 mg/l). Therefore, the discharge of “contaminated” groundwater into Charleston Creek is likely to be insignificant.

Sampling of the surface water in Charleston Creek in 1994 (see “Existing Conditions Report”, dated 1/25/94) revealed arsenic in Charleston Creek ranging from non detect to 0.0022 mg/l. Sampling of the sediments in the Creek found arsenic at levels of 5.5 mg/kg to 22 mg/kg. Based on these results, and data from the onsite monitoring wells, it is apparent that Facility operations have not substantially impacted the surface water or sediments in Charleston Creek.

Fate and transport calculations for the arsenic contamination in the groundwater predicted a future arsenic concentration in Charleston Creek to be 0.00245 mg/l, which was found to be considerably lower than the allowable ambient Water Quality Criteria of 0.190 mg/l, as established by the Pennsylvania Department of Environmental Protection (PADEP). These predicted concentrations are further supported by the fact there is no ongoing source of either hexavalent chromium or arsenic to the groundwater and the length of time since the initial release (at least 20 years).

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)**

Page 6

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 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): **NOT APPLICABLE.**

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.

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

Page 7

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): Site monitoring has been proposed on a semi-annual basis at MW6, MW9, MW10, MW13, and on an annual basis at MW12 and MW14. All wells will be sampled for hexavalent chromium, except for MW13, which will be sampled for arsenic, only, and MW12, which will be sampled for both hexavalent chromium and arsenic. Site monitoring will continue for three years.

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

Page 8

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 **Osram Sylvania Products, Incorporated** facility, EPA ID # **PAD 00 304 6794**, located at **1 Jackson Street, Wellsboro, Pennsylvania 16901**. 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) _____	Date <u>03-09-01</u>
	(print) <u>Hilary Livingston</u>	
	(title) <u>Remedial Project Manager</u>	
Supervisor	(signature) _____	Date <u>03-13-01</u>
	(print) <u>Paul Gotthold</u>	
	(title) <u>PA Operations Branch Chief</u>	
	(EPA Region or State) <u>EPA, Region 3</u>	

Locations where References may be found:

Facility RCRA Project File
EPA, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Contact telephone and e-mail numbers:

(name)	<u>Paul Gotthold</u>
(phone #)	<u>215-814-3410</u>
(e-mail)	<u>gotthold.paul@epa.gov</u>