

**Documentation of Environmental Indicator Determination
in accordance with EPA Interim Final Guidance 2/5/99**

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

Migration of Contaminated Groundwater Under Control

Facility Name: Harmon Industries, Inc.
Facility Address: 2712 S. Dillingham Road, Grain Valley, MO 64029
Facility EPA ID #: MOD 000 298 398

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 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 EIs 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 EIs 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 Determination 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): Numerous chlorinated solvents have been detected significantly above health-based standards for protection of human health (see attached tables). The VOCs with the highest concentrations detected in 1998 and 1999 are 1,1,1-trichloroethane (MCL = 0.2 ppm), 1,1-dichloroethylene (MCL =0.007 ppm), trichloroethylene (0.005 ppm) and Freon. Note: MCLs are also the Groundwater Protection Standards referenced in Harmon’s 1996 Post Closure Permit. Samples from MW #5, at the location of the former disposal area, have the highest concentration of waste constituents. References: 1999 Semi-Annual Report, 1998 Annual Report, Post-Closure Permit.

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).

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 firewater pond was constructed in 1986 (see attached figure) to provide an emergency water supply for fire-fighting protection. The shallow groundwater gradient is from east to west and the pond is downgradient from the plant buildings (where the contaminated material was initially dumped). Groundwater upgradient of the pond contains waste constituents in the form of dissolved VOCs, while no such constituents have been detected above GPS in the groundwater downgradient from the pond at MW #6. Groundwater monitoring data from the site suggests that the organic compounds are being removed or destroyed within the pond sediment or pond water. Results of a 1993 study of the pond indicate that the pond conditions are favorable for anaerobic and aerobic activity. Biotransformation of halogenated solvents such as trichloroethylene has been reported to occur under anaerobic conditions and complete biodegradation has been demonstrated under anaerobic followed by aerobic conditions. This information, coupled with groundwater monitoring data, indicates that groundwater contaminants are apparently not migrating past the pond and provides strong evidence that the pond is acting as a natural biologically active barrier to contaminant migration. Additionally, water discharging at the spillway of STA-1 in June of 1999 did not contain detectable concentrations of any waste constituents with the exception of a single detection of Freon (with is a plume indicator with no established standard). No waste constituents were detected within the creek at STA-2 during any sampling events. References: 1999 Semi-Annual Report, Appendix K of the Post-Closure Permit Application, 1998 Annual Report.

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.

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): Contaminated groundwater discharges to the firewater pond and adjacent marshy area. The well located immediately upgradient from this area is contaminated (1999 Annual Report). Contaminated groundwater has not been discharging to the creek downgradient from the pond. Groundwater monitoring data shows that MW #6 has not had any levels of contaminants above GPS to date. BW #11B has had limited one time detections of Carbon Disulfide (29 ppb), Chloroform (10 ppb) and 1,4-Dioxane (610 ppb) which were not detected during the same sampling event and therefore considered to be anomalous detections. Water discharging at the spillway of STA-1 sampled in June of 1999 did not contain detectable concentrations of any waste constituents (a previous sampling event at this location had a hit of Freon at 20 ppb). No waste constituents were detected within the creek at STA-2 during any sampling events. References: 1999 Semi-Annual Report, Appendix K of the Post-Closure Permit Application, 1998 Annual Report.

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 the appropriate groundwater “level,” and there are no other conditions (e.g., the nature or 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 the 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): During the June 1999 sampling event, no hazardous constituents were detected greater than 10 times the GPS in Well #9 (located immediately upgradient of surface water discharge area). Additionally, monitoring data shows that groundwater conditions are relatively static or slowly improving; there is a general downward trend in the concentrations of waste constituents in groundwater at the facility. Historically there have been detections slightly above 10 times the GPS but ongoing monitoring has never indicated the presence of a chemical of concern in surface water above applicable analytical detection limits (except for single detection of Freon as explained in #4 above). References: 1999 Semi-Annual Report, 1998 Annual Report, Post-Closure Permit.

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

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 specialist(s), 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 cannot 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):

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.

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): Harmon’s Post-Closure Permit and Sampling and Analysis Plan require continuous groundwater monitoring (effectiveness wells are sampled annually and perimeter wells are sampled quarterly) of the contaminant plume and requires additional corrective action if monitoring should indicate off-site plume migration (as detected by perimeter wells shown on attached figure – MW #6, MW #17, BW #5W, BW #11B). Both annual and semi-annual reports are submitted to the Agencies so that progress can be tracked. References: 1996 Post-Closure Permit, Sampling and Analysis Plan.

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 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 Harmon facility, EPA ID # MOD 000 298 398 , located at Grain Valley, Missouri. 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 _____
(Print) _____
(Title) _____

Supervisor: (Signature) _____ Date _____
(Print) _____
(Title) _____
(EPA Region or State) _____

Locations where References may be found: References may be found at the Missouri Department of Natural Resources, 1738 E. Elm Street, Jefferson City, MO 65101 or the U.S. EPA, 901 N. 5th Street, Kansas City, KS 66101.

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