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:	Schrader-Bridgeport International, Inc. (formerly Piedmont)
Facility Address:	205 Frazier Road, Altavista, VA 24517
Facility EPA ID #:	VAD 082881970

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):

A RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) was completed for this facility between 1990 and 1995. Based on the work performed, EPA determined that the groundwater was the only media of concern and that an expansion of the interim measures pump-and-treat system installed in 1990 was the most effective method to remediate the site. The following data lists the maximum concentration of contaminants that were detected in groundwater during the December 2002 sampling event, compared to Maximum Contaminant Levels (MCLs):

	Max Concentration (µg/l)	MCLs (µg/l)
cis-1,2-dichloroethylene	85	70
tetrachloroethylene	1300	5
trichloroethylene	540	5

Please see the Corrective Measures Implementation Plan and Annual Progress Reports located in the facility file for the most recent groundwater monitoring data.

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):

In 2000, Schrader-Bridgeport upgraded the groundwater pump-and-treat remedial system to better contain the groundwater plume. As required by their Corrective Measures Implementation Order (Order), the facility collects groundwater elevations and sampling data on a routine basis to verify the system is performing as designed.

A review of the recent water elevations (May 2003) and groundwater sampling results (December 2002) shows that the groundwater contaminant plume is stable and the levels of contaminants appear to be decreasing. The system appears to be working as designed to provide hydraulic containment of the plume and remove VOC mass from the groundwater. Although Schrader is still evaluating the progress towards meeting the final cleanup objectives, levels of groundwater contaminants have been generally decreasing since the system was upgraded in 2000, as illustrated below.

Constituent (concentrations in µg/l)	MCL	April 2001	December 2001	Dec 2002
tetrachloroethylene (PCE)	5	3220 (PW-15)	2930 (PW-15)	1300 (PW-15)
trichloroethylene (TCE)	5	408 (OW-76)	278 (OW-76)	540 (OW-76)
vinyl chloride	2	16.8 (OW-30)	not detected	not detected

This data indicates a long-term and significant decrease in levels of tetrachloroethylene. There is slight rise in the concentration of trichloroethylene, however, this can be partially explained by degradation of the tetrachloroethylene over this time period. Furthermore, graphical data found in Schrader's 2002 Annual Progress Report shows the following:

- Data for OW-30, after an initial rise in concentration for PCE, now shows a decrease in concentration. This well is located to the NE of the former sludge drying tank. The degree of improvement here is not great but improving.
- The decline of PCE in wells OW-34, OW-36 and OW-38 is much more dramatic and is almost logarithmic in nature.
- The data for OW-37 shows PCE is also declining, in general, but it does contains a spike of concentration increase at one point.

The May 2003 groundwater elevation data can be found in the June 6, 2003 submittal from Schrader and the December 2002 groundwater sampling results are described in the 2002 Annual Progress Report of Corrective Measures Implementation, which are both in the facility file.

[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.

_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):

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] 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)?

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____ 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[3] 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[3] 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[3] 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):

[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 implemented[4])?

____ 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):

[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):

As part of the EPA-approved Groundwater Monitoring Plan for the pump-and-treat extraction system, Schrader samples the following monitoring wells on an annual basis: PW-12, PW-13, PW-14, PW-15, PW-16, OW-26, OW-28, OW-39, OW-49, OW-50, OW-63, OW-65, OW-67, OW-74, OW-75, OW-76, OW-78, OW-84, OW-85, and OW-86.

The EPA wells are sampled for the following volatile organic compounds (VOCs) and inorganic compounds:

cis-1,2-dichloroethylene	tetrachloroethylene	trichloroethylene
carbon tetrachloride	trans-1,2-dichloroethylene	1,1,2,2-tetrachloroethane
1,1,1-trichloroethane	vinyl chloride	chromium
nickel	lead.	

To satisfy VDEQ post-closure requirements, Schrader monitors the following additional wells on a quarterly basis: TW-6, TW-7, TW-16, OW-25, OW-29, OW-30, OW-31, OW-32, OW-33, OW-34, OW-36, OW-37, OW-38, OW-42, OW-43, OW-59, OW-88, OW-89, and OW-90.

The VDEQ wells are sampled for the following VOCs and inorganic compounds:

cis-1,2-dichloroethylene	tetrachloroethylene	trichloroethylene
methyl ethyl ketone	bis(2-ethylhexyl) phthalate acetophenone	
antimony	arsenic	barium
beryllium	cobalt	chromium
copper	nickel	lead
selenium	tin	thallium
vanadium	zinc	mercury

Also, Schrader samples the air stripper influent and effluent quarterly to ensure the system is operating as designed. The analytical results are reported to both EPA and VDEQ on a regular basis for review.

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 Schrader Bridgeport facility, EPA ID # VAD082881970, located at 205 Frazier Road, Earlysville, VA. 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 7/18/03
(print) Jennifer L. Shoemaker
(title) Remedial Project Manager

Supervisor (signature) _____ Date 7/18/03
(print) Robert E. Greaves
(title) Chief, RCRA General Operations Branch
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Locations where References may be found:

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