

**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:** Federal-Mogul Corporation  
**Facility Address:** 300 Industrial Park Road, S.E., Blacksburg, VA 24060-6699  
**Facility EPA ID #:** VAD054039961

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**”<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 ongoing Base Corrective Action Program reveals that groundwater contains tetrachloroethene (TCE), on site and off site, at concentrations exceeding the Safe Drinking Water Maximum Contaminant Level (MCL) of 5 ug/L (2003 First Semi-Annual Report for Federal Mogul Corp., August 2003).

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).

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):**

From 1998 to 2003, extraction and monitoring wells from across the facility, as well as monitoring wells along the facility’s southern property boundary, have exhibited significant declines in, or nondetections for, concentrations of TCE in groundwater (2003 First Semi-Annual Report for Federal Mogul Corp., August 2003). It was during this period that the facility initiated its Base Corrective Action Program (pumped groundwater treated by air stripper) and the decrease in TCE concentrations appear to have been directly related to this remediation.

Offsite, the facility has monitored groundwater from wells and springs at residential properties at the downgradient end of the groundwater contaminant plume. Many of these wells and springs have been monitored regularly since 1996. Despite a minor fluctuation in TCE levels (documented at one spring, where TCE peaked in 2002, then declined in 2003), trends in offsite groundwater data collected from 1997 to 2003 indicate significant declines in, or nondetections for, TCE concentrations (2003 First Semi-Annual Report for Federal Mogul Corp., August 2003; Federal Mogul Corp. data in Virginia Dept. of Environmental Quality official files, September 2003).

For more than 45 days over the months of July and August of 2003, the facility had to shut down the groundwater remediation system, including the three extraction wells, because system effluent samples had exceeded the permitted TCE discharge level, of 5 ug/L, to the Publicly Owned Treatment Works. This exceedance was the result of a failure of the carbon medium in the filter unit. The unit has been repaired and the system was restarted on August 26, 2003. The facility will continue to collect quarterly samples from selected downgradient wells and springs at residential properties offsite, to determine whether the contaminant plume has migrated as a result of the shut down of the remediation system. If the quarterly data should indicate renewed migration of contaminated groundwater, the Environmental Indicator Determination will be subject to immediate reevaluation. However, groundwater and spring data collected from offsite residential properties on August 4, 2003 (Virginia Dept. of Environmental Quality official files)—the midpoint of the shutdown-- bear no indication that the contaminant plume had migrated at that time.

Footnotes:

<sup>2</sup> “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?

**Rationale and Reference(s):**

- X** 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.

A water sample from one spring located north of Jennelle Road offsite (2002), had a TCE concentration of 36 ug/L. This spring is the only location where the groundwater contaminant plume discharges to a surface water body, that has been identified. Water from this spring enters an unnamed tributary/drainage ditch that is partially lined with rip rap. The surface water then flows southward through a several hundred foot long concrete culvert beneath Jennelle Road and the Smart Road. Upon exiting the culvert (approximately 450 feet south of the spring), the surface water continues southward through a ditch that directs the water into the pit of an active quarry. The water is ponded at various locations within the quarry for dust control purposes (Federal Mogul Corp. data in Virginia Dept. of Environmental Quality official files, September 2003).

**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 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)?

**Rationale and Reference(s):**

  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 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 – skip to #8 and enter “IN” status code.

**Rationale and Reference(s):**

As noted on the preceding page, the spring sample TCE concentration in 2002 was 36 ug/L. The EPA OSWER Tier II Surface Water Ecological Benchmark for TCE is 350 ug/L. Therefore, the discharge of “contaminated” groundwater into surface water likely to be “insignificant.”

Footnotes:

<sup>3</sup> 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 implemented<sup>4</sup>)?

     **X** 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 ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR
- (2) providing or referencing an interim-assessment<sup>5</sup>, 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 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 – skip to #8 and enter “IN” status code.

**Rationale and Reference(s):**

See Ecological Benchmark comparison on previous page.

Footnotes:

<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.

**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. 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):**

As stated previously, the facility will continue to collect quarterly samples from selected downgradient wells and springs at residential properties offsite, to determine whether the contaminant plume has migrated as a result of the shut down of the remediation system. If the quarterly data should indicate renewed migration of contaminated groundwater, the Environmental Indicator Determination will be subject to immediate reevaluation. However, groundwater and spring data collected from offsite residential properties on August 4, 2003 (Virginia Dept. of Environmental Quality official files)—the midpoint of the shutdown-- bear no indication that the contaminant plume had migrated at that time.

**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 **Federal Mogul Corporation facility in Blacksburg, VA, EPA ID # VAD054039961**, 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	(Original Signed)	Date	9/23/03
	_____	_____	
	(Print) Allen R. Brockman		
	(Title) Environmental Specialist II		
	_____		
Supervisor	(Original Signed)	Date	9/23/03
	_____	_____	
	(Print) Howard Freeland		
	(Title) Environmental Manager II		
	(EPA Region/State) III/VA		
	_____		

**Locations where References may be found:**

Department of Environmental Quality  
Division of Hazardous Waste Permitting, Groundwater  
629 East Main Street  
Richmond, VA 23219

**Contact telephone and e-mail numbers:**

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