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:	**ICI Americas Inc.**
Facility Address:	**1 River Road, Tamaqua, PA 18252**
Facility EPA ID #:	**PAD000797928**

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:

On-Site

VOCs

ICI Americas Inc. (ICI) is a 110-acre facility in the mountains of Schuylkill County, Pennsylvania. Historic waste disposal and burning occurred at this property and groundwater has been impacted. ICI conducted the first groundwater sampling in 1989, and began regular monitoring in 1992. Groundwater has been shown to be contaminated with TCE and daughter products above the applicable MCLs at wells in the source areas and downgradient.

Metals

The ICI Americas site has several Solid Waste Management Areas (SWMUs) and regulated units, generally found in one area called the Woodlawn Environmental Management Area (Woodlawn). During post-excavation soil sampling in Woodlawn, several heavy metal hotspots were found, the primary contaminants being lead, antimony, and mercury. Additional excavation, down to bedrock in most units, was performed.

Post-excavation testing indicated subsurface contamination at several points is above the lead direct-contact screening value for non-residential land-use, in the Former Open Burn Pit. The areas above the screening numbers have been excavated to bedrock, to remove the soil sources. In addition, several units have tested above the soil-to-groundwater screening values for antimony and mercury; the Former Open Burn Pit, (excavated to bedrock) Former Pit 1, and Former Pit 2. All of the SWMUs and regulated units showing elevated levels for contaminants were closed under PADEP and EPA oversight.

The groundwater has been tested for heavy metals, and none, above the Maximum Contaminant Levels (MCLs), i.e. drinking water screening levels, has been found. The heavy metal contamination found in the bedrock is not leaching into groundwater at levels above health-based limits.

Off-Site

1)There were 2 former off-site potable wells, southeast of the source area, which showed TCE detection. Both off-site drinking water wells had whole-house carbon filtration units. Frequent monitoring showed that the carbon units were effective; post-filtration TCE levels were below detection limits. Only one of the wells ever showed pre-filtration levels above the MCL for TCE of 5 ug/l; the maximum being 13.8 ug/l. The levels have steadily decreased from the time monitoring began in 2000. At the last sampling event in September 2004, the TCE levels were below the MCL.

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).

2)The edge of the source area plume extends approximately 100 feet across a neighboring property line to

the northeast. The maximum concentration of TCE found since 1989 was 50 ug/l. Since removal of the soils at the source area in1999, TCE levels have decreased to 21 ug/l and continue too drop.

References for Questions 2, 3, 4, and 7:

Post-Excavation Confirmatory Soil Sample Analytical Data Evaluation (9/28/99)
Project Woodlawn, Groundwater Sampling Results (Reports 1999-2001)
Report on Groundwater Conditions, Project Woodlawn (1/12/01)
ICI-Resampling Report (5/8/01)
Groundwater Monitoring Results (Reports 2001-2005)

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:

A PADEP-required groundwater pump and treat system operated at the property from 1996 to 1999. ICI started the systems operation in 1996 to remove trichloroethylene and related organic compounds from the groundwater. In October 1999, PADEP approved temporary shut-off of the pumping system to determine if: 1) the system is effective in containing the plume in the fractured bedrock, and 2) organic contaminants in the groundwater were being naturally biodegraded, as ICI has asserted. A final report on the temporary shut-off was submitted in January 2001 and was evaluated by EPA and PADEP. An upgraded monitoring network provided monthly data on the groundwater quality for one year. Subsequently, PADEP approved a reduced-frequency monitoring program for 2001 and 2002. Based on a proposal for future Monitored Natural Attenuation using the findings of the 2001/2002 monitoring program, a new monitoring program was agreed to in 2003 by ICI, PADEP and EPA. This program includes wells in the source area, the edges of the plume, and sentry wells.

The source area wells have shown stabilized and some decreasing levels of contaminants since the soil sources were removed in 1999. The highest level of TCE found in the source area was 1160 ug/l. The level has fluctuated and is currently stable at 890 ug/l. The data also shows that the size of the plume has contracted since 1999. Sentry wells have remained clean while wells monitoring the interior of the plume have shown decreasing TCE levels over time.

The groundwater also displays evidence of TCE naturally attenuating, manifested by the high levels of daughter products and the presence of common degradation indicators, e.g. chloride and ethene, at the monitoring wells. Wells at the edges of the plume have shown an increasing ratio of daughter products to the concentration of TCE, indicating that TCE is biodegrading throughout the plume. This is further supported by the relatively elevated levels of chloride at the edges and the presence of ethene throughout the plume; conditions expected during anaerobic degradation of TCE.

References: See References for Question 2 on Page 2.

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:

Two springs in the area were included in the sampling events in 1999 and 2000. TCE was found in one sampling event in one spring, at 9 ug/l, which is slightly above the MCL of 5 ug/l. No other VOCs were detected in either spring in any other sampling event. These two near-by springs are located side-gradient to the plume.

The nearest surface water body downgradient to the plume is approximately 3600 feet from the source area. Monitoring shows that the Little Schuylkill River has not been impacted by the contaminated groundwater from the Woodlawn area. TCE and PCE were detected in several sampling points on the river. However, all TCE and PCE results in the river were well below the applicable MCLs of 5 ug/l. The maximum TCE result was 0.28 ug/l and the maximum PCE result was 1.5 ug/l. TCE and PCE levels were the same both upstream and downstream of the Woodlawn area indicating that the VOCs found in the river did not originate in the Woodlawn area. The sampling events were conducted in 1999 and 2000.

References: See References for Question 2 on Page 2.

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)?

_____ 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
Although the property has been sold, ICI retains responsibility for groundwater monitoring. Based on a proposal for future Monitored Natural Attenuation using the findings of the 2001/2002 monitoring program, a new monitoring program was agreed to in 2003 by ICI, PADEP and EPA. This program includes wells in the source area, the edges of the plume, and sentry wells.

The agreement of sale of all the property contained language restricting groundwater from being used for potable purposes. The property sale also grants ICI access for future monitoring.

In addition, ICI has an access agreement with other property owners, to the northeast of the source area, to monitor a well which is at the edge of the plume.

References: See References for Question 2 on Page 2.

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 **ICI Americas Inc.** facility, EPA ID # **PAD000797928**, located at **1 River Road, Tamaqua, Pennsylvania**. 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)	/s/	Date 10/4/05
	(print)	Linda A. Matyskiela	09/29/2005
	(title)	Project Manager	

Supervisor	(signature)	/s/	Date 10/4/05
	(print)	Paul Gotthold, Chief	
	(title)	PA Operations Branch	
	(EPA Region or State)	EPA Region III	

Locations where References may be found:
All documentation may be found at:

EPA Region III
WCMD Records Center
1650 Arch Street
Philadelphia, PA 19103

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