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

Migration of Contaminated Groundwater Under Control

Facility Name:	Schenectady International Incorporated (SII), Congress St. Facility
Facility Address:	Schenectady, New York
Facility EPA ID #:	NYD002070100

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, 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):

Background

The Schenectady International Incorporated (SII), Congress Street facility (Site) operated a chemical manufacturing facility on approximately 8.0 acres southwest of the intersection of Congress Street and 10th Avenue in the City of Schenectady in Schenectady County. The facility has been inactive since December 31, 1997. Adjacent land uses include light industrial areas to

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[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).

the south and west; commercial facilities to the east and northwest; and residential areas to the north and northeast. The facility sits on a steep terraced hillside that slopes down to a swale along the southwestern property line. The swale slopes to the northwest and ends at a steep slope to Cowhorn Creek. Cowhorn Creek is classified as a Class C stream suitable for fish survival and propagation. Railroad tracks and a service road lie southwest of the swale and outside of the facility fence. A spur from the railroad and an area that previously contained tanks are located inside the facility fence (figure 1).

The original manufacturing portion of the facility began operations in 1906 and expanded its manufacturing capacity to approximately 50 million pounds per year of synthetic coatings. While these coating have many potential applications, SII specialized in magnet wire enamels for electrical insulation; insulating varnishes for electrical motors; and industrial enamels. The facility also manufactured other resins for coatings and adhesives, e.g., phenolic modifiers for use in coatings, either subsequently used on site or used as intermediates for other resins. Such products represented a relatively small portion of the total coatings industry, and reflected the specialized type of products that SII manufactured. The resin manufacturing operations primarily occurred in Buildings 4 and 5, while the industrial enamel production was located in Buildings 1 and 2 (figure 1).

Hazardous waste streams generated at the site included process waste streams from resin production containing solvents (primarily aqueous distillates); spent solvents from the cleaning of production vessels; and filtration wastes including used filtration elements and residual products. SII's bulk hazardous waste streams included spent solvent and distillate streams from their production units. The company also put hazardous waste from either process stream filtering, process control samples or vessel wastes, into containers. The largest waste streams at the facility were storm water, non-contact cooling water and sanitary wastes. Most of which were treated as waste water in the City of Schenectady's Waste Water Treatment Plant. Some of the non-contact cooling water and the storm water were discharged via a SPDES permitted outfall to Cowhorn Creek.

Site Investigations

Numerous site wide investigation have been performed prior to and in conjunction with the consent order. Table 1 is a partial list of the reports that are referenced in this section by number.

The soil and groundwater contamination adjacent to the rail siding and storage vessels at the facility is likely the result of numerous spills that are suspected to have ranged from a few gallons to a few hundred gallons since 1910 (1,2). On-site contaminated soils and groundwater are beneath buildings, in transportation areas, southwest of the buildings and up to the swale between the facility and the railroad tracks. Figure 1 shows the extent of the groundwater contamination (2). Table 2 lists the major contaminants and maximum levels in soil and

groundwater samples. These levels exceed the Technical and Administrative Guidance Manual 4046 limits shown in Table 2.

Light Non-Aqueous Phase Liquid (LNAPL) was discovered during the installation of monitoring well OW 10-94 (figure 1, 2). The major chemical constituents detected in the LNAPL were Xylene (1000mg/l), 2 methylnaphthalene (5100 mg/L) and naphthalene (47000 mg/l). Prior to remedial measures, LNAPL was found to collect along the banks of Cowhorn Creek downstream from the facility (sample 9A, 3). This contamination is consistent with an organic solvent (Solvesso 150) spill at the facility in 1972.

Groundwater Flow

A drainage swale is located along the southwestern property boundary between the site and the rail road. Shallow groundwater moves in a westerly direction through the contaminated soils on the site and then flows parallel to the swale and finally discharges into the Cowhorn creek. Prior to remedial measures contaminated surface water flowed in the swale and discharged down a steep slope to the creek. Contaminated seeps are also present on the slope below the swale that discharge to Cowhorn. The average groundwater velocity (Darcy velocity) is estimated to be approximately 45 feet/year. Based on the groundwater flow conditions beneath the site and groundwater quality data, the total chemical mass flux leaving the site via groundwater flow was calculated to be approximately 0.275 pounds/day prior to remedial measures (3).

Deep groundwater flow moves in a westerly direction beneath the site and continues to Cowhorn Creek. Based on groundwater samples from OW5A and OW6A the deeper groundwater flow is uncontaminated (2,3).

Table 1: List of Reports

Ref #	Report Title	Prepared By	Date
1	Hydrogeologic Investigation Report	Conestoga-Rovers & Assoc.	September 1993
2	Remedial Investigation Report	Conestoga-Rovers & Assoc.	January 1996
3	Feasibility Study Report	Conestoga-Rovers & Assoc.	July 1996
4	Supplemental Remedial Investigation Report	Conestoga-Rovers & Assoc.	July 1998
5	Supplemental Feasibility Study Report	Conestoga-Rovers & Assoc.	December 2000
6	Supplemental Off-Site Sampling Report	Conestoga-Rovers & Assoc.	January 2003

Table 2: Chemicals of Concern

Media	Contaminant of Concern	Maximum Concentration (ppb)	TAGM 4046 Limits (ppb)
Soils	Xylene	3,800,000	1,200
	Chlorobenzene	3,500,000(est.)	1700
	Ethylbenzene	500,000 (est.)	5500
	2-Methylphenol	190,000	100 or MDL
	Phenols	160,000	30
	4-Methylphenol	370,000	900
	Napthlene	1,600,000	13,000
	Total VOC's	12,200,000	-
	Total SVOC's	4,158,000	-
Groundwater	Xylene	24,000	5
	Ethylbenzene	3,900	5
	Toluene	220	5
	2-Methylphenol	97	5
	Phenols	97	1
	Napthalene	5,300	10

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):

For the remedial purpose, the facility site has been divided into two Operational Units (OUs); the first, OU #1 dealing with groundwater treatment and containment; and the second, OU #2 to address the source (soils) remediation. In March 1998, the DEC issued a Record of Decision (ROD) for the OU #1 (groundwater). The ROD called for groundwater containment and treatment, plus collection and treatment of LNAPL. The primary components of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial system.

2. A remedial system consisting of a horizontal extraction pipe (french drain) with a sufficient number of vertical extraction wells to assure capture of contaminated groundwater leaving the site. The vertical wells will be located in the area(s) where the installation of the french drain cannot be constructed due to topography and/or access.

3. Collection of groundwater and seep water and treatment either on-site or off-site (dependent upon cost), plus collecting and treating the LNAPL off-site.

4. Building a security fence around the contaminated areas to reduce access to these areas and placing a restriction on the deed to prevent inappropriate changes to the property.

5. Since the remedy results in untreated hazardous waste remaining at the site, a long term monitoring program will be part of the remedy. This program will allow the effectiveness of the selected remedy to be monitored and will be a component of the operation and maintenance for the site. Soil remediation, if enacted, might lead to future reduction of the required monitoring. Operational Unit # 2 (soils: source remediation) is being currently evaluated and will be addressed in a future ROD.

Through a Consent Order a remedial measure was implemented to intercept, extract, and treat the contaminated groundwater and LNAPL (5). Between June 2000 and November 2001, SII installed four vertical pumping wells and a 700 foot french drain (figure 2). The drain runs along the swale at a depth of 10 feet at the southeast end to 25 feet at the northwest end. The collection drain was designed to intercept the shallow contaminated groundwater and allow the deeper uncontaminated groundwater to pass under the system and discharge to Cowhorn Creek. The treatment system became operational December 2001.

This remedial measure is effective in reducing the flow of contaminated groundwater off site to the creek. An average of 700,000 gallons per month of groundwater is removed and treated. As a result the groundwater levels are lower on site and the swale is dry except during heavy rain events. During these rain events no contamination is measured in swale water. This suggests that no contaminated groundwater is entering the swale and contaminating Cowhorn Creek as it was prior to the remedial measure.

The seeps on the slope below the swale that discharge to the creek have moved 20 feet downslope indicating that the groundwater levels are lower and that groundwater discharge is reduced. The seeps were sampled in September 2002 nearly a year after the treatment system became operational. All contaminants were below regulatory limits except for Phenol, which was estimated at 2 ppb (1 ppb is regulatory limit) in one seep and was undetectable in the other sampled seep (6).

Surface water in Cowhorn Creek is sampled quarterly and these analyses show no exceedences of regulatory standards.

In conclusion, the groundwater migration is essentially cutoff by the groundwater collection system and Cowhorn Creek itself and is **stabilized.**

[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?

__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.

Rationale and Reference(s):
As stated in section 3, some contamination continues to reach Cowhorn Creek from seeps.

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)?

__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[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 <u>each</u> 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):___

The seeps were sampled in September 2002 nearly a year after the treatment system became operational. All contaminants were below regulatory limits except for Phenol, which was estimated at 2 ppb in one seep and was undetectable in the other sampled seep.

Surface water in Cowhorn Creek is sampled quarterly and these analyses show no exceedences of regulatory standards.

[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])? **NA**

_____ 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.

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

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)

Quarterly monitoring of surface water and groundwater contamination will continue indefinitely. The performance of the pumping and treatment units are monitored daily.

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 Schenectady International, Inc. facility , EPA ID # NYD002070100, located at Congress Street and Tenth Avenue, Schenectady, NY.** 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.

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

_____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN - More information is needed to make a determination.

Completed by (signature) _____ Date 9/30/03
(print) Dan Verrillo
(title) Engineering Geologist I

Supervisor (signature) _____ Date 9/30/03
(print) Howard S. Brezner
(title)Environmental Engineer II
(EPA Region or State) NYSDEC

Director (signature) _____ Date 9/2/03
(print) Edwin Dassatti
(title)Director Bureau of Haz. Waste and Radiation Management
(EPA Region or State) NYSDEC

Locations where References may be found:
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