

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

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

**Migration of Contaminated Groundwater Under Control**

**Facility Name:** 914th Airlift Wing AFRC

**Facility Address:** 2720 Kirkbridge Drive Niagara Falls IAP-ARS, New York 14304-5001

**Facility EPA ID #:** NY0570024273

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 #8 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, GPRRA). 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 RCRAInfo national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Is **groundwater** known or reasonably suspected to be “**contaminated**” 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):

Contaminant	Level of Concern	Max. Detected	Times above Std	Location
Carbon tetrachloride	5 mg/L	2400 mg/L	480	IRP Site 3
Chloroform	7 mg/L	1500 mg/L	214	IRP Site 3
Ethylbenzene	5 mg/L	270 mg/L	54	IRP Site 7
Benzene	1 mg/L	570 mg/L	570	IRP Site 10
1,2-DCA	0.6 mg/L	92 mg/L	153	IRP Site 10
1,1-DCE	5 mg/L	220 mg/L	44	IRP Site 10
cis-1,2-DCE	5 mg/L	110000 mg/L	22000	IRP Site 10
trans-1,2-DCE	5 mg/L	450 mg/L	42	IRP Site 10
Toluene	5 mg/L	280 mg/L	56	IRP Site 10
TCE	5 mg/L	79700 mg/L	15940	IRP Site 10
Xylenes, total	5 mg/L	92.3 mg/L	18	IRP Site 10
1,2-Dichloropropane	1 mg/L	25 mg/L	25	IRP Site 13
Tetrachloroethene	5 mg/L	25 mg/L	5	IRP Site 13
1,1,2-TCA	1 mg/L	25 mg/L	25	IRP Site 13
Vinyl chloride	2 mg/L	1600 mg/L	800	IRP Sites 10 & 13
1,1-DCA	0.6 mg/L	25 mg/L	42	IRP Site 13

References:

Ecology and Environment, Inc., 2000, *2000 Internal Draft Sampling/Monitoring Report Installation-Wide Groundwater Monitoring Project, Niagara Falls Air Reserve Station*, Lancaster, New York.

\_\_\_\_\_, 2000, *Draft 1999 Sampling/Monitoring Report, Installation-Wide Groundwater Monitoring Project, Niagara Falls IAP-ARS*, Lancaster, New York.

\_\_\_\_\_, 2000, *Focused RCRA Facility Investigation and Interim Corrective Measures Study, Niagara Falls ARS*, Lancaster, New York.

\_\_\_\_\_, 1999, *Final 1998 Sampling/Monitoring Report, Installation-Wide Groundwater Monitoring Project, Niagara Falls IAP-ARS*, Lancaster, New York.

\_\_\_\_\_, 1998, *Final 1997 Sampling/Monitoring Report, Installation-Wide Groundwater Monitoring Project, Niagara Falls IAP-ARS*, Lancaster, New York.

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).

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3. Has the **migration** of contaminated ground water **stabilized** (such that contaminated ground water is expected to remain within "existing area of contaminated ground water"<sup>2</sup> 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"<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):

The "existing areas of contaminated groundwater" at Niagara Falls Air Reserve Station are generally defined and separated based on the source of contamination, which is related to the IRP site designation; therefore, discussion of the migration of contaminated groundwater will be divided by IRP site. At each of these sites, the migration of contaminated groundwater can be seen to have stabilized based on low or decreasing down gradient contaminant concentrations, the presence of natural hydraulic boundaries, or the operation of groundwater collection mechanisms.

**IRP Site 3**

In the overburden aquifer at IRP Site 3, groundwater migration off site is prevented by Cayuga Creek, which serves as a hydraulic barrier. Overburden wells across the creek are free of contamination. In the shallow bedrock, the migration of contaminated groundwater is mitigated by a groundwater collection trench and associated pumping wells. Contaminant levels in monitoring wells are relatively low at this site.

**IRP Site 5**

A very low hydraulic gradient across Site 5 in the overburden and the bedrock, along with low hydraulic conductivities of aquifer materials down gradient of the site, serve to prevent the migration of groundwater contaminants out of the "existing area of contaminated groundwater". In both the overburden and bedrock, down gradient wells are free of contamination.

**IRP Sites 7 and 8**

These sites are under a program of long term monitoring. The contaminant distributions are in a steady state condition.

**IRP Site 10**

The migration of contaminated groundwater is prevented at Site 10. A tributary to Cayuga Creek and Cayuga Creek frame the down gradient portions of the site and serve to prevent contaminant migration. Contaminant migration is also blocked by a 125 foot long groundwater collection trench from which water is pumped by a sump type "well". Down gradient wells across the tributary and Cayuga Creek are free of contamination.

**IRP Site 13**

Based on current and historical groundwater contamination at IRP Site 13, contaminated groundwater has not migrated a significant distance from the source area. In the overburden, this is supported by wells free of contamination on the down gradient side of the site. In the bedrock, contaminated groundwater flows toward a remedial pumping system, which prevents further migration from the site.

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.

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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):

Cayuga Creek along with several drainage ditches comprise the surface water at the Facility. Sites 3 and 10 have the potential to impact surface water bodies. However, routine surface water sampling at Site 3 has shown no impact to Cayuga Creek. An ephemeral drainage ditch and Cayuga Creek are in the vicinity of Site 10. Surface water sampling has indicated occasional impacts from VOCs to the drainage ditch, although the data indicates no impact to Cayuga Creek. It should be noted that augmentation of the overburden groundwater collection trench at Site 10 has been designed. The additional remedial program will consist of a shallow bedrock recovery well located within the source area to enhance the recovery of contaminants. Both Sites 3 and 10 are under a performance monitoring and site-wide monitoring program.

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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)?

  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 - enter “IN” status code in #8.

Rationale and Reference(s):

See discussion #3 above. The groundwater is not migrating and is contained. Samples are collected and analyzed from 9 locations along Cayuga Creek and no VOCs are detected.

References

Ecology and Environment, Inc., July 2000, *2000 Internal Draft Sampling/Monitoring Report Installation-Wide Groundwater Monitoring Project, Niagara Falls Air Reserve Station*, Lancaster, New York.

<sup>3</sup>

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

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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 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<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 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):

See discussion #3 above. The groundwater is not migrating and is contained. Samples are collected and analyzed from 9 locations along Cayuga Creek and no VOCs are detected.

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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.

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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.

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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: The IRP sites are in a long-term monitoring program. These wells are used to monitor the migration (vertically and horizontally) as well as the contamination of the groundwater at each site. They are sampled semi-annually in March and September and analyzed for VOCs using EPA method 8260B.

Well Number	Chemical Monitoring	Groundwater Elevation	Well Number	Chemical Monitoring	Groundwater Elevation
<b>MW1-1DA</b>	X	X	<b>MW8-1</b>		X
MW1-2DA		X	MW8-1DA		X
MW1-3DA		X	MW8-1E		X
MW1-4DA		X	MW8-2D		X
MW1-7A	X	X	MW8-3		X
MW2-1A		X	MW8-3DA		X
MW2-1DA		X	MW8-4A		X
MW2-2A		X	MW8-4D		X
MW2-4		X	MW8-5A		X
MW4-3		X	MW8-5D		X
MW4-4		X	MW8-6A		X
MW6-2A		X	MW8-8		X
MW6-3		X	MW8-10D		X
MW3-1A	X	X	MW8-11	X	X
MW3-1DA		X	MW8-11D	X	X
MW3-1E	X	X	MW8-11E	X	X
MW3-2		X	MW10-1DA	X	X
MW3-2DA		X	MW10-1EA	X	X
MW3-3DA	X	X	MW10-1F	X	X
MW3-4DA	X	X	MW10-2	X	X
MW3-5D	X	X	MW10-2E	X	X
MW3-6A		X	MW10-3	X	X
<b>MW3-6D</b>		X	<b>MW10-3D</b>	X	X
MW3-6D		X	MW10-3E	X	X
MW3-7		X	MW10-4	X	X
MW3-8		X	MW10-4D	X	X
MW3-8D		X	MW10-4E	X	X
MW3-8E		X	MW10-5D		X
PW3-1	X	X	MW10-6	X	X

PW3-2	X	X	MW10-6D		X
PW3-3A	X	X	MW10-7	X	X
MW5-1A		X	MW10-8		X
MW5-1DA	X	X	MW10-8D		X
MW5-1E	X	X	MW10-9D	X	X
MW5-2D		X	MW10-10D	X	X
MW5-3D		X	PW10-1	X	X
MW5-4		X	MW13-1		X
MW5-4D	X	X	MW13-1D		X
MW5-5A	X	X	MW13-1E	X	X
MW5-5D	X	X	MW13-2D		X
MW5-6	X	X	MW13-3	X	X
MW5-6D	X	X	MW13-3D		X
MW5-7	X	X	MW13-4	X	X
MW5-7D	X	X	MW13-4D	X	X
MW5-8	X	X	MW13-5A	X	X
MW5-8D	X	X	MW13-5D	X	X
<b>MW7-1D</b>		X	MW13-6		X
MW7-2		X	MW13-6D		X
MW7-2D		X	PW13-1	X	X
MW7-3		X	PW13-4D	X	X
MW7-3D		X	SW8-8	X	X
SW3-1		X	SW8-9		X
SW3-2	X	X	SW10-4	X	X
SW3-3	X	X	SW10-5	X	X
SW99-10	X	X	SW10-6	X	X
SW99-14		X	SW10-7	X	X

MW = monitoring well    PW = pumping well    SW = Surface water

References:

Ecology & Environment, July 2000, *2000 Internal Draft Sampling/Monitoring Report Installation Wide Groundwater Monitoring Project*, Lancaster, New York.

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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 facility, **EPA ID # NY0570024273, located at Niagara Falls IAP-ARS**. 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) Stanley Radon  
(title) Senior Engineering Geologist

Supervisor (signature) \_\_\_\_\_ Date \_\_\_\_\_  
(print) James Strickland  
(title) Regional Hazardous Materials Engineer  
(EPA Region or State) NYSDEC, Region 9

Approved by (signature) \_\_\_\_\_ Date \_\_\_\_\_  
(Print) Paul J. Merges, Ph.D.  
(title) Director, Bureau of Radiation & Hazardous Site Management  
NYSDEC, Albany

Locations where References may be found:

1. 914 Airlift Wing, Building 403, 2405 Franklin Drive, Niagara Falls IAP-ARS, NY 14304-5063
2. Niagara Falls Public Library, 1425 Main Street, Niagara Falls, NY 14305
3. New York State Department of Environmental Conservation, Region 9, 270 Michigan Avenue, Buffalo, NY 14203-2999

Contact and telephone numbers

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