DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRAInfo code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: **Buffalo Color Corporation**
Facility Address: **100 Lee Street, Buffalo, NY 14240**
Facility EPA ID #: **NYD08033052**

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.

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 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).

BACKGROUND

The Buffalo Color Corporation (BCC) is located on approximately 42 acres, adjacent to the Buffalo River (Figure 1). The area surrounding BCC is zoned for heavy industry, and includes CSX railroad tracks to the north and the west.

Honeywell International is located to the south and PVS Chemicals, Inc., is located to the south and east. Also to the east is an industrial property owned by Mobil Oil Company. Residential areas are located approximately 150 feet from the northeastern point of the site, across from Elk and Orlando Streets. Contaminated groundwater at the site flows towards the Buffalo River in a south-southwesterly direction.

Over the past 100 years, dyestuff and organic chemicals have been produced at the site. The plant was built in 1879 by a predecessor of Schoellkopf Aniline and Dye Company, which became National Aniline Chemical Company (NACCO) in 1917. In July of 1977, Buffalo Color Corporation bought assets from Allied Chemical, giving the plant the right to certain chemicals. Production of all dyestuff and chemicals at BCC ceased in July 2003. Currently, BCC operates as a packaging and distribution facility.

In 1995, the NYSDEC approved a RCRA facility investigation of the Buffalo Color Corporation. A single solid waste management unit (SWMU) was designated for areas A,B,C and E. Active features for the site at that time included sewer lines, an old container storage area for drummed hazardous waste (less than 90 days storage). Inactive features included abandoned sewer lines, an old container storage area in Area E, a closed deep well in Area E (used for waste disposal), and three closed surface impoundments in Area E that formerly served as part of the site's waste water treatment plant. Area D has been remediated under New York State's Hazardous Waste program.

The geology associated with this site consists of several different subsurface zones, each with contrasting hydrogeologic properties. These zones, in order of increasing depth are:

Fill- This layer of material is found over most of the surface of the site. It is mostly comprised of clay, silt, crushed stone, brick and miscellaneous building demolition debris. The thickness of this layer ranges from 0 to 20 feet. The maximum thickness of this layer was found to be occurring near the Buffalo River.

Alluvium- This layer consists of unconsolidated materials, most of which are fine to very coarse sands. These materials have a moderately high conductivity. The thickness of this layer varies between 0 to 21 feet, with the maximum thickness occurring near the Buffalo River.

Clay and Silt Tills- This layer consists of the fine-grained clay and silt tills. The thickness of this layer ranges between 0 to 10 feet. This layer underlies the majority of Areas B,C and E, as well as portions of Area A.

Glaciolacustrine Clay-This layer is primarily clay with some fine sands. This layer underlies the entire site. Thickness of this layer ranges from 24 to 36 feet. Grain size analysis shows that this layer is comprised almost entirely of clay sized particles. These materials possess a relatively low conductivity.

Basal Till- This layer is a mixture of sand, silt, gravel and small amounts of clay. This layer was encountered directly above the bedrock. Thickness of this layer ranged from 2 to 5 feet.

Onondaga Limestone- This layer slopes gently to the south at a rate of approximately 1.2 feet per 100 feet, and consists of fractured and weathered, dark gray limestone.

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?

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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).

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:

There are two aquifers that have been identified on the BCC site. The first aquifer, known as the Shallow Aquifer is a saturated and unconfined system within the fill and sediments above the glaciolacustrine clay. The second aquifer is the Confined Aquifer. This aquifer occurs within the Basal Tills and the weathered upper surface of the bedrock.

The groundwater in the Shallow Aquifer tends to flow towards the Buffalo River (Figure 2). However, many subsurface utilities (sewer lines and process water lines) and other man-made structures tend to influence the local flow. Groundwater contamination at the BCC site is primarily located in the Shallow Aquifer. Several contaminants (VOC's, SVOC's & metals) were found at concentrations that exceeded standards. In the Confined Aquifer, the primary contaminants were benzene, toluene, ethylbenzene and xylene (BTEX)compounds. However, these compounds appear to be the result of a releases from other facilities. The adjacent Mobil Oil property reportedly has had BTEX compounds released to the groundwater in the past, and may be a source of contaminants affecting the BCC site. Below is a listing of the primary contaminants found in the groundwater at the BCC site. Also, the standard, the maximum level detected and the location where maximum level was detected is included.

CONTAMINANT	NYS STANDARD ug/L	MAX. LEVEL DETECTED (ug/L)	WELL #	AREA
Benzene	1	89	RFI-44	BCE
Toluene	5	5	RFI-46	BCE
M+P Xylene	5	97	RFI-44	BCE
Acetone	5	260	RFI-44	BCE
Chloroform	7	120	RFI-44	BCE
Naphthalene	10	2200	RFI-44	BCE
Arsenic	25	168	RFI-48	BCE
Cadmium	5	7230	RFI-47	BCE
Chromium	50	167	RFI-44	BCE
Hexavalent Chromium	50	233	RFI-46	BCE
Iron	300	3590	RFI-44	BCE
Manganese	300	38300	RFI-44	BCE
Nickel	100	3610	RFI-44	BCE
Selenium	10	93	RFI-44	BCE
Silver	50	56.7	RFI-44	BCE

References:

Golder Associates, December 1998, *Addendum To Final Report On RCRA Facility Investigation ,Buffalo Color*

Corporation, Buffalo, New York.

Golder Associates, January 2000, *Report On Corrective Measures Study, Buffalo Color Corporation*, Buffalo, New York.

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:

The "existing areas of contaminated groundwater" at the Buffalo Color Corporation site will be identified and discussed below as Area A and Area BCE (see figure _).

AREA A

Groundwater in Area A is migrating through the Shallow Aquifer and is discharging into the Buffalo River. Concentrations of contaminants in the Shallow Aquifer below Area A exceed Class GA groundwater standards.

The proposed corrective action that will be implemented in Area A involves hydraulic containment which will prevent contaminants from discharging into the Buffalo River. The hydraulic containment system will include five groundwater extraction wells installed approximately 30-35 feet below ground surface. These wells will be located along the southeastern perimeter of Area A, approximately 100 feet away from the Buffalo River. Figure 3 depicts the modeled capture zone for the five extraction wells located adjacent to the Buffalo River.

In addition to the five extraction wells, five piezometers would be installed in close proximity to the extraction wells. The piezometers would be used to monitor water level elevations and also monitor the performance of the extraction

[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.

wells. The hydraulic containment system will be in place and operational by the end of 2005.

AREA BCE

Groundwater in Area BCE flows towards the Buffalo River, but is intercepted and discharges to several subsurface utilities located along the perimeter of the site, before it can reach the river. Results of the RFI indicate that this groundwater is likely discharging into the Buffalo Sewer Authority(BSA) line that runs along the BCC site, between BCC and PVS Chemical. Results from the RFI also indicate that groundwater contaminants in this area are not migrating to the Buffalo River.

As a result of the groundwater discharging into the BSA line in this area, it appears that the migration of contaminants is being contained. As long as the BSA line remains effective, no further construction and operation of alternative measures will be necessary for this portion of the site.

References:

Golder Associates, December 1998, *Addendum To Final Report On RCRA Facility Investigation ,Buffalo Color Corporation,* Buffalo, New York.

Golder Associates, January 2000, *Report On Corrective Measures Study, Buffalo Color Corporation*, Buffalo, New York.

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:

The Buffalo River is the only surface water body at the Buffalo Color Corporation site. Groundwater contamination is migrating through the Shallow Aquifer beneath Area A and is discharging into the Buffalo River. However, a remedial design for this area has been selected and implementation is in progress. The corrective measures involve the installation of the five extraction wells and five piezometers. The remedial system is designed to intercept Area A groundwater before it can discharge to the river.

Groundwater contamination from Area BCE is not migrating or discharging into the Buffalo River. The Buffalo Sewer Authority line that runs along the property between the BCC site and PVS Chemicals is effectively containing the migration of contaminated groundwater.

References:

Golder Associates, December 1998, *Addendum To Final Report On RCRA Facility Investigation ,Buffalo Color Corporation,* Buffalo, New York.

Golder Associates, January 2000, *Report On Corrective Measures Study, Buffalo Color Corporation*, Buffalo, New York.

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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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 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:

The discharge of contaminated groundwater into surface water is likely to be insignificant due to the implementation and operation of the following corrective measures:

1) **Area A Groundwater Extraction System**

Five groundwater extraction wells, six inches in diameter, will be placed in the alluvium to an average depth of approximately 30-35 feet below ground surface. These five extraction wells will be installed along the southeastern perimeter of Area A, approximately 100 feet from the Buffalo River. The wells will be equipped with submersible electric pumps with a pumping rate estimated at between 16gpm and 30gpm. The groundwater extraction wells would then transfer the groundwater to either one of the two existing BCC Area A tanks (VT-Tanks; 40,000 gallons each). The Area A tanks would allow discharge through the existing BCC Outfall #3 for discharge to the BSA sewer and treatment plant. Additionally, these tanks could also allow discharge to the Area D Groundwater Treatment System (GWTS).

Five piezometers would also be installed in proximity to the extraction wells. The piezometers would be used to monitor water level elevations and the performance of the extraction wells. The objective of the remedial system is to provide hydraulic containment of the shallow aquifer, preventing off-site contaminant migration.

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

2.) Area BCE Groundwater Containment

The primary objective of this component is to prevent off-site migration of contaminated groundwater in the Upper Aquifer and preventing it from discharging into the Buffalo River. The site investigations and evaluations done during the corrective measures study indicate that groundwater flow in these areas is presently contained due to the passive infiltration of groundwater into the Buffalo Sewer Authority sewers located adjacent to these plant areas. As long as the sewers remain a viable and effective containment system, they will serve as a component of the remedy for Area BCE.

3.) Repair of Sheet Piling Breach (Area E)

In Area E, the Buffalo Sewer Authority sewer is bound by sheet piling consisting of wood planking and steel piling. In the area where BCC Outfall #011 crosses the BSA sewer line, a five to ten foot section of the sheet piling appears to have been removed. Although evaluations in the CMS report suggested that contaminant migration was not occurring through the breach, repairing of this breach will limit potential groundwater flow from Area E to the PVS property and the Buffalo River.

References:

Golder Associates, December 1998, *Addendum To Final Report On RCRA Facility Investigation ,Buffalo Color Corporation*, Buffalo, New York.

Golder Associates, January 2000, *Report On Corrective Measures Study, Buffalo Color Corporation*, Buffalo, New York.

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])?

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,[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

[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.

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:

See discussion for Question #5. With the installation of the groundwater extraction system in Area A, along with the passive infiltration of groundwater into the Buffalo Sewer Authority sewer line in Area BCE and the repairing of the sheet piling breach in Area E, contaminated groundwater will be contained and prevented from entering the Buffalo River. In addition, the CMS report included a screening level risk assessment that evaluated the potential impact to the river posed by the discharge of groundwater from Area. The report concluded that impacts under existing conditions were negligible. Operation of the Area A groundwater remedial system will prevent future discharges to the river.

References:

Golder Associates, December 1998, *Addendum To Final Report On RCRA Facility Investigation ,Buffalo Color Corporation,* Buffalo, New York.

Golder Associates, January 2000, *Report On Corrective Measures Study, Buffalo Color Corporation*, Buffalo, New York.

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:

Groundwater monitoring will be performed in both the Shallow and Confined Aquifers in Area A and Area BCE. The monitoring network will consist of the following wells and piezometers:

Shallow Aquifer

Well #	Location (Area)	Well #	Location (Area)
RFI-PZ-17	BCE	RFI–29	BCE
RFI-PZ-18	BCE	RFI-30	BCE
RFI-PZ-19	BCE	RFI-32	BCE
RFI-17	BCE	RFI-33	BCE
RFI-18	BCE	RFI-34	BCE
RFI-20	BCE	RFI-35	BCE
RFI-22	A	RFI-36	BCE
RFI-24	A	RFI-42	BCE
RFI-25	A	RFI-45	BCE
RFI-27	BCE	RFI-51	BCE
RFI-28	BCE		

Monitoring for VOC's and SVOC's in these wells will be performed on a semi-annual basis and monitoring for metals and inorganics will be performed on a annual basis.

Confined Aquifer

Well #	Location (Area)
R-01	BCE
R-04	BCE
RFI-16	A
RFI-19D	BCE
RFI-21D	BCE
RFI-23D	A

Monitoring for VOC's and SVOC's in these wells will be performed on an annual basis and monitoring for metals and inorganics will be performed on a biennial basis.

8. Check the appropriate RCRAInfo 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 **Buffalo Color Corporation** facility , EPA ID # **NYD080335052** ,located at **100 Lee Street, Buffalo, New York.** 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: _____ Date: 9-15-2005
Stanley Radon
Senior Engineering Geologist

Supervisor: _____ Date: 9-15-2005
James Strickland
Regional Hazardous Materials Engineer

Director: Original signed by: _____ Date: 9-15-2005
Edwin Dassatti, P.E.
Bureau of Hazardous Waste and Radiation Management
Division of Solid and Hazardous Materials

Locations where References may be found:

Region 9
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999

Contact, telephone number and e-mail:

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.