December 15, 2017 Reference No. 11109628

Mr. Mike Hinton
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

Re: 2017 Periodic Review Report
Cascades Containerboard Packaging Inc. - Frontier Site (formerly Norampac)

Pursuant to the Site Management Plan - Frontier Chemical Site, Niagara Falls, New York (SMP) dated April 23, 2014 by GHD (formerly Conestoga-Rovers & Associates [CRA]), this correspondence provides the 2017 Periodic Review Report (PRR) for the Cascades Containerboard Packaging Inc. (Cascades) Facility (Former Frontier Chemical Site) located in Niagara Falls, New York. This PRR and Institutional Controls/Engineering Controls (IC/EC) Certification presents the field activities and monitoring results for the annual monitoring period of November 18, 2016 through November 18, 2017.

1. Introduction

The Frontier Chemical Royal Avenue Site Potentially Responsible Party (PRP) Group (the Frontier Group) entered into an Order on Consent (Index #89-0571-00-01, executed on August 15, 2008) with the New York State Department of Environmental Conservation (NYSDEC) to perform additional Site characterization and remediation of the conditions at the Cascades site (Site). The Site was previously referred to as the Norampac Facility in the 2015 PRR. The Frontier Group consisted of the Site owner and numerous parties who performed the additional investigations and completed the remediation of the Site in accordance with the approved Remedial Design Report (CRA-February 2013). The Site is now owned and maintained by Cascades. The Site is a 9-acre property located in an industrialized area of Niagara Falls, New York.

Following completion of the additional Site characterization, the Frontier Group worked with the NYSDEC to develop and implement the various components of the Site remedy. The overburden and shallow bedrock groundwater remedy was implemented as specified in the 2006 Record of Decision (ROD). The deep bedrock groundwater, designated as OU2, was investigated, and a remedial action consisting of monitored natural attenuation was determined to be the appropriate remedy and set forth in the OU2 ROD (March 2011). For the source area soil, a remedy consisting of excavation and ex situ thermal treatment was selected and implemented as the appropriate remedy.

After completion of the remedial work described in the Remedial Design Report, the Remedial Action Objectives were met although some minimal residual contamination remains in place at subsurface locations on the Site, which is hereafter referred to as "residual material". A SMP was prepared to manage

the residual material at the Site until the Environmental Easement is removed in accordance with ECL Article 71, Title 36.

This 2017 PRR presents the measures taken in 2017 to evaluate the performance and effectiveness of the remedy to reduce or mitigate contamination at the Site and to assess the conditions of the asphalt/concrete and soil cover system at the Site.

2. Site Overview

The Cascades Facility is located in an industrial area of the City of Niagara Falls, County of Niagara, New York and is identified as Block 1 and Lot 6 on the Niagara County Tax Map (160.09). The Site is an approximately 9-acre area parcel bordered to the north by property identified as owned by Sentry Metals, to the northwest by Cascades, to the west by the Greenpac Mill, to the south by Elkem Metal Company, and to the east by 47th Street, beyond which is an industrial site (Strator).

After Site remediation activities were completed in early 2014, the SMP provided a series of ECs and ICs. The ROD requires that the Site surface either be covered with the existing asphalt or concrete surface or 1 foot of clean fill material. At the completion of excavation activities associated with the source area soil remediation that was completed in 2014, the cover system was made compliant with the ROD. The existing undisturbed asphalt and concrete-covered areas were allowed to remain "as is". All previously existing soil cover areas and the area disturbed due to the excavation of the source area soil were covered with clean fill material. Recycled concrete and hard demolition material from the Site remediation project were also used as part of the 1 foot of clean surface material that was placed over all previously existing and post-excavation soil cover areas. The recycled concrete/demolition material was crushed to 2-inch-minus prior to placement and compacted in place. The remainder of the 1 foot of clean cover was completed using imported crushed stone from a quarry.

Adherence to these ICs on the Site is required by the Environmental Easement and is being implemented under the SMP. The ICs that are implemented are as follows:

- Compliance with the Environmental Easement and the SMP by the Grantor (Site owner) and the Grantor's successors and assigns (Cascades).
- All ECs must be operated and maintained as specified in the SMP.
- All ECs on the Controlled Property must be inspected at a frequency and in the manner defined in the SMP.
- Groundwater and other environmental or public health monitoring must be performed as defined in the SMP.
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in the manner defined in the SMP.

ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The Site has a series of ICs in the form of Site restrictions. Adherence to these ICs is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The industrial zoned property may only be used for industrial use provided that the long-term ECs and ICs included in the SMP are employed.
- The property may not be used for a higher level of use, such as unrestricted, restricted residential, or commercial use without additional evaluation (including possible additional remediation) and amendment of the Environmental Easement, as approved by the NYSDEC.
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP.
- The use of the groundwater underlying the property as a source of potable or process water is prohibited without treatment rendering it safe for the intended use as determined by the NYSDEC, New York State Department of Health (NYSDOH), or Niagara County Health Department.
- The potential for vapor intrusion must be evaluated for any building developed on the Site in the future, and any potential impacts that are identified must be monitored or managed through implementation of appropriate vapor mitigation measures.
- Vegetable gardens and farming on the property are prohibited.
- The Site owner will submit to NYSDEC a written statement that certifies, under penalty of perjury, that:
    - Controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC.
    - Nothing has occurred that impairs the ability of the controls to protect public health and the environment or that constitutes a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

3. Evaluate Remedy Performance, Effectiveness, and Protectiveness

In accordance with the SMP, annual inspections are made of the asphalt/concrete cover system, soil cover system, and monitoring wells at the Site. The 2017 annual inspection was conducted on October 3, 2017. A copy of the annual inspection report is presented in Attachment A. The 2017 inspection shows that the asphalt/concrete cover system is in fair condition; however, several large potholes were observed in the asphalt/concrete. The inspection indicated that well MW88-13A requires repairs to the well casing,

which is broken at the ground surface. Those repairs will be made in 2018 and will be documented in the 2018 PRR.

4. Monitoring Plan Compliance

Commencing in November 2010, groundwater samples have been collected on a semiannual basis from eight on-Site wells in the A-Zone and B-Zone of the bedrock formation at the Site, in accordance with the monitoring plan provided in the SMP. The results of the semiannual groundwater monitoring were used to calculate the volume of groundwater and the chemical loading associated with the groundwater that discharges into the Falls Street Tunnel and the 47th Street Tunnel, which are located immediately adjacent to the Cascades Site. Semiannual Groundwater Discharge Reports are submitted to the Niagara Falls Water Board (NFWB). In addition to the semiannual groundwater sampling, annual groundwater samples were collected from three on-Site deep groundwater monitoring wells (C-Zone). As stated in the SMP, the annual sampling of the deep groundwater monitoring wells will continue for a period of 5 years, starting in 2014 and continuing until 2018. Thereafter, a determination will be made as to the need for and frequency of future sampling.

4.1 Semiannual Groundwater Sampling

Semiannual groundwater sampling was performed on April 11-12, 2017 and October 3-4, 2017. The eight wells were sampled for Target Compound List (TCL) volatile organic compounds (VOCs), Target Analyte List (TAL) metals, and total phenols and in accordance with Environmental Protection Act (EPA) Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures. The calculated groundwater volumes and chemical loadings were presented in the Semiannual Groundwater Discharge Reports submitted to the NFWB on May 19, 2017 and November 30, 2017. The 2017 Semiannual Groundwater Discharge Reports are presented in Attachment B. There were no exceedances of the discharge limitations and monitoring requirements in either the May or November reports.

For both the May 2017 and November 2017 Semiannual Groundwater Discharge Reports, the calculated groundwater volumes and chemical loadings were compared to the discharge limitations and monitoring requirements presented in the NFWB Significant Industrial User (SIU) Permit #78, which was issued on October 1, 2015 by the NFWB to the Norampac-Frontier Site. SIU Permit #78 was revised on August 31, 2016 to accommodate the corporate name change from "Norampac Industries Inc. Niagara Falls Division" to "Cascades Containerboard Packaging Inc. - Frontier Site". SIU Permit #78 was further revised on September 6, 2016 in order to increase the daily maximum groundwater flow from 3,600 gallons per day to 4,000 gallons per day. There were no other changes to the limitations and requirements from the previous revision of SIU Permit #78.

A copy of the revised SIU Permit #78 is presented as Attachment C.

4.2 Annual Groundwater Sampling

Annual sampling of three C-Zone wells (MW1-C-08, MW2-C-08, and MW3-C-08) was conducted on October 4, 2017. The wells were sampled in order to assess the bedrock groundwater quality over time. The wells were sampled for VOCs in accordance with EPA Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures. Table 1 presents the 2017 analytical results for the groundwater samples from the three C-Zone wells.

The C-Zone wells had previously been sampled in December 2008 and March-April 2009, as described in the Remedial Pre-Investigation Design Report (CRA, September 2010), as well as in October 2014, October 2015, and October 2016. Table 2 shows the 2017 analytical results for the three C-Zone wells as compared to the results from the 2008, 2009, 2014, 2015, and 2016 samples, as well as the New York State Technical and Operational Guidance Series (NYS TOGs) guidance values and standards. A discussion of the sample results for the three wells is presented below.

- ***MW1-C-08*** - As seen in Table 2, the 2016 sample from MW1-C-08 had results that were below the NYS TOGs standards, as well as below the results from 2008, 2009, 2014, and 2015. The 2017 total VOC results at MW1-C-08 were slightly higher than the 2016 total VOC results.
- ***MW2-C-08*** - The 2017 sample results from MW2-C-08 exceeded the NYS TOGS standards for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2-chlorotouene, benzene, and chlorobenzene. The 2017 results at MW2-C-08 were also slightly higher for those parameters than the 2008, 2009, 2014, 2015, and 2016 samples, with the exception of benzene (which had a result that was lower than any of the previous samples).
- ***MW3-C-08*** - The 2017 sample results for MW3-C-08 exceeded the NYS TOGs standards for 1,2-dichlorobenzene,1,3-dichlorobenzene 1,4-dichlorobenzene, benzene, and chlorobenzene, and the results for those parameters were also higher than during the 2008, 2009, 2014, 2015, and 2016 sampling events. While the 2015 sample at MW3-C-08 had a cis-1,2-dichloroethene detection of 45 micrograms per liter (µg/L) and a vinyl chloride detection of 9 µg/L, the 2016 and 2017 samples had no detections of cis-1,2-dichloroethene and vinyl chloride.

In accordance with the current schedule, semiannual sampling events will occur in April and October 2018. Semiannual groundwater discharge reports will be submitted to the NFWB in May and November 2018. The next annual sampling event, as well as the annual inspection, will occur in October 2018, followed by the preparation and submission of the next PRR.

4.2.1 Total Concentration Trends

GHD compared the 2017 total VOC concentrations from the three C-Zone wells (MW1-C-08, MW2-C-08, and MW3-C-08) to the historical total VOC concentrations at those wells. Figure 1 shows the total VOC concentrations at MW1-C-08 since measurements began in December 2008. Figure 2 shows the total VOC concentrations at MW2-C-08 since 2008, and Figure 3 shows the same for MW3-C-08.

Figure 1 shows that total VOC concentrations at MW1-C-08 have remained below 6 µg/L since the 2013/2014 source area soil remediation activities were completed, with a total VOC concentration of 1.31 µg/L in 2017. Figure 2 shows an increase of total VOCs at MW2-C-08 since the 2013/2014 remediation activities were completed, with the increase continuing in 2017, as the total VOC concentration at MW2-C-08 was 219.37 µg/L in 2017. Figure 3 shows that the 2017 total VOC concentration at MW3-C-08 was higher than the total VOC concentrations from 2008 through 2016.

4.2.2 Loading to the Sanitary Sewer System

As discussed in Section 4.1, semiannual discharge reports were submitted to the NFWB in May and November 2017. The discharge reports are included in Attachment B. Table 4 of the November 2017 discharge report lists the total chemical flux from all the A-Zone and B-Zone wells along Royal Avenue and 47th Street in order to determine the chemical loading (with regard to VOCs) to the tunnel sewer system. Based on the calculated loadings from the Royal Avenue West Side Mass Flux (Zone-A), the Royal Avenue East Side Mass Flux (Zone-A), the 47th Street Mass Flux (Zone-A), and the 47th Street Mass Flux (Zone-B), the total chemical loading (VOCs) to the tunnel sewer system for the November 2017 reporting period was 0.1142 pound/day. Table 4 of the May 2017 discharge report lists a total chemical flux of 0.1874 pound/day from all the A-Zone and B-Zone wells along Royal Avenue and 47th Street. The following table provides the average daily flow and total daily chemical loading (VOCs) to the tunnel sewer system from the A-Zone and B-Zone wells going back to 2014.

Reporting Period	Calculated Daily Flow (gal/day)	Total Chemical Loading (VOCs) from A-Zone and B-Zone Wells (pounds/day)
November 2017	2,019	0.1142
May 2017	2,435	0.1874
November 2016	1,809	0.0741
May 2016	3,457	0.2798
November 2015	2,097	0.1273
May 2015	2,395	0.1396
November 2014	3,220	0.0902
May 2014	3,077	0.1463

4.3 Vertical Gradients

Groundwater elevations were collected from wells in the C-Zone (MW1-C-08, MW2-C-08, and MW3-C-08) during the October 2017 semiannual and annual groundwater sampling activities. The groundwater elevations were compared to the groundwater contours in the B-Zone at the same locations of the C-Zone wells that were generated using groundwater elevations from B-Zone wells during the October 2017 sampling activities. The following table shows the groundwater elevations (measured in feet above mean sea level) in the B-Zone and C-Zone at the locations of MW1-C-08, MW2-C-08, and MW3-C-08 in October 2016.

Zone	MW-1	MW-2	MW-3
B	546	555	555
C	555.3	555.47	556.61

The upward gradient between the C-Zone and B-Zone was confirmed by the groundwater elevations collected from the C-Zone wells and the B-Zone groundwater contours in October 2017.

5. Overall Conclusions and Recommendations

All of the required work was completed and is reported herein. The remedy has effectively isolated and secured the residual material, and there is no risk to human health or the environment. It is noted that there are a few chemicals present in the C-Zone groundwater that exceed the NYS TOGS standards. However, there is an upward gradient from the C-Zone into the B-Zone that should protect the C-Zone from impact associated with any of the residual materials left in the Site soils. It is recommended that the annual groundwater monitoring of the C-Zone wells continue as described in the SMP in order to track the current condition. Semiannual groundwater monitoring and annual inspections will also continue as described in the SMP.

As required, a completed copy of the Site Management PRR Notice – Institutional and Engineering Controls Certificate Form is included as Attachment D.

Should there be any questions, please do not hesitate to contact me at 716-205-1975 or Michelle Hamm and Bill Rajczak of Cascades at 716-490-0595.

Sincerely,

GHD

Shaun McEvoy

SM/adh/2

Encl.

cc: Michelle Hamm, Cascades
Bill Rajczak, Cascades
Richard Snyder, GHD

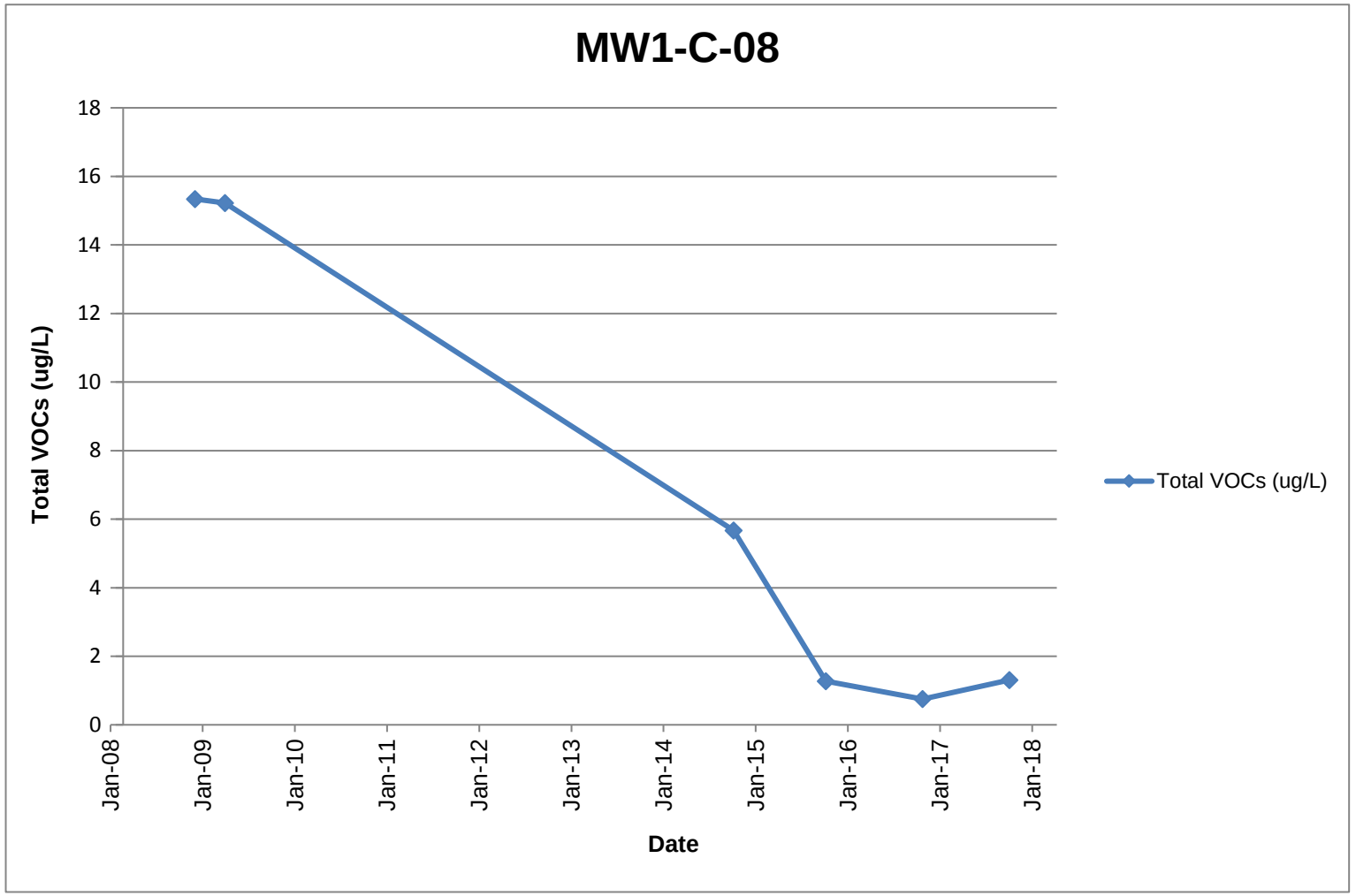


figure 1
Total VOC Concentration Trend, MW1-C-08 (2008 - 2017)
Cascades Containerboard Packaging Site
2017 Periodic Review Report
GHD

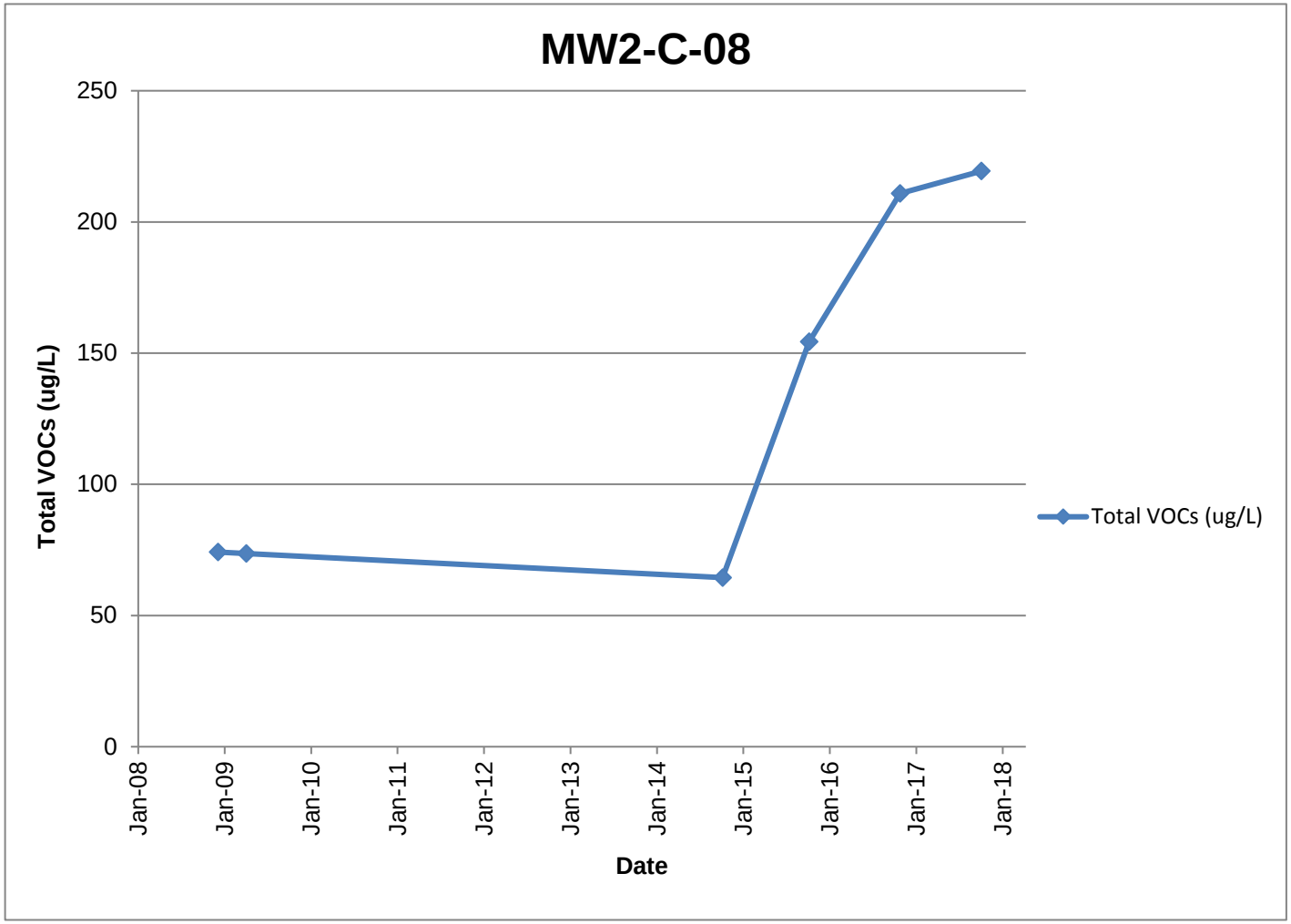


figure 2
Total VOC Concentration Trend, MW2-C-08 (2008 - 2017)
Cascades Containerboard Packaging Site
2017 Periodic Review Report
GHD

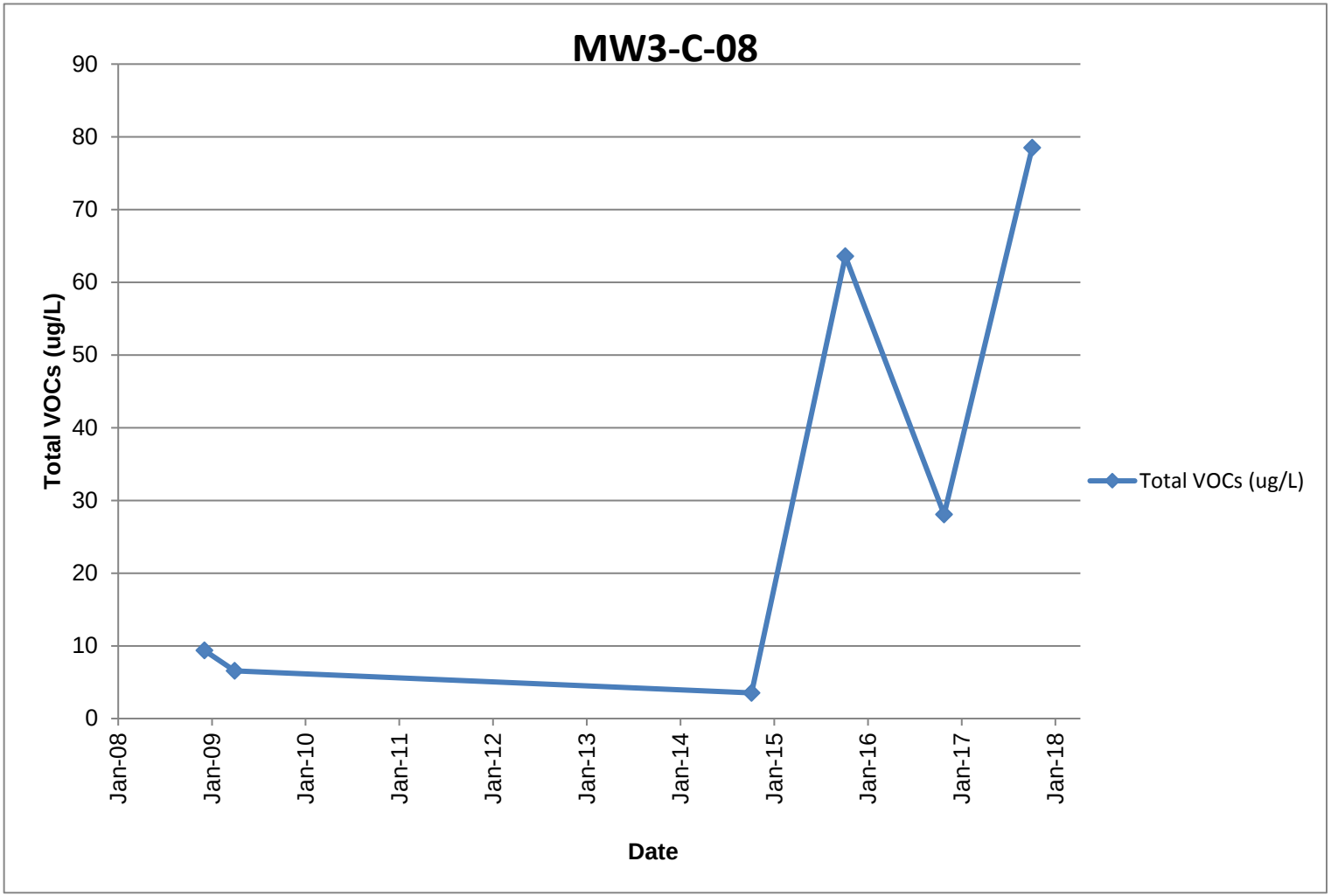


figure 3
Total VOC Concentration Trend, MW3-C-08 (2008 - 2017)
Cascades Containerboard Packaging Site
2017 Periodic Review Report
GHD

Table 1

Analytical Results Summary
C-Zone Groundwater Sampling
Cascades Containerboard Packaging Site
Niagara Falls, New York
October 2017

	Location ID:	MW1-C-08	MW2-C-08	MW3-C-08
	Sample Name:	WG-11109628-100417-SG-010	WG-11109628-100417-SG-011	WG-11109628-100417-SG-009
	Sample Date:	10/04/2017	10/04/2017	10/04/2017
Parameters	**Unit**			
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	0.67 J	0.25 J	0.88 J
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	µg/L	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane (Ethylene dibromide)	µg/L	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	µg/L	1.0 U	6.9	9.1 J
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	µg/L	1.0 U	22	6.1 J
1,4-Dichlorobenzene	µg/L	1.0 U	41	34 J
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	µg/L	1.0 U	13	3.6 J
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U
4-Chlorotoluene	µg/L	1.0 U	0.90 J	1.4 J
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	5.0 U	5.0 U	5.0 U
Acetone	µg/L	5.0 U	5.7	8.0 J
Benzene	µg/L	0.18 J	6.5	2.2 J
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	120	13 J
Chloroethane	µg/L	1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	0.46 J	0.56 J	1.0 U
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U
Cyclohexane	µg/L	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U
Isopropyl benzene	µg/L	1.0 U	1.0 U	1.0 U
Methyl acetate	µg/L	5.0 U	5.0 U	5.0 U
Methyl cyclohexane	µg/L	1.0 U	1.0 U	1.0 U
Methyl tert butyl ether (MTBE)	µg/L	1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	1.0 U	0.92 J	1.0 U
Toluene	µg/L	1.0 U	0.44 J	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	0.21 J
trans-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	1.0 U	0.62 J	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	1.0 U	1.0 U	1.0 U
Trifluorotrichloroethane (CFC-113)	µg/L	1.0 U	1.0 U	1.0 U
Vinyl chloride	µg/L	1.0 U	0.58 J	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U

Notes:

J - Estimated concentration
U - Not detected at the associated reporting limit

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

				Location ID:	MW1-C-08	MW1-C-08	MW1-C-08
				Sample Name:	GW-47392-120308-JJW-001	GW-47392-033109-JJW-014	GW-47392-033109-JJW-015
				Sample Date:	12/03/2008	03/31/2009	03/31/2009
							Duplicate
		New York State TOGs					
Parameter	**Units**	**Guidance Value**	**Standard**				
Volatile Organic Compounds (VOCs)							
1,1,1-Trichloroethane	µg/L	NC	5		1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5		1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	NC	1		1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	NC	5		1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04		1.0 U	1.0 U	1.0 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006		1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	µg/L	NC	3		1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	NC	0.6		1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	NC	1		1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	µg/L	NC	3		1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	µg/L	NC	3		1.0 U	1.0 U	1.0 U
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC		5.0 U	5.0 U	5.0 U
2-Chlorotoluene	ug/L	NC	5		1.0 U	1.0 U	1.0 U
2-Chloroethyl vinyl ether	µg/L	NC	NC		--	--	--
2-Hexanone	µg/L	50	NC		5.0 U	5.0 U	5.0 U
3-Chlorotoluene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
4-Chlorotoluene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC		5.0 U	5.0 U	5.0 U
Acetone	µg/L	50	NC		5.0 U	5.0 U	5.0 U
Acrolein	µg/L	NC	5		--	--	--
Acrylonitrile	µg/L	NC	5		--	--	--
Benzene	µg/L	NC	1		0.84 J	**3.1**	**2.6**
Bromodichloromethane	µg/L	50	NC		1.0 U	1.0 U	1.0 U
Bromoform	µg/L	50	NC		1.0 U	1.0 U	1.0 U
Bromomethane (Methyl Bromide)	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	60	NC		1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Chloroethane	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	NC	7		**10**	1.0 U	0.65 J
Chloromethane (Methyl Chloride)	µg/L	NC	5		1.0 U	1.0 UJ	1.0 UJ
cis-1,2-Dichloroethene	µg/L	NC	5		1.0 U	1.6	1.2
cis-1,3-Dichloropropene	µg/L	NC	NC		1.0 U	1.0 U	1.0 U
Cyclohexane	µg/L	NC	NC		1.1	1.0 U	1.0 U
Dibromochloromethane	µg/L	50	NC		1.0 U	1.0 U	1.0 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

				Location ID:	MW1-C-08	MW1-C-08	MW1-C-08
				Sample Name:	GW-47392-120308-JJW-001	GW-47392-033109-JJW-014	GW-47392-033109-JJW-015
				Sample Date:	12/03/2008	03/31/2009	03/31/2009
							Duplicate
		New York State TOGs					
Parameter	**Units**	**Guidance Value**	**Standard**				
Volatile Organic Compounds (VOCs)							
Dibromodifluoromethane	µg/L	NC	NC		--	1.0 U	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5		1.0 U	--	--
Ethylbenzene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Isopropylbenzene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Methyl acetate	µg/L	NC	NC		1.0 U	1.0 U	1.0 U
Methyl cyclohexane	µg/L	NC	NC		1.8	1.0 U	1.0 U
Methyl Tert Butyl Ether	µg/L	10	NC		1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Styrene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Toluene	µg/L	NC	5		1.6	4.7 J	**9.8 J**
Total Monochlorotoluenes	µg/L	NC	NC		1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	NC	NC		1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5		1.0 U	1.0 U	1.0 U
Vinyl chloride	µg/L	NC	2		1.0 U	1.5	0.97 J
Xylene (total)	µg/L	NC	NC		3.0 U	2.0 U	2.0 U
Total VOCs	µg/L	NC	NC		15.34	10.9	15.22

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW1-C-08**	**MW1-C-08**	**MW1-C-08**
			Sample Name:	**WG-47392-100714-DJT-010**	**WG-11109628-100815-SG-012**	**WG-11109628-102516-SG-003**
			Sample Date:	**10/07/2014**	**10/08/2015**	**10/25/2016**
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
1,1,1-Trichloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	NC	1	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	NC	5	0.77J	0.65 J	0.75 J
1,1-Dichloroethene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04	--	--	5.0 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006	--	--	5.0 U
1,2-Dichlorobenzene	µg/L	NC	3	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	µg/L	NC	0.6	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	NC	1	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	µg/L	NC	3	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	µg/L	NC	3	5.0 U	5.0 U	5.0 U
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC	--	--	25 U
2-Chlorotoluene	ug/L	NC	5	--	--	--
2-Chloroethyl vinyl ether	µg/L	NC	NC	25 U	25 U	--
2-Hexanone	µg/L	50	NC	--	--	25 U
3-Chlorotoluene	µg/L	NC	5	--	--	
4-Chlorotoluene	µg/L	NC	5	--	--	
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC	--	--	25 U
Acetone	µg/L	50	NC	25 U	25 U	25 U
Acrolein	µg/L	NC	5	100 U	100 U	--
Acrylonitrile	µg/L	NC	5	50 U	50 U	--
Benzene	µg/L	NC	1	**1.6 J**	0.62 J	5.0 U
Bromodichloromethane	µg/L	50	NC	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	50	NC	5.0 U	5.0 U	5.0 U
Bromomethane (Methyl Bromide)	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Carbon disulfide	µg/L	60	NC	--	--	5.0 U
Carbon tetrachloride	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Chloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Chloroform (Trichloromethane)	µg/L	NC	7	5.0 U	5.0 U	5.0 U
Chloromethane (Methyl Chloride)	µg/L	NC	5	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	NC	5	0.84 J	5.0 U	5.0 U
cis-1,3-Dichloropropene	µg/L	NC	NC	5.0 U	5.0 U	5.0 U
Cyclohexane	µg/L	NC	NC	--	--	--
Dibromochloromethane	µg/L	50	NC	5.0 U	5.0 U	5.0 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW1-C-08**	**MW1-C-08**	**MW1-C-08**
			Sample Name:	**WG-47392-100714-DJT-010**	**WG-11109628-100815-SG-012**	**WG-11109628-102516-SG-003**
			Sample Date:	**10/07/2014**	**10/08/2015**	**10/25/2016**
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
Dibromodifluoromethane	µg/L	NC	NC	--	--	--
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5	--	--	5.0 U
Ethylbenzene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Isopropylbenzene	µg/L	NC	5	--	--	5.0 U
Methyl acetate	µg/L	NC	NC	--	--	--
Methyl cyclohexane	µg/L	NC	NC	--	--	--
Methyl Tert Butyl Ether	µg/L	10	NC	--	--	5.0 U
Methylene chloride	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Styrene	µg/L	NC	5	--	--	5.0 U
Tetrachloroethene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Toluene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Total Monochlorotoluenes	µg/L	NC	NC	5.0 U	5.0 U	25 U
trans-1,2-Dichloroethene	µg/L	NC	5	0.96 J	5.0 U	5.0 U
trans-1,3-Dichloropropene	µg/L	NC	NC	5.0 U	5.0 U	5.0 U
Trichloroethene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane (CFC-11)	µg/L	NC	5	--	--	5.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5	--	--	5.0 U
Vinyl chloride	µg/L	NC	2	1.5 J	5.0 U	5.0 U
Xylene (total)	µg/L	NC	NC	--	--	10 U
Total VOCs	µg/L	NC	NC	5.67	1.27	0.75

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW1-C-08**	**MW2-C-08**	**MW2-C-08**
			Sample Name:	**WG-11109628-100417-SG-010**	**GW-47392-120508-JJW-011**	**GW-47392-040309-JJW-023**
			Sample Date:	**10/04/2017**	**12/05/2008**	**04/03/2009**
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
1,1,1-Trichloroethane	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	NC	1	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	NC	5	0.67 J	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	µg/L	NC	5	1.0 U	1.0 UJ	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	µg/L	NC	3	1.0 U	1.5	1.5
1,2-Dichloroethane	µg/L	NC	0.6	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	NC	1	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	µg/L	NC	3	1.0 U	2.3	**3.1**
1,4-Dichlorobenzene	µg/L	NC	3	1.0 U	**3.6**	**4.0**
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	ug/L	NC	5	1.0 U	2.0	1.0 U
2-Chloroethyl vinyl ether	µg/L	NC	NC	--	--	--
2-Hexanone	µg/L	50	NC	5.0 U	5.0 U	5.0 U
3-Chlorotoluene	µg/L	NC	5	--	1.0 U	2.3
4-Chlorotoluene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC	5.0 U	5.0 U	5.0 U
Acetone	µg/L	50	NC	5.0 U	5.0 UJ	5.0 U
Acrolein	µg/L	NC	5	--	--	--
Acrylonitrile	µg/L	NC	5	--	--	--
Benzene	µg/L	NC	1	0.18 J	**33**	**30**
Bromodichloromethane	µg/L	50	NC	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	50	NC	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl Bromide)	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	60	NC	1.0 U	0.57 J	1.0 U
Carbon tetrachloride	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	NC	5	1.0 U	**24**	**26**
Chloroethane	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	NC	7	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl Chloride)	µg/L	NC	5	0.46 J	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	NC	5	1.0 U	2.8	2.6
cis-1,3-Dichloropropene	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Cyclohexane	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	50	NC	1.0 U	1.0 U	1.0 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW1-C-08**	**MW2-C-08**	**MW2-C-08**
			Sample Name:	**WG-11109628-100417-SG-010**	**GW-47392-120508-JJW-011**	**GW-47392-040309-JJW-023**
			Sample Date:	**10/04/2017**	**12/05/2008**	**04/03/2009**
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
Dibromodifluoromethane	µg/L	NC	NC	--	--	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5	1.0 U	1.0 U	--
Ethylbenzene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Isopropylbenzene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Methyl acetate	µg/L	NC	NC	5.0 U	1.0 UJ	1.0 UJ
Methyl cyclohexane	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Methyl Tert Butyl Ether	µg/L	10	NC	1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Styrene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Toluene	µg/L	NC	5	1.0 U	1.0	1.0 U
Total Monochlorotoluenes	µg/L	NC	NC	-	2	2.3
trans-1,2-Dichloroethene	µg/L	NC	5	1.0 U	0.80 J	0.61 J
trans-1,3-Dichloropropene	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	NC	5	1.0 U	0.63 J	0.52 J
Trichlorofluoromethane (CFC-11)	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Vinyl chloride	µg/L	NC	2	1.0 U	2.0	**3.0**
Xylene (total)	µg/L	NC	NC	2.0 U	3.0 U	2.0 U
Total VOCs	µg/L	NC	NC	1.31	74.2	73.63

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW2-C-08**	**MW2-C-08**	**MW2-C-08**
			Sample Name:	**WG-47392-100714-SG-011**	**WG-11109628-100715-SG-008**	**WG-11109628-102516-SG-006**
			Sample Date:	**10/7/2014**	**10/07/2015**	**10/25/2016**
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
1,1,1-Trichloroethane	µg/L	NC	5	5.0 U	5.0 U	20 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5	5.0 U	5.0 U	20 U
1,1,2-Trichloroethane	µg/L	NC	1	5.0 U	5.0 U	20 U
1,1-Dichloroethane	µg/L	NC	5	5.0 U	5.0 U	20 U
1,1-Dichloroethene	µg/L	NC	5	5.0 U	5.0 U	20 U
1,2,4-Trichlorobenzene	µg/L	NC	5	5.0 U	5.0 U	20 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04	--	--	20 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006	--	--	20 U
1,2-Dichlorobenzene	µg/L	NC	3	2.8 J	**6.2**	**6.8 J**
1,2-Dichloroethane	µg/L	NC	0.6	5.0 U	5.0 U	20 U
1,2-Dichloropropane	µg/L	NC	1	5.0 U	5.0 U	20 U
1,3-Dichlorobenzene	µg/L	NC	3	**3.4 J**	**13**	**20**
1,4-Dichlorobenzene	µg/L	NC	3	**7.8**	**25**	**37**
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC	--	--	100 U
2-Chlorotoluene	ug/L	NC	5	--	--	--
2-Chloroethyl vinyl ether	µg/L	NC	NC	25 U	25 U	--
2-Hexanone	µg/L	50	NC	--	--	100 U
3-Chlorotoluene	µg/L	NC	5	--	--	--
4-Chlorotoluene	µg/L	NC	5	--	--	--
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC	--	--	100 U
Acetone	µg/L	50	NC	25 U	25 U	100 U
Acrolein	µg/L	NC	5	100 U	100 U	--
Acrylonitrile	µg/L	NC	5	50 U	50 U	--
Benzene	µg/L	NC	1	**8.6**	**12**	**13 J**
Bromodichloromethane	µg/L	50	NC	5.0 U	--	20 U
Bromoform	µg/L	50	NC	5.0 U	5.0 U	20 U
Bromomethane (Methyl Bromide)	µg/L	NC	5	5.0 U	5.0 U	20 U
Carbon disulfide	µg/L	60	NC	--	--	20 U
Carbon tetrachloride	µg/L	NC	5	5.0 U	5.0 U	20 U
Chlorobenzene	µg/L	NC	5	**38**	**86**	**120**
Chloroethane	µg/L	NC	5	5.0 U	5.0 U	20 U
Chloroform (Trichloromethane)	µg/L	NC	7	5.0 U	5.0 U	20 U
Chloromethane (Methyl Chloride)	µg/L	NC	5	5.0 U	5.0 U	20 U
cis-1,2-Dichloroethene	µg/L	NC	5	5.0 U	0.67 J	20 U
cis-1,3-Dichloropropene	µg/L	NC	NC	5.0 U	5.0 U	20 U
Cyclohexane	µg/L	NC	NC	--	--	--
Dibromochloromethane	µg/L	50	NC	5.0 U	5.0 U	20 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	MW2-C-08	MW2-C-08	MW2-C-08
			Sample Name:	WG-47392-100714-SG-011	WG-11109628-100715-SG-008	WG-11109628-102516-SG-006
			Sample Date:	10/7/2014	10/07/2015	10/25/2016
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
Dibromodifluoromethane	µg/L	NC	NC	--	--	--
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5	--	--	20 U
Ethylbenzene	µg/L	NC	5	5.0 U	5.0 U	20 U
Isopropylbenzene	µg/L	NC	5	--	--	20 U
Methyl acetate	µg/L	NC	NC	--	--	--
Methyl cyclohexane	µg/L	NC	NC	--	--	--
Methyl Tert Butyl Ether	µg/L	10	NC	--	--	20 U
Methylene chloride	µg/L	NC	5	5.0 U	5.0 U	20 U
Styrene	µg/L	NC	5	--	--	20 U
Tetrachloroethene	µg/L	NC	5	5.0 U	5.0 U	20 U
Toluene	µg/L	NC	5	5.0 U	0.56 J	20 U
Total Monochlorotoluenes	µg/L	NC	NC	3.0 J	9.84 J	14 J
trans-1,2-Dichloroethene	µg/L	NC	5	5.0 U	5.0 U	20 U
trans-1,3-Dichloropropene	µg/L	NC	NC	5.0 U	5.0 U	20 U
Trichloroethene	µg/L	NC	5	5.0 U	5.0 U	20 U
Trichlorofluoromethane (CFC-11)	µg/L	NC	5	--	--	20 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5	--	--	20 U
Vinyl chloride	µg/L	NC	2	0.85 J	1.1 J	20 U
Xylene (total)	µg/L	NC	NC	--	--	40 U
Total VOCs	µg/L	NC	NC	64.45	154.37	210.8

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW2-C-08**	**MW3-C-08**	**MW3-C-08**
			Sample Name:	**WG-11109628-100417-SG-011**	**GW-47392-120408-JJW-006**	**GW-47392-040109-JJW-019**
			Sample Date:	**10/04/2017**	**12/04/2008**	**04/01/2009**
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
1,1,1-Trichloroethane	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	NC	1	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	NC	5	0.25 J	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	µg/L	NC	3	**6.9**	0.54 J	0.58 J
1,2-Dichloroethane	µg/L	NC	0.6	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	NC	1	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	µg/L	NC	3	**22**	0.50 J	0.47 J
1,4-Dichlorobenzene	µg/L	NC	3	**41**	1.0	1.2
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC	5.0 U	5.0 U	5.0 U
2-Chlorotoluene	ug/L	NC	5	**13**	0.67 J	1.0 U
2-Chloroethyl vinyl ether	µg/L	NC	NC	--	--	--
2-Hexanone	µg/L	50	NC	5.0 U	5.0 U	5.0 U
3-Chlorotoluene	µg/L	NC	5	--	1.0 U	0.56 J
4-Chlorotoluene	µg/L	NC	5	0.90 J	1.0 U	1.0 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC	5.0 U	5.0 U	5.0 U
Acetone	µg/L	50	NC	5.7	5.0 U	5.0 U
Acrolein	µg/L	NC	5	--	--	--
Acrylonitrile	µg/L	NC	5	--	--	--
Benzene	µg/L	NC	1	**6.5**	0.83 J	1.0 U
Bromodichloromethane	µg/L	50	NC	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	50	NC	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl Bromide)	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	60	NC	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	NC	5	**120**	1.3	1.1
Chloroethane	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	NC	7	1.0 U	0.60 J	1.0 U
Chloromethane (Methyl Chloride)	µg/L	NC	5	1.0 U	1.0 U	1.0 UJ
cis-1,2-Dichloroethene	µg/L	NC	5	0.56 J	1.8	1.9
cis-1,3-Dichloropropene	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Cyclohexane	µg/L	NC	NC	--	1.0 U	1.0 U
Dibromochloromethane	µg/L	50	NC	1.0 U	1.0 U	1.0 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	MW2-C-08	MW3-C-08	MW3-C-08
			Sample Name:	WG-11109628-100417-SG-011	GW-47392-120408-JJW-006	GW-47392-040109-JJW-019
			Sample Date:	10/04/2017	12/04/2008	04/01/2009
		New York State TOGs				
Parameter	**Units**	**Guidance Value**	**Standard**			
Volatile Organic Compounds (VOCs)						
Dibromodifluoromethane	µg/L	NC	NC	--	--	1.0 U
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5	1.0 U	1.0 U	--
Ethylbenzene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Isopropylbenzene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Methyl acetate	µg/L	NC	NC	5.0 U	1.0 U	1.0 U
Methyl cyclohexane	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Methyl Tert Butyl Ether	µg/L	10	NC	1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Styrene	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	NC	5	0.92 J	1.0 U	1.0 U
Toluene	µg/L	NC	5	0.44 J	1.0 U	1.0 U
Total Monochlorotoluenes	µg/L	NC	NC	--	0.67 J	0.56 J
trans-1,2-Dichloroethene	µg/L	NC	5	1.0 U	0.54 J	0.73 J
trans-1,3-Dichloropropene	µg/L	NC	NC	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	NC	5	0.62 J	1.0 U	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5	1.0 U	1.0 U	1.0 U
Vinyl chloride	µg/L	NC	2	0.58 J	1.5	1.0 U
Xylene (total)	µg/L	NC	NC	2.0 U	3.0 U	2.0 U
Total VOCs	µg/L	NC	NC	219.37	9.28	6.54

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

				Location ID:	MW3-C-08	MW3-C-08	MW3-C-08
				Sample Name:	WG-47392-100714-SG-012	WG-11109628-100715-DT-007	WG-11109628-102616-SG-008
				Sample Date:	10/7/2014	10/07/2015	10/26/2016
		New York State TOGs					
Parameter	**Units**	**Guidance Value**	**Standard**				
Volatile Organic Compounds (VOCs)							
1,1,1-Trichloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	µg/L	NC	1	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	µg/L	NC	5	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04	--	--	5.0 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006	--	--	5.0 U
1,2-Dichlorobenzene	µg/L	NC	3	5.0 U	0.98 J	**3.5 J**
1,2-Dichloroethane	µg/L	NC	0.6	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	µg/L	NC	1	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	µg/L	NC	3	5.0 U	1.7 J	**3.2 J**
1,4-Dichlorobenzene	µg/L	NC	3	1.0 J	**3.3 J**	**13**
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC	--	--	25 U
2-Chlorotoluene	ug/L	NC	5	--	--	
2-Chloroethyl vinyl ether	µg/L	NC	NC	25 U	25 U	--
2-Hexanone	µg/L	50	NC	--	--	25 U
3-Chlorotoluene	µg/L	NC	5	--	--	25 U
4-Chlorotoluene	µg/L	NC	5	--	--	25 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC	--	--	25 U
Acetone	µg/L	50	NC	25 U	25 U	25 U
Acrolein	µg/L	NC	5	100 U	100 U	--
Acrylonitrile	µg/L	NC	5	50 U	50 U	--
Benzene	µg/L	NC	1	5.0 U	5.0 U	5.0 U
Bromodichloromethane	µg/L	50	NC	5.0 U	5.0 U	5.0 U
Bromoform	µg/L	50	NC	5.0 U	5.0 U	5.0 U
Bromomethane (Methyl Bromide)	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Carbon disulfide	µg/L	60	NC	--	--	5.0 U
Carbon tetrachloride	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Chlorobenzene	µg/L	NC	5	5.0 U	1.1 J	**5.6**
Chloroethane	µg/L	NC	5	5.0 U	5.0 U	5.0 U
Chloroform (Trichloromethane)	µg/L	NC	7	5.0 U	5.0 U	5.0 U
Chloromethane (Methyl Chloride)	µg/L	NC	5	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	µg/L	NC	5	1.6 J	**45**	5.0 U
cis-1,3-Dichloropropene	µg/L	NC	NC	5.0 U	5.0 U	5.0 U
Cyclohexane	µg/L	NC	NC	--	--	--
Dibromochloromethane	µg/L	50	NC	5.0 U	5.0 U	5.0 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

				Location ID:	MW3-C-08	MW3-C-08	MW3-C-08
				Sample Name:	WG-47392-100714-SG-012	WG-11109628-100715-DT-007	WG-11109628-102616-SG-008
				Sample Date:	10/7/2014	10/07/2015	10/26/2016
		New York State TOGs					
Parameter	**Units**	**Guidance Value**	**Standard**				
Volatile Organic Compounds (VOCs)							
Dibromodifluoromethane	µg/L	NC	NC		--	--	--
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5		--	--	5.0 U
Ethylbenzene	µg/L	NC	5		5.0 U	5.0 U	5.0 U
Isopropylbenzene	µg/L	NC	5		--	--	5.0 U
Methyl acetate	µg/L	NC	NC		--	--	--
Methyl cyclohexane	µg/L	NC	NC		--	--	--
Methyl Tert Butyl Ether	µg/L	10	NC		--	--	5.0 U
Methylene chloride	µg/L	NC	5		5.0 U	5.0 U	5.0 U
Styrene	µg/L	NC	5		--	--	5.0 U
Tetrachloroethene	µg/L	NC	5		5.0 U	5.0 U	5.0 U
Toluene	µg/L	NC	5		5.0 U	5.0 U	5.0 U
Total Monochlorotoluenes	µg/L	NC	NC		5.0 U	5.0 U	2.75 J
trans-1,2-Dichloroethene	µg/L	NC	5		5.0 U	0.70 J	5.0 U
trans-1,3-Dichloropropene	µg/L	NC	NC		5.0 U	5.0 U	5.0 U
Trichloroethene	µg/L	NC	5		5.0 U	1.8 J	5.0 U
Trichlorofluoromethane (CFC-11)	µg/L	NC	5		--	--	5.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5		--	--	5.0 U
Vinyl chloride	µg/L	NC	2		0.93 J	**9**	5.0 U
Xylene (total)	µg/L	NC	NC		--	--	10 U
Total VOCs	µg/L	NC	NC		3.53	63.58	28.05

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

			Location ID:	**MW3-C-08**
			Sample Name:	**WG-11109628-100417-SG-009**
			Sample Date:	**10/04/2017**
		New York State TOGs		
Parameter	**Units**	**Guidance Value**	**Standard**	
Volatile Organic Compounds (VOCs)				
1,1,1-Trichloroethane	µg/L	NC	5	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	NC	5	1.0 U
1,1,2-Trichloroethane	µg/L	NC	1	1.0 U
1,1-Dichloroethane	µg/L	NC	5	0.88 J
1,1-Dichloroethene	µg/L	NC	5	1.0 U
1,2,4-Trichlorobenzene	µg/L	NC	5	1.0 U
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	NC	0.04	1.0 U
1,2-Dibromoethane (Ethylene Dibromide)	µg/L	NC	0.0006	1.0 U
1,2-Dichlorobenzene	µg/L	NC	3	**9.1 J**
1,2-Dichloroethane	µg/L	NC	0.6	1.0 U
1,2-Dichloropropane	µg/L	NC	1	1.0 U
1,3-Dichlorobenzene	µg/L	NC	3	**6.1 J**
1,4-Dichlorobenzene	µg/L	NC	3	**34 J**
2-Butanone (Methyl Ethyl Ketone)	µg/L	50	NC	5.0 U
2-Chlorotoluene	ug/L	NC	5	3.6 J
2-Chloroethyl vinyl ether	µg/L	NC	NC	-
2-Hexanone	µg/L	50	NC	5.0 U
3-Chlorotoluene	µg/L	NC	5	-
4-Chlorotoluene	µg/L	NC	5	1.4 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	µg/L	NC	NC	5.0 U
Acetone	µg/L	50	NC	8.0 J
Acrolein	µg/L	NC	5	-
Acrylonitrile	µg/L	NC	5	-
Benzene	µg/L	NC	1	**2.2 J**
Bromodichloromethane	µg/L	50	NC	1.0 U
Bromoform	µg/L	50	NC	1.0 U
Bromomethane (Methyl Bromide)	µg/L	NC	5	1.0 U
Carbon disulfide	µg/L	60	NC	1.0 U
Carbon tetrachloride	µg/L	NC	5	1.0 U
Chlorobenzene	µg/L	NC	5	**13 J**
Chloroethane	µg/L	NC	5	1.0 U
Chloroform (Trichloromethane)	µg/L	NC	7	1.0 U
Chloromethane (Methyl Chloride)	µg/L	NC	5	1.0 U
cis-1,2-Dichloroethene	µg/L	NC	5	1.0 U
cis-1,3-Dichloropropene	µg/L	NC	NC	1.0 U
Cyclohexane	µg/L	NC	NC	1.0 U
Dibromochloromethane	µg/L	50	NC	1.0 U

Table 2

Summary of 2017 Deep Groundwater (C-Zone) Analytical Results
Cascades Containerboard Packaging Site
Niagara Falls, New York

Location ID:	**MW3-C-08**
Sample Name:	**WG-11109628-100417-SG-009**
Sample Date:	**10/04/2017**

Parameter	**Units**	**New York State TOGs**		
		Guidance Value	**Standard**	
Volatile Organic Compounds (VOCs)				
Dibromodifluoromethane	µg/L	NC	NC	-
Dichlorodifluoromethane (CFC-12)	µg/L	NC	5	1.0 U
Ethylbenzene	µg/L	NC	5	1.0 U
Isopropylbenzene	µg/L	NC	5	1.0 U
Methyl acetate	µg/L	NC	NC	1.0 U
Methyl cyclohexane	µg/L	NC	NC	1.0 U
Methyl Tert Butyl Ether	µg/L	10	NC	1.0 U
Methylene chloride	µg/L	NC	5	1.0 U
Styrene	µg/L	NC	5	1.0 U
Tetrachloroethene	µg/L	NC	5	1.0 U
Toluene	µg/L	NC	5	1.0 U
Total Monochlorotoluenes	µg/L	NC	NC	-
trans-1,2-Dichloroethene	µg/L	NC	5	0.21 J
trans-1,3-Dichloropropene	µg/L	NC	NC	1.0 U
Trichloroethene	µg/L	NC	5	1.0 U
Trichlorofluoromethane (CFC-11)	µg/L	NC	5	1.0 U
Trifluorotrichloroethane (Freon 113)	µg/L	NC	5	1.0 U
Vinyl chloride	µg/L	NC	2	1.0 U
Xylene (total)	µg/L	NC	NC	2.0 U
Total VOCs	µg/L	NC	NC	78.49

Notes:

6.24	- Concentration exceed NYS TOGs
U	- Not present at or above the associated MDL
J	- Estimated concentration between the MDL and Reporting Limit
MDL	- Method Detection Limit
NC	- No criteria
NYS TOGs	- New York State Technical and Operational Guidance Series
--	- Not analyzed

Attachment A
2017 Site Inspection Form

SITE INSPECTION FORM
CASCADES CONTAINERBOARD PACKAGING SITE
NIAGARA FALLS, NEW YORK
NYSDEC SITE NO. 932110

INSPECTION DATE: 10/3/17

INSPECTED BY: D. Tyran S. Gardner

Overall Site

Has the Site use changed since the last inspection? ***Yes*** _____ ***No*** X

If yes, please describe the changes: _____

Have neighboring property uses changed? ***Yes*** _____ ***No*** X

If yes, please describe the changes: _____

Asphalt/Concrete Cover System

Potential Problems	***Concern***	***Corrective Action***
Potholes and cracks	• Deterioration of asphalt pavement or concrete • Safety hazard	• Use cold mix or hot mix asphalt and liquid bituminous material to patch, repair, or replace asphalt • For concrete, select repair method based on type and extent of damage
Ponding water	• Safety hazard	• No action required if ponding is minor • If ponding is significant, install drainage holes in asphalt/concrete pavement
Obstructions/Debris	• Safety hazard	• Remove obstructions as soon as possible

Inspect For	***Inspection Item Identified (circle one)***		***Action Required (circle one)***		***Comments***
Deterioration	Yes	(No)	Yes	(No)	
Obstruction/Debris	Yes	(No)	Yes	(No)	
Potholes	(Yes)	No	Yes	No	Several large 10' ø potholes
Drainage/Puddles	Yes	(No)	Yes	(No)	
Other	Yes	(No)	Yes	(No)	

D. Tyran

SITE INSPECTION FORM
CASCADES CONTAINERBOARD PACKAGING SITE
NIAGARA FALLS, NEW YORK
NYSDEC SITE NO. 932110

INSPECTION DATE: 10/3/17

INSPECTED BY: D. Tyran S. Gardner

Soil Cover System

Potential Problems	***Concern***	***Corrective Action***
Erosion	• Deterioration of integrity of crushed concrete cover • Washed out cover	• Backfill with additional imported crushed stone as needed • If persistent erosion occurs, erosion control mats may be required in selected areas
Animal burrows	• Potential for crushed concrete erosion • Safety hazard	• Contract exterminator regarding trapping and relocation of persistent rodents • Fill all holes with crushed stone
Damage to fence	• Potential access to Site by unauthorized persons	• No action if damage is minor and does not allow access by unauthorized persons • Repair fence if appropriate

Inspect For	***Inspection Item Identified (circle one)***		***Action Required (circle one)***		***Comments***
Erosion	Yes	(No)	Yes	(No)	
Animal Burrows	Yes	(No)	Yes	(No)	
Damage to fence	Yes	(No)	Yes	(No)	
Other	Yes	(No)	Yes	(No)	

SITE INSPECTION FORM
CASCADES CONTAINERBOARD PACKAGING SITE
NIAGARA FALLS, NEW YORK
NYSDEC SITE NO. 932110

INSPECTION DATE: 10/3/17

INSPECTED BY: D. Tyran S. Gardner

Monitoring Wells

Potential Problems	***Concern***	***Corrective Action***
Missing locks	• Potential access by unauthorized persons	• Replace lock
Missing J-plugs	• Potential well contamination from surface water or rain water	• Replace J-plug
Concrete surface seal	• Damaged seal can allow water infiltration around casing and contamination of groundwater	• Contract drilling subcontractor to have surface seal replaced
Damaged flush-mount or stickup casing	• Damaged casing can result in damage to riser	• Contract drilling subcontractor to have casing replaced

Monitoring Well	***Well Condition (circle one)***			***Comments***
MW3C-08	(Good)	Fair	Needs Repair	
BH87-3A	(Good)	Fair	Needs Repair	
BH87-3B	(Good)	Fair	Needs Repair	
MW01-9A	(Good)	Fair	Needs Repair	
MW-9	Good	(Fair)	Needs Repair	
MW2C-08	(Good)	Fair	Needs Repair	
MW88-13A	Good	Fair	(Needs Repair)	Well Casing Broken off @ Ground surface
BH87-28	Good	(Fair)	Needs Repair	
MW-12	(Good)	Fair	Needs Repair	
MW1C-08	(Good)	Fair	Needs Repair	
MW-13	(Good)	Fair	Needs Repair	

D. Tyran

Attachment B
May 2017 and November 2017 Semiannual Discharge Reports

May 19, 2017 Reference No. 11109628

Mr. Joel Paradise
Niagara Falls Water Board
5815 Buffalo Avenue
Niagara Falls, NY 14304

Dear Mr. Paradise:

Re: Semiannual Groundwater Discharge Report
SIU Permit #78
Cascades Containerboard Packaging, Inc. (Former Frontier Chemical Site)

This semiannual report has been prepared in accordance with Paragraph G of the Significant Industrial User Permit #78 issued on October 1, 2015 (modified August 31, 2016 and September 6, 2016) by the Niagara Falls Water Board to Cascades Containerboard Packaging, Inc. (formerly Norampac Industries, Inc. and formerly Frontier Chemical Site PRP Group) in Niagara Falls, New York (Site). The report presents the analytical data and field measurements taken for the semiannual period covering December 2016 through May 2017. The data collected have been used to calculate the volume of groundwater and the chemical loading associated with the groundwater that discharges into the Falls Street Tunnel (FST) and the 47th Street Tunnel, which are located immediately adjacent to the Frontier Chemical Site.

1. Data Collection

Groundwater levels were measured in all of the available monitoring wells in the A Zone and B Zone of the bedrock formation at the Site. The groundwater levels were measured on April 11, 2017, and the data are presented on attached Figures 1 and 2.

Groundwater samples were collected from the following monitoring wells on April 11 and 12, 2017 and analyzed for the list of parameters specified in Paragraphs F and G of the Permit.

A Zone

- MW01-9A
- MW88-13A
- BH87-28
- BH-87-3A

B Zone

- BH87-3B
- MW-9
- MW-12
- MW-13

2. Flow Calculation

The groundwater flow volume is calculated based upon the thickness of the bedrock aquifer through which the groundwater flows, the aquifer permeability, and the gradient (slope) of the groundwater table. These three factors are combined, using Darcy's Law of hydraulic flow, to determine the flow volume (Flow = permeability x gradient x cross sectional saturated area). The groundwater gradients used in the flow calculation are presented on Figures 1 and 2. The calculation of groundwater flow is presented in Table 1. The Bedrock A Zone migration boundary along the south side of the Site has been divided into the west side and the east side. The April 2017 groundwater levels show that a portion of the A Zone groundwater discharge from the western half of the Site continues to discharge towards Royal Avenue. The most likely receiver of the A Zone groundwater in this area is the underlying B Zone, which is captured by the 47th Street Tunnel.

The calculated volume of groundwater discharge to the tunnels from the entire Site for the December 2016 through May 2017 time period is 2,435 gallons per day.

It is noted that the groundwater in the B Zone continues to flow to the east toward 47th Street with no migration to the south. This flow pattern is consistent with the pattern that developed after the closure of a portion of the FST and was first measured during the October 19, 2012 groundwater monitoring event.

3. Loading Calculation

The chemical loading to the tunnel sewer system is determined by multiplying groundwater flow volume by the concentration of the chemicals in the groundwater at the downgradient boundary of the Site, adjacent to where the groundwater enters the tunnels. Since there are multiple wells available along the tunnels, the chemical concentrations of this group of wells have been averaged to provide the best estimate of chemical loading. The concentrations of chemicals present in the October 2016 groundwater samples and the calculated chemical loadings to the tunnel sewers for each individual compound for each flow zone are presented in Tables 2A, 2B, 2C, 3A, and 3B. The total daily chemical loading for each compound is summarized in Table 4.

4. Discharge Limitations

The calculated volume of groundwater discharge to the tunnels and the associated chemical loadings have been compared to the limitations of the Permit (see Table 5). The calculations show that all parameters are within the Permit limits.

It is noted that while it is expected that the chemical loadings will decrease over time, some variability should be expected in the groundwater hydraulics and concentrations used to calculate the infiltration conditions and, therefore, some flexibility is needed in the Permit limits for the Site. It is believed that the Permit limits are reasonable, given the current conditions and making allowance for some continued variation over time. However, if conditions change, modifications may be necessary.

5. Next Report

The next semiannual report will be submitted to the Niagara Falls Water Board by November 31, 2017.

Should you have any questions, please contact me.

Sincerely,

GHD

Shaun McEvoy

SM/adh/4

Encl.

cc: Rick Roll, Niagara Falls Water Board
Paul Drof, Niagara Falls Water Board
Bill Rajczak, Cascades Containerboard Packaging, Inc.
Michelle Hamm, Cascades Containerboard Packaging, Inc.

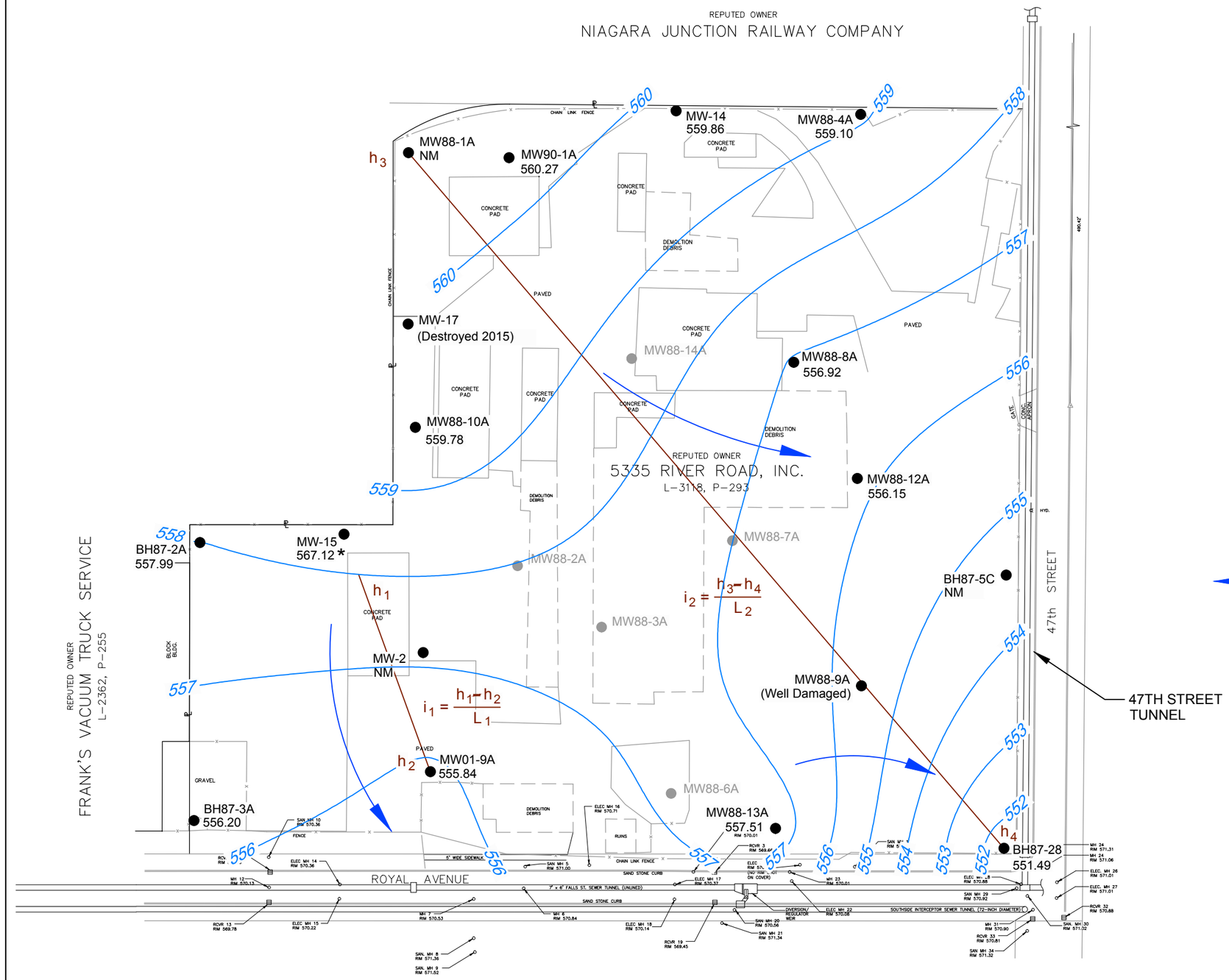


figure 1

GROUNDWATER CONTOURS - ZONE A
APRIL 2017
CASCADES CONTAINERBOARD PACKAGING, NIAGARA FALLS DIVISION
Niagara Falls, New York

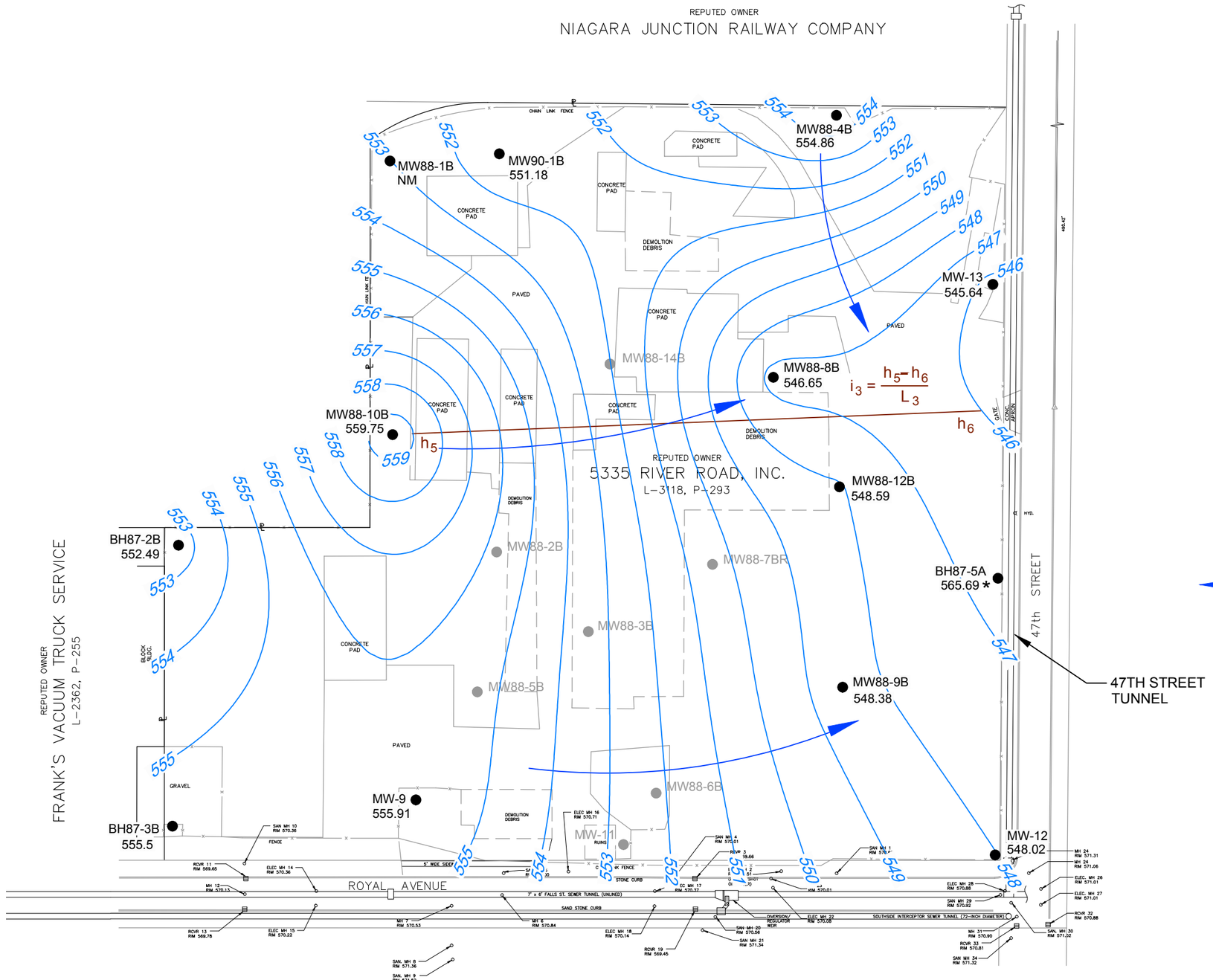


figure 2

GROUNDWATER CONTOURS - ZONE B
APRIL 2017
CASCADES CONTAINERBOARD PACKAGING, NIAGARA FALLS DIVISION
Niagara Falls, New York

11109628-00(PARA004)GN-WA002 APR 28, 2017

Table 1

April 2017 Groundwater Flow Rate Estimate
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

A) Bedrock A-Zone (Figure 1)

Royal Avenue West Side
Flow Thickness: Upper 3 to 5 ft of bedrock
Head Difference: $= h_1-h_2$
$= 2.16$ ft

Distance between h_1 & h_2 = 180 ft

i = 2.16/180 = 0.012

Flow Width: 400 ft
K = 2.5×10^{-5} to 5.2×10^{-5} ft/sec
Flow rate: $= 5 \text{ ft} \times 0.012 \times 400 \text{ ft} \times 5.2 \times 10^{-5}$ ft/sec
$= 1.25 \times 10^{-3}$ ft^3/sec
= 807 US gal/day
= 294,390 US gal/year

Royal Avenue East Side
Flow Thickness: Upper 3 to 5 ft of bedrock
Head Difference: $= h_3-h_4$
$= 8.78$ ft

Distance between h_3 & h_4 = 821 ft

i = 8.78/821 = 0.01069

Flow Width: 400 ft
K = 2.5×10^{-5} to 5.2×10^{-5} ft/sec
Flow rate: $= 5 \text{ ft} \times 0.01069 \times 340 \text{ ft} \times 5.2 \times 10^{-5}$ ft/sec
$= 9.5 \times 10^{-4}$ ft^3/sec
= 611 US gal/day
= 222,914 US gal/year

47th Street South Side
Flow Thickness: Upper 3 to 5 ft of bedrock
Head Difference: $= h_3-h_4$
$=8.78$ ft

Distance between h_3 & h_4 = 821 ft

i = 8.78/821 = 0.01069

Flow Width: 400 ft
K = 2.5×10^{-5} to 5.2×10^{-5} ft/sec
Flow rate: $= 5 \text{ ft} \times 0.01069 \times 350 \text{ ft} \times 5.2 \times 10^{-5}$ ft/sec
$= 1.01 \times 10^{-3}$ ft^3/sec
= 718 US gal/day
= 262,252 US gal/year

See Figure 1 for locations of h_1, h_2, h_3, and h_4.

April 2017 Groundwater Flow Rate Estimate
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

B) Bedrock B-Zone (Figure 2)

Flow Thickness: 2-foot thick fracture zone from 8 to10 ft beneath A-Zone
Flow from B-Zone discharges to the east

• Easterly Flow:

Head Difference: $= h_5 - h_6 = 13$ ft
Distance between h_5 & $h_6 = 510$ ft
Gradient (i): = 0.025
Flow Width: = 660 ft
Hydraulic Conductivity: $= 1.4 \times 10^{-5}$ ft/sec
Flow rate: $= 2\text{ft} \times 0.025 \times 660\text{ ft} \times 1.4 \times 10^{-5}$ ft/sec
$= 4.62 \times 10^{-4}$ ft^3/sec
= 299 US gal/day
= 108,981 US gal/year

See Figure 2 for locations of h_5 and h_6.

Notes:

ft - Feet
sec - Second
gal - Gallons

Table 2A

A-Fracture Zone Bedrock, Royal Avenue West Side Discharge
April 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells MW-01-9A 04/11/2017	Adjacent Wells BH87-3A 04/12/2017	Average Concentration (µg/L) Adjacent Wells	Mass Flux (pounds/day) Adjacent Wells
VOCs by Method OLM04.2 (µg/L)				
1,1-Dichloroethane	**1700/1900**	100 U	905.0	0.0061
1,2,4-Trichlorobenzene	**220/230 J**	100 U	117.5	0.0008
1,2-Dichlorobenzene	**2400/2400**	**610**	1505.0	0.0101
1,3-Dichlorobenzene	**3000/3000**	**1500**	2250.0	0.0151
1,4-Dichlorobenzene	**3000/3000**	**1700**	2150.0	0.0145
Acetone	**640/720 J**	500 U	365.0	0.0025
Benzene	**650/660 J**	**33 J**	344.0	0.0023
Chlorobenzene	**2700/2600**	**1200**	1925.0	0.0130
cis-1,2-Dichloroethene	**1600/2600**	**42 J**	1071.0	0.0072
Tetrachloroethene	**850/830 J**	**9.4 J**	424.7	0.0029
Toluene	**790/800 J**	100 U	402.5	0.0027
Trichloroethene	**1100/1100**	**27 J**	563.5	0.0038
Vinyl chloride	**300/290 J**	100 U	152.5	0.0010
Monochlorotoluene	**10100/10000**	**261 J**	5155.5	0.0347
SVOCs by Method OLM04.2 (µg/L)				
Phenol	**1070/1180**	**17.4**	571.2	0.0038
TAL Metals by Method ILM04.0 (µg/L)				
Arsenic	**125/121**	15 U	62.3	0.0004
Iron	**923/914**	**265**	591.8	0.0040
Potassium	**1230000/1180000**	**447000**	826000.0	5.5608
Sodium	**366000/354000**	**113000**	236500.0	1.5922

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration
U - Not detected at the associated reporting limit

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 807 US gallons/day

Table 2B

A-Fracture Zone Bedrock, Royal Avenue East Side Discharge
April 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells BH87-28 04/12/2017	Adjacent Wells MW-88-6A	Adjacent Wells MW-88-13A 04/12/2017	Average Concentration (µg/L) Adjacent Wells	Mass Flux (pounds/day) Adjacent Wells
VOCs by Method OLM04.2 (µg/L)					
1,1-Dichloroethane	**8.6 J**	**NS**	**630**	319.3	0.0016
1,2,4-Trichlorobenzene	40 U	**NS**	**320 J**	162.0	0.0008
1,2-Dichlorobenzene	**130**	**NS**	**4700**	2415.0	0.0123
1,3-Dichlorobenzene	**210**	**NS**	**1400**	805.0	0.0041
1,4-Dichlorobenzene	**160**	**NS**	**2700**	1430.0	0.0073
Acetone	200 U	**NS**	**180 J**	100.0	0.0005
Benzene	**86**	**NS**	**1400**	743.0	0.0038
Chlorobenzene	**260**	**NS**	**1700**	980.0	0.0050
cis-1,2-Dichloroethene	**21 J**	**NS**	**580**	300.5	0.0015
Tetrachloroethene	40 U	**NS**	**1500**	752.0	0.0038
Toluene	**13 J**	**NS**	**460**	236.5	0.0012
Trichloroethene	40 U	**NS**	**2600**	1302.0	0.0066
Vinyl chloride	**37 J**	**NS**	400 U	38.5	0.0002
Monochlorotoluene	**137 J**	**NS**	**5800**	2968.5	0.0151
SVOCs by Method OLM04.2 (µg/L)					
Phenol	**47.1**	**NS**	**178 J**	112.6	0.0006
TAL Metals by Method ILM04.0 (µg/L)					
Arsenic	**14.8 J**	**NS**	**170**	92.4	0.0005
Iron	**254**	**NS**	**1830**	1042.0	0.0053
Potassium	**4940000**	**NS**	**1660000**	3300000.0	16.8204
Sodium	**335000**	**NS**	**257000**	291000.0	1.4833

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration
U - Not detected at the associated reporting limit
NS - Not sampleable (abandoned)

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 611 US gallons/day

Table 2C

A-Fracture Zone Bedrock, 47th Street Discharge
April 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells: BH87-28 04/12/2017	Adjacent Wells: BH87-5C	Average Concentration (µg/L): Adjacent Wells	Mass Flux (pounds/day): Adjacent Wells
VOCs by Method OLM04.2 (µg/L)				
1,1-Dichloroethane	**8.6 J**	NS	8.6	0.00005
1,2,4-Trichlorobenzene	40 U	NS	0.0	0.00000
1,2-Dichlorobenzene	**130**	NS	130.0	0.00078
1,3-Dichlorobenzene	**210**	NS	210.0	0.00126
1,4-Dichlorobenzene	**160**	NS	160.0	0.00096
Acetone	200 U	NS	0.0	0.00000
Benzene	**86**	NS	86.0	0.00052
Chlorobenzene	**260**	NS	260.0	0.00156
cis-1,2-Dichloroethene	**21 J**	NS	21.0	0.00013
Tetrachloroethene	40 U	NS	0.0	0.00000
Toluene	**13 J**	NS	12.0	0.00007
Trichloroethene	40 U	NS	0.0	0.00000
Vinyl chloride	**37 J**	NS	37.0	0.00022
Monochlorotoluene	**137 J**	NS	137.0	0.00082
SVOCs by Method OLM04.2 (µg/L)				
Phenol	**47.1 J**	NS	47.1	0.00028
TAL Metals by Method ILM04.0 (µg/L)				
Arsenic	**14.8 J**	NS	14.8	0.00009
Iron	**254**	NS	254.0	0.00152
Potassium	**4940000**	NS	4940000.0	29.58912
Sodium	**335000**	NS	335000.0	2.00655

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration
U - Not detected at the associated reporting limit
NS - Well not sampleable

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 718 US gallons/day

Table 3A

B-Fracture Zone Bedrock - Southerly Discharge
April 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells					Average Concentration (µg/L) Southerly Discharge	Mass Flux (pounds/day) Adjacent Wells
	MW-9 04/12/2017	MW-11	MW-12 04/11/2017	BH87-3B 04/12/2017	MW-88-6B		
VOCs by Method OLM04.2 (µg/L)							
1,1-Dichloroethane	**240**	**NS**	40 U	**8.6 J**	**NS**	84.2	0.0000
1,2,4-Trichlorobenzene	40 U	**NS**	40 U	50 U	**NS**	0.0	0.0000
1,2-Dichlorobenzene	**17 J**	**NS**	40 U	**350**	**NS**	123.7	0.0000
1,3-Dichlorobenzene	**60**	**NS**	40 U	**440**	**NS**	168.0	0.0000
1,4-Dichlorobenzene	**46**	**NS**	40 U	**590**	**NS**	213.3	0.0000
Acetone	200 U	**NS**	200 U	250 U	**NS**	0.0	0.0000
Benzene	**9.3 J**	**NS**	40 U	**35 J**	**NS**	16.1	0.0000
Chlorobenzene	**30 J**	**NS**	40 U	**920**	**NS**	318.0	0.0000
cis-1,2-Dichloroethene	**39 J**	**NS**	40 U	**23 J**	**NS**	22.0	0.0000
Tetrachloroethene	40 U	**NS**	40 U	**7.1 J**	**NS**	5.0	0.0000
Toluene	**6.9 J**	**NS**	40 U	50 U	**NS**	5.3	0.0000
Trichloroethene	40 U	**NS**	40 U	**21 J**	**NS**	9.7	0.0000
Vinyl chloride	**32 J**	**NS**	40 U	50 U	**NS**	13.7	0.0000
Monochlorotoluene	**80 J**	**NS**	40 U	**90 J**	**NS**	58.0	0.0000
SVOCs by Method OLM04.2 (µg/L)							
Phenol	**69.1 J**	**NS**	**21.3**	**9.3 J**	**NS**	33.2	0.0000
TAL Metals by Method ILM04.0 (µg/L)							
Arsenic	**51.9**	**NS**	**7.5 J**	15 U	**NS**	20.3	0.0000
Iron	**443**	**NS**	**146**	**279**	**NS**	289.3	0.0000
Potassium	**2100000**	**NS**	**6260000**	**610000**	**NS**	2990000.0	0.0000
Sodium	**332000**	**NS**	**442000**	**134000**	**NS**	262466.7	0.0000

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration
U - Not detected at the associated reporting limit
NS - Not sampleable (abandoned)

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 0 US gallons/day

Table 3B

B-Fracture Zone Bedrock - Easterly Discharge
April 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells				Average Concentration (µg/L)	Mass Flux (pounds/day)
	MW-11 11/15/01	MW-12 04/11/2017	MW-13 04/11/2017	BH87-5A	Easterly Discharge	Adjacent Wells
VOCs by Method OLM04.2 (µg/L)						
1,1-Dichloroethane	**2800**	40 U	**3 J**	NS	3.5	8.73011E-06
1,2,4-Trichlorobenzene	**1100**	40 U	25 U	NS	0.0	0
1,2-Dichlorobenzene	**12000**	40 U	25 U	NS	0.0	0
1,3-Dichlorobenzene	**8400**	40 U	**4 J**	NS	4.0	9.97727E-06
1,4-Dichlorobenzene	**9600**	40 U	**5 J**	NS	4.5	1.12244E-05
Acetone	**5500**	200 U	130 U	NS	0.0	0
Benzene	**5100**	40 U	25 U	NS	0.0	0
Chlorobenzene	**13000**	40 U	**8.5 J**	NS	6.3	1.55895E-05
cis-1,2-Dichloroethene	**640**	40 U	**27**	NS	15.5	3.86619E-05
Tetrachloroethene	**6000**	40 U	**1.9 J**	NS	3.0	7.35824E-06
Toluene	**2500**	40 U	25 U	NS	0.0	0
Trichloroethene	**10000**	40 U	**6 J**	NS	5.0	1.24716E-05
Vinyl chloride	**170 J**	40 U	25 U	NS	0.0	0
Monochlorotoluene	**47400**	40 U	**290**	NS	147.0	0.000366665
SVOCs by Method OLM04.2 (µg/L)						
Phenol	**3300**	**21.3 J**	**12.7**	NS	17.0	4.24034E-05
TAL Metals by Method ILM04.0 (µg/L)						
Arsenic	**237**	**7.5 J**	15 U	NS	4.5	1.12244E-05
Iron	**472**	**146**	**768**	NS	457.0	0.001139903
Potassium	4180000	**6260000**	**27700**	NS	3143850.0	7.841761016
Sodium	**475000**	**442000**	**149000**	NS	295500.0	0.73707091

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration
U - Not detected at the associated reporting limit
NS - Not sampleable (abandoned)

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 299 US gallons/day

Table 4

Total Chemical Flux
April 2017
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Zone A Royal Ave West Side Mass Flux Adjacent Wells (pounds/day)	Zone A Royal Avenue East Side Mass Flux Adjacent Wells (pounds/day)	Zone A 47th Street Mass Flux Adjacent Wells (pounds/day)	Zone B Easterly Flow Mass Flux Adjacent Wells (pounds/day)	Total (pounds/day)
VOCs by Method OLM04.2 (µg/L)					
1,1-Dichloroethane	0.0061	0.0016	0.0001	< 0.0001	0.0078
1,2,4-Trichlorobenzene	0.0008	0.0008	0.0000	0.0000	0.0016
1,2-Dichlorobenzene	0.0101	0.0123	0.0008	0.0000	0.0232
1,3-Dichlorobenzene	0.0151	0.0041	0.0013	< 0.0001	0.0205
1,4-Dichlorobenzene	0.0145	0.0073	0.0010	< 0.0001	0.0227
Acetone	0.0025	0.0005	0.0000	0.0000	0.0030
Benzene	0.0023	0.0038	0.0005	0.0000	0.0066
Chlorobenzene	0.0130	0.0050	0.0016	< 0.0001	0.0195
cis-1,2-Dichloroethene	0.0072	0.0015	0.0001	< 0.0001	0.0089
Tetrachloroethene	0.0029	0.0038	0.0000	< 0.0000	0.0067
Toluene	0.0027	0.0012	0.0001	0.0000	0.0040
Trichloroethene	0.0038	0.0066	0.0000	< 0.0001	0.0104
Vinyl chloride	0.0010	0.0002	0.0002	0.0000	0.0014
Monochlorotoluene	0.0347	0.0151	0.0008	0.0004	0.0510
TOTAL VOCs	0.1167	0.0640	0.0064	0.0004	0.1874
SVOCs by Method OLM04.2 (µg/L)					
Phenol	0.0038	0.0006	0.0003	< 0.0001	0.0047
TAL Metals by Method ILM04.0 (µg/L)					
Arsenic	0.0004	0.0005	0.0001	< 0.0001	0.0010
Iron	0.0040	0.0053	0.0015	0.00114	0.0120
Potassium	5.5608	16.8204	29.5891	7.84176	59.8120
Sodium	1.5922	1.4833	2.0065	0.73707	5.8190

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List

Table 5

Comparisons of Loading to Interim Discharge Limitations
Cascades Containerboard Packaging, Inc. – Frontier Site – April 2017
Niagara Falls, New York

Outfall Number Effluent Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Calculated Daily Discharge April 2017 Pounds/Day Except as Noted (Gallons/Day)
	Annual Average	Daily Maximum		Measurement Frequency	Sample Type	
MS #1 Flow		4000	gallons/day	2 per year	See E-2	2435
MS #1 Arsenic		0.008	pounds/day	2 per year	See E-3	0.0010
MS#1 Iron		0.24	pounds/day	2 per year	See E-3	0.0120
MS #1 Potassium		400	pounds/day	2 per year	See E-3	59.8120
MS #1 Sodium		40.0	pounds/day	2 per year	See E-3	5.8190
MS #1 T. Phenol		0.05	pounds/day	2 per year	See E-3	0.0047
MS #1 1,1-Dichloroethane		0.13	pounds/day	2 per year	See E-3	0.0078
MS#1 1,2,4-Trichlorobenzene		0.026	pounds/day	2 per year	See E-3	0.0016
MS #1 1,2-Dichlorobenzene		0.26	pounds/day	2 per year	See E-3	0.0232
MS #1 1,3-Dichlorobenzene		0.11	pounds/day	2 per year	See E-3	0.0205
MS#1 1,4-Dichlorobenzene		0.17	pounds/day	2 per year	See E-3	0.0227
MS #1 Acetone		0.026	pounds/day	2 per year	See E-3	0.0030
MS #1 Benzene		0.15	pounds/day	2 per year	See E-3	0.0066
MS #1 Chlorobenzene		0.10	pounds/day	2 per year	See E-3	0.0195
MS #1 Cis-1,2-Dichloroethene		0.060	pounds/day	2 per year	See E-3	0.0089
MS #1 Tetrachloroethene		0.05	pounds/day	2 per year	See E-3	0.0067
MS#1 Toluene		0.03	pounds/day	2 per year	See E-3	0.0040
MS #1 Trichloroethene		0.15	pounds/day	2 per year	See E-3	0.0104
MS #1 Vinyl Chloride		0.012	pounds/day	2 per year	See E-3	0.0014
MS #1 Monochlorotoluene		0.2	pounds/day	2 per year	See E-3	0.0510

NIAGARA FALLS WATER BOARD
WASTEWATER FACILITIES
ENFORCEMENT DIVISION

SELF-MONITORING REPORT
SIGNIFICANT INDUSTRIAL USERS

PERMIT NO. 078 SEMI-ANNUAL DECEMBER 2016 – MAY 2017

INDUSTRY NAME: Cascades Containerboard Packaging, Inc. – Frontier Site

Pursuant to federal pretreatment reporting requirements and the Niagara Falls Water Board Regulations Part 1960, Significant Industrial Users shall submit periodic self-monitoring and compliance reports. Such reports shall be submitted using this form, according to the following schedule:

Quarterly	-	1st Quarter by February 28th
	-	2nd Quarter by May 31st
	-	3rd Quarter by August 31st
	-	4th Quarter by November 30th
Semi-Annual	-	by May 31st and
	-	by November 30th

Each section of this report form shall be filled out for those parameters listed in Section "G" of the company's Wastewater Discharge Permit. The analysis results must be reported in both concentration and mass. In addition, the calculated annual average load (pounds/day) for each pollutant shall also be reported.

The samples shall be collected at the monitoring points identified in the user permit. Identification of those points in this report should be as listed on page two (2) of the User Permit.

SELF-MONITORING REPORT
Significant Industrial Users (SIUs)

PAGE 2

PART II of the report is the Compliance Monitoring section. The user is obligated to determine if the analysis results indicates compliance. All violations noted should be brought to the Niagara Falls Water Board – Wastewater Facilities attention immediately upon noting and should also be reported in this section. The analysis result should be compared against all applicable federal, state and local standards and limitations. If no violations are noted then **"NO VIOLATIONS"** should appear on the report.

Pursuant to 40 CFR Part 403.12g of the Federal Standards, all violations noted must be followed up by a sample recollect/analysis and the results submitted to the Niagara Falls Water Board within thirty (30) days of first becoming aware of the violation.

Pursuant to 40 CFR Part 403.12g all Periodic Self-Monitoring Reports must be signed by a "responsible company official" certifying the following statement:

> I, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: _____
Title: Consultant for Cascades Containerboard Packaging, Inc.

Date: May 19, 2017

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock A Zone Royal Avenue- West Side**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: April 11, 2017						
24-HOUR FLOW IN MGD	0.00081				0.00058	
BENZENE	344		0.0023		206	0.0013
MONOCHLOROBENZENE	1925		0.0130		1,490	0.008
1,2 – DICHLOROBENZENE	1,505		0.0101		913	0.0055
1,3 – DICHLOROBENZENE	2,250		0.0151		1,453	0.0085
1,4 – DICHLOROBENZENE	2,150		0.0145		1,617	0.0088
1,2,4 - TRICHLOROBENZENE	118		0.0008		67	0.0004
1,1 - DICHLOROETHANE	905		0.0061		453	0.0033
CIS – 1,2 - DICHLOROETHYLENE	1,071		0.0072		588	0.0038
ACETONE	365		0.0025		221	0.0014
TETRACHLOROETHYLENE	425		0.0029		219	0.0015
TOLUENE	403		0.0027		226	0.0014
TRICHLOROETHYLENE	564		0.0038		475	0.0053
VINYL CHLORIDE	153		0.0010		147	0.0007
MONOCHLOROTOLUENES	5156		0.0347		2,988	0.0185
TOTAL PHENOL	571		0.0038		311	0.0020
ARSENIC	62.3		0.0004		40.65	0.0003
IRON	592		0.0040		484	0.0026
POTASSIUM	826,000		5.5608		722,350	3.6578
SODIUM	236,500		1.5922		187,950	0.9938

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock A Zone - Royal Avenue East Side**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: April 12, 2017						
24-HOUR FLOW IN MGD	0.00061				0.00056	
BENZENE	743		0.0038		749	0.0035
MONOCHLOROBENZENE	980		0.0050		880	0.0041
1,2 - DICHLOROBENZENE	2415		0.0123		2,415	0.0112
1,3 - DICHLOROBENZENE	805		0.0041		728	0.0034
1,4 - DICHLOROBENZENE	1,430		0.0073		1,388	0.0065
1,2,4 - TRICHLOROBENZENE	162		0.0008		174	0.0008
1,1 - DICHLOROETHANE	319		0.0016		343	0.0016
CIS – 1,2 - DICHLOROETHYLENE	301		0.0015		431	0.0019
ACETONE	100		0.0005		127	0.0006
TETRACHLOROETHYLENE	752		0.0038		802	0.0037
TOLUENE	237		0.0012		218	0.0010
TRICHLOROETHYLENE	1,302		0.0066		1,352	0.0062
VINYL CHLORIDE	39		0.0002		95	0.0004
MONOCHLOROTOLUENES	2,969		0.0151		2,707	0.0127
TOTAL PHENOL	113		0.0006		148	0.0007
ARSENIC	92.4		0.0005		126	0.0006
IRON	1,042		0.0053		2,257	0.0099
POTASSIUM	3,300,000		16.8204		3,270,000	15.1539
SODIUM	291,000		1.4833		304,000	1.4015

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock A-Zone 47th Street**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: April 12, 2017						
24-HOUR FLOW IN MGD	0.00072				0.00072	
BENZENE	86		0.0005		248	0.0015
MONOCHLOROBENZENE	260		0.0016		210	0.0013
1,2 - DICHLOROBENZENE	130		0.0008		130	0.0008
1,3 - DICHLOROBENZENE	210		0.0006		155	0.0006
1,4 - DICHLOROBENZENE	160		0.0010		126	0.0008
1,2,4 - TRICHLOROBENZENE	0		0.0000		0	0.0000
1,1-DICHLOROETHANE	8.6		0.0001		16.3	0.0001
CIS – 1,2 - DICHLOROETHYLENE	21		0.0001		201	0.0012
ACETONE	0		0.0000		4	0.0001
TETRACHLOROETHYLENE	0		0.0000		0	0.0000
TOLUENE	12		0.0001		25	0.0002
TRICHLOROETHYLENE	0		0.0000		0	0.0000
VINYL CHLORIDE	37		0.0002		144	0.000
MONOCHLOROTOLUENES	137		0.0008		126	0.0007
TOTAL PHENOL	47.1		0.0003		67.6	0.0004
ARSENIC	14.8		0.0001		18.8	0.0001
IRON	254		0.0015		244	0.0015
POTASSIUM	4,940,000		29.5891		4,885,000	29.0381
SODIUM	335,000		2.0066		341,500	2.0296

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock B Zone (South)**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: April 11-12, 2017						
24-HOUR FLOW IN MGD	0.000000[1]				0.000000	
BENZENE	16.1		0.0000		11.8	0.0000
MONOCHLOROBENZENE	318		0.0000		227	0.0000
1,2 – DICHLOROBENZENE	124		0.0000		73.5	0.0000
1,3 - DICHLOROBENZENE	168		0.0000		110	0.0000
1,4 - DICHLOROBENZENE	213		0.0000		139	0.0000
1,2,4 - TRICHLOROBENZENE	0		0.0000		0	0.0000
1,1 - DICHLOROETHANE	84.2		0.0000		70.1	0.0000
CIS – 1,2 - DICHLOROETHYLENE	22		0.0000		20	0.0000
ACETONE	0		0.0000		0	0.0000
TETRACHLOROETHYLENE	5.0		0.0000		6.2	0.0000
TOLUENE	5.3		0.0000		2.7	0.0000
TRICHLOROETHYLENE	9.7		0.0000		13.4	0.0000
VINYL CHLORIDE	13.7		0.0000		10.8	0.0000
MONOCHLOROTOLUENES	58		0.0000		49	0.0000
TOTAL PHENOL	33.2		0.0000		22.6	0.0000
						0.0000
ARSENIC	20.3		0.0000		20.7	0.0000
IRON	289		0.0000		271	0.0000
POTASSIUM	2,990,000		0.0000		2.487,032	0.0000
SODIUM	262,467		0.0000		259,350	0.0000

[1] No discharge to south for the time period December 2016 through May 2017.

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock B Zone (East)**

	RESULTS		RESULTS		ANNUAL AVERAGE	ANNUAL AVERAGE
	µg/L	/ µg/L	pounds/day	/pounds/day	µg/L	pounds/day
DATE SAMPLED: April 11, 2017						
24-HOUR FLOW IN MGD	0.00030				0.00028	
BENZENE	0.0		0.0		0.0	0.0
MONOCHLOROBENZENE	6.3		<0.0001		3.2	<0.0001
1,2 - DICHLOROBENZENE	0.0		0.0		0.0	0.0
1,3 - DICHLOROBENZENE	4.0		<0.0001		3.9	<0.0001
1,4 - DICHLOROBENZENE	4.5		<0.0001		4.5	<0.0001
1,2,4 - TRICHLOROBENZENE	0.0		0.0		0.0	0.0
1,1 - DICHLOROETHANE	3.5		<0.0001		1.8	<0.0001
CIS – 1,2 - DICHLOROETHYLENE	15.5		<0.0001		7.8	<0.0001
ACETONE	0		0		9	<0.0001
TETRACHLOROETHYLENE	3.0		<0.0001		1.5	0.0
TOLUENE	0.0		0.0		0.0	0.0
TRICHLOROETHYLENE	5.0		<0.0001		2.5	<0.0001
VINYL CHLORIDE	0.0		0.0		0.0	0.0
MONOCHLOROTOLUENES	147		0.0004		127	0.0003
TOTAL PHENOL	17		<0.0001		10.9	<0.0001
ARSENIC	4.5		<0.0001		8.8	<0.0001
IRON	457		0.0011		1,540	0.0035
POTASSIUM	3,143,850		7.8418		3,037,750	7.1369
SODIUM	295,500		0.7371		287,500	0.6752

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Total Sum of Bedrock A and B Zones**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: April 11-12, 2017						
24-HOUR FLOW IN MGD	0.002435				0.002122	
BENZENE			0.0066			0.0062
MONOCHLOROBENZENE			0.0020			0.0046
1,2 - DICHLOROBENZENE			0.0232			0.0175
1,3 - DICHLOROBENZENE			0.0205			0.0129
1,4 - DICHLOROBENZENE			0.0227			0.0160
1,2,4 - TRICHLOROBENZENE			0.0016			0.0012
1,1 - DICHLOROETHANE			0.0078			0.0050
CIS – 1,2 - DICHLOROETHYLENE			0.0089			0.0069
ACETONE			0.0030			0.0019
TETRACHLOROETHYLENE			0.0067			0.0052
TOLUENE			0.0040			0.0026
TRICHLOROETHYLENE			0.0104			0.0082
VINYL CHLORIDE			0.0014			0.0020
MONOCHLOROTOLUENES			0.0510			0.0322
TOTAL PHENOL			0.0047			0.0030
ARSENIC			0.0010			0.0010
IRON			0.0120			0.0174
POTASSIUM			59.8120			54.9866
SODIUM			5.8190			5.0999

PART II

COMPLIANCE MONITORING

SIU NAME: Cascades Containerboard Packaging, Inc. – Frontier Site

PERMIT NO.: 078

NO VIOLATIONS

VIOLATION PARAMETER	DATE	FLOW [MGD]	SAMPLE POINT LOCATION	ACTUAL* DISCHARGE	PERMIT LIMIT	TYPE** LIMIT VIOLATED

NOTE:

* - Actual discharge – list actual analytical results and appropriate units.

** - Type Limit Violated – List Type:

A.A. = Annual Average

D.M. = Daily Maximum

L.L. = Local Limits (Regulation 1960.5)

ADMIN\WINWORD\PARADISE\SIU\SELF-MONITORING REPORT FORM - BLANK

November 30, 2017 Reference No. 11109628

Mr. Joel Paradise
Niagara Falls Water Board
5815 Buffalo Avenue
Niagara Falls, NY 14304

Dear Mr. Paradise:

Re: Semiannual Groundwater Discharge Report
SIU Permit #78
Cascades Containerboard Packaging, Inc. (Former Frontier Chemical Site)

This semiannual report has been prepared in accordance with Paragraph G of the Significant Industrial User Permit #78 issued on October 1, 2015 (modified August 31, 2016 and September 6, 2016) by the Niagara Falls Water Board to Cascades Containerboard Packaging, Inc. (formerly Norampac Industries, Inc. and formerly Frontier Chemical Site PRP Group) in Niagara Falls, New York (Site). The report presents the analytical data and field measurements taken for the semiannual period covering June 2017 through November 2017. The data collected have been used to calculate the volume of groundwater and the chemical loading associated with the groundwater that discharges into the Falls Street Tunnel (FST) and the 47th Street Tunnel, which are located immediately adjacent to the Frontier Chemical Site.

1. Data Collection

Groundwater levels were measured in all of the available monitoring wells in the A Zone and B Zone of the bedrock formation at the Site. The groundwater levels were measured on October 3, 2017, and the data are presented on attached Figures 1 and 2.

Groundwater samples were collected from the following monitoring wells on October 3 and 4, 2017 and analyzed for the list of parameters specified in Paragraphs F and G of the Permit.

A Zone

- MW01-9A
- MW88-13A
- BH87-28
- BH-87-3A

B Zone

- BH87-3B
- MW-9
- MW-12
- MW-13

GHD
2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
T 716 297 6150 **F** 716 297 2265 **W** www.ghd.com

2. Flow Calculation

The groundwater flow volume is calculated based upon the thickness of the bedrock aquifer through which the groundwater flows, the aquifer permeability, and the gradient (slope) of the groundwater table. These three factors are combined, using Darcy's Law of hydraulic flow, to determine the flow volume (flow = permeability x gradient x cross sectional saturated area). The groundwater gradients used in the flow calculation are presented on Figures 1 and 2. The calculation of groundwater flow is presented in Table 1. The Bedrock A Zone migration boundary along the south side of the Site has been divided into the west side and the east side. The October 2017 groundwater levels show that a portion of the A Zone groundwater discharge from the western half of the Site continues to discharge towards Royal Avenue. The most likely receiver of the A Zone groundwater in this area is the underlying B Zone, which is captured by the 47th Street Tunnel.

The calculated volume of groundwater discharge to the tunnels from the entire Site for the June 2017 through November 2017 time period is 2,019 gallons per day.

It is noted that the groundwater in the B Zone continues to flow to the east toward 47th Street with no migration to the south. This flow pattern is consistent with the pattern that developed after the closure of a portion of the FST and was first measured during the October 19, 2012 groundwater monitoring event.

3. Loading Calculation

The chemical loading to the tunnel sewer system is determined by multiplying groundwater flow volume by the concentration of the chemicals in the groundwater at the downgradient boundary of the Site, adjacent to where the groundwater enters the tunnels. Since there are multiple wells available along the tunnels, the chemical concentrations of this group of wells have been averaged to provide the best estimate of chemical loading. The concentrations of chemicals present in the October 2017 groundwater samples and the calculated chemical loadings to the tunnel sewers for each individual compound for each flow zone are presented in Tables 2a, 2b, 2c, 3a, and 3b. The total daily chemical loading for each compound is summarized in Table 4.

4. Discharge Limitations

The calculated volume of groundwater discharge to the tunnels and the associated chemical loadings have been compared to the limitations of the Permit (see Table 5). The calculations show that all parameters are within the Permit limits.

It is noted that while it is expected that the chemical loadings will decrease over time, some variability should be expected in the groundwater hydraulics and concentrations used to calculate the infiltration conditions and, therefore, some flexibility is needed in the Permit limits for the Site. It is believed that the

Permit limits are reasonable, given the current conditions and making allowance for some continued variation over time. However, if conditions change, modifications may be necessary.

5. Next Report

The next semiannual report will be submitted to the Niagara Falls Water Board by May 31, 2018.

Should you have any questions, please contact me.

Sincerely,

GHD

Shaun McEvoy

SM/adh/5

Encl. SIU Permit Calculations and Permit Submittal Sheets

cc: Rolfe Porter, Niagara Falls Water Board
Doug Williamson, Niagara Falls Water Board
Michelle Hamm, Cascades Containerboard Packaging, Inc.
Bill Rajczak, Cascades Containerboard Packaging, Inc.

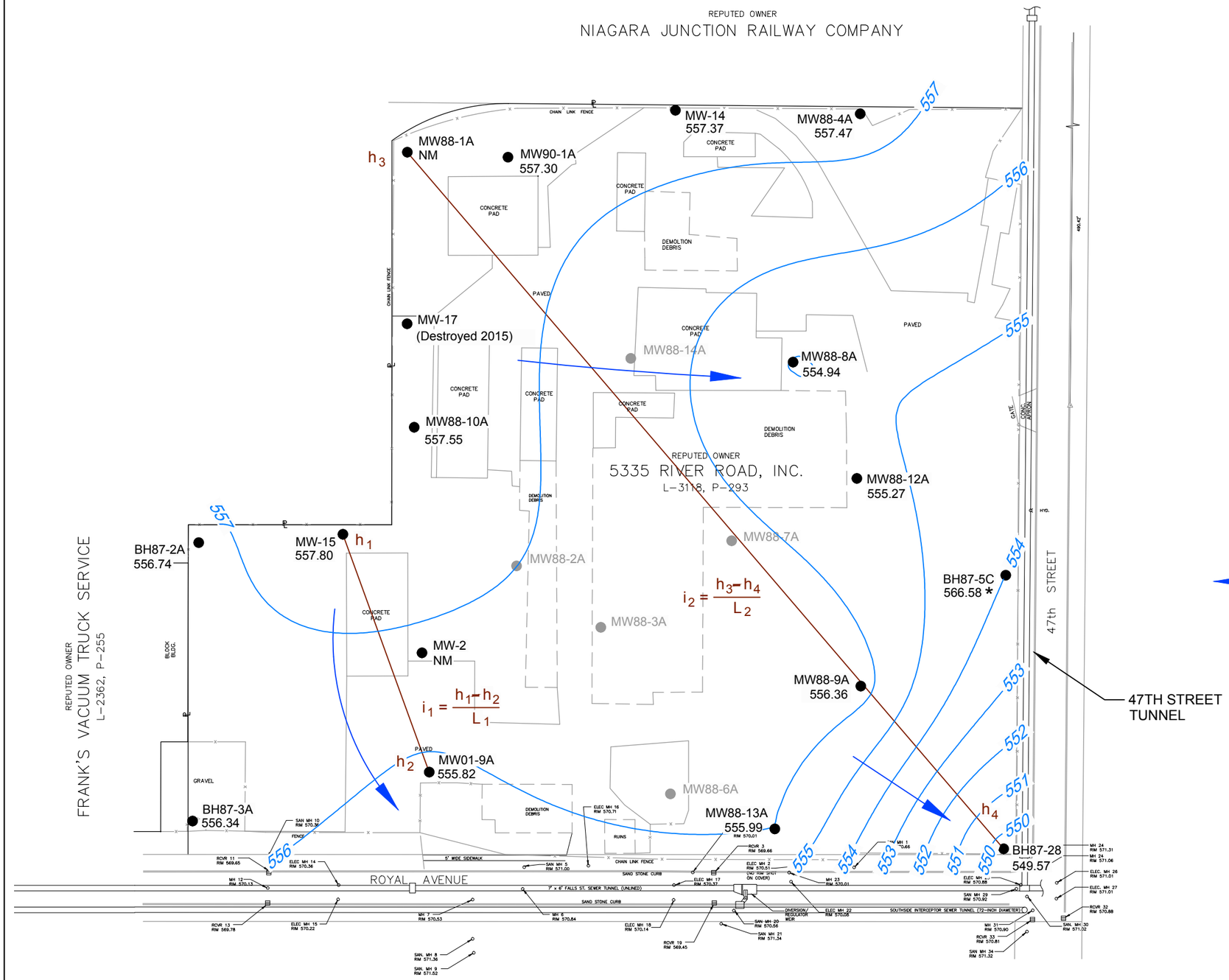


figure 1

GROUNDWATER CONTOURS - ZONE A
OCTOBER 2017
CASCADES CONTAINERBOARD PACKAGING, NIAGARA FALLS DIVISION
Niagara Falls, New York

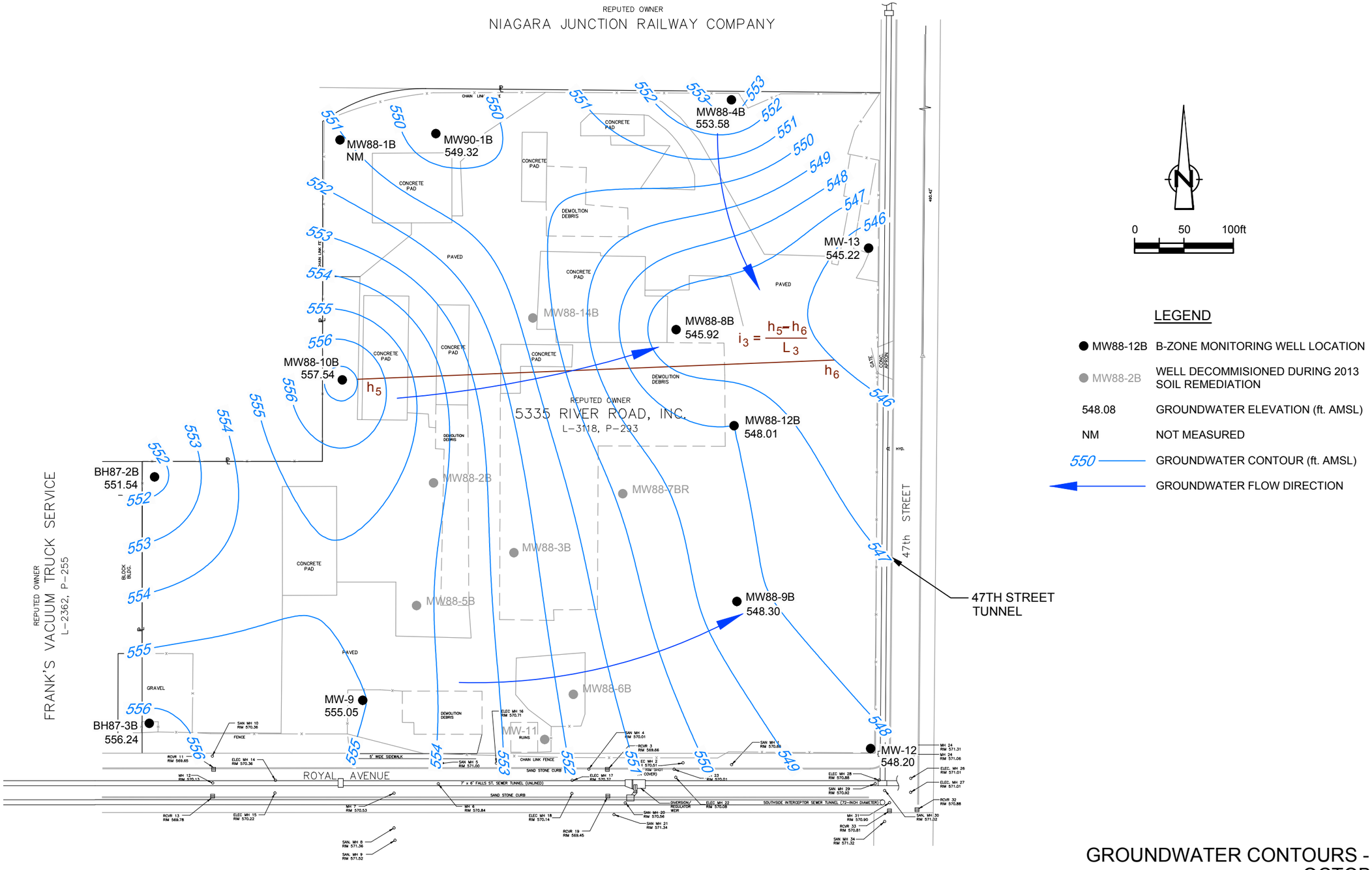


figure 2

GROUNDWATER CONTOURS - ZONE B
OCTOBER 2017
CASCADES CONTAINERBOARD PACKAGING, NIAGARA FALLS DIVISION
Niagara Falls, New York

Table 1

October 2017 Groundwater Flow Rate Estimate
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

A) Bedrock A-Zone (Figure 1)

Royal Avenue West Side
Flow Thickness: Upper 3 to 5 feet of bedrock
Head Difference: = h1-h2
1.98

Distance between h1 & h2 = 226 ft

i = 2.16/180 = 0.0876

Flow Width: 440 ft
K = 2.5×10^{-5} to 5.2×10^{-5} ft/sec
Flow rate: = 5ft x 0.0876 x 440 ft x 5.2×10^{-5} ft/sec
= 1.002×10^{-3} ft^3/sec
= 648 USgal/day
= 236,361 USgal/year

Royal Avenue East Side
Flow Thickness: Upper 3 to 5 feet of bedrock
Head Difference: = h3-h4
= 7.73 ft

Distance between h3 & h4 = 821 ft

i = 7.73/821 = 0.00942

Flow Width: 300 ft
K = 2.5×10^{-5} to 5.2×10^{-5} ft/sec
Flow rate: = 5ft x 0.00942 x 300 ft x 5.2×10^{-5} ft/sec
= 7.35×10^{-4} ft^3/sec
= 475 USgal/day
= 173,322 USgal/year

47th Street South Side
Flow Thickness: Upper 3 to 5 feet of bedrock
Head Difference: = h3-h4
=7.73ft

Distance between h_3 & h_4 = 821 ft

i = 7.73/821 = 0.00942

Flow Width: 400 ft
K = 2.5×10^{-5} to 5.2×10^{-5} ft/sec
Flow rate: = 5ft x 0.00942x 400 ft x 5.2×10^{-5} ft/sec
= 9.8×10^{-4} ft^3/sec
= 633 USgal/day
= 231,096 USgal/year

Notes:

See Figure 1 for locations of h_1, h_2, h_3 and h_4

October 2017 Groundwater Flow Rate Estimate
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

B) Bedrock B-Zone (Figure 2)

Flow Thickness: 2-foot-thick fracture zone from 8 to 10 feet beneath A-Zone
Flow from B-Zone discharges to the east

• Easterly Flow:

Head Difference: = h_5-h_6 = 11 feet
Distance between h_5 & h_6 = 495 ft
Gradient (i): = 0.022
Flow Width: = 660 ft
Hydraulic Conductivity: = 1.4×10^{-5} ft/sec
Flow rate: = 2ft x 0.022 x 660 ft x 1.4×10^{-5} ft/sec
= 4.07×10^{-4} ft^3/sec
= 263 USgal/day
= 95,903 USgal/year

Notes:

See Figure 2 for locations of h_5 and h_6

Table 2A

A-Fracture Zone Bedrock, Royal Avenue West Side Discharge
October 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells MW-01-9A 10/03/2017	Adjacent Wells BH87-3A 10/03/2017	Average Concentration (µg/L) Adjacent Wells	Mass Flux (pounds/day) Adjacent Wells
VOCs by Method OLM04.2 (µg/L)				
1,1-Dichloroethane	**760/790**	250 U	400.0	0.0022
1,2,4-Trichlorobenzene	**130 J/140**	250 U	80.0	0.0004
1,2-Dichlorobenzene	**1500/1500**	**460**	980.0	0.0053
1,3-Dichlorobenzene	**1900/2000**	**1300**	1625.0	0.0088
1,4-Dichlorobenzene	**2000/2000**	**2500**	2250.0	0.0122
Acetone	**5000 U/280 J**	1300 U	205.0	0.0011
Benzene	**280 J/280**	**61 J**	170.5	0.0009
Chlorobenzene	**1600/1700**	**3200**	2425.0	0.0131
cis-1,2-Dichloroethene	**1600/1600**	**44 J**	822.0	0.0044
Tetrachloroethene	**160 J/160**	250 U	92.5	0.0005
Toluene	**310 J/330**	250 U	172.5	0.0009
Trichloroethene	**130 J/130**	250 U	77.5	0.0004
Vinyl chloride	**240 J/210**	250 U	125.0	0.0007
Monochlorotoluene	**6000/6000**	**315 J**	3157.5	0.0171
SVOCs by Method OLM04.2 (µg/L)				
Phenol	**256/216**	**232**	234.0	0.0013
TAL Metals by Method ILM04.0 (µg/L)				
Arsenic	**60.4/59.2**	15 U	30.7	0.0002
Iron	**1100/1200**	**222**	686.0	0.0037
Potassium	**1340000/1310000**	**153000**	739000.0	3.9948
Sodium	**328000/321000**	**52700**	188600.0	1.0195

Notes:

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 648 US gallons/day
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration

Table 2B

A-Fracture Zone Bedrock, Royal Avenue East Side Discharge
October 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells BH87-28 10/04/2017	MW-88-6A	MW-88-13A 10/04/2017	Average Concentration (µg/L) Adjacent Wells	Mass Flux (pounds/day) Adjacent Wells
VOCs by Method OLM04.2 (µg/L)					
1,1-Dichloroethane	200 U	**NS**	**570**	295.0	0.0012
1,2,4-Trichlorobenzene	200 U	**NS**	**250**	135.0	0.0005
1,2-Dichlorobenzene	**100 J**	**NS**	**3900**	1955.0	0.0077
1,3-Dichlorobenzene	**230**	**NS**	**1200**	715.0	0.0028
1,4-Dichlorobenzene	**170 J**	**NS**	**2300**	1158.5	0.0046
Acetone	1000 U	**NS**	**130**	115.0	0.0005
Benzene	**58 J**	**NS**	**1000**	529.0	0.0021
Chlorobenzene	**280**	**NS**	**1400**	840.0	0.0033
cis-1,2-Dichloroethene	200 U	**NS**	**550**	285.0	0.0011
Tetrachloroethene	200 U	**NS**	**1100**	560.0	0.0022
Toluene	200 U	**NS**	**320**	170.0	0.0007
Trichloroethene	200 U	**NS**	**2100**	1060.0	0.0042
Vinyl chloride	200 U	**NS**	**27**	23.5	0.0001
Monochlorotoluene	**141 J**	**NS**	**4700**	2420.5	0.0096
SVOCs by Method OLM04.2 (µg/L)					
Phenol	**39.9**	**NS**	**199**	119.5	0.0005
TAL Metals by Method ILM04.0 (µg/L)					
Arsenic	**26.9**	**NS**	**145**	86.0	0.0003
Iron	**73.5**	**NS**	**2540**	1306.8	0.0052
Potassium	**3980000**	**NS**	**1390000**	2685000.0	10.6394
Sodium	**268000**	**NS**	**236000**	252000.0	0.9986

Notes:

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 475 US gallons/day
NS - Not sampleable (Abandoned)
VOCs - Volatile Organic Compounds
SVOCs - Semi volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration

Table 2C

A-Fracture Zone Bedrock, 47th Street Discharge
October 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

	Adjacent Wells		Average Concentration (µg/L)	Mass Flux (pounds/day)
Analyte	**BH87-28 10/04/2017**	**BH87-5C**	**Adjacent Wells**	**Adjacent Wells**
VOCs by Method OLM04.2 (µg/L)				
1,1-Dichloroethane	200 U	NS	0.0	0.00000
1,2,4-Trichlorobenzene	200 U	NS	0.0	0.00000
1,2-Dichlorobenzene	**100 J**	NS	100.0	0.00053
1,3-Dichlorobenzene	**230**	NS	230.0	0.00121
1,4-Dichlorobenzene	**170 J**	NS	170.0	0.00090
Acetone	1000 U	NS	0.0	0.00000
Benzene	**58 J**	NS	58.0	0.00031
Chlorobenzene	**280**	NS	280.0	0.00148
cis-1,2-Dichloroethene	200 U	NS	0.0	0.00000
Tetrachloroethene	200 U	NS	0.0	0.00000
Toluene	200 U	NS	0.0	0.00000
Trichloroethene	200 U	NS	0.0	0.00000
Vinyl chloride	200 U	NS	0.0	0.00000
Monochlorotoluene	**141 J**	NS	141.0	0.00074
SVOCs by Method OLM04.2 (µg/L)				
Phenol	**39.9**	NS	39.9	0.00021
TAL Metals by Method ILM04.0 (µg/L)				
Arsenic	**26.9**	NS	26.9	0.00014
Iron	**73.5**	NS	73.5	0.00039
Potassium	**3980000**	NS	3980000.0	21.01684
Sodium	**268000**	NS	268000.0	1.41520

Notes:

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed wells, the average concentration was set to 0 µg/L
(3) Flow rate = 633 US gallons/day
NS - Well not sampleable
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration

Table 3A

B-Fracture Zone Bedrock - Southerly Discharge
October 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells					Average Concentration (µg/L) Southerly Discharge	Mass Flux (pounds/day) Adjacent Wells
	MW-9 10/04/2017	MW-11	MW-12 10/04/2017	BH87-3B 10/03/2017	MW-88-6B		
VOCs by Method OLM04.2 (µg/L)							
1,1-Dichloroethane	**360**	**NS**	500 U	250 U	**NS**	145.0	0.0000
1,2,4-Trichlorobenzene	**2.3 J**	**NS**	500 U	250 U	**NS**	25.8	0.0000
1,2-Dichlorobenzene	**63**	**NS**	500 U	**170 J**	**NS**	94.3	0.0000
1,3-Dichlorobenzene	**93**	**NS**	500 U	**320**	**NS**	154.3	0.0000
1,4-Dichlorobenzene	**84**	**NS**	500 U	**490**	**NS**	208.0	0.0000
Acetone	**140**	**NS**	2500 U	1300 U	**NS**	173.3	0.0000
Benzene	**51**	**NS**	500 U	250 U	**NS**	42.0	0.0000
Chlorobenzene	**150**	**NS**	500 U	**1200**	**NS**	466.7	0.0000
cis-1,2-Dichloroethene	**360**	**NS**	500 U	250 U	**NS**	145.0	0.0000
Tetrachloroethene	**2.3 J**	**NS**	500 U	250 U	**NS**	25.8	0.0000
Toluene	**27**	**NS**	500 U	250 U	**NS**	34.0	0.0000
Trichloroethene	**3.6 J**	**NS**	500 U	250 U	**NS**	26.2	0.0000
Vinyl chloride	**86**	**NS**	500 U	250 U	**NS**	53.7	0.0000
Monochlorotoluene	**251**	**NS**	500 U	**90 J**	**NS**	130.3	0.0000
SVOCs by Method OLM04.2 (µg/L)							
Phenol	**64.5**	**NS**	**34.8**	14.9 U	**NS**	33.6	0.0000
TAL Metals by Method ILM04.0 (µg/L)							
Arsenic	**56.5**	**NS**	**15.2**	15 U	**NS**	24.4	0.0000
Iron	**350**	**NS**	**170**	**569**	**NS**	363.0	0.0000
Potassium	**2090000**	**NS**	**5740000**	**374000**	**NS**	2734666.7	0.0000
Sodium	**325000**	**NS**	**429000**	**83500**	**NS**	279166.7	0.0000

Notes:

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed well, the average concentration was set to 0 µg/L
(3) Flow rate = 0 US gallons/day
NS - Not sampleable (Abandoned)
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration

Table 3B

B-Fracture Zone Bedrock - Easterly Discharge
October 2017 Chemical Flux
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Adjacent Wells			Average Concentration (µg/L)	Mass Flux (pounds/day)
	MW-12 10/04/2017	MW-13 10/03/2017	BH87-5A	Easterly Discharge	Adjacent Wells
VOCs by Method OLM04.2 (µg/L)					
1,1-Dichloroethane	500 U	40 U	NS	0.0	0
1,2,4-Trichlorobenzene	500 U	40 U	NS	0.0	0
1,2-Dichlorobenzene	500 U	40 U	NS	0.0	0
1,3-Dichlorobenzene	500 U	**8.1 J**	NS	29.1	6.37357E-05
1,4-Dichlorobenzene	500 U	**14 J**	NS	32.0	7.0208E-05
Acetone	2500 U	200 U	NS	0.0	0
Benzene	500 U	40 U	NS	0.0	0
Chlorobenzene	500 U	**17 J**	NS	33.5	7.3499E-05
cis-1,2-Dichloroethene	500 U	**18 J**	NS	34.0	7.4596E-05
Tetrachloroethene	500 U	40 U	NS	0.0	0
Toluene	500 U	25 U	NS	0.0	0
Trichloroethene	500 U	25 U	NS	0.0	0
Vinyl chloride	500 U	25 U	NS	0.0	0
Monochlorotoluene	500 U	**13 J**	NS	31.5	6.9111E-05
SVOCs by Method OLM04.2 (µg/L)					
Phenol	**34.8**	20 U	NS	18.4	4.03696E-05
TAL Metals by Method ILM04.0 (µg/L)					
Arsenic	**15.2**	15 U	NS	8.4	1.83199E-05
Iron	**170**	**299**	NS	234.5	0.000514493
Potassium	**5740000**	**24500**	NS	2882250.0	6.323652465
Sodium	**429000**	**139000**	NS	284000.0	0.623095602

Notes:

(1) For U Values where compound was detected in one or more of the listed wells, 10 percent of U value was used to calculate average concentration
(2) For U values where compound was not detected in any listed well, the average concentration was set to 0 µg/L
(3) Flow rate = 263 US gallons/day
NS - Not sampleable (Abandoned)
VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List
J - Estimated concentration

Table 4

Total Chemical Flux
October 2017
Cascades Containerboard Packaging, Inc. - Frontier Site
Niagara Falls, New York

Analyte	Zone A Royal Ave West Side Mass Flux Adjacent Wells (pounds/day)	Zone A Royal Avenue East Side Mass Flux Adjacent Wells (pounds/day)	Zone A 47th Street Mass Flux Adjacent Wells (pounds/day)	Zone B Easterly Flow Mass Flux Adjacent Wells (pounds/day)	Total (pounds/day)
VOCs by Method OLM04.2 (µg/L)					
1,1-Dichloroethane	0.0022	0.0012	0.0000	0.0000	0.0033
1,2,4-Trichlorobenzene	0.0004	0.0005	0.0000	0.0000	0.0010
1,2-Dichlorobenzene	0.0053	0.0077	0.0005	0.0000	0.0136
1,3-Dichlorobenzene	0.0088	0.0028	0.0012	< 0.0001	0.0128
1,4-Dichlorobenzene	0.0122	0.0046	0.0009	< 0.0001	0.0177
Acetone	0.0011	0.0005	0.0000	0.0000	0.0016
Benzene	0.0009	0.0021	0.0003	0.0000	0.0033
Chlorobenzene	0.0131	0.0033	0.0015	< 0.0001	0.0179
cis-1,2-Dichloroethene	0.0044	0.0011	0.0000	< 0.0001	0.0056
Tetrachloroethene	0.0005	0.0022	0.0000	0.0000	0.0027
Toluene	0.0009	0.0007	0.0000	0.0000	0.0016
Trichloroethene	0.0004	0.0042	0.0000	0.0000	0.0046
Vinyl chloride	0.0007	0.0001	0.0000	0.0000	0.0008
Monochlorotoluene	0.0171	0.0096	0.0007	< 0.0001	0.0275
TOTAL VOCs	0.0680	0.0407	0.0052	0.0004	0.1142
SVOCs by Method OLM04.2 (µg/L)					
Phenol	0.0013	0.0005	0.0002	0.0000	0.0019
TAL Metals by Method ILM04.0 (µg/L)					
Arsenic	0.0002	0.0003	0.0001	0.0000	0.0006
Iron	0.0037	0.0052	0.0004	0.00051	0.0098
Potassium	3.9948	10.6394	21.0168	6.32365	41.9748
Sodium	1.0195	0.9986	1.4152	0.62310	4.0564

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
TAL - Target Analyte List

Table 5

Comparisons of Loading to Interim Discharge Limitations
Cascades Containerboard Packaging, Inc. - Frontier Site - October 2017
Niagara Falls, New York

Outfall Number Effluent Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Calculated Daily Discharge October 2017 pounds/day Except as noted (gallons/day)
	Annual Average	Daily Maximum		Measurement Frequency	Sample Type	
MS #1 Flow		4000	gallons/day	2 per year	See E-2	2019
MS #1 Arsenic		0.008	pounds/day	2 per year	See E-3	0.0006
MS#1 Iron		0.24	pounds/day	2 per year	See E-3	0.0098
MS #1 Potassium		400	pounds/day	2 per year	See E-3	41.9748
MS #1 Sodium		40.0	pounds/day	2 per year	See E-3	4.0564
MS #1 T. Phenol		0.05	pounds/day	2 per year	See E-3	0.0019
MS #1 1,1-Dichloroethane		0.13	pounds/day	2 per year	See E-3	0.0033
MS#1 1,2,4-Trichlorobenzene		0.026	pounds/day	2 per year	See E-3	0.0010
MS #1 1,2-Dichlorobenzene		0.26	pounds/day	2 per year	See E-3	0.0136
MS #1 1,3-Dichlorobenzene		0.11	pounds/day	2 per year	See E-3	0.0128
MS#1 1,4-Dichlorobenzene		0.17	pounds/day	2 per year	See E-3	0.0177
MS #1 Acetone		0.026	pounds/day	2 per year	See E-3	0.0016
MS #1 Benzene		0.15	pounds/day	2 per year	See E-3	0.0033
MS #1 Chlorobenzene		0.10	pounds/day	2 per year	See E-3	0.0179
MS #1 Cis-1,2-Dichloroethene		0.060	pounds/day	2 per year	See E-3	0.0056
MS #1 Tetrachloroethene		0.05	pounds/day	2 per year	See E-3	0.0027
MS#1 Toluene		0.03	pounds/day	2 per year	See E-3	0.0016
MS #1 Trichloroethene		0.15	pounds/day	2 per year	See E-3	0.0046
MS #1 Vinyl Chloride		0.012	pounds/day	2 per year	See E-3	0.0008
MS #1 Monochlorotoluene		0.2	pounds/day	2 per year	See E-3	0.0275

Attachment 1

NIAGARA FALLS WATER BOARD
WASTEWATER FACILITIES
ENFORCEMENT DIVISION

SELF-MONITORING REPORT
SIGNIFICANT INDUSTRIAL USERS

PERMIT NO. 078 SEMI-ANNUAL JUNE 2017 – NOVEMBER 2017

INDUSTRY NAME: Cascades Containerboard Packaging, Inc. – Frontier Site

Pursuant to federal pretreatment reporting requirements and the Niagara Falls Water Board Regulations Part 1960, Significant Industrial Users shall submit periodic self-monitoring and compliance reports. Such reports shall be submitted using this form, according to the following schedule:

Quarterly	-	1st Quarter by February 28th
	-	2nd Quarter by May 31st
	-	3rd Quarter by August 31st
	-	4th Quarter by November 30th
Semi-Annual	-	by May 31st
		and
	-	by November 30th

Each section of this report form shall be filled out for those parameters listed in Section "G" of the company's Wastewater Discharge Permit. The analysis results must be reported in both concentration and mass. In addition, the calculated annual average load (pounds/day) for each pollutant shall also be reported.

The samples shall be collected at the monitoring points identified in the user permit. Identification of those points in this report should be as listed on page two (2) of the User Permit.

SELF-MONITORING REPORT
Significant Industrial Users (SIUs)

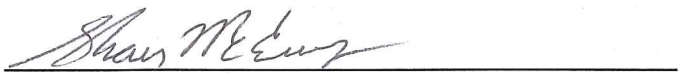
PAGE 2

PART II of the report is the Compliance Monitoring section. The user is obligated to determine if the analysis results indicates compliance. All violations noted should be brought to the Niagara Falls Water Board – Wastewater Facilities attention immediately upon noting and should also be reported in this section. The analysis result should be compared against all applicable federal, state and local standards and limitations. If no violations are noted then **"NO VIOLATIONS"** should appear on the report.

Pursuant to 40 CFR Part 403.12g of the Federal Standards, all violations noted must be followed up by a sample recollect/analysis and the results submitted to the Niagara Falls Water Board within thirty (30) days of first becoming aware of the violation.

Pursuant to 40 CFR Part 403.12g all Periodic Self-Monitoring Reports must be signed by a "responsible company official" certifying the following statement:

> I, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed: 

Title: Consultant for Cascades Containerboard Packaging, Inc.

Date: November 30, 2017

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock A Zone Royal Avenue- West Side**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: October 3, 2017						
24-HOUR FLOW IN MGD	0.00065				0.00073	
BENZENE	171		0.0009		258	0.0016
MONOCHLOROBENZENE	2,425		0.0131		2,175	0.0131
1,2 – DICHLOROBENZENE	980		0.0053		1,243	0.0077
1,3 – DICHLOROBENZENE	1,625		0.0088		1,938	0.0120
1,4 – DICHLOROBENZENE	2,250		0.0122		2,200	0.0134
1,2,4 - TRICHLOROBENZENE	80		0.0004		99	0.0006
1,1 - DICHLOROETHANE	400		0.0022		653	0.0042
CIS – 1,2 - DICHLOROETHYLENE	822		0.0044		947	0.0058
ACETONE	205		0.0011		285	0.0018
TETRACHLOROETHYLENE	92.5		0.0005		259	0.0017
TOLUENE	173		0.0009		288	0.0018
TRICHLOROETHYLENE	77.5		0.0004		321	0.0021
VINYL CHLORIDE	125		0.0007		139	0.0009
MONOCHLOROTOLUENES	3158		0.0171		4,157	0.0259
TOTAL PHENOL	234		0.0013		403	0.0026
ARSENIC	30.6		0.0002		46.45	0.0003
IRON	686		0.0037		639	0.0039
POTASSIUM	739,000		3.9948		782,500	4.7778
SODIUM	188,600		1.0195		212,550	1.3059

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock A Zone - Royal Avenue East Side**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: October 4, 2017						
24-HOUR FLOW IN MGD	0.00048				0.00055	
BENZENE	529		0.0021		636	0.0030
MONOCHLOROBENZENE	840		0.0033		910	0.0042
1,2 - DICHLOROBENZENE	1,955		0.0077		2,185	0.0100
1,3 - DICHLOROBENZENE	715		0.0028		760	0.0035
1,4 - DICHLOROBENZENE	1,159		0.0046		1,295	0.0060
1,2,4 - TRICHLOROBENZENE	135		0.0005		149	0.0007
1,1 - DICHLOROETHANE	295		0.0012		305	0.0014
CIS – 1,2 - DICHLOROETHYLENE	285		0.0011		293	0.0013
ACETONE	115		0.0005		108	0.0005
TETRACHLOROETHYLENE	560		0.0022		656	0.0030
TOLUENE	170		0.0007		204	0.0010
TRICHLOROETHYLENE	1,060		0.0042		1,181	0.0054
VINYL CHLORIDE	23.5		0.0001		31	0.0002
MONOCHLOROTOLUENES	2421		0.0096		2,695	0.0124
TOTAL PHENOL	120		0.0005		117	0.0006
ARSENIC	86		0.0003		89	0.0004
IRON	1,307		0.0052		1,175	0.0053
POTASSIUM	2,685,000		10.6394		2,992,500	13.7299
SODIUM	252,000		0.9986		271,500	1.2410

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock A-Zone 47th Street**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: October 4, 2017						
24-HOUR FLOW IN MGD	0.00063				0.00068	
BENZENE	58		0.0003		72	0.0004
MONOCHLOROBENZENE	280		0.0015		270	0.0016
1,2 - DICHLOROBENZENE	100		0.0005		115	0.0007
1,3 - DICHLOROBENZENE	230		0.0012		220	0.0009
1,4 - DICHLOROBENZENE	170		0.0009		165	0.0010
1,2,4 - TRICHLOROBENZENE	0		0.0000		0	0.0000
1,1-DICHLOROETHANE	0		0.0000		4.3	0.0001
CIS – 1,2 - DICHLOROETHYLENE	0		0.0000		11	0.0001
ACETONE	0		0.0000		0	0.0000
TETRACHLOROETHYLENE	0		0.0000		0	0.0000
TOLUENE	0		0.0000		6	0.0001
TRICHLOROETHYLENE	0		0.0000		0	0.0000
VINYL CHLORIDE	0		0.0000		19	0.0001
MONOCHLOROTOLUENES	141		0.0007		139	0.0008
TOTAL PHENOL	39.9		0.0002		43.5	0.0003
ARSENIC	26.9		0.0001		20.9	0.0001
IRON	73.5		0.0004		164	0.0010
POTASSIUM	3,980,000		21.01684		4,460,000	25.3030
SODIUM	268,000		1.4152		301,500	1.7109

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock B Zone (South)**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: October 3-4, 2017						
24-HOUR FLOW IN MGD	0.000000[1]				0.000000	
BENZENE	42		0.0000		29.1	0.0000
MONOCHLOROBENZENE	467		0.0000		393	0.0000
1,2 – DICHLOROBENZENE	94.3		0.0000		109	0.0000
1,3 - DICHLOROBENZENE	154		0.0000		161	0.0000
1,4 - DICHLOROBENZENE	208		0.0000		211	0.0000
1,2,4 - TRICHLOROBENZENE	25.8		0.0000		12.9	0.0000
1,1 - DICHLOROETHANE	145		0.0000		115	0.0000
CIS – 1,2 - DICHLOROETHYLENE	145		0.0000		83.5	0.0000
ACETONE	173		0.0000		86.5	0.0000
TETRACHLOROETHYLENE	25.8		0.0000		15.4	0.0000
TOLUENE	34.0		0.0000		19.7	0.0000
TRICHLOROETHYLENE	26.2		0.0000		18.0	0.0000
VINYL CHLORIDE	53.7		0.0000		33.7	0.0000
MONOCHLOROTOLUENES	130		0.0000		94	0.0000
TOTAL PHENOL	33.6		0.0000		33.4	0.0000
						0.0000
ARSENIC	24.4		0.0000		22.4	0.0000
IRON	363		0.0000		326	0.0000
POTASSIUM	2,734,667		0.0000		2,862,334	0.0000
SODIUM	279,167		0.0000		270,817	0.0000

[1] No discharge to south for the time period June 2017 through November 2017.

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Monitoring Wells in Bedrock B Zone (East)**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: October 3-4, 2017						
24-HOUR FLOW IN MGD	0.00026				0.00028	
BENZENE	0.0		0.0		0.0	0.0
MONOCHLOROBENZENE	33.5		<0.0001		19.9	<0.0001
1,2 - DICHLOROBENZENE	0.0		0.0		0.0	0.0
1,3 - DICHLOROBENZENE	29.1		<0.0001		16.6	<0.0001
1,4 - DICHLOROBENZENE	32		<0.0001		18.3	<0.0001
1,2,4 - TRICHLOROBENZENE	0.0		0.0		0.0	0.0
1,1 - DICHLOROETHANE	0.0		0.0		1.8	<0.0001
CIS – 1,2 - DICHLOROETHYLENE	34.0		<0.0001		24.8	<0.0001
ACETONE	0.0		0		0.0	0.0
TETRACHLOROETHYLENE	0.0		0.0		1.5	<0.0001
TOLUENE	0.0		0.0		0.0	0.0
TRICHLOROETHYLENE	0.0		0.0		2.5	<0.0001
VINYL CHLORIDE	0.0		0.0		0.0	0.0
MONOCHLOROTOLUENES	31.5		<0.0001		89.3	0.0002
TOTAL PHENOL	18.4		<0.0001		17.7	<0.0001
ARSENIC	8.3		<0.0001		6.4	<0.0001
IRON	235		0.0005		346	0.0008
POTASSIUM	2,882,250		6.3237		3,013,050	7.0828
SODIUM	284,000		0.6231		289,750	0.6801

PART I

ANALYTICAL RESULTS

SIU PERMIT NAME: **Cascades Containerboard Packaging, Inc. – Frontier Site**

SIU PERMIT NO.: **078**

SAMPLE LOCATION: **Total Sum of Bedrock A and B Zones**

	RESULTS µg/L	/ µg/L	RESULTS pounds/day	/pounds/day	ANNUAL AVERAGE µg/L	ANNUAL AVERAGE pounds/day
DATE SAMPLED: October 3-4, 2017						
24-HOUR FLOW IN MGD	0.002019				0.002227	
BENZENE			0.0033			0.0050
MONOCHLOROBENZENE			0.0179			0.010
1,2 - DICHLOROBENZENE			0.0136			0.0184
1,3 - DICHLOROBENZENE			0.0128			0.0167
1,4 - DICHLOROBENZENE			0.0177			0.0202
1,2,4 - TRICHLOROBENZENE			0.0010			0.0013
1,1 - DICHLOROETHANE			0.0033			0.0056
CIS – 1,2 - DICHLOROETHYLENE			0.0056			0.0072
ACETONE			0.0016			0.0023
TETRACHLOROETHYLENE			0.0027			0.0047
TOLUENE			0.0016			0.0028
TRICHLOROETHYLENE			0.0046			0.0075
VINYL CHLORIDE			0.0008			0.0011
MONOCHLOROTOLUENES			0.0275			0.0393
TOTAL PHENOL			0.0019			0.0033
ARSENIC			0.0006			0.0008
IRON			0.0098			0.0109
POTASSIUM			41.9748			50.8934
SODIUM			4.0564			4.9377

PART II

COMPLIANCE MONITORING

SIU NAME: Cascades Containerboard Packaging, Inc. – Frontier Site

PERMIT NO.: 078

NO VIOLATIONS

VIOLATION PARAMETER	DATE	FLOW [MGD]	SAMPLE POINT LOCATION	ACTUAL* DISCHARGE	PERMIT LIMIT	TYPE** LIMIT VIOLATED

NOTE:

* - Actual discharge – list actual analytical results and appropriate units.

** - Type Limit Violated – List Type:

A.A. = Annual Average

D.M. = Daily Maximum

L.L. = Local Limits (Regulation 1960.5)

ADMIN\WINWORD\PARADISE\SIU\SELF-MONITORING REPORT FORM - BLANK

Attachment C
Permit No. 78

NIAGARA FALLS WATER BOARD
WASTEWATER FACILITIES
SIGNIFICANT INDUSTRIAL USER
WASTEWATER DISCHARGE PERMIT

PERMIT NO. 78 Norampac- Frontier Site

In accordance with all terms and conditions of the Niagara Falls Water Board Wastewater Regulations Part 1960 and also with all applicable provisions of Federal and State Law or regulation.

Permission is Hereby Granted To: Norampac Industries, Inc.- Niagara Falls Division

Located at: 4626 Royal Avenue, Niagara Falls, NY 14303

Classified by SIC No(s): None, non production facility

For the contribution of wastewater into the Niagara Falls Water Board Publicly-Owned Treatment Works (POTW).

Effective this 1st day of October 2015
To expire this 1st day of October 2020

For

Paul J. Drof
Executive Director of The Niagara Falls Water Board

Signed this 29th day of September, 2015

DISCHARGE IDENTIFICATION

OUTFALL	DESCRIPTION	LOCATION	RECEIVING
MS #1	Monitoring Wells in Bedrock Zones A, B	4626 Royal Avenue	Contaminated Site Ground Water
MS #2	Remedial Water	Manhole located at corner of Royal Ave. and 47th St.	Above Ground Remedial Water

WASTEWATER DISCHARGE PERMIT REQUIREMENTS FOR:		**ACTION REQUIRED**	**REQUIRED DATE OF SUBMISSION**
A.	**<u>Discharges to the Niagara Falls Water Board (NFWB) Sewer</u>**		
1.	Identification of all discharges to the NFWB Sewer System on a current plant sewer map certified by a New York State licensed professional engineer.	NONE	SUBMISSION RECEIVED 9/22/15
2.	Identification of each contributing waste stream to each discharge to the NFWB Sewer System clearly marked on, or referenced to, a current plant sewer map certified by a New York State licensed professional engineer.	NONE	SUBMISSION RECEIVED 9/22/15
3.	Elimination of all uncontaminated discharges to the NFWB Sewer System. All uncontaminated flows should be clearly identified on a current sewer map certified by a New York State licensed professional engineer.	NONE	SUBMISSION RECEIVED 9/22/15
4.	Establishment of a control manhole that is continuously and immediately accessible for each discharge to the NFWB Sewer System.	NONE	SUBMISSION RECEIVED 9/22/15
B.	**<u>Wastewater Discharge Management Practices</u>**		
1.	Identification of a responsible person(s) (day to day and in emergencies).	NONE	SUBMISSION RECEIVED 9/22/15

WASTEWATER DISCHARGE PERMIT REQUIREMENTS FOR:

C. Slug Control Plan**

Pursuant to Section 40 CFR 403.12 (v) of the Federal Pretreatment Standards the Niagara Falls Water Board will evaluate the permittee, a minimum of once every two years for the need for a "Slug Control Plan." If a plan is required by the Niagara Falls Water Board, then the plan will contain, at a minimum, the following elements:

a) Description of discharge practices, including non-routine batch discharges;
b) Description of stored chemicals;
c) Procedures for immediately notifying the POTW of slug discharges, including any discharge that would violate a prohibition under 40 CFR 403.5 (b), with procedures for follow-up written notification within five days;
d) If necessary, procedures to prevent adverse impact from accidental spills, including inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants (including solvents), and/or measures and equipment necessary for emergency response.

**This section applies to all pollutants limited by the Niagara Falls Water Board SPDES Permit and all prohibited wastewater discharges (See Section 1960.5 of the Niagara Falls Water Board - Wastewater Regulations).

D. General Wastewater Discharge Permit Conditions

1. Flow monitoring should be performed concurrently with any Wastewater Discharge Permit sampling and should be reported at the same time as analytical results. If it is not feasible to perform flow monitoring, an estimate of flow (method of estimated flow preapproved by the Niagara Falls Water Board) should be submitted with the analytical results.

2. All sampling for billing and pretreatment compliance purposes will be coordinated through the Niagara Falls Water Board Industrial Monitoring Coordinator

3. All analysis must be performed by a State certified laboratory using analytical methods promulgated and consistent with 40 CFR 136 and amendments thereto. The permittee will request their contract laboratory to report both Practical Quantization Limit (PQL) and Method Detection Limit (MDL). The PQL and MDL are defined in the NYSDEC Technical Guidance Series 1.3.7.

   The permittee should report results that are less than the MDL or PQL on the NFWB Self Monitoring Report, as non-detect (ND), by placing a less than sign (<) followed by the analytical result. Every effort should be made to attain results down to the MDL. If this is not possible, then results less than PQL but greater than MDL must also be additionally flagged with the qualifier "J" on the Self Monitoring Report. For example, a result less than 5 PQL would be reported <5 (J). In either case the calculated load in lbs per day would be zero.

   Monitoring results which are lower than the PQL must be reported but will not be used to determine compliance with the permit limit.

4. An estimate of relative production levels for wastewater contributing processes at the time of any pretreatment compliance sampling will be submitted upon request of the Director of Niagara Falls Water Board-Wastewater Facilities.

5. All samples will be handled in accordance with EPA approved methods. Chain of Custody records will be submitted with all sampling results.

6. All conditions, standards and numeric limitations of the Niagara Falls Water Board Wastewater Regulations are hereby incorporated into this permit by reference. These conditions, standards and numeric limitations must be complied with. Failure to comply with any part of said ordinances constitutes a violation and is subject to enforcement actions(s) described in Section 1960.9 of said Regulations, and in the Niagara Falls Water Board Pretreatment Administrative Procedure Number Five (5) - "Enforcement Response Guide." Violators are subject to all applicable Civil and Criminal penalties. In the event of a violation, including slug discharges or spills, the Niagara Falls Water Board must be notified immediately by phone and confirmed by letter within five (5) working days.

   Any person adjudicated of violating any provision in the Niagara Falls Water Board Wastewater Regulations shall be assessed a fine in the amount of up to $10,000. This amount is available for each violation, and each day of a violation is a separate incident for which penalties may be sought.

The person violating any of the provisions of the Niagara Falls Water Board Wastewater Regulations will be liable for any expense, loss, or damage occasioned by reason of such violation. The expense, loss or damage will be taken to be to the extent determined by the Director.

In addition, any person who knowingly makes any false statements; representation or certification in any application, record, report, plan or other document filed or required to be maintained pursuant to the Niagara Falls Water Board Wastewater Regulations or Wastewater Discharge Permit, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required under the Niagara Falls Water Board Wastewater Regulations will, upon conviction be punished by a fine up to $5,000. Furthermore, the Niagara Falls Water Board may recover reasonable attorney's fees, court costs, court reporting fees, and other expenses of litigation by appropriate suit at law against the person found to have violated applicable laws, orders, rules and permits required by the Niagara Falls Water Board Wastewater Regulations.

7. In accordance with Federal Regulation CFR 40, Part 403.12(g), any exceedance of a numeric limitation noted by the SIU must be re-sampled, analyzed and resubmitted to the Niagara Falls Water Board - Wastewater Facilities within 30 days.

   Specifically, if any limit that is listed in Section F of this permit is exceeded, then the permittee will undertake a short term monitoring program for that pollutant. Samples will be collected identical to those required for routine monitoring purposes and will be collected on each of at least two (2) operating days and analyzed. Results will be reported in both concentration and mass, and will be submitted within 30 days of becoming aware of the exceedance.

8. Sampling frequency for any permitted compounds may be increased beyond the requirements set forth in Section F and G of this permit. If the permittee monitors (sample and analysis) more frequent than required under this permit, **all** results of this monitoring must be reported.

9. As noted in Section 1960.5g of the Niagara Falls Water Board Wastewater Regulations, "Personnel as designated by the Director will be permitted at any time for reasonable cause to enter upon all properties served by the Niagara Falls Water Board – Wastewater Facilities for the purpose of, and to carry out, inspection of the premises, observation, measurement, sampling and testing, in accordance with provisions of the Ordinance."

10. As noted in Section 1960.5c of the Niagara Falls Water Board Regulations, significant changes in discharge characteristics or volume must be reported immediately to the Niagara Falls Water Board – Wastewater Facilities.

11. As noted in Section 1960.6b of the Niagara Falls Water Board Regulations, samples required to be collected via a 24-hour composite sampler must be retained refrigerated for an additional 24 hour plus un-refrigerated an additional 48 hours (total 78 hours).

12. As noted in Section 1960.5d of the Niagara Falls Water Board Wastewater Regulations, all "SIU's will keep on file for a minimum of three (3) years, all records, flow charts, laboratory calculations or any other pertinent data on their discharge to the Niagara Falls Water Board – Wastewater Facilities."

13. As noted in Section 1960.6g of the Niagara Falls Water Board Wastewater Regulations, "Permits are issued to a specific user for a specific monitoring station. A permit will not be reassigned or transferred without the approval of the Director which approval will not be unreasonably withheld. Any succeeding owner or user to which a permit has been transferred and approved will also comply with all the terms and conditions of the existing permit."

14. The Annual Average Limitation is equivalent to the specific SIU allocation, and will be defined as the permissible long-term average discharge of a particular pollutant. These limitations are listed in Section F of this permit. The computation of the Annual Average will be as follows; for each compound listed in Section G of this permit, the Annual Average will be the average of the present monitoring quarter and three previous quarters' data.

15. The Daily Maximum Limitation will be defined as the maximum allowable discharge on anyone day. The Daily Maximum Limitation will allow for periodic short term discharge fluctuations. These specific limitations are listed in Section F of this permit.

16. Enforcement of the Annual Average Limitation will be based on the reported average of the last four quarters data vs. the Annual Average Limited listed in Section F of this permit. Enforcement of the Daily Maximum Limitation will be based on individual analysis results vs. the Daily Maximum Limit listed in Section F of this permit. These results may be obtained from self- monitoring (Section G), Niagara Falls Water Board Verification, incident investigation or billing samples.

17. The Niagara Falls Water Board Administrative Procedure Number 6 "Procedure for Determination and Use of Local Limits" lists all pollutants noted in the Niagara Fall Water Board – Wastewater Facilities SPDES Permit. The limits defined in the procedure are values which are based on the quantity of substances discharged which can be easily related to the Treatment Plant's removal capacity.

17. The pollutants listed in this procedure, which are <u>not</u> specifically listed in Section F and G of this permit, may be present in the permittee's wastewater discharge, but at levels which do not require specific permit limitations. Consequently, if any of the limits listed in this procedure, for pollutants <u>not</u> identified in Section F and G of this permit, are exceeded then the permittee will undertake a short-term, high intensity monitoring program for that pollutant. Samples identical to those required for routine monitoring purposes will be collected on each of at least three operating days and analyzed. Results will be expressed in terms of both concentration and mass, and will be submitted no later than the end of the third month following the month when the limit was first exceeded.

    If levels higher than the limit are confirmed, the permit may be reopened by the Niagara Falls Water Board for consideration of revised permit limits.

E. Specific Wastewater Discharge Permit Conditions

1. Billing Agreement:

Sewer use billing will be calculated based on the information provided in the periodic self monitoring reports and will follow the procedures outlined in the Niagara Falls Water Board Regulations for SIUs Part 1960.

2. Flow Measurement:

The permittee will not discharge wastewater in the conventional way through a point source discharge and therefore not through a typical monitoring station. As such the flow will be based on the calculation as described in the attached Table 1, pages one and two.

3. Sample Collection:

a) This site has been designated as a hazardous waste remedial site. Ground water exits the site and passively enters the NFWB combined sewers on 47th Street and Royal Avenue. The "discharge" cannot be easily, nor economically be combined into a point source discharge.

Because of this issue pollutant monitoring will be conducted by sampling monitoring wells which most accurately represent the pollutant quality of the wastewater exiting the site. The wells designated for this purpose are from the Zones A and B Fracture Bedrock. They are identified on the attached Figures 3-5 and 3-6. The original enlarged copies of these figures are contained in the original permit application.

These wells will be collectively identified as Monitoring Station #1 (MS #1).

b) Surface site remediation to remove contaminated soil will result in the generation or collection of surface water, equipment decontamination wastewater, storm water, air scrubber unit wastewater and sanitary sewage. The discharge of these wastewaters will enter the NFWB sanitary sewer at MS #2.

A representative sample of the discharge including all sources noted above will be collected as follows; every second week a composite of eight grab samples over eight (8) hours will be collected and analyzed for the pollutants listed on Attachment – A, which is entitled "Discharge Monitoring and Reporting Requirements Part B".

The discharge will remain within the limits listed on Attachment – A, which is entitled "Interim Discharge Limits and Monitoring Requirements Part B".

F. Discharge Limitations & Monitoring Requirements

During the Period beginning the effective date of this Permit and lasting until the expiration date, discharge from the permitted facility outfall(s) will be limited and monitored by the permittee as specified below.

OUTFALL NUMBER/ EFFLUENT PARAMETER	DISCHARGE LIMITATIONS		UNITS	MINIMUM MONITORING REQUIREMENTS	
	ANNUAL AVERAGE	DAILY MAXIMUM		MEASUREMENT FREQUENCY	SAMPLE TYPE
MS #1 Flow		3,600	Gals/day	2 per year	See E-2
MS #1 Arsenic		0.008	Lbs/day	2 per year	See E-3
MS #1 Iron		0.24	Lbs/day	2 per year	See E-3
MS #1 Potassium		400	Lbs/day	2 per year	See E-3
MS #1 Sodium		40.0	Lbs/day	2 per year	See E-3
MS #1 T. Phenol		0.05	Lbs/day	2 per year	See E-3
MS #1 1,1-Dichloroethane		0.13	Lbs/day	2 per year	See E-3
MS #1 1,2,4-Trichlorobenzene		0.026	Lbs/day	2 per year	See E-3
MS #1 1,2-Dichlorobenzene		0.26	Lbs/day	2 per year	See E-3
MS #1 1,3-Dichlorobenzene		0.11	Lbs/day	2 per year	See E-3
MS #1 1,4-Dichlorobenzene		0.17	Lbs/day	2 per year	See E-3
MS #1 Acetone		0.026	Lbs/day	2 per year	See E-3
MS #1 Benzene		0.15	Lbs/day	2 per year	See E-3
MS #1 Chlorobenzene		0.10	Lbs/day	2 per year	See E-3
MS #1 Cis-1,2-Dichloroethene		0.060	Lbs/day	2 per year	See E-3
MS #1 Tetrachloroethene		0.05	Lbs/day	2 per year	See E-3
MS #1 Toluene		0.03	Lbs/day	2 per year	See E-3
MS #1 Trichloroethene		0.15	Lbs/day	2 per year	See E-3
MS #1 Vinyl Chloride		0.012	Lbs/day	2 per year	See E-3
MS #1 Monochlorotoluene		0.2	Lbs/day	2 per year	See E-3

G. Discharge Monitoring Reporting Requirements

During the period beginning the effective date of this permit and lasting until its expiration date, discharge monitoring results will be summarized and reported by the permittee; Monthly - 14 days after monitoring period, Quarterly - by the last day of the monitoring period = February 28, May 31, August 31, November 30. *Semiannual reports* will be submitted on the last day of the monitoring period = **November 30, May 31**. The annual average for each parameter listed in Section F, will be computed and reported quarterly. The individual sample analysis for present quarter will also be reported quarterly unless directed otherwise in this permit.

OUTFALL NO	PARAMETER	REPORTING FREQUENCY
MS #1	Flow	Semi-Annual
MS #1	Arsenic	Semi-Annual
MS #1	Iron	Semi-Annual
MS #1	Potassium	Semi-Annual
MS #1	Sodium	Semi-Annual
MS #1	T. Phenol	Semi-Annual
MS #1	1,1-Dichloroethane	Semi-Annual
MS #1	1,2,4-Trichlorobenzene	Semi-Annual
MS #1	1,2-Dichlorobenzene	Semi-Annual
MS #1	1,3-Dichlorobenzene	Semi-Annual
MS #1	1,4- Dichlorobenzene	Semi-Annual
MS #1	Acetone	Semi-Annual
MS #1	Benzene	Semi-Annual
MS #1	Chlorobenzene	Semi-Annual
MS #1	Cis-1,2-Dichloroethene	Semi-Annual
MS #1	Tetrachloroethene	Semi-Annual
MS #1	Toluene	Semi-Annual
MS #1	Trichloroethene	Semi-Annual
MS #1	Vinyl Chloride	Semi-Annual
MS #1	Monochlorotoluene	Semi-Annual

H. Comments/Revisions

Attachment D
Site Management Periodic Review Report Notice - Institutional and Engineering Controls Certification Form

Enclosure 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. 932110

Site Name ~~Frontier Chemical - Royal Avenue~~ Cascades Containerboard Packaging - Royal Avenue

Site Address: 4626 Royal Avenue Zip Code: 14303
City/Town: Niagara Falls
County: Niagara
Site Acreage: 9.8

Reporting Period: November 18, ~~2015~~ 2016 to November 18, ~~2016~~ 2017

	YES	NO
1. Is the information above correct?	☐	☑
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☑
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☑
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☑	☐
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☑

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Industrial	☑	☐
7. Are all ICs/ECs in place and functioning as designed?	☑	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative

Date

SITE NO. 932110

Box 3

Description of Institutional Controls

Parcel	Owner	Institutional Control
160.09-1-6	4626 Royal Avenue Holding LLC	Ground Water Use Restriction Soil Management Plan Landuse Restriction Site Management Plan Monitoring Plan IC/EC Plan

Environmental Easement and Site Management Plan

Box 4

Description of Engineering Controls

Parcel	Engineering Control
160.09-1-6	Cover System

12" clean cover system consisting of crushed concrete or crushed stone with some asphalt

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☑	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☑	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative

Date

IC CERTIFICATIONS
SITE NO. 932110

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Michelle Hamm (print name) at Cascade Paperboard Packaging, 4001 Packing Road, Niagara Falls, NY 14303 (print business address),

am certifying as Remedial - Designated Rep (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

Michelle Hamm — Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

12-8-17 — Date

IC/EC CERTIFICATIONS

Box 7

Qualified Environmental Professional Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Richard J. Snyder (print name) at GHD Services Suite 3, 135 Raritan center Parkway Edison NJ 08836 (print business address)

am certifying as a Qualified Environmental Professional for the Owner (Owner or Remedial Party)

STATE OF NEW YORK
RICHARD J. SNYDER
No. 66242
LICENSED PROFESSIONAL ENGINEER

Richard J. Snyder — 12-12-17

Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification — Stamp (Required for PE) — Date