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Our ref: 11192137-LTR-58

15 August 2024

Ms. Lubna Hussain
Director, West Central Region
Ontario Ministry of the Environment
119 King Street West, 12th floor
Hamilton, ON
L8P 4Y7

LANXESS Canada Co./Cie (LANXESS) Progress Report July 2024

Dear Ms. Hussain

This letter presents a summary of the July 2024 LANXESS Progress Report.

The following noteworthy items regarding the Combined Groundwater Collection and Treatment System (CTS) are discussed in the report text.

The average monthly pumping rates of PW4, PW5, W5A, W9, and E7 were less than their Target Average pumping rates during July 2024. PW4 was pumping at a slightly reduced flowrate in July 2024; LANXESS suspects either a pump/motor issue or decreased well yield. PW5 continued operating at a reduced pumping rate in July 2024. Despite not meeting the Target Average pumping rate, hydraulic monitoring data indicate PW5 currently generates an effective groundwater capture zone. LANXESS is in the process of connecting the new replacement well PW6 to the existing treatment system infrastructure and is working towards bringing the well online. The pumping rate of W5A was below its Target Average pumping rate in July 2024. The well is unable to maintain its pumping rate due to low water level in the well. The W5A flow issue is currently being investigated. W9 continued pumping at a reduced rate during July 2024. The well pump is running at maximum capacity, therefore, LANXESS believes that the decreased pumping rate is due to an issue with the pump/motor and/or decreased well efficiency. Due to delays with contractor availability, LANXESS has had to re-scheduled inspection of the pump/motor and possible video inspection. LANXESS is awaiting a future date from their contractor. The E7 average daily pumping rate was slightly less than its Target Average pumping rate in July 2024 due to a significant power outage and because of a leak within one of the Rayox trains. The leak was repaired, and the system was restarted at its target pumping rate.

During July 2024, the CTS operated within the Effluent Limits and within the Effluent Objectives for all compounds.

Please refer to the detailed information in the Progress Report for further information on these items.

Regards

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AB/kf/58

Encl.

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July 2024

Progress Report
LANXESS Canada Co./Cie
Elmira, Ontario

GHD has prepared this report on behalf of LANXESS Canada Co./Cie (LANXESS) and submitted it to the Ontario Ministry of the Environment, Conservation and Parks (MECP). This report complies with the administrative reporting requirements of the November 4, 1991 Control Order (Control Order), the Amended Environmental Compliance Approval (ECA) No. 0831-BX6JGD (Combined On-Site and Off-Site Groundwater Collection and Treatment Systems [CTS]), and Certificate of Approval (C of A) No. 4-0025-94-976 (E7/E9 Treatment Facility).

Unless otherwise stated, all data included in this report were collected in July 2024.

The Progress Report is organized as follows:

1. Monitoring and Analytical Data

A summary of the LANXESS monitoring programs is provided in Table 1.

A summary of the analytical results for the CTS is presented in Attachment A.

A summary of the analytical results from the monthly July 2024 Environmental Appeal Board (EAB) monitoring of discharges to surface water through storm water outfalls 0200, 0400 and 0800, and the storm water drainage system (SWS), is included in Attachment B. Attachment B is not required under the Control Order but is provided for review.

A summary of the analytical results for routine quarterly surface water samples collected from Canagagigue Creek (the Creek) in July 2024 is presented in Attachment C. Groundwater and surface water elevation monitoring completed on July 22, 2024, as required by ECA No. 0831-BX6JGD Section 9, is also presented in Attachment C. Further details related to this requirement are described in Section 8 of this report.

A summary of the analytical results for groundwater samples collected as part of the 2024 Creek Bank Groundwater Monitoring Program is presented in Attachment D. The sampling locations are presented on Figure D.1.

2. Correspondence, Meetings, and Events

July 15, 2024	June 2024 Progress Report submitted to MECP West Central Region (WCR)
July 24, 2024	Meeting with The Region of Waterloo Water Resources Department regarding the potential future use of the off-site Municipal Aquifer in Elmira as a source of potable water

3. CTS Monitoring and Performance

A schematic process flow diagram of the CTS is provided on Figure A.1 (Attachment A).

The July 2024 average pumping rates for the CTS containment wells PW4 and PW5, the CTS extraction wells W3R, W5A, W5B, W6A, W6B, W8 and W9, the Upper Aquifer Containment System (UA CS) wells, and E7, as compared to the target average pumping rates, are listed below, and shown graphically on Figures A.2 and A.3 (Attachment A).

Average Daily Pumping Rates		
July 2024 (Litres/second [L/s])		
Containment and Extraction Wells	**Target Average (1)**	**Average**
On Site Wells		
PW4	2.9	2.6
PW5	1.8	0.8
Upper Aquifer Wells	--	0.7
Off Site Wells		
W3R	18.5	19.2
W5A	4.5	0.7
W5B	2.8 (2)	4.5
W6A	0.20	0.41
W6B	0.30	0.42
W8	0.05	0.09
W9	13.6	12.2
E7	23.9	23.7
Yara	--	0.3

Notes:

(1) As wells and treatment system components require periodic downtime for maintenance, the Target Average pumping rate is set at 90% of the set point rate. GHD recommends that LANXESS maintain the target pumping rates greater than or equal to these rates.

(2) The Target Average Pumping Rate for W5B has been temporarily reduced because a plume-wide decrease in groundwater elevations has limited the available drawdown and the corresponding well yield.

With the exceptions discussed below, the containment and extraction wells, including the UA CS wells, are operating as intended.

The PW4 average monthly pumping rate was less than its Target Average pumping rate in July 2024. PW4 continued pumping at a slightly reduced flowrate throughout the month; LANXESS suspects either a pump/motor issue or decreased well yield. LANXESS will schedule inspection of the pump/motor and possible well rehabilitation, subject to contractor availability.

PW5 continued operating at a reduced pumping rate in July 2024. The well is currently unable to maintain its Target Average pumping rate. The PW5 Target Average pumping rate is an internal operational guideline LANXESS uses when operating extraction/containment wells, which includes a significant safety factor. Despite not meeting the Target Average pumping rate, hydraulic monitoring data indicate PW5 currently generates an effective groundwater capture zone. LANXESS is in the process of connecting new replacement well PW6 to the existing treatment system infrastructure and is working towards bringing the well online. Excavation work for the installation of the pit less adapter, effluent pipeline, and communication and power lines will commence in August 2024, subject to contractor availability.

The pumping rate of W5A was below its Target Average pumping rate in July 2024. The well is unable to maintain its pumping rate due to low water level in the well. The W5A flow issue is currently being

investigated. LANXESS is evaluating next steps as the system appears to be in good working order. The well was last rehabilitated in May 2023, and the pump and motor were last replaced in July 2023.

W9 continued pumping at a reduced rate during July 2024. The well pump is running at maximum capacity, therefore, LANXESS believes that the decreased pumping rate is due to an issue with the pump/motor and/or decreased well efficiency. Due to delays with contractor availability, LANXESS has had to re-scheduled inspection of the pump/motor and possible video inspection. LANXESS is awaiting a future date from their contractor.

The E7 average daily pumping rate was slightly less than its Target Average pumping rate in July 2024 due to a significant power outage and because of a leak within one of the Rayox trains. The leak was repaired, and the system was restarted at its target pumping rate.

a) Bypass or Upset Conditions

The bypass or upset conditions encountered in the CTS are summarized in Table A.1 (Attachment A).

b) Data Summary and Interpretation

Table A.2 (Attachment A) presents the analytical results for the CTS samples collected in July 2024 and summarizes the effluent pH and temperature. The discharge pH was between 7.20 and 7.35 Standard Units (su), which is within the ECA discharge limit pH range of 5.5 to 9.5 su. The effluent temperature was between 13.2 and 14.7 degrees Celsius (°C), which is less than the discharge limit of 25°C.

The ATS removed ammonia to concentrations that were less than those required by the ECA.

The Combined Discharge Effluent[1] met the Effluent Limits and Effluent Objectives for all indicator parameters in July 2024.

Table A.3 (Attachment A) summarizes the effluent discharge flow rates. The total flow rate of treated groundwater discharged to the Creek via SS+890 was 36.6 L/s. The total flow rate of additional treated groundwater discharged to the Creek via Shirt Factory Creek (at storm water outfall 0800) was 5.3 L/s. The total flow rate of the combined treated groundwater discharged to the Creek (SS+890 discharge plus Shirt Factory Creek discharge) was 41.9 L/s, which was less than the discharge Effluent Limit of 92.2 L/s.

c) Supplementary Data

As part of the ongoing monitoring of on-Site carbon treatment performance, on July 2, 2024, LANXESS collected samples from the carbon tower influent (GCI) and carbon tower effluent (GCE) for volatile organic compound (VOC) and base/neutral and acid extractable compound (BNA) analyses. Table A.4 (Attachment A) presents the GCI and GCE analytical results.

On July 2, 2024, LANXESS collected samples from the influent to and treated effluent from the portable carbon adsorbers installed to pre-treat groundwater from UA CS wells U+500 and U+560. ECA No. 0831-BX6JGD does not require the collection of groundwater samples from UA CS wells; however, LANXESS has been collecting these samples on a voluntary basis to monitor and improve the performance of the on-Site granular activated carbon (GAC) Tower. LANXESS analyzed the samples for VOCs and BNAs. Table A.4 (Attachment A) presents the analytical results for the influent and pre-treated effluent samples from the U+500 and U+560 containment wells.

d) Broad Scan Data

On July 2, 2024, LANXESS collected samples from the groundwater effluent via the SS+890 discharge (GE) and from sampling location SFE, which is the additional groundwater effluent discharge via Shirt Factory Creek. LANXESS analyzed the samples for the ECA Effluent Broad Scan Parameters. Table A.5 (Attachment A) presents the broad scan analytical results versus Effluent Limits. All parameters were present in samples of the treated effluent at concentrations that were non-detectable, less than the Effluent Limits, or did not constitute an exceedance as defined by the ECA.

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[1] The Combined Discharge Effluent value was calculated by multiplying the average flow rates by the concentration of the analytes at the SS+890 GE outfall and the additional effluent discharge location via Shirt Factory Creek.

e) Toxicity

LANXESS collected a groundwater sample from the GE SS+890 discharge outfall and a sample from the SFE discharge outfall on July 2, 2024 and submitted the samples for acute toxicity analyses. The laboratory results indicate that the July 2024 groundwater samples were not acutely toxic to *Daphnia magna* and rainbow trout. The results have been included in Attachment A.

f) Routine Maintenance

Routine maintenance tasks completed on the CTS in July 2024 are summarized in Table A.6 (Attachment A). These activities are completed by LANXESS personnel as part of on-going preventative maintenance and system inspections. These maintenance activities do not typically cause a system bypass or shutdown and are not required by the Control Order or ECA. This information is being provided to demonstrate LANXESS' commitment to proactively maintain the CTS and ensure continued operations.

g) Receiver Water Quality Data

LANXESS collected surface water samples on July 22, 2024. The sampling locations are presented on Figure C.1. This sampling and analysis fulfill the quarterly indicator and broad scan monitoring requirements for the Primary and Secondary Surface Water Quality Monitoring Programs in ECA No. 0831-BX6JGD.

Table C.1 (Attachment C) presents the analytical results for the surface water samples collected in July 2024.

Apart from formaldehyde, all parameters analyzed as part of the July 22, 2024 sampling event were either not detected at their reporting detection limit (RDL) or were present at concentrations that were less than the Provincial Water Quality Objectives (PWQOs), Interim PWQOs (IPWQOs), and ECA Schedule E criterion.

The following presents a summary of receiver water quality parameters that were present at concentrations greater than the relevant criteria:

Parameter	IPWQO	Schedule E Criterion	Locations	Concentration Range
Formaldehyde	0.8 micrograms per litre (µg/L)	N/A	SS-110 SS+385 (West, Centre) SS+855 Field Duplicate SS+925	2.1 – 23.4 µg/L
Notes: N/A – No Schedule E Criterion specified in ECA No. 0831-BX6JGD.				

The upstream (SS-110) formaldehyde concentration on July 22, 2024 was 2.1 µg/L, indicating that the concentration of formaldehyde upstream of the Site was greater than the IPWQO (0.8 µg/L) and likely resulted in formaldehyde detections in the surface water samples collected further downstream. Upstream formaldehyde concentrations are indicative of discharges upstream of the Site and background surface water quality and are unrelated to operations the Site. Additionally, formaldehyde was detected at a higher concentration (10 µg/L) in the field duplicate sample collected at SS+855 but was not detected (ND[2.0 µg/L]) in the original sample collected from this location (collected at the same time). Due to this discrepancy, these data were qualified as estimated and may be inaccurate or imprecise. Formaldehyde was also detected in the sample collected from surface water monitoring station SS+925 at a concentration of 23.4 µg/L, however, formaldehyde was not detected (RDL = 2.0 µg/L) in the GE and SFE effluent samples collected in July 2024, indicating that the formaldehyde result is unrelated to operations at the Site. Based on the detected background concentration, the inconsistent formaldehyde detection in the surface water samples, and the non-detect GE and SFE effluent discharge sample results, the reported formaldehyde may be attributable to a combination of upstream discharges and/or field or laboratory contamination.

None of the detected concentrations in the July 2024 surface water samples are defined as an exceedance by ECA No. 0831-BX6JGD.

GHD's statistical analyses completed on the Schedule E parameters from July 2021 to July 2024 are presented in Table C.2. There were no statistically significant differences between the background and downstream parameter concentrations.

Summary of Efforts Made and Results Achieved

During July 2024, the CTS operated within the Effluent Limits and within the Effluent Objectives for all compounds.

4. Remedial Action Plan

There are no new activities to report for this item in July 2024.

5. E7 AOP

The average E7 pumping rate (23.7 L/s) was slightly less than its recommended Target Average pumping rate (23.9 L/s) during July 2024 due to a power outage and a leak within one of the Rayox trains. The influent sample collected on July 19, 2024 contained n-nitrosodimethylamine (NDMA) at a concentration of 0.03 µg/L. NDMA was not detected in the effluent sample collected on July 19, 2024 (RDL = 0.01 µg/L).

6. Environmental Audit

There are no new activities to report for this item in July 2024.

7. Remediation of Former Operating Pond Area

There are no new activities to report for this item in July 2024.

8. Additional Work/Studies

ECA No. 0831-BX6JGD, Section 9 (Upper Aquifer Hydraulic Containment Requirements), states that LANXESS is to operate the UA CS with the requirement that the water level of the surface of the UA_1 in the southwest portion of the property along the west side of the Creek, is maintained at least one (1) centimetre (cm) below the surface water elevation of the Creek, except for periods of time less than 1 day. Exceptions to this requirement include periods of up to 5 days for routine maintenance and/or equipment repair, and periods greater than 5 days because of Creek water level fluctuations beyond the control of the Owner.

Figure C.2 (Attachment C) shows the continuous surface water and groundwater elevations measured at UOW+510 and USW+500 in 2024. Heavy rains caused high surface water flows in the Creek and high Creek levels and the continuous monitoring data indicate a local loss of hydraulic containment in these areas beginning on July 16, 2024. High surface water levels cause Creek bank storage effects. Bank storage effects refer to the inflow of surface water (from the Creek) into surrounding aquifer materials during periods of high levels, which results in a local increase in groundwater elevations. When the surface water elevation undergoes a rapid decrease, the response of the groundwater level in the Creek bank is to decrease, but at a much slower rate than the surface water, resulting in a temporary loss of containment. This is a common occurrence near UOW+510/USW+500 during the spring freshet and other high flow events in the Creek.

The continuous monitoring data indicate that groundwater and surface water elevations decreased throughout the early part of July 2024, until July 10, 2024 when there was a significant rainfall event, and subsequent increase in the flowrate from the Grand River Conservation Authority (GRCA) Woolwich dam on July 11, 2024. Elevations effectively decreased through the end of the month, where there was a small

increase in flowrate on July 30 and July 31, 2024. Containment was lost at UOW+510/USW+500 on July 17, 2024 and was restored again on July 31, 2024.

When the required differential is not maintained due to Creek water level fluctuations, to demonstrate there are no practical alternatives to prevent the loss of containment, and document no adverse impact to surface water, LANXESS completes the following:

1. Collect manual water elevation measurements to confirm water elevation measurements from select stilling wells, creek bank monitoring wells, and surface water stake locations.
2. Confirm transducers are calibrated and functioning correctly at select continuous monitoring stations.
3. If routine surface water quality data are not available for the periods of time that the 1 cm differential is not maintained, collect monthly surface water monitoring samples along the west bank of the Creek at transect monitoring locations SS-110, SS+855, and the closest existing surface water sampling station to the area where the loss of containment occurred. Have these samples analyzed for the Primary Surface Water Quality Monitoring parameters in Schedule E.

LANXESS completed required groundwater and surface water elevation monitoring on July 22, 2024 and verified the functionality of the transducers. The elevation monitoring locations are presented on Figure C.3 (Attachment C). The difference between the manual surface water elevations and the manual groundwater elevations at the key monitoring pairs completed on July 22, 2024 have been plotted on Figure C.4 (Attachment C).

Routine surface water quality data was collected on July 22, 2024 and analyzed for the quarterly indicator and broad scan monitoring parameters which include the Schedule E list of parameters. The sampling locations are presented on Figure C.1 (Attachment C). Table C.1 (Attachment C) presents the analytical results for the routine surface water samples collected in July 2024. All the Schedule E parameters analyzed, as part of the July 22, 2024 routine sampling event, were either not detected at their respective RDLs or were present at concentrations that were less than their respective PWQOs, IPWQOs, and/or ECA Schedule E criterion.

Based on the Schedule E surface water quality monitoring completed, during the period when the differential was not maintained in July 2024, there are no adverse impacts to the surface water.

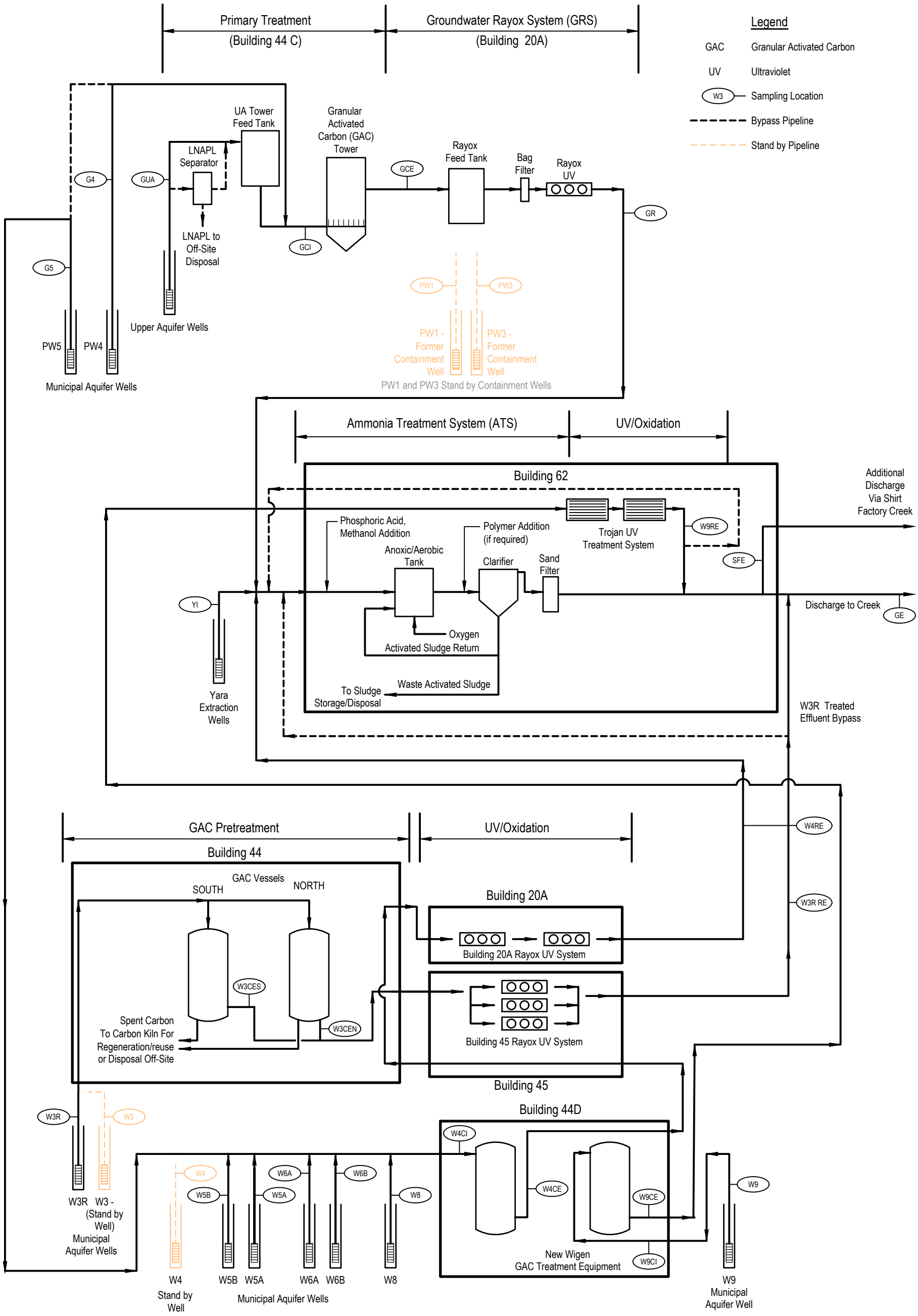
Table 1

Monitoring Program Summary
LANXESS Canada Co./Cie
Elmira, Ontario

Media and Sampling Program	Parameters	Frequency	July 2024 Results Location
Treatment System			
Off-Site Groundwater Collection and Treatment System (Off-Site CTS) Influent	Offsite Broad Scan (Schedule D)	Annual	-
On-Site Groundwater Collection and Treatment System (On-Site CTS) Influent	Effluent Broad Scan (Schedule C)	Annual	-
Combined On-Site and Off-Site Groundwater Collection and Treatment Systems (CTS) Effluent	Indicator parameters	Monthly	Attachment A
	Effluent Broad Scan (Schedule C)	Quarterly	Attachment A
CTS Effluent - Acute Toxicity	Not applicable	Quarterly	Attachment A
CTS Effluent - Chronic Toxicity	Not applicable	Semi-annual	-
Surface Water			
Environmental Appeal Board (EAB) Sampling	Select VOCs, semi-volatile organic compounds (SVOCs), pesticides, general chemistry	Monthly	Attachment B
Primary Surface Water Quality Monitoring	Indicator parameters	Quarterly	Attachment C
	Effluent Broad Scan (Schedule C)	Quarterly	Attachment C
Secondary Surface Water Quality Monitoring	Indicator parameters	Quarterly	Attachment C
	Effluent Broad Scan (Schedule C)	Quarterly	Attachment C
Upper Aquifer Hydraulic Containment Requirement	Schedule E	As required	Attachment C
Receiver Biomonitoring Program – Clams	See Biomonitoring Reports	Biennial (Even Years)	-
Receiver Biomonitoring Program – Benthic		Biennial (Odd Years)	-
Groundwater			
Groundwater Elevation Monitoring Program (GEMP)	Elevation	Semi-annual	-
Upper Municipal Aquifer (MU) Sentry Well Monitoring Program	n-Nitrosodimethylamine (NDMA), chlorobenzene	Semi-annual	-
NAPL Monitoring Program (NMP)	Elevation	Annual	-
Creek Bank Groundwater Monitoring Program – Spring Round	NDMA, chlorobenzene	Annual	-
Creek Bank Groundwater Monitoring Program – Summer Round	Selected pesticides and volatile organic compounds (VOCs)	Annual	Attachment D
Off-Site Sentry Well Monitoring Program	NDMA +/- chlorobenzene	Annual	-
Off-Site Plume Monitoring Program	NDMA +/- chlorobenzene	Biennial (Odd Years)	-

Attachment A

Analytical Results
Collection and Treatment System



LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

Project No. **11192137**
Date **August 2024**

TREATMENT SYSTEM PROCESS FLOW SCHEMATIC

FIGURE A.1

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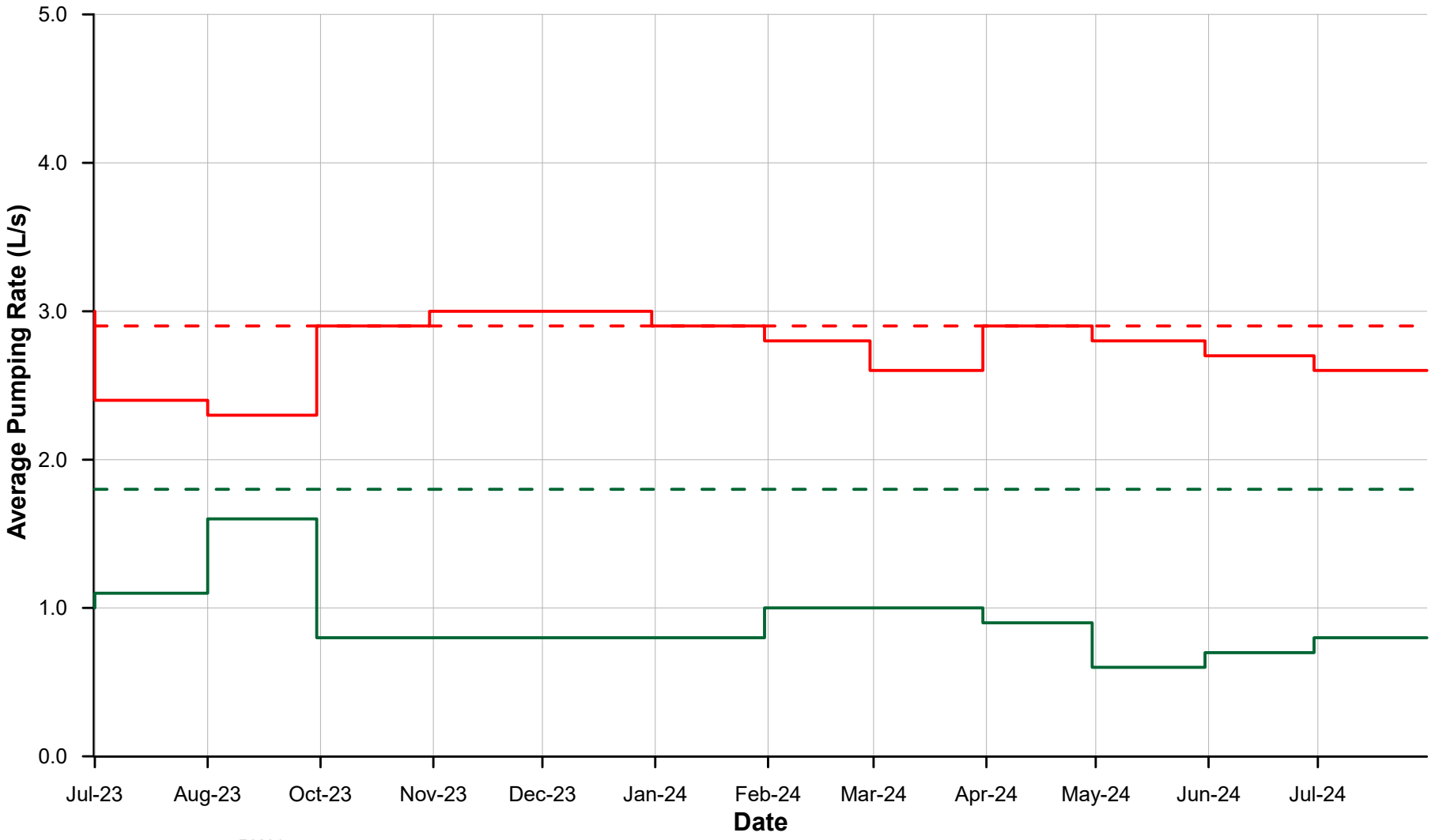


figure A.2

ON-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES

LANXESS CANADA CO./CIE

Elmira, Ontario

*Note: Target pumping rates were updated based on the average daily pumping rates recommended in the 2015 Model Check Point Analysis (GHD, June 2016). The Target Average pumping rates are 90% of the recommended daily Set Point pumping rates since the wells and treatment system components require periodic downtime for maintenance.

11192137(DIRE058)GIS-OT003 Aug 09, 2024

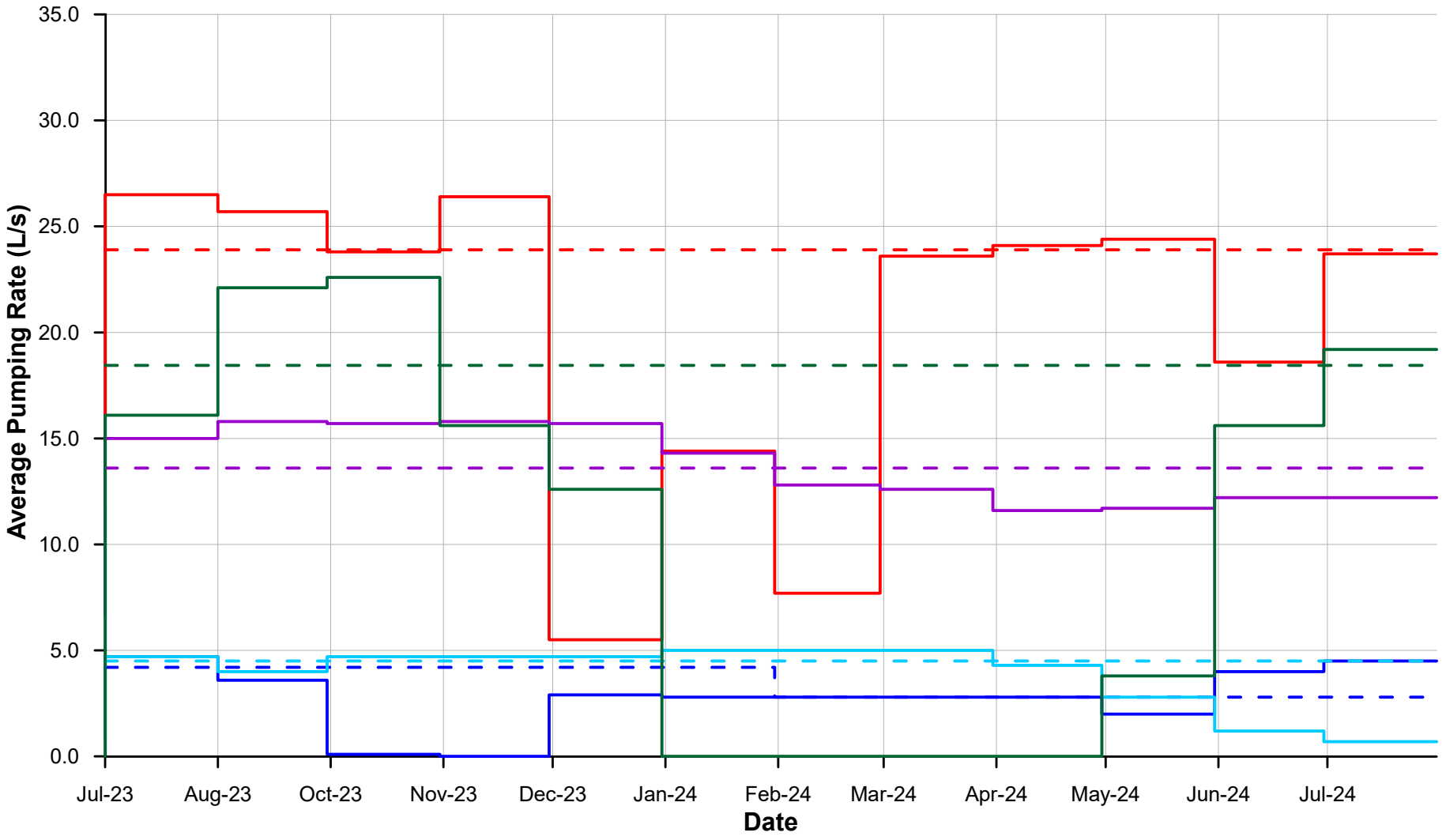


figure A.3a
OFF-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*Note: Target pumping rates were updated based on the average daily pumping rates recommended in the 2015 Model Check Point Analysis (GHD, June 2016). The Target Average pumping rates are 90% of the recommended daily Set Point pumping rates since the wells and treatment system components require periodic downtime for maintenance.

11192137(DIRE058)GIS-OT004 Aug 09, 2024

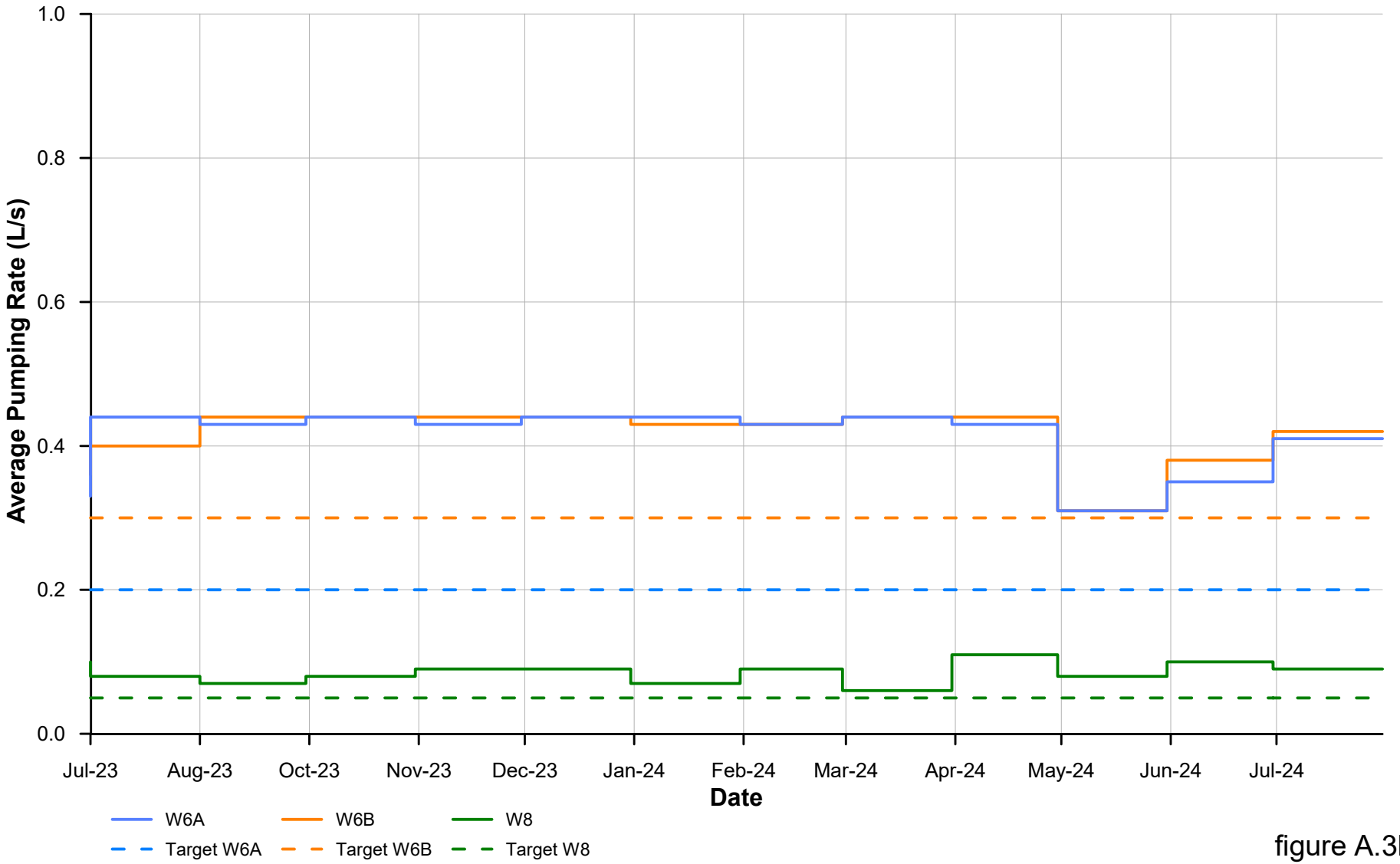


figure A.3b
OFF-SITE EXTRACTION WELL AVERAGE
VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*Note: Target pumping rates were updated based on the average daily pumping rates recommended in the 2015 Model Check Point Analysis (GHD, June 2016). The Target Average pumping rates are 90% of the recommended daily Set Point pumping rates since the wells and treatment system components require periodic downtime for maintenance.

LANXESS has reduced the W6A and W6B target average pumping rates as a result of reduced well capacity.

Table A.1

Performance - Combined On-Site and Off-Site Groundwater Collection and Treatment System
Bypass/Upset Conditions - July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

ON-SITE GROUNDWATER CONTAINMENT AND TREATMENT SYSTEM

July 3	Shut down at 07:15 due to a power outage plus additional time for generator testing, and restarted at 15:00
July 14	Shut down at 12:30 due to a power outage, and restarted at 14:00

OFF-SITE GROUNDWATER COLLECTION AND TREATMENT SYSTEM

W3R Groundwater Rayox System

July 3	Shut down at 07:15 due to a power outage plus additional time for generator testing, and restarted at 15:00
July 10	Shut down at 12:25 for scheduled sump inspections, and restarted July 12, 2024 at 09:45
July 14	Shut down at 12:30 due to a power outage, and restarted at 14:00
July 17	Shut down at 10:30 for scheduled sump inspections, and restarted July 19, 2024 at 11:50

W5A/W5B/W6A/W6B/W8 Groundwater Rayox System [1]

July 3	Shut down at 07:15 due to a power outage plus additional time for generator testing, and restarted at 15:00
July 4	Shut down at 12:57 for an unknown reason, and restarted at 15:00
July 14	Shut down at 12:30 due to a power outage, and restarted at 14:00
July 24	Shut down at 06:45 for scheduled carbon change out, and restarted July 25, 2024 at 12:50

W9 Groundwater Trojan UV/Oxidation System

July 3	Shut down at 07:15 due to a power outage plus additional time for generator testing, and restarted at 15:00
July 14	Shut down at 12:30 due to a power outage, and restarted at 14:00
July 18	Shut down at 20:15 due to an unknown reason, and restarted July 20, 2024 at 18:15

Note:

[1] Groundwater pumped by PW5 is treated in the W5A/W5B/W6A/W6B/W8 Groundwater Rayox System and PW5 is, therefore, shut down when the W4/W5A/W5B/W6A/W6B/W8 system is shut down.

Table A.2

Combined On-Site and Off-Site Groundwater Containment and Treatment System
Analytical Results [1]
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Date	Parameter [2] [3]	Untreated Influent	Primary Treatment								Secondary Treatment				Tertiary Treatment		Combined Discharge Effluent[4]	Combined Discharge Effluent		
		W3R	W3R CEN	W3R CES	W4 CI	W4 CE	W9 CI	W9 CE	GCI	GCE	W3R RE	W4 RE	W9 RE	GR	SFE	GE		Limit	Adjusted Limit [5]	Objective
2-Jul-24	Ammonia-N (mg/L)	0.209													0.122	0.103	0.105	0.84[6]	0.84	0.62
2-Jul-24	Total Phosphorus (mg/L)														0.0031	0.0498	0.044	0.5	0.5	--
2-Jul-24	BOD_5 (mg/L)														ND(2.0)	ND(2.0)	ND(2.0)	15	15	--
2-Jul-24	Total Cyanide (µg/L)														ND(2)	ND(2)	ND(2)	14	14	ND(5)
2-Jul-24	Formaldehyde (µg/L)														ND(2.0)	ND(2.0)	ND(2.0)	24	24	ND(5)
2-Jul-24	pH (s.u.)														7.35	7.20	7.22	5.5 - 9.5	5.5 - 9.5	--
2-Jul-24	Temperature (°C)														13.2	14.7	14.5	<25	<25	--
2-Jul-24	Chlorobenzene (µg/L)	27.7	0.20	1.55	71.4	56.6	20.9	3.22	2130	40.2	0.26	23.2	1.62	21.2	1.31	0.29	0.36	10	11.0	ND(0.5)
16-Jul-24	Chlorobenzene (µg/L)										0.58	7.75	ND(0.20)	4.78	ND(0.20)	0.32				
2-Jul-24	Toluene (µg/L)								102	1.44					0.79	ND(0.20)	0.19	5	5.5	ND(0.4)
2-Jul-24	1,1-Dichloroethane (µg/L)								0.27	ND(0.20)					ND(0.20)	0.36	0.33	10	10	ND(1)
2-Jul-24	g-BHC (Lindane) (µg/L)														ND(0.0030)	ND(0.0030)	ND(0.0030)	0.14	0.15	ND(0.003)
2-Jul-24	n-Nitrosodimethylamine (NDMA) (µg/L)[7]	0.52									ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.14	0.15	ND(0.01)
16-Jul-24	NDMA (µg/L)[7]										ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)				
2-Jul-24	n-Nitrosodiethylamine (NDEA) (µg/L)[7]	ND(0.04)									ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	4	4	ND(0.06)
16-Jul-24	NDEA (µg/L)[7]										ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)				
2-Jul-24	Nitrosomorpholine (NMOR) (µg/L)[7]	ND(0.04)									ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	4	4.4	ND(0.06)
16-Jul-24	NMOR (µg/L)[7]										ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)				
2-Jul-24	Benzothiazole (µg/L)								125	ND(2.0)					ND(2.0)	ND(2.0)	ND(2.0)	4	4.4	ND(2)
2-Jul-24	Carboxin (µg/L)								70.9	0.771					ND(0.100)	ND(0.100)	ND(0.100)	7	7.7	ND(2)

SS+890 Discharge (GE) Flow Rate	36.59 L/s
Shirt Factory Creek Discharge (SFE) Flow Rate	5.32 L/s
Total Combined Discharge Effluent Flow	41.91 L/s

Table A.2

Combined On-Site and Off-Site Groundwater Containment and Treatment System
Analytical Results [1]
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Notes:

[1]	All samples analyzed by ALS Canada Ltd. unless otherwise noted.		
[2]	"Parameters" are the parameters identified in ECA No. 0831-BX6JGD.		
[3]	The Sample Locations are coded as follows:		
W3R	Extraction Well W3R Influent.		
W3R CEN	W3R North Carbon Adsorber Effluent.	W3R CES	W3R South Carbon Adsorber Effluent.
W4CI	W4 Carbon Adsorber Influent. The influent may include influent from W5A, W5B, W6A, W6B, W8 and PW5.		
W4CE	W4 Carbon Adsorber Effluent. The effluent may include effluent from W5A, W5B, W6A, W6B, W8 and PW5.		
W9CI	W9 Carbon Adsorber Influent.	W9CE	W9 Carbon Adsorber Effluent.
GCI	On-Site Carbon Tower Influent.	GCE	On-Site Carbon Tower Effluent.
W3R RE	Effluent from the W3R UV system.		
W4 RE	Effluent from the W4 UV system prior to treatment through the ATS. The effluent may include effluent from W5A, W5B, W6A, W6B, W8 and PW5.		
W9 RE	Effluent from the W9 Trojan UV/oxidation system.	GR	On-Site Groundwater Rayox Effluent.
SFE	Additional Effluent Discharge via Shirt Factory Creek.	GE	Effluent Discharge to Canagaguige Creek.
[4]	The Combined Discharge Effluent value is a calculated value determined by using average flow data from GE Effluent Discharge via SS+880 and Additional Effluent Discharge via Shift Factory Creek and monthly sample results from GE and SFE.		
[5]	Adjusted Effluent Requirements are applicable to monthly average discharge flows greater than 46.0 L/s.		
[6]	Total Ammonia Discharge Effluent Limit value is the greater of: calculated concentration, or 0.84 mg/L (May-October) or 2.4 mg/L (November-April) as per ECA No. 0831-BX6JGD.		
[7]	Samples analyzed by the LANXESS lab, Elmira Ontario.		
ND(RDL)	Not detected at the associated reporting detection limit.		

Table A.3

Combined On-Site and Off-Site Groundwater Collection and Treatment System Flow Rates
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Date	On-Site Flow Rate [1]	Off-Site Flow Rate [2]	ATS Influent Flow Rate [3]	W3R Bypass Flow Rate	W9 Bypass Flow Rate	SS+890 Discharge Flow Rate	Shirt Factory Creek Discharge Flow Rate	Total Combined Discharge Effluent Flow Rate [4]
	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)	(L/s)
7/1/2024	3.5	40.2	12.6	18.9	12.6	39.8	4.29	44.1
7/2/2024	3.6	40.2	12.6	18.9	12.6	39.6	4.48	44.1
7/3/2024	2.8	28.5	9.0	12.5	10.0	28.8	2.73	31.6
7/4/2024	3.5	39.2	11.3	18.9	12.6	39.4	3.47	42.9
7/5/2024	3.6	40.8	13.0	18.9	12.6	40.0	4.46	44.5
7/6/2024	3.6	41.0	13.2	18.9	12.6	39.4	5.36	44.7
7/7/2024	3.6	40.0	12.1	18.9	12.6	40.0	3.64	43.7
7/8/2024	3.6	41.6	11.0	21.6	12.6	39.6	5.72	45.3
7/9/2024	3.6	43.7	11.2	23.7	12.6	39.7	7.72	47.4
7/10/2024	3.5	31.3	10.4	12.2	12.5	31.5	3.63	35.1
7/11/2024	3.4	19.0	10.6	0.0	12.3	22.9	0.00	22.9
7/12/2024	3.5	34.1	11.5	14.1	12.4	33.8	4.21	38.0
7/13/2024	3.5	42.7	10.6	23.7	12.4	40.2	6.35	46.6
7/14/2024	3.4	40.8	10.1	22.7	11.8	38.6	5.98	44.6
7/15/2024	3.5	42.3	10.5	23.7	12.2	40.1	6.16	46.3
7/16/2024	3.5	41.9	10.5	23.7	11.7	39.4	6.55	45.9
7/17/2024	3.5	31.4	11.7	10.3	13.3	31.6	3.75	35.4
7/18/2024	3.5	18.2	10.4	0.0	11.7	22.1	0.00	22.1
7/19/2024	3.5	18.9	10.8	12.0	0.0	22.7	0.06	22.8
7/20/2024	3.5	33.5	10.4	23.7	3.4	35.5	1.93	37.5
7/21/2024	3.5	44.0	10.4	23.7	13.9	40.0	7.96	47.9
7/22/2024	3.4	44.1	10.4	23.7	13.9	40.1	7.82	47.9
7/23/2024	3.4	44.0	10.3	23.7	13.9	39.8	8.02	47.8
7/24/2024	2.6	39.2	4.8	23.4	13.9	39.5	2.65	42.1
7/25/2024	2.1	40.9	6.2	23.3	13.9	39.0	4.36	43.3
7/26/2024	2.7	45.3	11.2	23.7	13.6	38.7	9.72	48.4
7/27/2024	3.0	44.1	9.9	23.7	13.9	38.9	8.55	47.5
7/28/2024	3.2	44.1	10.1	23.7	13.9	38.5	9.15	47.7
7/29/2024	3.3	43.8	9.9	23.4	13.9	38.3	8.90	47.2
7/30/2024	3.2	44.1	9.8	23.7	13.9	38.4	8.97	47.4
7/31/2024	2.4	44.1	9.1	23.7	13.9	38.3	8.30	46.6
Average	**3.3**	**38.3**	**10.5**	**19.2**	**12.2**	**36.6**	**5.3**	**41.9**
Minimum	**2.1**	**18.2**	**4.8**	**0.0**	**0.0**	**22.1**	**0.0**	**22.1**
Maximum	**3.6**	**45.3**	**13.2**	**23.7**	**13.9**	**40.2**	**9.7**	**48.4**

Notes:

L/s Litres per second
[1] The ECA requires that the influent flow rate to the on-Site Treatment System be less than 5 L/s.
[2] The ECA requires that the influent flow rate to the off-Site Treatment System be less than 87.2 L/s.
[3] The ECA requires that the influent flow rate to the Ammonia Treatment System be less than 46 L/s.
[4] The ECA requires that the monthly average effluent discharge flow rate be less than 92.2 L/s.

Table A.4

Supplementary Sample Analytical Results
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:	**UA500I**	**UA500CE**	**UA560I**	**UA560CE**	**GCI**	**GCE**
Sample Date:	**7/2/2024**	**7/2/2024**	**7/2/2024**	**7/2/2024**	**7/2/2024**	**7/2/2024**
Parameter [µg/L]						
Volatile Organic Compounds (VOCs)						
Benzene	19.4	11.0	16.3	ND(0.20)	10.7	ND(0.20)
Chlorobenzene	903	174	350	ND(0.20)	2130	40.2
1,1-Dichloroethane	ND(0.20)	ND(0.20)	0.31	ND(0.20)	0.27	ND(0.20)
Ethylbenzene	85.6	14.6	50.2	ND(0.20)	13.4	0.41
Toluene	2530	1050	3140	ND(0.20)	102	1.44
m/p-Xylenes [1]	153	23.3	119	ND(0.40)	12.3	0.47
o-Xylene [1]	92.4	15.3	70.1	ND(0.20)	7.65	0.27
Base/Neutral and Acid Extractable Compounds (BNAs)						
Aniline	1060	708	1580	ND(2.0)	75.9	3.6
Benzothiazole	1700	243	19.0	ND(2.0)	125	ND(2.0)
Carboxin (Oxathiin)	1680	254	999	ND(0.100)	70.9	0.771
2-Chlorophenol	11.0	5.79	0.39	ND(0.30)	4.80	ND(0.30)
2-Mercaptobenzothiazole	3800	475	ND(20)	ND(20)	294	ND(20)
2,4-Dichlorophenol	21.1	8.46 J+	0.37 J+	ND(0.20)	0.25	ND(0.20)
2,6-Dichlorophenol	4.12	1.38	0.24	ND(0.20)	0.42	ND(0.20)
2,4,5-Trichlorophenol	13.6	2.73	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
2,4,6-Trichlorophenol	5.70	1.49	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)

Notes:

UA500I	Influent to the installed UA500R portable carbon drum.
UA500CE	Effluent from the installed UA500R portable carbon drum.
UA560I	Influent to the installed UA560 portable carbon drum.
UA560CE	Effluent from the installed UA560 portable carbon drum.
GCI	Carbon Tower Influent.
GCE	Carbon Tower Effluent.
ND(RDL)	Not detected at the associated reporting detection limit.
J+	The result is an estimated quantity, but the result may be biased high.
[1]	Samples analyzed for m,p-Xylenes and o-Xylene only. No separate analysis for Total Xylenes.

Table A.5

Combined On-Site and Off-Site Groundwater Collection and Treatment System
Effluent Broad Scan Analytical Results
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Parameter [µg/L unless otherwise noted] [1]	Sample Station: SFE	Sample Station: GE	Combined Discharge Effluent [6][7]	Effluent Limit [8]	Adjusted Limit [9]
General Chemistry					
Alkalinity ($CaCO_3$) (mg/L)	309	283	286	--	--
Ammonia as N (mg/L)	0.122	0.103	0.105	2.4[10]	2.4[10]
Un-ionized Ammonia (mg/L)[2]	ND(0.0010)	ND(0.0010)	ND(0.0010)	--	--
Formaldehyde	ND(2.0)	ND(2.0)	ND(2.0)	24	24
pH (field)	7.35	7.20	7.22	5.5 - 9.5	5.5 - 9.5
Phenols (Total) (mg/L)	0.0011	ND(0.0010)	0.0006	--	--
Temperature (field) (^oC)	13.2	14.7	14.5	<25	<25
Total Cyanide	ND(2)	ND(2)	ND(2)	14	14
Total Phosphorus (mg/L)	0.0031	0.0498	0.0439	0.5	0.5
Volatile Organic Compounds (VOCs)					
1,1-Dichloroethane	ND(0.20)	0.36	0.33	10	10
Benzene	0.29	ND(0.20)	0.12	--	--
Chlorobenzene	1.31	0.29	0.42	10	11.0
Ethylbenzene	ND(0.20)	ND(0.20)	ND(0.20)	--	--
m/p-Xylenes[3]	ND(0.40)	ND(0.40)	ND(0.40)	--	--
o-Xylene[3]	ND(0.20)	ND(0.20)	ND(0.20)	--	--
Toluene	0.79	ND(0.20)	0.19	5	5.5
Base/Neutral/Acid Extractables and Nitrosoamines					
2,3,4-Trichlorophenol	ND(0.50)	ND(0.50)	ND(0.50)	--	--
2,4,5-Trichlorophenol	ND(0.20)	ND(0.20)	ND(0.20)	--	--
2,4,6-Trichlorophenol	ND(0.20)	ND(0.20)	ND(0.20)	--	--
2-Chlorophenol	ND(0.30)	ND(0.30)	ND(0.30)	--	--
2-Mercaptobenzothiazole	ND(20)	ND(20)	ND(20)	--	--
2,4-Dichlorophenol	ND(0.20)	ND(0.20)	ND(0.20)	--	--
2,4-Dimethylphenol	ND(0.50)	ND(0.50)	ND(0.50)	--	--
2,6-Dichlorophenol	ND(0.20)	ND(0.20)	ND(0.20)	--	--
Aniline	ND(2.0)	ND(2.0)	ND(2.0)	--	--
Benzothiazole	ND(2.0)	ND(2.0)	ND(2.0)	4	4.4
bis(2-Ethylhexyl)phthalate	ND(0.60)	ND(0.60)	ND(0.60)	--	--
Carboxin (Oxathiin)	ND(0.100)	ND(0.100)	ND(0.100)	7	7.7
Morpholine	3.6	ND(1.0)	0.89	--	--
m/p-Cresol[5]	ND(0.50)	ND(0.50)	ND(0.50)	--	--
n-Nitrosodiethylamine (NDEA)[4]	ND(0.06)	ND(0.06)	ND(0.06)	4	4
n-Nitrosodimethylamine (NDMA)	ND(0.01)	ND(0.01)	ND(0.01)	0.14	0.15
n-Nitrosodiphenylamine (NDPhA)	ND(1.0)	ND(1.0)	ND(1.0)	--	--
Nitrosodibutylamine (NDBA)[4]	ND(0.06)	ND(0.06)	ND(0.06)	--	--
Nitrosomorpholine (NMOR)[4]	ND(0.06)	ND(0.06)	ND(0.06)	4	4.4
o-Cresol[6]	ND(0.50)	ND(0.50)	ND(0.50)	--	--
Phenol	1.95	1.60	1.64	--	--
Pesticides and Herbicides					
2,4,5-T	ND(0.050)	ND(0.050)	ND(0.050)	--	--
Lindane (g-BHC)	ND(0.0030)	ND(0.0030)	ND(0.0030)	0.14	0.15
p,p-DDT	ND(0.00040)	ND(0.00040)	ND(0.00040)	--	--

Table A.5

Combined On-Site and Off-Site Groundwater Collection and Treatment System
Effluent Broad Scan Analytical Results
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

SS+890 Discharge (GE) Flow Rate	36.59 L/s
Shirt Factory Creek Discharge (SFE) Flow Rate	5.32 L/s
Total Combined Discharge Effluent Flow	41.91 L/s

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
--	No Effluent Limit value specified in ECA No. 0831-BX6JGD.
[1]	Analyses completed by ALS Canada Ltd. unless otherwise noted.
[2]	Unionized ammonia is a calculated value (station SFE and GE only) based on effluent discharge temperature, pH and total ammonia concentration.
[3]	Samples analyzed for m,p-Xylenes and o-Xylene only. No separate analysis for Total Xylenes.
[4]	Nitrosamine analysis completed by LANXESS Canada Co./Cie.
[5]	Samples analyzed for m,p-Cresols and o-Cresol only. No separate analysis for m-Cresol and p-Cresol following MECP approval (November 21, 1996).
[6]	The Combined Discharge Effluent value is a calculated value determined by using average flow data from GE Effluent Discharge via SS+880 and Additional Effluent Discharge via Shift Factory Creek and monthly sample results from GE and SFE.
[7]	Only Combined Effluent Discharge results are compared to Effluent Limits.
[8]	ECA No. 0831-BX6JGD Effluent Limit.
[9]	Adjusted Effluent Requirements. Applicable to monthly average discharge flows greater than 46.0 L/s.
[10]	Total Ammonia Discharge Effluent Limit value is the greater of: calculated concentration, or 0.84 mg/L (May-October) or 2.4 mg/L (November-April) as per ECA No. 0277 BV2JU5.

Table A.6

Maintenance Summary
On-Site and Off-Site Groundwater Collection and Treatment System
July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Start Date	Description	Work Type
07/02/2024	Check 44-LIT-0861 (44PM-37) - UA Carbon Tower Feed Tank Level	Instrumentation
07/02/2024	Check 20-LT-0205 (20PM-39) - Rayox Feed Tank Level Transmitter	Instrumentation
07/02/2024	Monthly E7 Compressor Inspection - North Compressor	General
07/02/2024	Monthly E7 Compressor Inspection - South Compressor	General
07/02/2024	Check 62-FIT-905 (62PM-15) - Oxygen Flow to Nitrification Tank	Instrumentation
07/02/2024	Check 62-PSL-840 (62TA-08) - Air Scour Blower	Instrumentation
07/02/2024	Check 20-LT-337 (20PM-TBA) - W3R Well Level Transmitter	Instrumentation
07/02/2024	W3R Alarming Low Well Level	Instrumentation
07/03/2024	Repair East Phosphoric Acid Pump	Mechanical
07/05/2024	Check 62-AIT-904 (62-ICP-904) - Nitrification Tank Dissolved O2	Instrumentation
07/10/2024	Fabricate Hinged Lids for Stilling Wells	Mechanical
07/15/2024	Clean 62-AIT-904 Probe Mid Month - Nitrification Tank Dissolved O2	Instrumentation
07/17/2024	Repair/Restart E7 B Train (power outage)	Electrical
07/17/2024	Prep Bldg. #45 Rayox Feed Tank for Entry	Piping
07/18/2024	Check 20-LSHH-216 (20-ICP-216) - Rayox Feed Tank Level Switch	Instrumentation
07/18/2024	Check 44-LSHH-780 (44-ICP-780) - UA Spent Carbon Hopper Level High High Switch	Instrumentation
07/18/2024	Check 44-LSHH-879 (44-ICP-879) - Bldg. #44C Carbon Tower High Level	Instrumentation
07/18/2024	Trip and Alarm 45-XS-145 (45-ICP-145) - Rayox B UV Skid Deviation Control Unit	Instrumentation
07/18/2024	Check 20-LSH-240 (20-ICP-240) - Well W3 Sump Level Switch	Instrumentation
07/18/2024	Check 20-LSH-0260 (20-ICP-260) - Well W5A Sump Level Switch	Instrumentation
07/18/2024	Check 20-LSH-250 (20-ICP-250) - Well W4 Sump Level Switch	Instrumentation
07/18/2024	Check 44-LSH-300 (20TA-06) - W8/W9 Air Release Chamber Level	Instrumentation
07/29/2024	Replace UA+500 Pretreatment Drum	Instrumentation
07/29/2024	Bldg. #44D W4 North Carbon Adsorber Carbon Change Out	Piping
07/30/2024	Check Motor on North RAS Pump	Electrical
07/30/2024	Extend Backwash Drain to UA Hopper	Piping

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 255182
Sample Number : 82963

SAMPLE IDENTIFICATION

Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-07-02
Location :	Elmira ON	Sampling Time :	10:30
Substance :	SFE 070224	Date Received :	2024-07-02
Sampling Method :	Grab	Time Received :	14:10
Sampled By :	A. Norris	Temperature at Receipt :	18 °C
Sample Description :	Clear, colourless	Date Tested :	2024-07-03

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	3.3 %
	Mean Mortality	6.7 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.0 days
Organism Batch :	Dm24-12	Average Brood Size :	35.2
Culture Mortality :	0.3% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-07-02	LC50 :	6.0 g/L
Organism Batch :	Dm24-12	95% Confidence Limits :	5.6 - 6.4 g/L
Analyst(s) :	GR, AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	5.9 - 6.8 g/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Noted Deviation: Due to a temperature system malfunction, the test temperature exceeded the range of 18-22°C allowed by the test method, reaching 23°C, for an unknown length of time (but less than 16 hours), between 2024-07-04 and 2024-07-05. All test validity criteria were met, and the test is considered valid.

Approved By : V.Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-07-16 14:07-04:00
Project Manager

Work Order : 255182
Sample Number : 82963

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.5	7.8	1373	21	92	550 mg/L

0 HOURS

Date & Time : 2024-07-03 9:00
Analyst(s) : AA (PG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.5	7.8	1373	21	92	550
100	B	0	0	7.5	7.8	1373	21	92	550
100	C	0	0	7.5	7.8	1373	21	92	550
Control	A	0	0	8.2	8.7	439	20	100	140
Control	B	0	0	8.2	8.7	439	20	100	140
Control	C	0	0	8.2	8.7	439	20	100	140

Notes:

24 HOURS

Date & Time : 2024-07-04 10:00
Analyst(s) : JGR

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	0	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes:

48 HOURS

Date & Time : 2024-07-05 9:20
Analyst(s) : GR (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	8.1	8.1	1294	21
100	B	2	0	8.1	8.1	1296	21
100	C	0	1	8.1	8.1	1291	21
Control	A	0	0	8.3	8.1	447	21
Control	B	0	0	8.3	8.2	446	21
Control	C	0	0	8.3	8.1	446	21

Notes:

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2024-07-10

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout
EPS 1/RM/13

Work Order : 255182
Sample Number : 82963

SAMPLE IDENTIFICATION

Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-07-02
Location :	Elmira ON	Sampling Time :	10:30
Substance :	SFE 070224	Date Received :	2024-07-02
Sampling Method :	Grab	Time Received :	14:10
Sampled By :	A. Norris	Temperature at Receipt :	18 °C
Sample Description :	Clear, colourless	Date Tested :	2024-07-03

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007, February 2016, and December 2023 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	42.1 mm
Organism Batch :	T24-12	Range of Fork Lengths :	40 - 45 mm
Control Sample Size :	10	Mean Wet Weight :	0.8 g
Cumulative stock mortality rate :	0.3% (previous 7 days)	Organism Loading Rate :	0.4 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Test Type :	Single concentration	Number of Replicates :	1
Sample pH Adjustment :	None	Organisms Per Replicate :	10
Sample Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Sample Pre-Aeration :	30 minutes	Volume of Sample :	20 L
Control Pre-aeration/Aeration Rate :	6.5 ± 1 mL/L/min	Volume of Control :	18 L
Duration of Control Pre-aeration:	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-12	LC50 :	4446 mg/L
Date Tested :	2024-07-01	95% Confidence Limits :	3949 - 5004 mg/L
Analyst(s) :	DT, AJS	Historical Mean LC50 :	4325 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	3595 - 5204 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Approved By : V. Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-07-16 14:07-04:00
Project Manager

Work Order : 255182
Sample Number : 82963

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.4	7.9	1384	15	83
After 30 min pre-aeration :	7.4	7.9	1391	16	85

0 HOURS

Date & Time 2024-07-03 9:10
Analyst(s) : DT

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.4	7.9	1391	16	85
Control	0	0	8.2	9.2	745	15	97

Notes:

24 HOURS

Date & Time 2024-07-04 9:30
Analyst(s) : DT

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15
Control	0	0	–	–	–	15

Notes:

48 HOURS

Date & Time 2024-07-05 9:45
Analyst(s) : NWP (DT)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15
Control	0	0	–	–	–	15

Notes:

72 HOURS

Date & Time 2024-07-06 9:15
Analyst(s) : NWP (JCS)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15
Control	0	0	–	–	–	15

Notes:

96 HOURS

Date & Time 2024-07-07 8:15
Analyst(s) : JCS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	8.2	9.0	1348	15
Control	0	0	8.2	9.3	742	15

Notes:

"–" = not measured/not required

Number impaired does not include number dead.

[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2024-07-08

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 255182
Sample Number : 82964

SAMPLE IDENTIFICATION

Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-07-02
Location :	Elmira ON	Sampling Time :	12:00
Substance :	GE 070224	Date Received :	2024-07-02
Sampling Method :	Grab	Time Received :	14:10
Sampled By :	A. Norris	Temperature at Receipt :	18 °C
Sample Description :	Clear, colourless	Date Tested :	2024-07-03

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7.0 days
Organism Batch :	Dm24-12	Average Brood Size :	35.2
Culture Mortality :	0.3% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms per Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms per Test Level :	30
Duration of Pre-Aeration :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	Yes (see 'COMMENTS')

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride		
Date Tested :	2024-07-02	LC50 :	6.0 g/L
Organism Batch :	Dm24-12	95% Confidence Limits :	5.6 - 6.4 g/L
Analyst(s) :	GR, AA	Historical Mean LC50 :	6.3 g/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	5.9 - 6.8 g/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Noted Deviation: Due to a temperature system malfunction, the test temperature exceeded the range of 18-22°C allowed by the test method, reaching 23°C, for an unknown length of time (but less than 16 hours), between 2024-07-04 and 2024-07-05. All test validity criteria were met, and the test is considered valid.

Approved By : V.Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-07-16 14:07-04:00

Project Manager

Work Order : 255182
Sample Number : 82964

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Chemistry (100%) :	7.3	8.0	1344	21	94	560 mg/L

0 HOURS

Date & Time : 2024-07-03 9:05
Analyst(s) : AA (PG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*	Hardness
100	A	0	0	7.3	8.0	1344	21	94	560
100	B	0	0	7.3	8.0	1344	21	94	560
100	C	0	0	7.3	8.0	1344	21	94	560
Control	A	0	0	8.2	8.7	439	20	100	140
Control	B	0	0	8.2	8.7	439	20	100	140
Control	C	0	0	8.2	8.7	439	20	100	140

Notes:

24 HOURS

Date & Time : 2024-07-04 10:05
Analyst(s) : JGR

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	21
100	B	–	0	–	–	–	21
100	C	–	0	–	–	–	21
Control	A	–	0	–	–	–	21
Control	B	–	0	–	–	–	21
Control	C	–	0	–	–	–	21

Notes:

48 HOURS

Date & Time : 2024-07-05 9:25
Analyst(s) : GR (JGR)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	8.3	8.0	1287	21
100	B	0	0	8.2	8.1	1296	21
100	C	0	0	8.4	8.0	1308	21
Control	A	0	0	8.3	8.1	446	21
Control	B	0	0	8.3	8.1	446	21
Control	C	0	0	8.3	8.1	445	21

Notes:

Number immobile does not include number dead.

"–" = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2024-07-10

NAUTILUS ENVIRONMENTAL
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout
EPS 1/RM/13

Work Order : 255182
Sample Number : 82964

SAMPLE IDENTIFICATION

Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-07-02
Location :	Elmira ON	Sampling Time :	12:00
Substance :	GE 070224	Date Received :	2024-07-02
Sampling Method :	Grab	Time Received :	14:10
Sampled By :	A. Norris	Temperature at Receipt :	18 °C
Sample Description :	Clear, colourless	Date Tested :	2024-07-03

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007, February 2016, and December 2023 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	10.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Mean Fork Length :	42.1 mm
Organism Batch :	T24-12	Range of Fork Lengths :	40 - 45 mm
Control Sample Size :	10	Mean Wet Weight :	0.8 g
Cumulative stock mortality rate :	0.3% (previous 7 days)	Organism Loading Rate :	0.4 g/L
Control organisms showing stress :	0 (at test completion)		

TEST CONDITIONS

Test Type :	Single concentration	Number of Replicates :	1
Sample pH Adjustment :	None	Organisms Per Replicate :	10
Sample Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Duration of Sample Pre-Aeration :	30 minutes	Volume of Sample :	18 L
Control Pre-aeration/Aeration Rate :	6.5 ± 1 mL/L/min	Volume of Control :	18 L
Duration of Control Pre-aeration:	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride		
Organism Batch :	T24-12	LC50 :	4446 mg/L
Date Tested :	2024-07-01	95% Confidence Limits :	3949 - 5004 mg/L
Analyst(s) :	DT, AJS	Historical Mean LC50 :	4325 mg/L
Statistical Method :	Linear Regression (MLE)	Warning Limits (± 2SD) :	3595 - 5204 mg/L

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Approved By : V.Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-07-16 14:07-04:00

Project Manager

Work Order : 255182
Sample Number : 82964

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)[3]
Initial Water Chemistry (100%) :	7.1	8.0	1364	15	85
After 30 min pre-aeration :	7.2	8.2	1362	16	87

0 HOURS

Date & Time 2024-07-03 9:10
Analyst(s) : DT

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation[3]
100%	0	0	7.2	8.2	1362	16	87
Control	0	0	8.2	9.2	745	15	97

Notes:

24 HOURS

Date & Time 2024-07-04 9:30
Analyst(s) : DT

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15
Control	0	0	–	–	–	15

Notes:

48 HOURS

Date & Time 2024-07-05 9:45
Analyst(s) : NWP (DT)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	1	–	–	–	15
Control	0	0	–	–	–	15

Notes: The impaired test organism in the 100% exposure is sporadically swimming in circles (NWP).

72 HOURS

Date & Time 2024-07-06 9:15
Analyst(s) : NWP (JCS)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	1	–	–	–	15
Control	0	0	–	–	–	15

Notes:

96 HOURS

Date & Time 2024-07-07 8:15
Analyst(s) : JCS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	1	8.2	9.0	1322	15
Control	0	0	8.2	9.3	742	15

Notes: The impaired test organism in the 100% exposure is erratically swimming in circles.

"–" = not measured/not required

Number impaired does not include number dead.

[3] adjusted for temperature and barometric pressure

Test Data Reviewed By : JL

Date : 2024-07-08

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 255182

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 Fax: (519) 763-4419

P.O. Number:	4600003374
Field Sampler Name (print):	Allan Norris
Signature:	
Affiliation:	LANXESS CANADA
Sample Storage (prior to shipping):	ICE PACK
Custody Relinquished by:	
Date/Time Shipped:	JUL 2/24 1:30

Client:	LANXESS CANADA CO./CIE 25 ERB ST ELMIRA ON N3B 2J3
Phone:	519 669 1671 x 221
Fax:	519 669 3273
Contact:	MICHELLE YANTZI

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
				18°C												
2024-07-02	10:30	SFE 070224	82963		✓		✓							✓		1 x 20L
2024-07-02	12:00	GE 070224	82964		✓		✓							✓		1 x 20L

For Lab Use Only

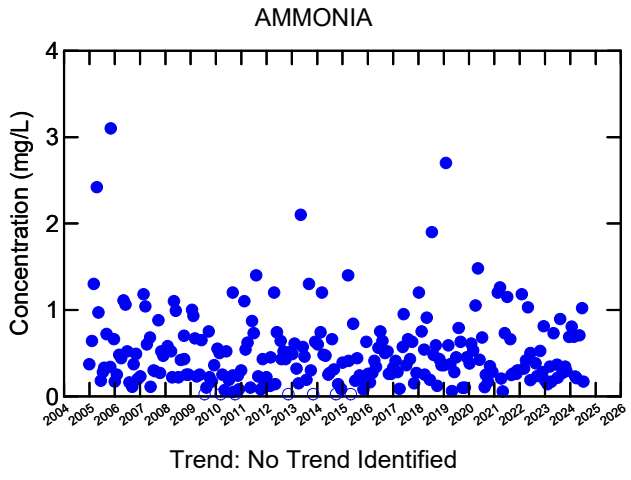
Received By:	AJS IDT
Date:	2024/07/02
Time:	14:10
Storage Location:	
Storage Temp (°C):	

Please list any special requests or instructions:

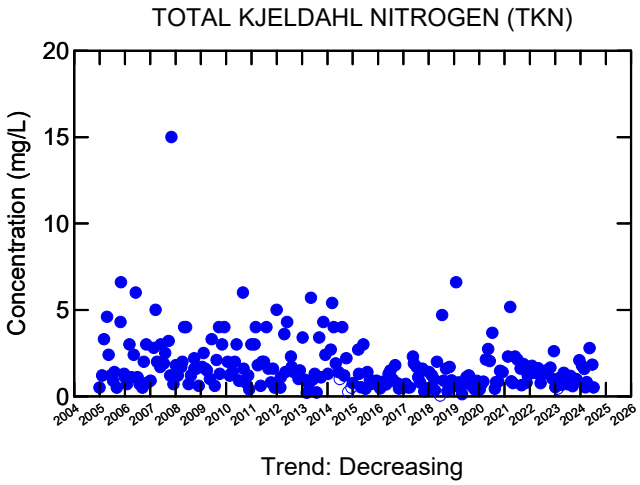
ACUTE TOXICITY

Attachment B

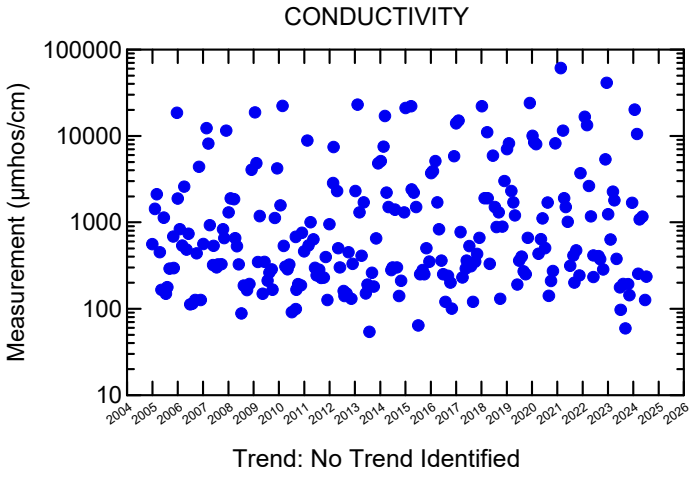
EAB Data



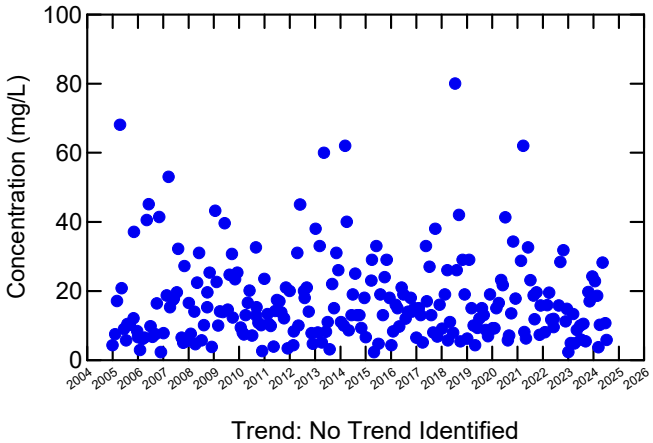
Trend: No Trend Identified



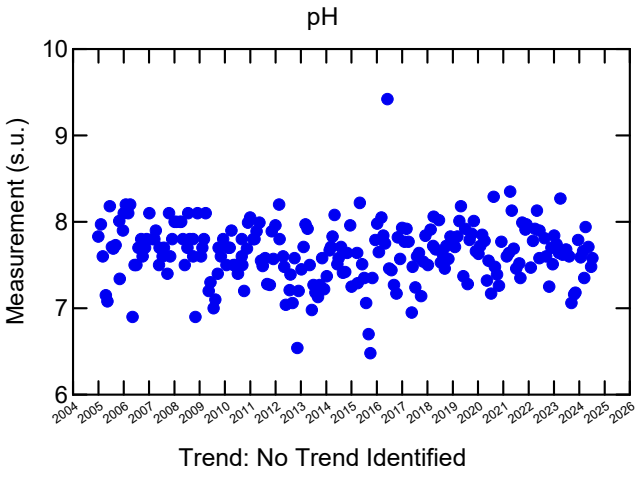
Trend: Decreasing



Trend: No Trend Identified



Trend: No Trend Identified



Trend: No Trend Identified

Legend:

- Detected Result
- Non-detect (plotted at one half the detection limit)

Notes:

Any detection limits elevated above target detection limit and/or detected values were not included in the trend analysis.

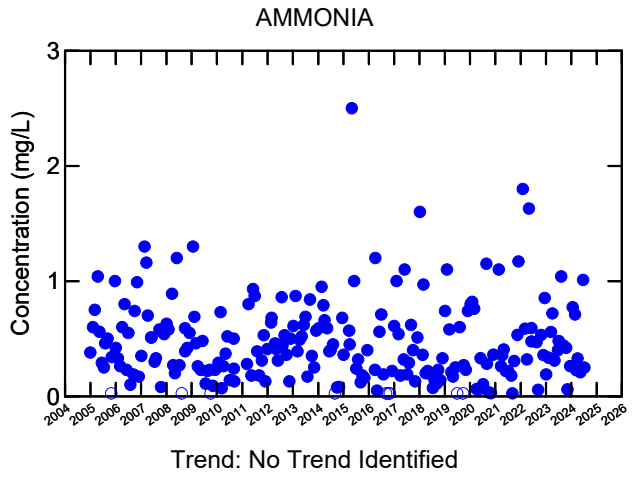
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

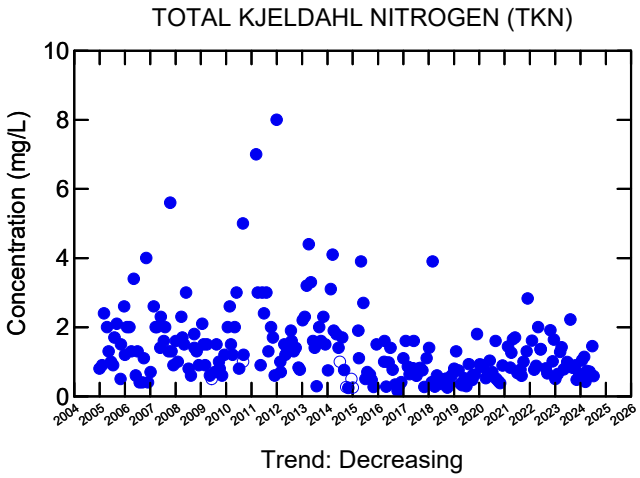
LANXESS Canada Co./Cie
Elmira, Ontario

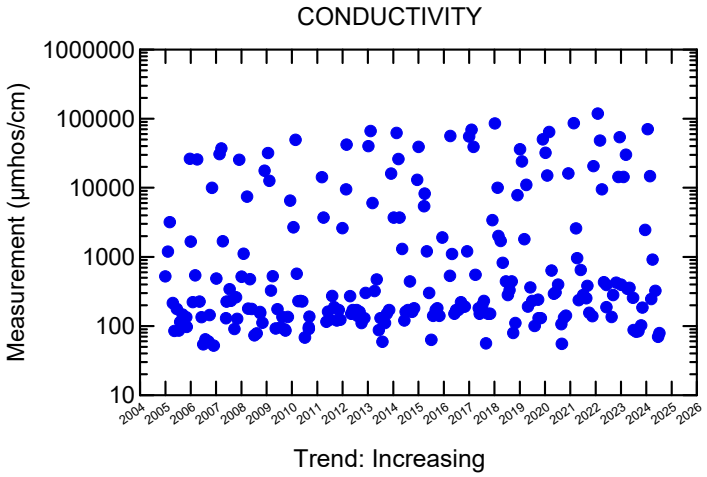
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0200

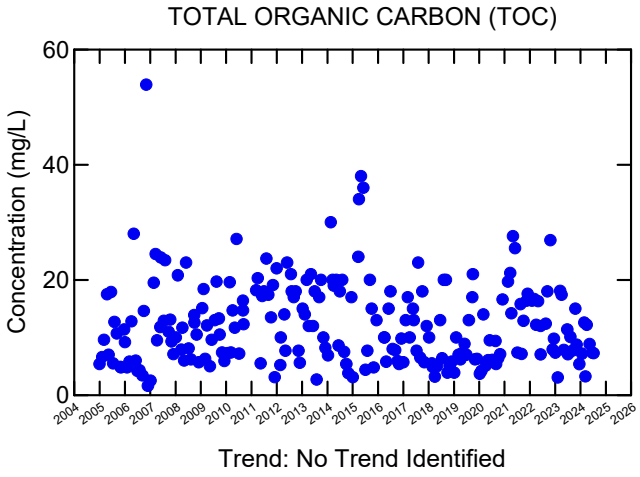
Project No. **11192137-38**
Date: **Aug 8, 2024**

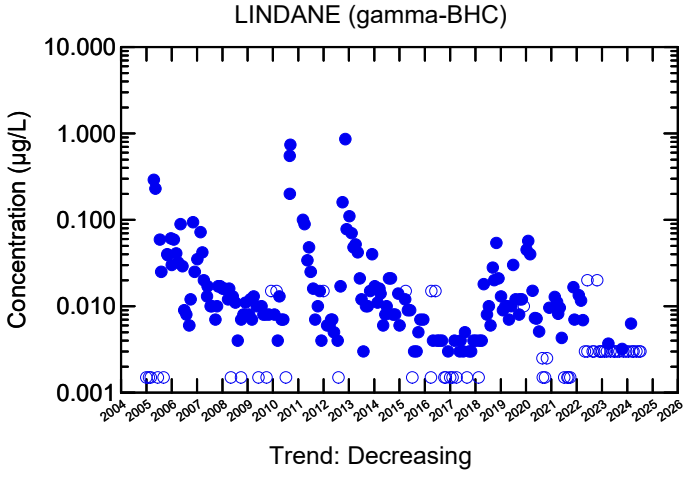
FIGURE B.1

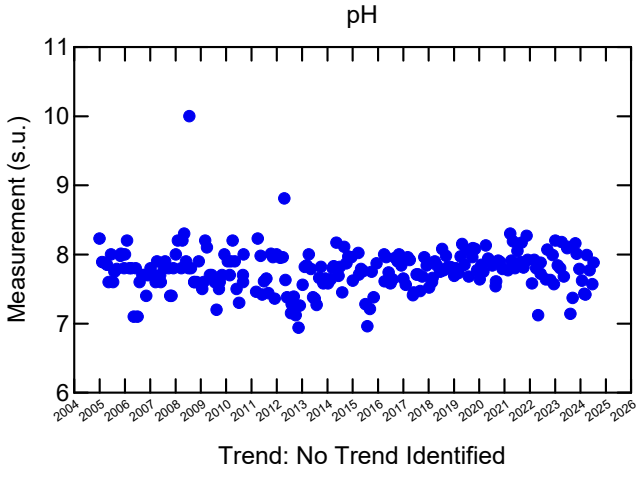












Legend:

- Detected Result
- Non-detect (plotted at one half the detection limit)

Notes:

Any detection limits elevated above target detection limit and/or detected values were not included in the trend analysis.

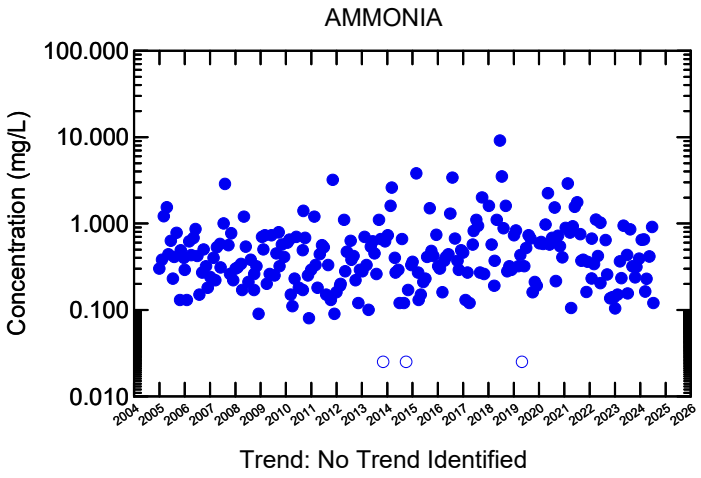
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

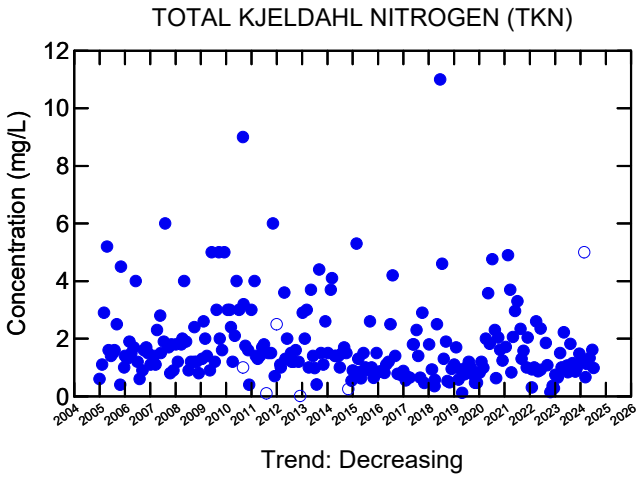
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0400

Project No. **11192137-38**
Date: **Aug 8, 2024**

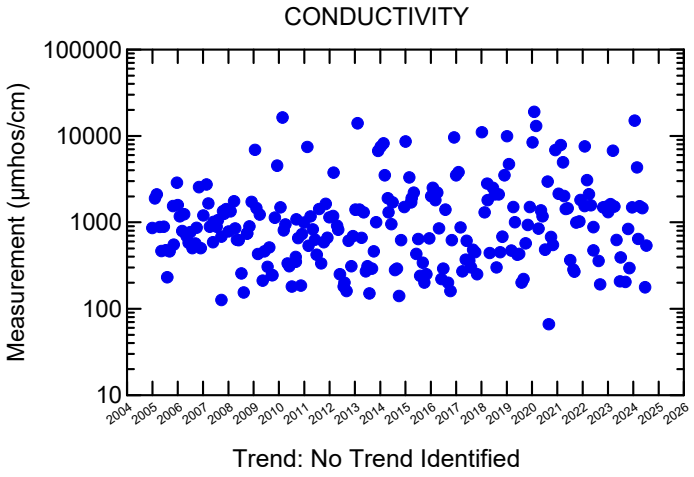
FIGURE B.2



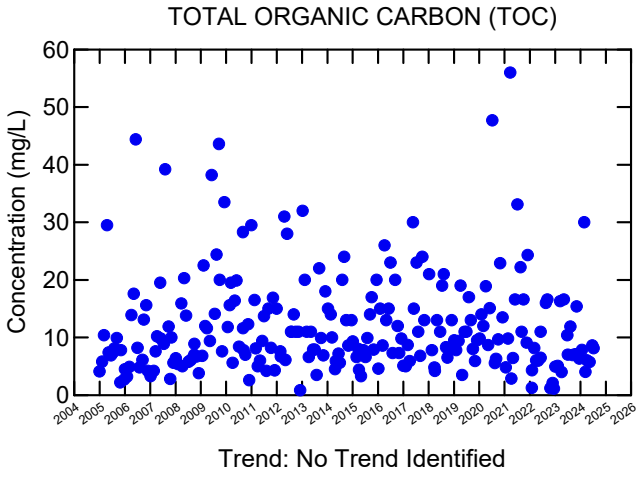
Trend: No Trend Identified



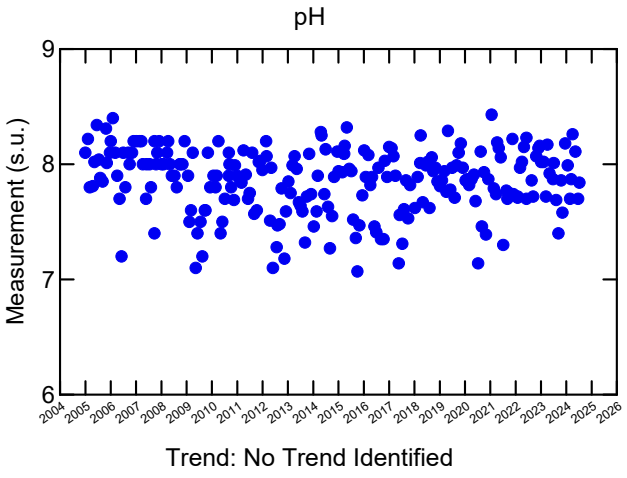
Trend: Decreasing



Trend: No Trend Identified



Trend: No Trend Identified



Trend: No Trend Identified

Legend:

- Detected Result
- Non-detect (plotted at one half the detection limit)

Notes:

Any detection limits elevated above target detection limit and/or detected values were not included in the trend analysis.

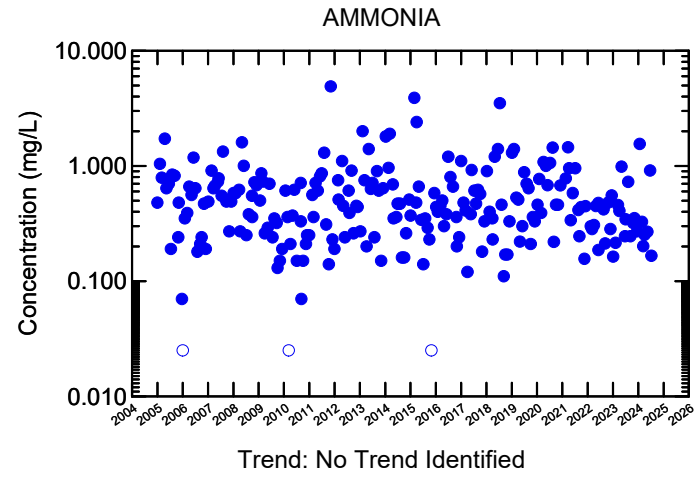
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

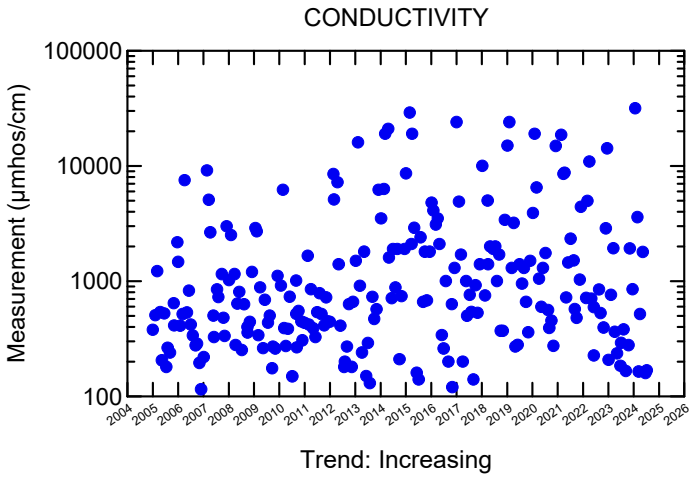
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0800

Project No. **11192137-38**
Date: **Aug 8, 2024**

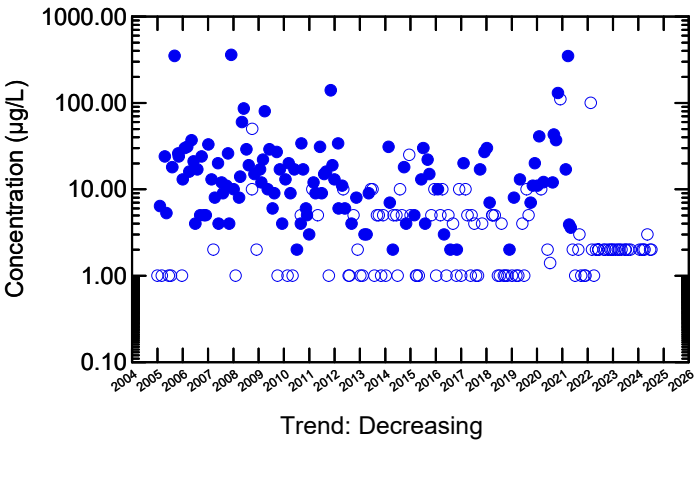
FIGURE B.3



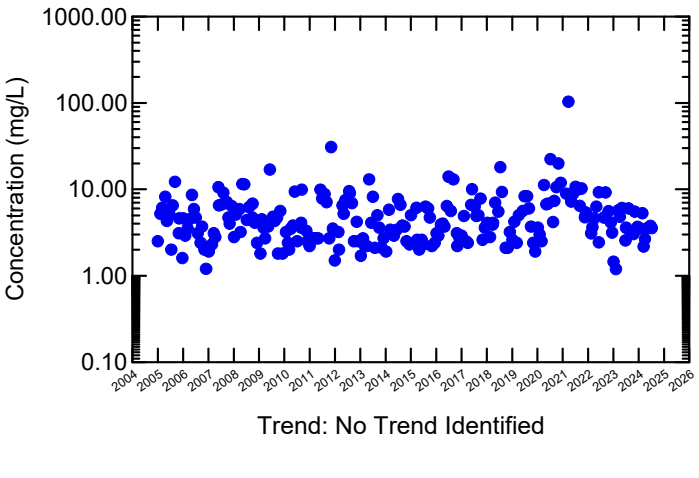
Trend: No Trend Identified



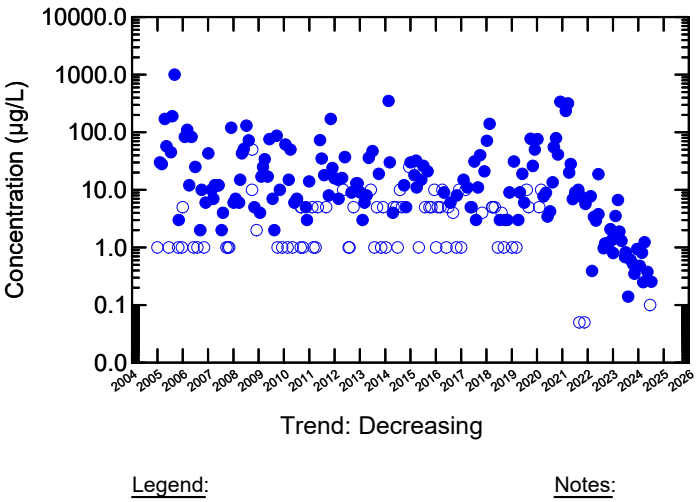
Trend: Increasing



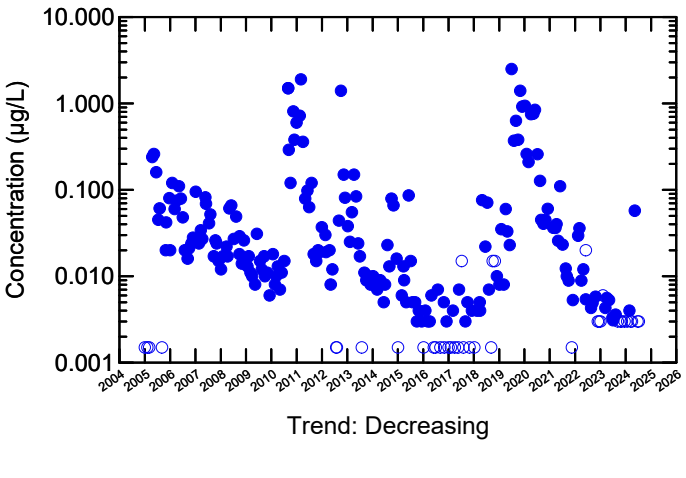
Trend: Decreasing



Trend: No Trend Identified



Trend: Decreasing



Trend: Decreasing

Legend:

- Detected Result
- Non-detect (plotted at one half the detection limit)

Notes:

Any detection limits elevated above target detection limit and/or detected values were not included in the trend analysis.

No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

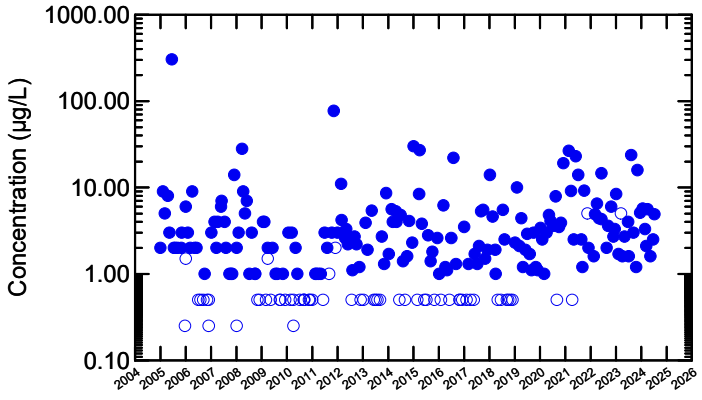
LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER SEWER

Project No. **11192137-38**
Date: **Aug 8, 2024**

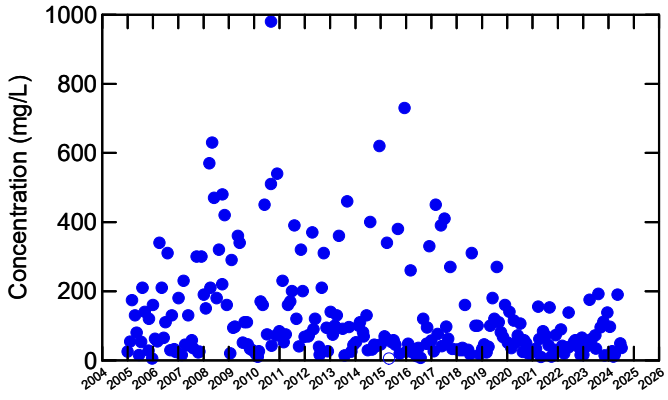
FIGURE B.4

PHENOLICS (TOTAL)



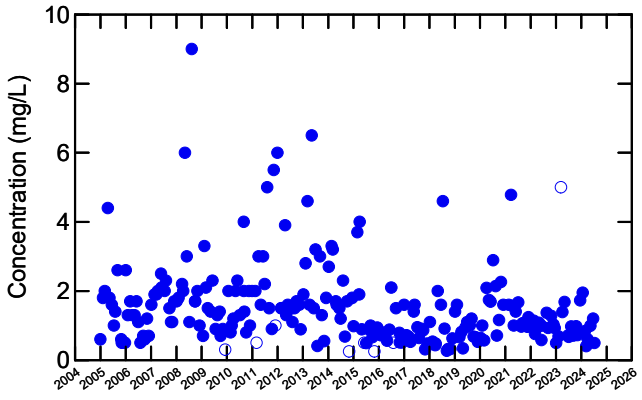
Trend: Increasing

TOTAL SUSPENDED SOLIDS (TSS)



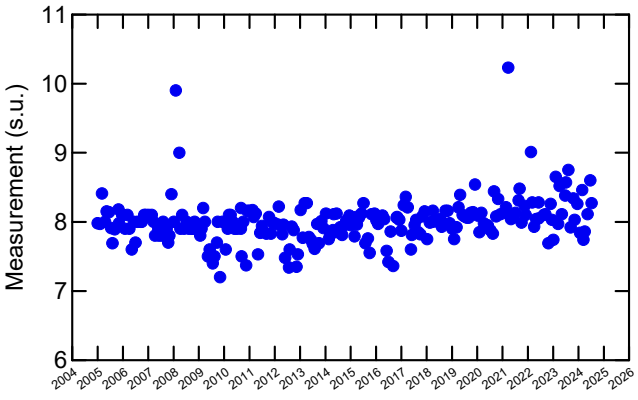
Trend: Decreasing

TOTAL KJELDAHL NITROGEN (TKN)



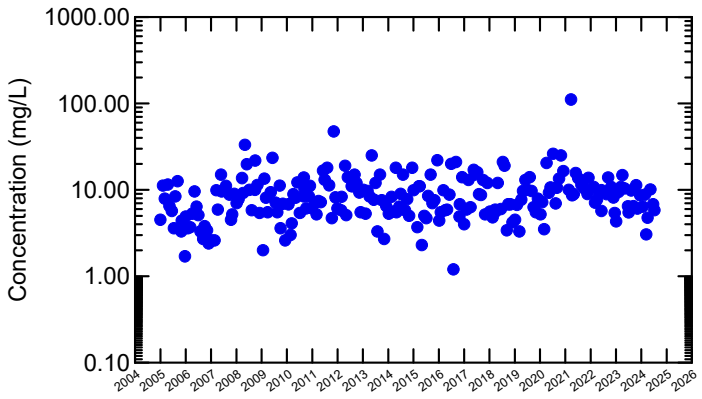
Trend: Decreasing

pH



Trend: Increasing

TOTAL ORGANIC CARBON (TOC)



Trend: Increasing

Legend:

- Detected Result
- Non-detect (plotted at one half the detection limit)

Notes:

Any detection limits elevated above target detection limit and/or detected values were not included in the trend analysis.

No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER SEWER

Project No. **11192137-38**
Date: **Aug 8, 2024**

FIGURE B.5

Table B.1

Environmental Appeal Board (EAB)
Analytical Results - July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

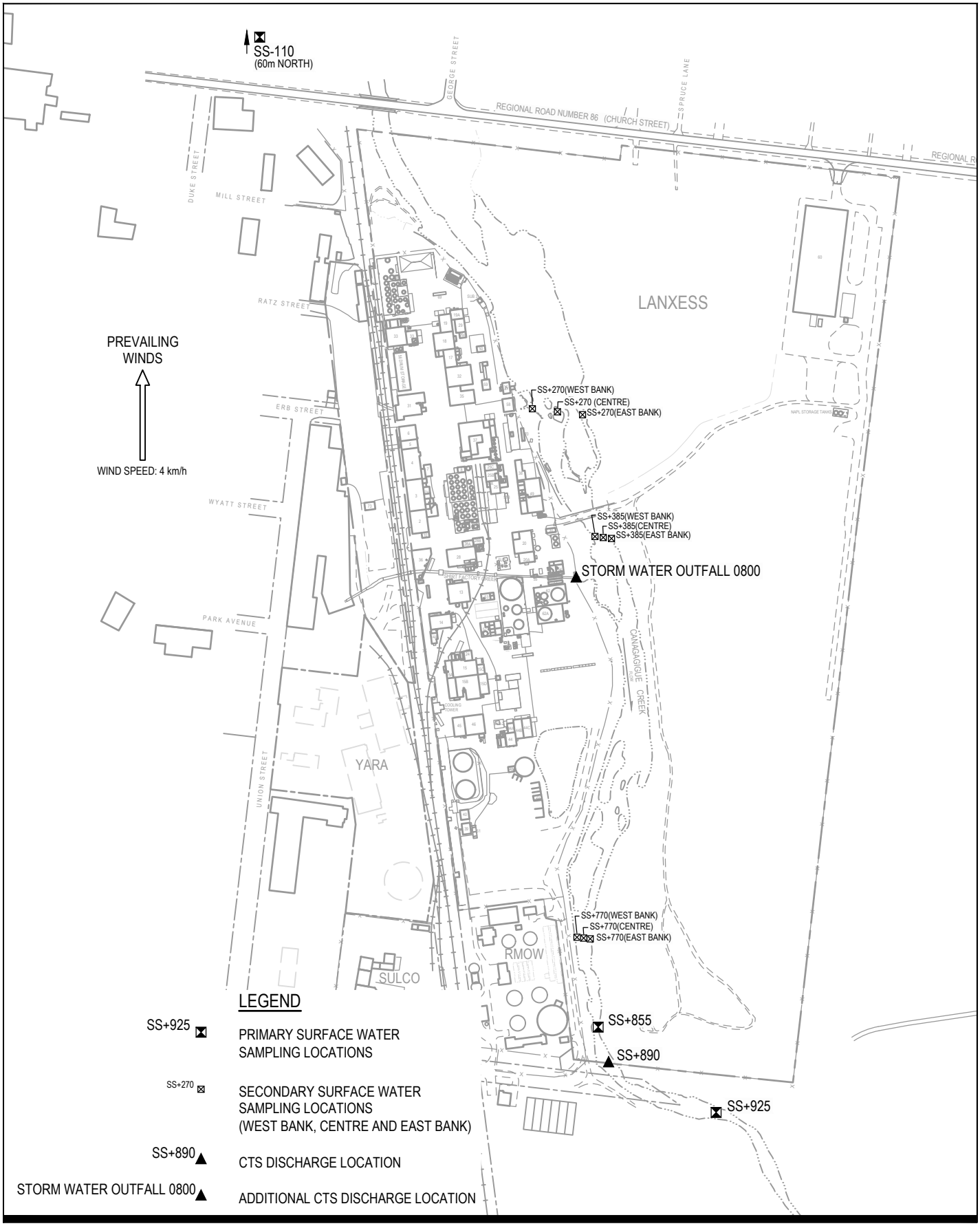
Sample Location:		**Storm Water Sewer**	**Storm Water Outfall 0200**	**Storm Water Outfall 0400**	**Storm Water Outfall 0800**
Sample ID:		**SWS 071024**	**0200 071024**	**0400 071024**	**0800 071024**
Sample Date:		**7/10/2024**	**7/10/2024**	**7/10/2024**	**7/10/2024**
Parameters	**Units**				
General Chemistry					
Ammonia-N	mg/L	0.166	0.170	0.249	0.120
Conductivity	umhos/cm	168	235	78.7	537
Cyanide (total)	mg/L	ND(0.0020)	0.0044	0.0030	ND(0.0020)
Dissolved organic carbon (DOC) (dissolved)	mg/L	3.55	--	--	--
pH, lab	s.u.	8.27	7.58	7.88	7.84
Phenolics (total)	mg/L	0.0049	--	--	--
Sulfide	mg/L	ND(0.010)	ND(0.010)	ND(0.010)	ND(0.010)
Total kjeldahl nitrogen (TKN)	mg/L	0.493	0.508	0.584	0.982
Total organic carbon (TOC)	mg/L	5.80	5.83	7.27	8.12
Total suspended solids (TSS)	mg/L	35.6	--	--	--
Herbicides					
2,4,5-TP (Silvex)	µg/L	ND(0.100)	ND(0.250)	ND(0.250)	ND(0.250)
2,4-DB	µg/L	ND(0.100)	ND(0.250)	ND(0.250)	ND(0.250)
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	ND(0.100)	ND(0.250)	ND(0.250)	ND(0.250)
Pesticides					
gamma-BHC (lindane)	µg/L	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)
Semi-Volatiles					
2-Mercaptobenzothiazole	µg/L	ND(20)	ND(20)	ND(20)	ND(20)
Aniline	µg/L	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ
Benzothiazole	µg/L	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)
Carboxin	µg/L	0.254	ND(0.100)	ND(0.100)	0.116
N-Nitrosodiethylamine	µg/L	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)
N-Nitrosodimethylamine	µg/L	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
N-Nitrosodi-n-butylamine	µg/L	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)
N-Nitrosodiphenylamine	µg/L	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
N-Nitrosodiphenylamine + Diphenylamine	µg/L	ND(0.40)	ND(0.40)	0.82	ND(0.40)
Nitrosomorpholine	µg/L	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)
Volatiles					
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	ND(20)	ND(20)	ND(20)	ND(20)
Ethylbenzene	µg/L	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
m&p-Xylenes	µg/L	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)
o-Xylene	µg/L	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
Toluene	µg/L	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
Misc					
Oil and grease	mg/L	ND(5.0)	--	--	--

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
--	The parameter was not analyzed for.

Attachment C

Analytical Results
Surface Water Monitoring Program



0 50 100 150m

Coordinate System: UTM NAD 27

N

LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

SURFACE WATER SAMPLING LOCATIONS JULY 22, 2024

Project No. **11192137**
Date **August 2024**

FIGURE C.1

Filename: N:\CA\Waterloo\Projects\662\11192137\Digital_Design\ACAD 2020\Figures\LTR-GEMP2024JULY-DIR058\11192137-GHD-00-00-LTR-EN-D102_WA-GEMP2024JULY-DIR058.dwg
Plot Date: 08 August 2024 9:00 AM

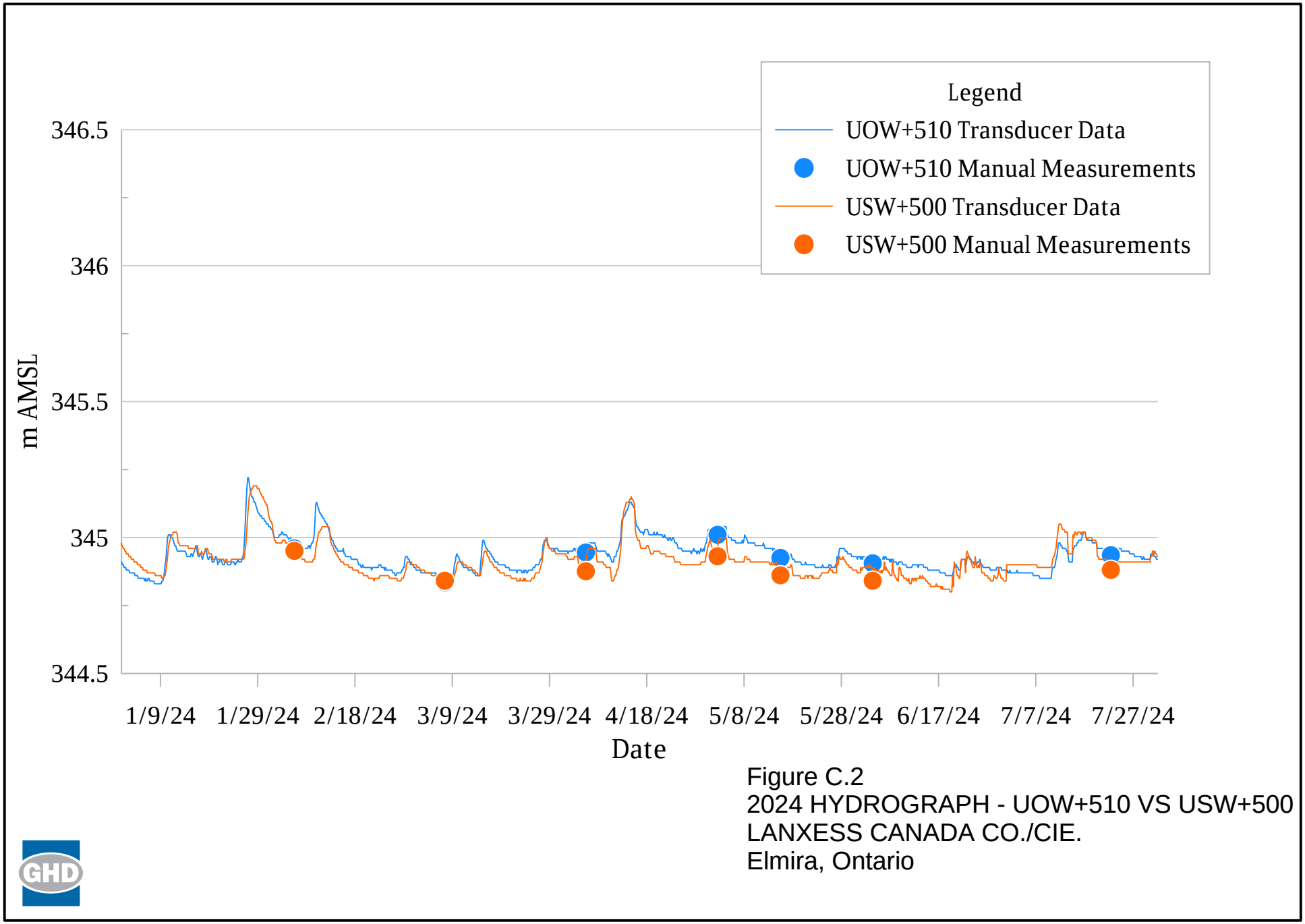
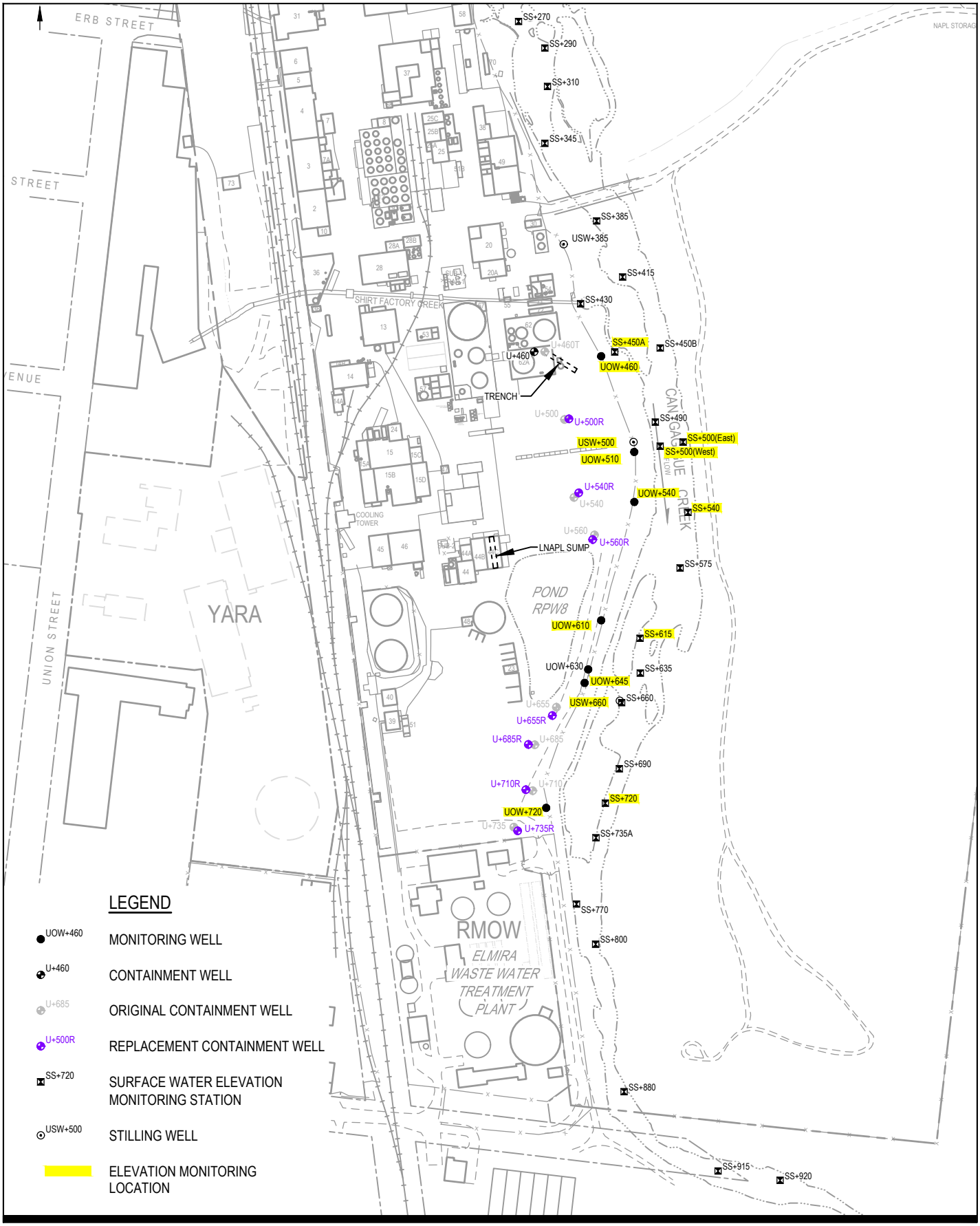


Figure C.2
2024 HYDROGRAPH - UOW+510 VS USW+500
LANXESS CANADA CO./CIE.
Elmira, Ontario



0 30 60 90m

Coordinate System: UTM NAD 27

N

GHD

LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

Project No. **11192137**
Date **August 2024**

ELEVATION MONITORING LOCATIONS

FIGURE C.3

Filename: N:\CA\Waterloo\Projects\662\11192137\Digital_Design\ACAD 2020\Figures\LTR-GEMP2024JULY-DIR058\11192137-GHD-00-00-LTR-EN-D103_WA-GEMP2024JULY-DIR058.dwg
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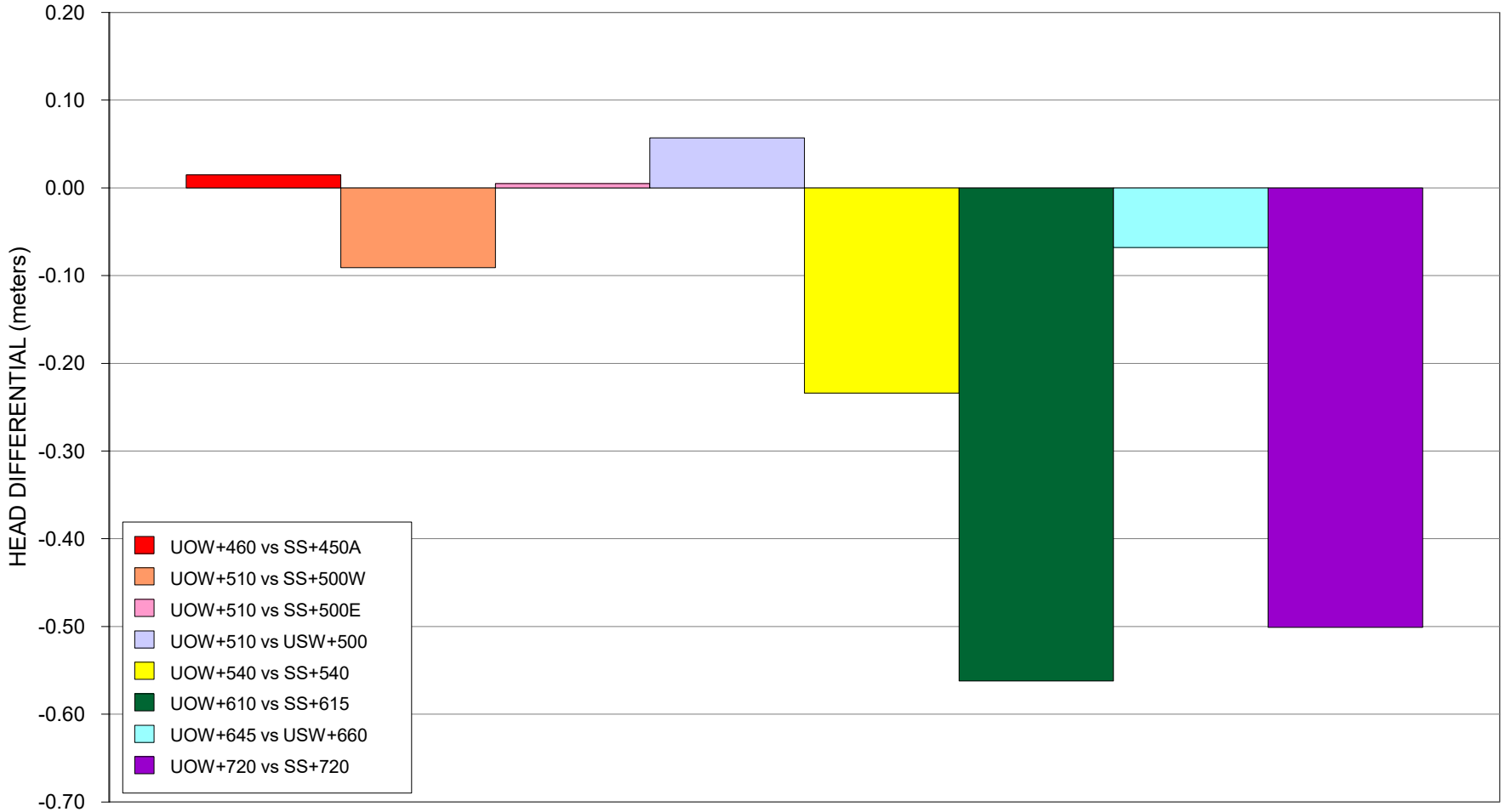

figure C.4
HEAD DIFFERENTIAL AT KEY MONITORING PAIRS - JULY 22, 2024
UPPER AQUIFER CONTAINMENT SYSTEM
LANXESS CANADA CO./CIE
Elmira, Ontario

11192137(DIRE058)GIS-OT003 July 23, 2024

Table C.1

Summary of Detected Compounds in Surface Water
July 2024 [1]
LANXESS Canada Co./Cie
Elmira, Ontario

Flow [2] = 590 L/s	Units	PWQO Status	PWQO Value	Sample Location ECA Schd. E Criteria	SS-110 (Upstream)	SS+270 (West)	SS+270 (Centre)	SS+270 (East)	SS+385 (West)	SS+385 (Centre)	SS+385 (East)	SS+770 (West)	SS+770 (Centre)	SS+770 (East)	SS+855	SS+925
General Chemistry																
Alkalinity	mg/L				251	263	260	263	263	258	264	266	265	264	263/266	263
Ammonia as N	mg/L				0.109	0.197	0.207	0.188	0.139	0.139	0.176	0.120	0.130	0.122	0.155/0.125	0.145
Un-ionized Ammonia	mg/L	PWQO	0.020	0.016	0.0083	0.0115	0.0123	0.0105	0.0100	0.0101	0.0110	0.0075	0.0077	0.0082	0.0078/0.0062	0.0033
Temperature °C (Field)	°C				21.2	19.8	19.8	19.8	20.1	19.9	19.6	19.5	19.5	19.4	19.2	18.8
Conductivity (Field)	µmho/cm				636	645	640	648	648	649	646	666	671	660	676	810
pH (Field)	su	PWQO	6.5-8.5		8.28	8.20	8.21	8.18	8.29	8.30	8.24	8.24	8.22	8.28	8.15	7.81
Dissolved Oxygen (Field)	mg/L	PWQO	>5		6.62	5.99	5.83	5.60	6.42	6.65	6.60	6.65	6.51	6.41	6.72	7.60
Formaldehyde	µg/L	IPWQO	0.8		2.1	ND(2.0)	ND(2.0)	ND(2.0)	2.4	2.1	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0) UJ/10.0 J	23.4
Total Phenols	mg/L	PWQO	0.001		0.0018 U	0.0281 U	0.0026 U	0.0074 U	0.0018 U	0.0015 U	0.0034 U	0.0080 U	0.0077 U	0.0041 U	0.0067 U/0.0014 U	0.0011 U
Total Phosphorus	mg/L				0.0730	0.139	0.0869	0.0981	0.0928	0.103	0.102	0.0804	0.0766	0.0806	0.0804/0.0863	0.0890
Remaining 1 General Chemistry Parameter Analyzed					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOCs)																
All 8 VOCs Analyzed					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Base, Neutral and Acid Extractable Compounds (BNAs)																
2-Chlorophenol	µg/L	PWQO	7	7.0	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ/ND(0.30) UJ	ND(0.30) UJ
Aniline	µg/L	IPWQO	2	4.0	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ/ND(2.0) UJ	ND(2.0) UJ
Phenol	µg/L	IPWQO	5	4.8	14.9 U	8.60 U	1.62 U	0.74 U	ND(0.50)	1.12 U	5.13 U	10.2 U	0.93 U	1.73 U	11.6 U/2.16 U	2.87 U
Remaining 18 BNAs Analyzed					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides & Herbicides																
All 3 Pesticide and Herbicide Analyzed					ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

	Concentration greater than associated PWQO/IPWQO and/or Schedule E Criteria.
[1]	Samples were collected on July 22, 2024. Winds were from the south at 4 km/h.
[2]	Flow measurement was obtained from the Grand River Conservation Authority (GRCA) Elmira (Arthur Street) gauge.
L/s	Litres per second.
RDL	Reporting detection limit.
PWQO	Provincial Water Quality Objective, MOE, February 1999.
IPWQO	Interim Provincial Water Quality Objective, MOE, February 1999.
ND(RDL)	Not detected at the associated reporting detection limit.
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
263/266	Duplicate sample.

Table C.2

Comparison of Schedule E Parameter Concentrations at SS+925 and SS-110 Using Statistical Analyses
July 2021 to July 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Parameter	Units	SS+925 Number of Samples	SS+925 Arithmetic Mean (x)	SS+925 Standard Deviation (s_x)	w_x [1]	t value (t_x) [2]	SS-110 Number of Samples	SS-110 Arithmetic Mean (y)	SS-110 Standard Deviation (s_y)	w_y	t value (t_y) [2]	t* [3]	t_c [4] →	If t* >t_c, a significant difference is evident [5]
Un-ionized Ammonia	µg/L	15	0.0013	0.0017	1.82E-07	2.602	15	0.0044	0.0052	1.82E-06	2.602	-2.186	2.602	
Acid Extractables														
2,3,4-Trichlorophenol	µg/L	13	0.2500	0.0000	0.00E+00	2.650	13	0.2500	0.0000	0.00E+00	2.650	(6)	(6)	
2,4,5-Trichlorophenol	µg/L	13	0.2269	0.0563	2.44E-04	2.650	13	0.2269	0.0563	2.44E-04	2.650	0.000	2.650	
2,4,6-Trichlorophenol	µg/L	13	0.2269	0.0563	2.44E-04	2.650	13	0.2269	0.0563	2.44E-04	2.650	0.000	2.650	
2,4-Dichlorophenol	µg/L	13	0.1423	0.0188	2.71E-05	2.650	13	0.1423	0.0188	2.71E-05	2.650	0.000	2.650	
2,6-Dichlorophenol	µg/L	13	0.2269	0.0563	2.44E-04	2.650	13	0.2269	0.0563	2.44E-04	2.650	0.000	2.650	
2-Chlorophenol	µg/L	13	0.1500	0.0000	0.00E+00	2.650	13	0.1500	0.0000	0.00E+00	2.650	(6)	(6)	
Phenol	µg/L	13	0.3412	0.3287	8.31E-03	2.650	13	0.8038	1.9969	3.07E-01	2.650	-0.824	2.650	
m/p-Cresol	µg/L	13	0.2500	0.0000	0.00E+00	2.650	13	0.2500	0.0000	0.00E+00	2.650	(6)	(6)	
o-Cresol	µg/L	13	0.2708	0.0749	4.31E-04	2.650	13	0.2808	0.1109	9.47E-04	2.650	-0.269	2.650	
Base/Neutral Extractables														
2-Mercaptobenzothiazole	µg/L	13	10.0000	0.0000	0.00E+00	2.650	13	10.0000	0.0000	0.00E+00	2.650	(6)	(6)	
Aniline	µg/L	13	1.0000	0.0000	0.00E+00	2.650	12	1.0000	0.0000	0.00E+00	2.681	(6)	(6)	
Benzothiazole	µg/L	13	1.0000	0.0000	0.00E+00	2.650	13	1.0000	0.0000	0.00E+00	2.650	(6)	(6)	
Carboxin	µg/L	15	0.0500	0.0000	0.00E+00	2.602	15	0.0500	0.0000	0.00E+00	2.602	(6)	(6)	
n-Nitrosodimethylamine (NDMA)	µg/L	15	0.0050	0.0000	0.00E+00	2.602	15	0.0050	0.0000	0.00E+00	2.602	(6)	(6)	
Nitrosomorpholine (NMOR)	µg/L	15	0.0300	0.0000	0.00E+00	2.602	15	0.0300	0.0000	0.00E+00	2.602	(6)	(6)	
bis(2-Ethylhexyl)phthalate	µg/L	15	0.6067	0.2549	4.33E-03	2.602	15	0.6067	0.2549	4.33E-03	2.602	0.000	2.602	
Pesticides														
Lindane (gamma-BHC)	µg/L	15	0.0015	0.0000	0.00E+00	2.602	15	0.0015	0.0000	0.00E+00	2.602	(6)	(6)	
Volatile Organic Compounds														
Benzene	µg/L	15	0.1000	0.0000	0.00E+00	2.602	15	0.1000	0.0000	0.00E+00	2.602	(6)	(6)	
Chlorobenzene	µg/L	15	0.1000	0.0000	0.00E+00	2.602	15	0.1000	0.0000	0.00E+00	2.602	(6)	(6)	
Ethylbenzene	µg/L	13	0.1000	0.0000	0.00E+00	2.650	13	0.1000	0.0000	0.00E+00	2.650	(6)	(6)	
Toluene	µg/L	15	0.1000	0.0000	0.00E+00	2.602	15	0.1000	0.0000	0.00E+00	2.602	(6)	(6)	
Trichloroethylene	µg/L	15	0.1000	0.0000	0.00E+00	2.602	15	0.1000	0.0000	0.00E+00	2.602	(6)	(6)	
m,p-Xylenes	µg/L	15	0.2000	0.0000	0.00E+00	2.602	15	0.2000	0.0000	0.00E+00	2.602	(6)	(6)	
o-Xylene	µg/L	13	0.1000	0.0000	0.00E+00	2.650	13	0.1000	0.0000	0.00E+00	2.650	(6)	(6)	

Notes:

(1) w = standard deviation/number of data points
(2) t-value at 99% confidence interval
(3) Difference of means defined as $(x-y)/(w_x+w_y)^{1/2}$
(4) Defined as $(w_x t_x + w_y t_y)/(w_x+w_y)$
(5) The statistical comparison method used was Cochran's Approximation to the Behrens Fisher t-Test (McBean, 1988). The merit of this procedure is that it does not have the restrictive assumptions that the typical t-Test does. In the typical t-Test, the variances of the data sets have to be statistically the same (they are allowed to deviate from one another, but only by an amount that is a function of the size of the data set). Cochran's test removes this assumption, and has been chosen as the method of analysis since the variances of the SS-110 and SS+855 sample sets for parameters such as lindane and toluene, are not similar.
(6) A statistical comparison test was not performed since none of the values were detected above the reporting detection limit for the specified parameter (detection frequency is 100 percent non detect).

Attachment D

Analytical Results
Creek Bank Groundwater Monitoring Program

0 30 60 90m

Coordinate System: UTM NAD 27

N

GHD

LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

SAMPLING LOCATIONS
CREEK BANK GROUNDWATER MONITORING PROGRAM

Project No. **11192137**
Date **August 2024**

FIGURE D.1

Filename: N:\CA\Waterloo\Projects\662\11192137\Digital_Design\ACAD 2020\Figures\LTR-GEMP2024JULY-DIR058\11192137-GHD-00-00-LTR-EN-D104_WA-GEMP2024JULY-DIR058.dwg
Plot Date: 08 August 2024 8:59 AM

Data Source

Table D.1

2024 Creek Bank Groundwater Monitoring Program
July 2024 Analytical Data
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:			**OW95-5**	**OW96-5**	**OW96-5**	**OW97-5**	**OW127-4**	**OW147-4**	**OW153-4**
Sample ID:		**Ontario**	**GW-5380-073024-AB-007**	**GW-5380-073024-AB-003**	**GW-5380-073024-AB-004**	**GW-5380-073024-AB-001**	**GW-5380-073024-AB-005**	**GW-5380-073024-AB-006**	**GW-5380-073024-AB-002**
Sample Date:		**Table 8** [1]	**7/30/2024**	**7/30/2024**	**7/30/2024**	**7/30/2024**	**7/30/2024**	**7/30/2024**	**7/30/2024**
Sample Type:			**Original**	**Original**	**Field Duplicate**	**Original**	**Original**	**Original**	**Original**
Parameters	**Units**								
Field Parameters									
Conductivity	mS/cm	-	1.34	5.21	5.21	4.46	10.0	1.54	4.88
Dissolved oxygen (DO)	mg/L	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Oxidation reduction potential (ORP)	millivolts	-	-160	-100	-100	-78	-120	-116	-92
pH	s.u.	-	6.94	6.76	6.76	6.77	6.77	6.73	6.80
Temperature	Deg C	-	22.08	21.52	21.52	20.08	20.60	21.01	21.24
Turbidity	NTU	-	3.5	1.2	1.2	0.7	1.1	4.3	0.5
Pesticides									
Lindane (gamma-hexachlorocyclohexane)	µg/L	0.95	ND(0.0030)	0.0031	ND(0.0030)	ND(0.0030)	ND(0.0030)	ND(0.0030)	0.151
o,p-DDD	µg/L	1.8	0.0256	0.00812	0.00566	0.00109	0.00075	0.0162	0.0104
p,p-DDD	µg/L	1.8	0.0361	0.00769	0.00588	0.00097	0.00083	0.0493	0.0196
o,p-DDE	µg/L	10	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00200)	ND(0.00040)
p,p-DDE	µg/L	10	0.00110	0.00254	0.00202	ND(0.00040)	ND(0.00200)	0.00263	0.00108
o,p-DDT	µg/L	0.05	ND(0.00160)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)	ND(0.00040)
p,p-DDT	µg/L	0.05	0.00062	0.00348	0.00513	0.00356	0.0138	0.00430	0.0106
Volatiles									
Benzene	µg/L	5	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	5.28	ND(0.20)	ND(0.20)
Chlorobenzene	µg/L	30	0.74	1.26	1.31	ND(0.20)	33.0	1.34	0.58
Chloroform (Trichloromethane)	µg/L	2.4	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)	ND(1.00)
1,2-Dichlorobenzene	µg/L	3	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	0.58	ND(0.50)	ND(0.50)
1,3-Dichlorobenzene	µg/L	59	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
1,4-Dichlorobenzene	µg/L	1	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	0.67	0.50	0.53
1,1-Dichloroethane	µg/L	5	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
1,2-Dichloroethane	µg/L	1.6	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
1,1-Dichloroethylene	µg/L	1.6	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
cis-1,2-Dichloroethylene	µg/L	1.6	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
trans-1,2-Dichloroethylene	µg/L	1.6	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
1,2-Dichloropropane	µg/L	5	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
Ethylbenzene	µg/L	2.4	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
1,1,1,2-Tetrachloroethane	µg/L	1.1	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
1,1,2,2-Tetrachloroethane	µg/L	1	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
Tetrachloroethylene	µg/L	1.6	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
Toluene	µg/L	22	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
1,1,1-Trichloroethane	µg/L	200	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
1,1,2-Trichloroethane	µg/L	4.7	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.00)
Trichloroethylene	µg/L	1.6	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
Vinyl Chloride	µg/L	0.5	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
m&p-Xylenes	µg/L	300	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)	ND(0.40)
o-Xylene	µg/L	300	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)

Note:

ND(RDL)	Not detected at the associated reporting detection limit.
[1]	Table 8 Generic Site Condition Standards for Use within 30 meters of a Water Body in a Potable Groundwater Condition .
	"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Standards Development Branch, Ontario Ministry of the Environment, April 15, 2011.
-	No Table 8 Standard specified.
1.13	Concentration greater than associated Table 8 Standard.