Technical Remediation Advisory Committee Revised Agenda

Thursday, September 12, 2024
6:00 pm
Council Chambers - Hybrid with YouTube Recording
24 Church Street West, Elmira, ON, N3B 2Z6
Chair: Councillor Nathan Cadeau

		Pages
1.	Land Acknowledgement	
2.	Disclosures of Pecuniary Interest	
3.	Approval of Previous Minutes	1
4.	Delegations	
5.	Updates	
5.1	LANXESS Canada Co.	10
5.1.1	Follow Up Summary from the Sept 10th Technical Experts Meeting	
5.1.2	Summer Fieldwork Updates	
5.1.2.1	Replacement of Well PW5	
5.1.2.2	Commissioning of Well PW6	
5.1.2.3	Investigating Well Extraction Pumping Rates	
5.1.3	Progress Update on LANXESS 2024 Work Plan	
5.1.4	GHD/Alan Deal - Historic Location of Dense Non-Aqueous Phase Liquids (DNAPL) & LANXESS Off Site Isotopic Analysis Study	15
6.	2028 Order Deadline Remediation Frameworks Discussion	32
7.	Fall Presentation to Council	

8. Other Business

8.1 Ontario Drinking Water Quality Standards for NDMA *33*

9. Correspondence

9.1 LANXESS May, June, July 2024 Progress Reports prepared by GHD 36

9.1.1 Review of LANXESS May, June & July Monthly Progress Reports 167

9.2 LANXESS August 2024 Progress Report Prepared by GHD 169

10. Next Meeting - Oct 10th, 2024

10.1 Fall Meeting Schedule

11. Adjournment

Township of Woolwich
Technical Remediation Advisory Committee
Meeting Minutes

Thursday, June 13, 2024
6:07 p.m. – 8:18 p.m.
Hybrid Meeting
Hosted in Council Chambers and on Zoom
24 Church Street West, Elmira

Present from TRAC:	Councillor Nathan Cadeau, TRAC Chair Mayor Sandy Shantz, Councillor Eric Schwindt *Tiffany Svensson, Technical Expert* Susan Bryant, TRAC Community Member Eric Hodgins, TRAC Community Member Bryan Broomfield, TRAC Community Member Linda Dickson, TRAC Community Member *Ryan Prosser, TRAC Community Member* David Hofbauer, TRAC Community Member Dr. Sebastian Siebel-Achenbach, TRAC Community Member Karl Belan, Region of Waterloo *Mari MacNeil, Region of Waterloo* *Geoff Moroz, Region of Waterloo*
Stakeholders:	*Chris Foster-Pengelly, GRCA* *Hadley Stamm, LANXESS Corporation* *Jason Rice, Ministry of the Environment, Conservation and Parks*
Special Guests:	*Sadie Payne, Former Conestoga College Student* *Nadia LeMoine, Former Conestoga College Student* *Dr. Ulysses Klee, Professor, Conestoga College*
Present from Staff:	Stacey Bruce, Committee Support Specialist Rae Ann Bauman, Executive Officer

Italics indicate a virtual participant.

1. Land Acknowledgement

Chair Councillor Nathan Cadeau read a Land Acknowledgement.

2. Disclosures of Pecuniary Interest

No pecuniary interests were declared.

3. Approval of Previous Minutes

Moved by Linda Dickson
Seconded by Susan Bryant

That the Technical Remediation Advisory Committee (TRAC) minutes of April 25, 2024, be adopted as presented

…Carried.

4. Delegations

None.

5. Electronic Dashboard – EngageWR Platform Discussion

Rae Ann Bauman, Executive Officer presented a draft TRAC page designed in partnership with Waterloo Region's EngageWR electronic dashboard to house information related to this community project and increase public engagement as described in the committee's new Terms of Reference. The draft page includes links to TRAC's Terms of Reference, Woolwich Township's Procedural By-law, agenda and minutes, a key timeline of events, correspondence, documents received, and related resources. Key widget features in the backend of the page for subscriptions, newsfeeds, and forums for registered or anonymous public polls and surveys were demonstrated. It was discussed that Stacey Bruce, Committee Support Specialist, will be the future administrator of the dashboard and capable of further modifying the page for the committee. The next steps in launching the platform live involve finalizing the posted timeline of events and training S. Bruce.

Discussion around this matter covered content requests from the committee, the current file upload size restriction of 100 MB, and further details about the direct electronic link to Wilfrid Laurier's Assuring Protection for Tomorrow's Environment Collection. It was noted that an RFP is currently underway to increase the file upload size restriction to 250 MB. It was also highlighted that links from this community page open in pop-up windows, allowing users to stay connected to the original content. Community members S. Bryant, Dr. Sebastian Siebel-Achenbach, and Eric Hodgins were identified as key contributors to developing project milestones to complete the timeline of events section on the draft page.

There were no further questions regarding this.

At this time in the meeting Rae Ann Bauman left.

6. Advancements in NDMA Remediation – Student Research Presentation

18:19 Bryan Broomfield entered the meeting.

Conestoga College Professor Dr. Ulysses Klee introduced former students Sadie Payne and Nadia LeMoine, who have recently successfully completed their studies and presented past project work from a professional research internship course on advancements in NDMA remediation and investigation strategies to meet Ontario drinking water standards in the Elmira Aquifer pertaining to its removal from groundwater.

The presentation covered the students' research questions, the significance of their results, methods, findings, and study limitations. It addressed the nature of NDMA, its harmful effects, and the longstanding contamination of the Elmira Aquifer, emphasizing the challenges in removing this chemical from groundwater and its impact on the community's water supply. Various remediation techniques such as ex-situ ultraviolet (UV) treatment, reverse osmosis, granular activated carbon, and both ex-situ and in-situ bioremediation strategies using propane oxidizing bacteria were detailed. The presentation discussed the pros and cons, implementation systems, and potential discharge areas for these treatments, drawing insights from a Community Assessment for Public Health Emergency Response (CASPER) literature review and a LANXESS facility tour in Elmira. The study's overall conclusion that a multi-step approach is necessary to effectively treat NDMA in the Elmira Aquifer was underscored.

18:30 David Hofbauer entered the meeting.

The committee raised questions regarding the theoretical and practical aspects of this research. The presenters elaborated on the Canadian and US focus of their study, highlighting successful applications of similar technologies in evidence-based case studies with drinking water standards similar to Ontario. The presenters also described how the case studies they examined commonly applied multiple technological strategies where it was difficult to assess the individual effects of each one. They also discussed LANXESS's successful local use of the technologies studied, emphasizing again the importance of a multi-step remediation approach.

In response to further questions from the committee, the presenters described their interest in studying the technologies, touring the LANXESS facility, and gaining a deeper understanding of this environmental issue. They also explained limiting their focus on NDMA over both it and chlorinated benzene due to the high availability of research materials. The committee further clarified the differences between the ex-situ and targeted in-situ treatment, the availability of microbial bioremediation methods for chlorinated contaminants vs. the limitations around this for NDMA, and the hazards of injecting propane into the contaminated groundwater for propane-oxidizing bacterial treatment were emphasized. The effective application of UV and activated carbon remediation technologies by LANXESS and the energy intensiveness of these treatments were also noted. The remaining NDMA contamination in the aquifer and the technical challenges associated with its treatment, particularly regarding well site selection and aquifer substrate conditions like silt were described by the company. LANXESS spoke to the importance of further consulting with GHD and WSP regarding removing the mass of these contaminants with ex-situ treatments to meet 2028 deadline targets.

The committee discussed the scalability of the technologies presented in the study, focusing on the required scale for remediating 2 million gallons of water daily from the Elmira Aquifer. They noted considerations such as costs, energy demands, and the requirement for full-time personnel to oversee continuous treatment operations. Additionally, the committee explored the study's conclusion on employing a multi-step remediation approach further, emphasizing the importance of the combination of different technological processes in the case study applications to enhance overall efficiency, with each contributing specific capability.

The committee questioned whether evidence from other case studies addressed the effectiveness of technologies at the asymptotic plateau of treatment, similar to the current situation with the pump-and-treat method being used in the Elmira Aquifer. Since this was beyond their study, the presenters could not address this and were unable to respond to this initially, but after further inquiries were made regarding potential future research directions the presenters suggested focusing on comparing reverse osmosis and UV remediation technologies, alongside proposing another LANXESS facility tour in the future for additional insights.

In response to a committee question, it was noted that no other in-situ methods are currently available for NDMA remediation besides the propane oxidizing bacteria treatment, which poses explosion hazards and is unsuitable for community use. Discussions explored the potential for alternative, safer bioremediation treatments, referencing an associated unsuccessful and discontinued in-situ Chemical Oxidation (ISCO) pilot test that took place a decade ago in the central area of Elmira, west of the LANXESS site. The importance of specific aerobic and anaerobic conditions for tailored in-situ bioremediation treatments for different compounds was highlighted.

Additionally, the importance of conducting further site characterization was emphasized for future bioremediation work. However, it was noted that there is already sufficient information available to continue discussions on cleanup options like this due to the extensive prior studies of the site. The localized impact and limited broader scale effectiveness of permanganate-based bioremediation were noted from environmental remediation experience.

The student research presenters were complimented on their comprehensive work by the committee. It was also noted similarly from past LANXESS monthly progress reports that carbon and UV remediation treatments have demonstrated effectiveness.

There was no further discussion regarding this.

7. Review of LANXESS April 2024 Monthly Progress Report

Linda Dickson presented her summary of LANXESS's April 2024 Monthly Progress Report.

Hadley Stamm provided a response that well W3R has been up and running since the end of May, in response to questioning around of the exact date that the wireless equipment was recently installed for well W3R.

The committee further discussed a containment breach that occurred in April beneath the NW portion of the site, specifically north and west of the dam and southwest of the creek. LANXESS explained their efforts to control water levels through extraction well operations relative to the creek, which is typically challenged during high spring water events. Due to significant seasonal high fluctuations in water levels in this area, it was noted that the water lost was diluted, and such events typically do not result in exceedances of contaminant concentrations or adverse impacts. The ministry mentioned that the Environmental Compliance Approval (ECA) has previously been amended to reduce monitoring requirements, but that additional specific

monitoring is required to address data gaps that occur during storm events, particularly in spring months when containment breaches are common like this. It was emphasized that GHD, on behalf of LANXESS, collects surface water samples as close as possible to these events to monitor any potential negative effects through testing.

There was no further discussion regarding this.

8. Updates

7:04 Mari MacNeil entered the meeting.

H. Stamm presented the following LANXESS Elmira – TRAC Update.

LANXESS first provided an informal update on well PW6, noting that its replacement is progressing ahead of schedule, although potential supply chain challenges post-COVID-19 could still affect the overall timeline.

8.1 Human Health and Ecological Risk Assessment (HHERA) Revisions

The company described their discussion of necessary revisions in the HHERA with the ministry on June 12th, 2024. They also highlighted submitting initial comments at the end of May and their request for a formal meeting with the ministry's technical team to plan the execution of this work. The company described that after this technical discussion, they intend to finalize this report, incorporating the additional data collected by the ministry from the creek's floodplain. LANXESS noted also planning to update their progress regarding this at the next TRAC meeting.

8.2 Removal of Canagagigue Creek Hotspots

LANXESS discussed that their next remediation work for the hotspot removal on the creek will depend on findings from the risk assessment. They emphasized their intention to undertake voluntary work on the creek, pending the assessment's outcomes, which may dictate mandatory obligations. The company highlighted uncertainty regarding whether mandated work would differ from voluntary efforts. They expressed a need to clarify regulatory obligations before proceeding with targeted voluntary work.

Questions were raised by the committee regarding the timeline for submission of the final HHERA. LANXESS indicated it is expected to be completed by the end of summer, but that creek cleanup work is unlikely this year. Anticipating additional ministry comments post-submission, the company noted not foreseeing cleanup work commencing until next summer.

The committee questioned perceived delays in cleanup efforts during the preparation of ongoing reports. The company emphasized the importance of understanding the rationale behind cleanup efforts, considering their potential impact, and ensuring alignment with community interests.

The committee provided additional comments on the importance of avoiding unintended impacts on the creek by ensuring accurate identification of contaminant hot spots. The need for a thorough risk assessment before initiating any further work to gain a comprehensive understanding was emphasized.

8.3 Technical Advisory Group (TAG) and the Ministry of the Environment & Parks (MECP) Written Comments on the LANXESS Canagagigue Creek Clam Biomonitoring Program

LANXESS discussed wanting a deeper understanding for this clam biomonitoring work from the HHERA study that is expected to be completed. It was also emphasized that they would like to further understand the analysis of fish tissue data and long-term monitoring obligations under their ECA permit. The company highlighted challenges in obtaining clams for the biomonitoring program due to the Ministry of Natural Resources and Forestry (MNRF) licensing restrictions for introducing them into the creek. The company proposed fish tissue monitoring every 3-5 years as an alternative method for the ministry's consideration.

19:23 Geoff Moroz entered the meeting.

Using alternative clam species abundant in the upstream watershed for in-situ monitoring was suggested in response by the committee. They also recommended that GHD utilize further expertise to provide more detailed insights into creek biology and testing methods. In reply, LANXESS noted interest in exploring a collaboration with EnviroScience Inc., a US-based company specializing in bioremediation.

The ministry provided comment on the consideration of native clam species for biomonitoring, emphasizing the need to understand their upstream source in the Grand River in relation to the LANXESS site and other inputs into the creek system as well as their population size as it must be sufficient to support the study work without negatively impacting the species harvested for this work. The committee further underscored the significance of utilizing expert knowledge to study potential native clam populations for biomonitoring. The importance of understanding clam population size, baseline contaminant exposure, and maintaining a sufficient multiple-year supply of clams from healthy, stable populations with contaminant levels below detection limits for effective monitoring was further emphasized.

There was no further discussion regarding this.

9. 2028 Order Deadline

Regarding the 2028 cleanup deadline, LANXESS stated that it is unfeasible to meet this target set 30 years ago. They emphasized future efforts to address the removal of the mass of remaining aquifer contamination through consultations with GHD and Stantec consultants. They also noted exploring plans around sparging various wells and leveraging Joe Ricker's plume analytics as well as current existing studies to effect change in the environment of the contaminated site.

Discussion around the 2028 deadline and developing a proposal for a remedial framework by 2026 occurred, with ongoing updates on a remediation framework set as a standing future TRAC agenda item. The committee expressed interest in hearing the ministry's response to future proposed frameworks. The company highlighted the slow progress and challenges in their remediation efforts, emphasizing the iterative process of conducting remediation pilot tests to advance the cleanup work.

The committee requested a comprehensive summary of remediation technologies employed and studies acquired, emphasizing the need to revisit the potentially outdated draft remediation framework and technologies used for in situ and ex-situ treatment documents prepared five years ago. The committee decided, after further discussion, to proceed with this while also exploring new strategies through a technical experts meeting. To ensure inclusivity of perspectives, it was determined that the meeting will involve hydrogeologist consultants, representatives from the company and ministry, TRAC's Technical Expert, and community members.

9.1 ACTION: H. Stamm of LANXESS to initiate a Technical Experts Meeting involving hydrogeologist consultants, representatives from the company and ministry, TRAC's Technical Expert, and community members.

The committee discussed reformulating its framework questions for community outreach, emphasizing their current regulatory and technical aspects and the need for public education. The critical role of technical experts in formulating these current draft questions was highlighted.

The committee reviewed the five-year age and potential retooling of these questions, including a follow-up on past discussions from the Technical Advisory Group (TAG) group on questions to pose to the public in consideration of the 2028 order deadline. A technical experts meeting before September was deemed crucial for revising these current draft questions effectively.

The committee discussed answers, feasibility, and relevance of fundamental questions they aim to address, emphasizing the need for responses from those capable of providing answers. They focused on the critical nature of addressing these issues effectively. The audience for the framework questions and considerations regarding existing water in the aquifer for cleanup evaluations were discussed, focusing on containment vs. cleanup strategies to conserve this water supply resource.

The committee also deliberated on the overwhelming weight of these questions for community committee member volunteers to answer compared to mandated experts and the ministry. The balance between expectations and the participatory capacity of the committee was considered.

Discussion focused on the assimilation of treated water into the stream, its current non-usage, and the perception surrounding these issues. The evaluation included the relevance and methodologies of Ontario Drinking Water Standards, prompting a query to the Ministry of the Environment Conservation and Parks (MECP) regarding their establishment, particularly in terms of the public perception of minor exceedances.

9.2 ACTION: The MECP to follow up with their Water Resources Branch regarding the historical establishment of the limits for the key contaminants for the committee.

Concerns were raised about site-specific cleanup criteria from the MECP, contrasting with offsite contamination and the evolution of cleanup approaches over the past decades, varying by regulatory requirements and company-driven initiatives.

The importance of the technical nature of these questions was emphasized. Considerations extended to water conditions and industrial vs. end-use drinking water, as well as the contextual relevance of unanswered questions to generate discussion and input on the 2028 order deadline.

In conclusion, the committee meeting organizers were tasked with determining questions to prioritize for this ongoing future discussion. The company's investment in treating contaminated water intended for discharge into the creek, and reassessing priorities leading up to 2028, was highlighted. The role of technical experts, the committee, and public feedback, alongside the necessity to educate the public and allow experts to shape future directions and question formulations, was underscored.

9.3 ACTION: Chair Councillor N. Cadeau, and Technical Expert Tiffany Svensson, to identify and formulate questions related to developing a remediation framework in preparation for the 2028 order deadline, for future discussion.

There was no further discussion regarding this.

10. Preparing The Spring TRAC Update for Council

The committee discussed preparing a comprehensive update to present to Council on August 27th. This high-level presentation will cover the committee's purpose, recent structural changes, and relevant work. Discussion highlighted the importance of including diverse perspectives and differing views on the committee's direction in the presentation. Committee members were encouraged to propose questions for Council for the presentation via email to Chair Councillor N. Cadeau.

10.1 ACTION: Chair, Councillor N. Cadeau, and Technical Expert T. Svensson will prepare a draft of the presentation, within the next month, which will be circulated to the committee for feedback.

There was no further discussion regarding this.

11. Other Business

11.1 2023 Annual Environmental Report

D. Hofbauer presented his summary of the 2023 Annual Environmental Report, prepared by GHD on behalf of LANXESS.

The committee discussed the notable annual reoccurring recommendation for the plant to develop a labeling system to ensure drums are not stored longer than 90 days, per ministry guidelines. They also reviewed LANXESS's waste disposal practices. It was confirmed there have been no violations and that the plant follows recommended disposal guidelines.

There was no further discussion regarding this.

12. Correspondence

12.1 Alan Marshal's May 14, 2024, Council Meeting Delegation

12.2 LANXESS April 2024 Progress Report Prepared by GHD

12.3 2023 Annual Environmental Report

12.4 Student Research Paper on Advancements in NDMA Remediation

It was noted that four documents were received since the last TRAC committee meeting and there was no further discussion regarding these.

13. Next Meeting

The committee agreed to reschedule the next meeting to September 12th, 2024, at 6:00 pm, moving it a week earlier.

14. Adjournment (8:18 P.M.)

14.1 Card Signing for Ramin Ansari's Retirement

Committee members were invited to sign a card for Ramin Ansari's retirement.

Moved by Dr. S. Siebel-Achenbach
Seconded by Ryan Prosser

The committee adjourns to meet again on Sept 12, 2024.

…Carried.

Recorder: Stacey Bruce, Committee Support Specialist

LANXESS
Energizing Chemistry

LANXESS Elmira – TRAC Update

Hadley Stamm

September 12, 2024

Agenda – September 12, 2024

- **2024 Pending Work**
- **2025 Work Plan**
- **New Work**

Summary of 2024 Remediation Work Completed and 2025 Expectations

2024

- Address PW4 target flow issues (increase UA Tower carbon replacement and/or clean forcemain / replace equipment as required)
- Inspect & clean air relief and drain chambers for off-site groundwater extraction wells
- Replace of Activated Carbon in building 44C & 44D
- PW6 installation (well installed, working on power supply and final connections

2025

- Submit Annual Monitoring and Annual Audit Reports
- Completion of Process Hazard Risk Analysis of the CTS
- Continuing discussions with the MECP on the Remedial Framework
- Preparation and submission of the Final Creek HHREA
- Assessment of off-site groundwater extraction well targets rates
- **Ricker Analysis for the Groundwater Remedy**
- Redevelop PW5 Extraction well

New Work

- September held TRAC Technical Experts Meeting
- Address outstanding TRAC questions – end of 2024
- Finalize and submit 2018 Technology Evaluation – October 2024
- Groundwater Bench Test and Pilot Test Proposal – October 2024
- Prepare submit Remedial Technology Evaluation/Feasibility Study Report – December 2024
- CSM refinement and update June 2025
- Continued discussions with the MECP/RMOW/TRAC and development of a Remedial Framework/Remedial Work/Draft Control Order – third quarter 2025


LANXESS
Energizing Chemistry

Chlorobenzene Source Evaluation

TRAC Meeting

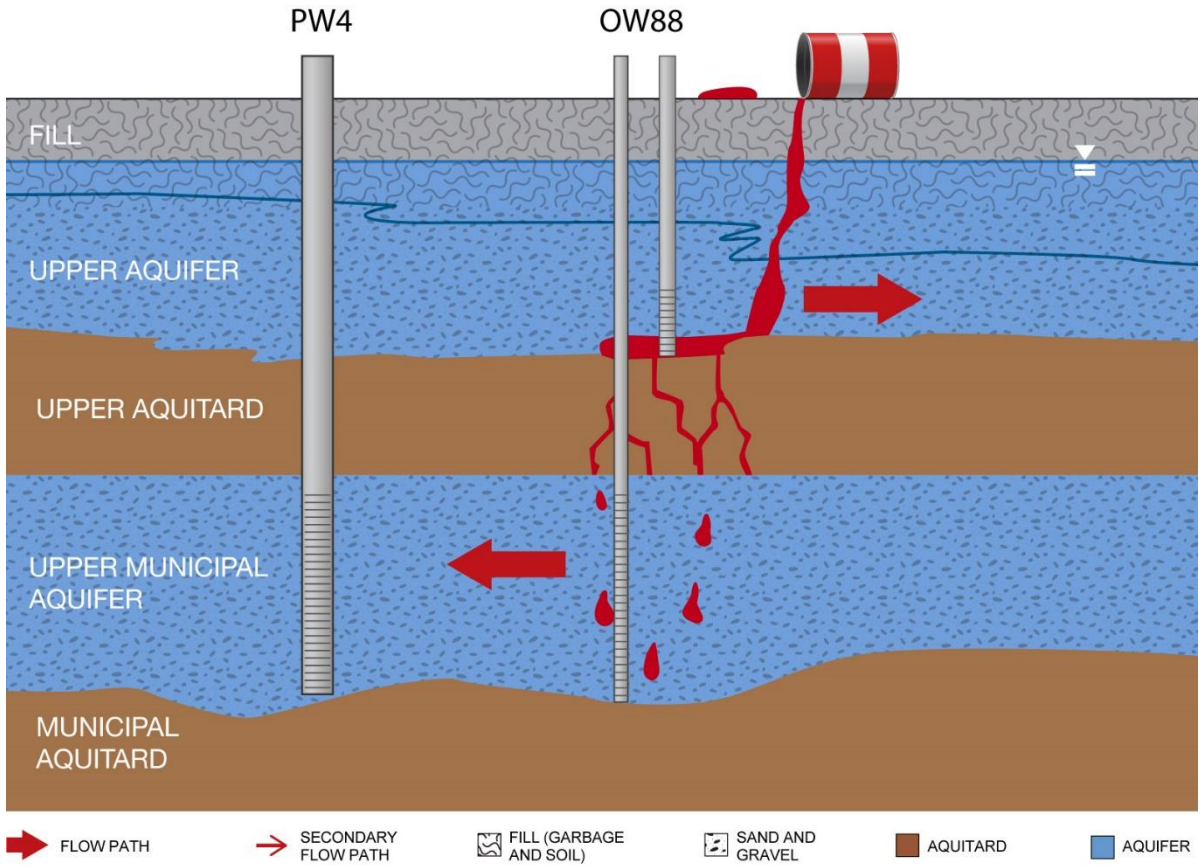
September 12, 2024

Chlorobenzene does not equal DNAPL

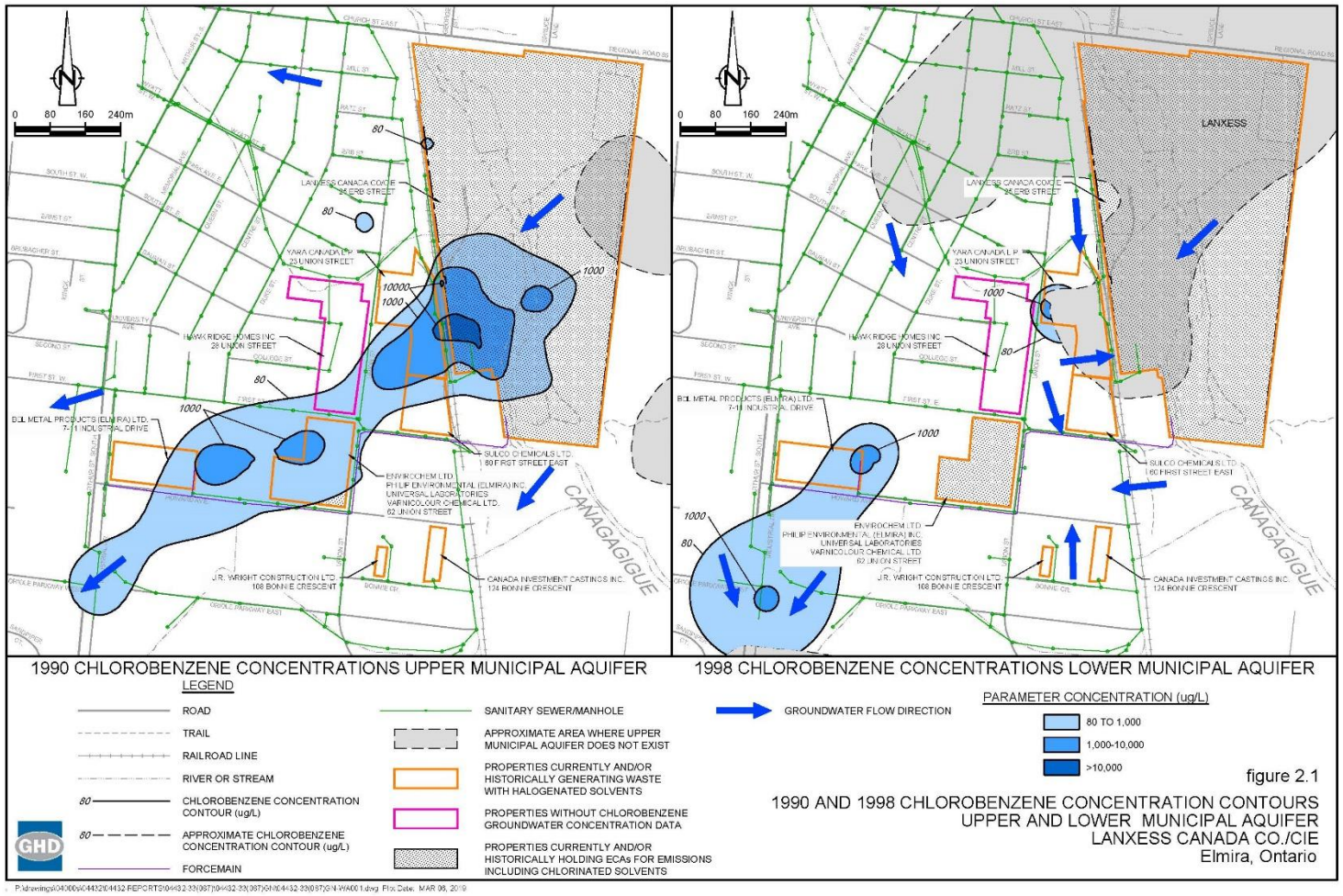
- Chlorobenzene aqueous solubility is 490,000 ug/L
- 1% of aqueous solubility = 4,900 ug/L

"experience has shown that DNAPL may be present up – gradient of a monitoring well displaying sampled groundwater concentrations in excess of 1 per cent of the effective solubility of the component of interest." Environment Agency, June 2003. Illustrated handbook of DNAPL transport and fate in the subsurface.

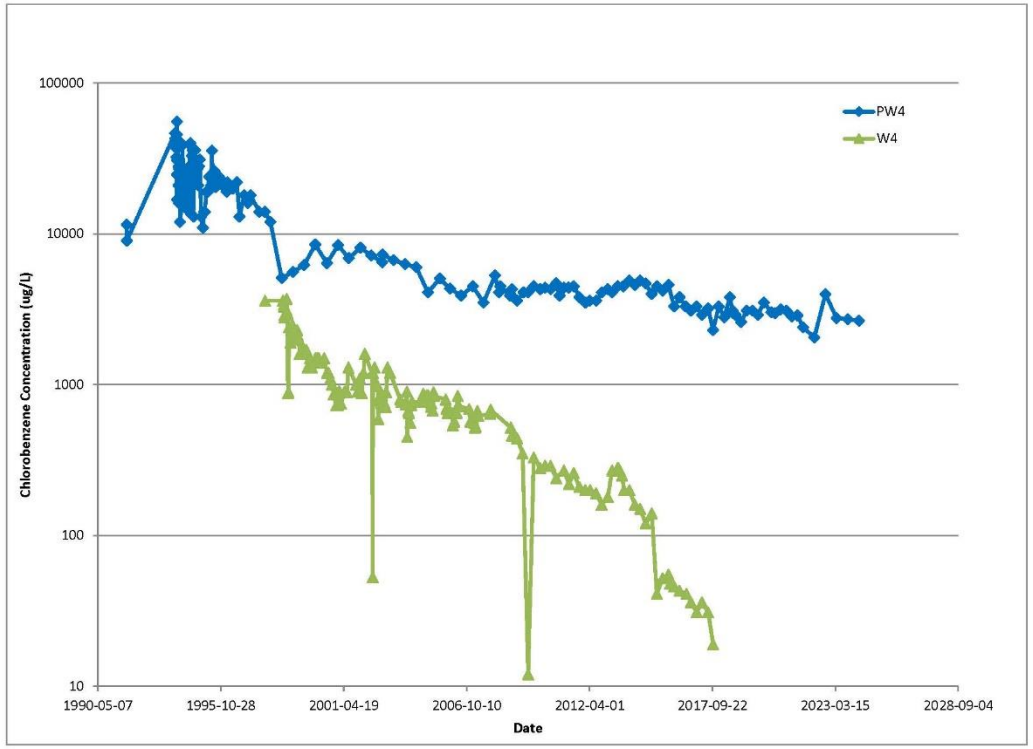
DNAPL at LANXESS



Historic Chlorobenzene Concentrations



Chlorobenzene Concentrations vs. Time



Chlorobenzene Source Evaluation

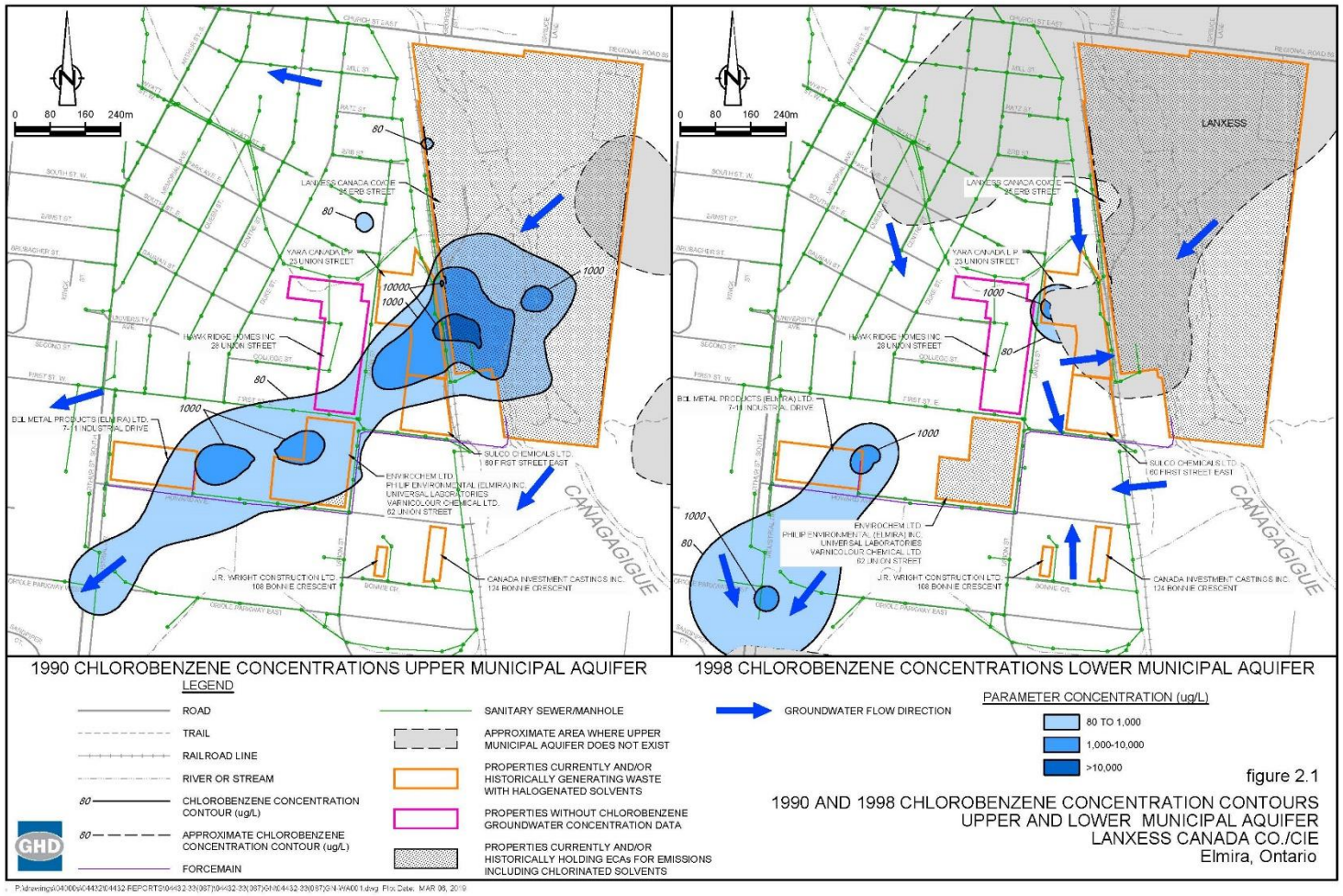
There were four main investigative activities:

- review of historic chlorobenzene users
- installing and sampling a new monitoring well nest
- collecting samples and analyzing them for volatile organic compounds (VOCs)
- collecting samples for isotope analysis

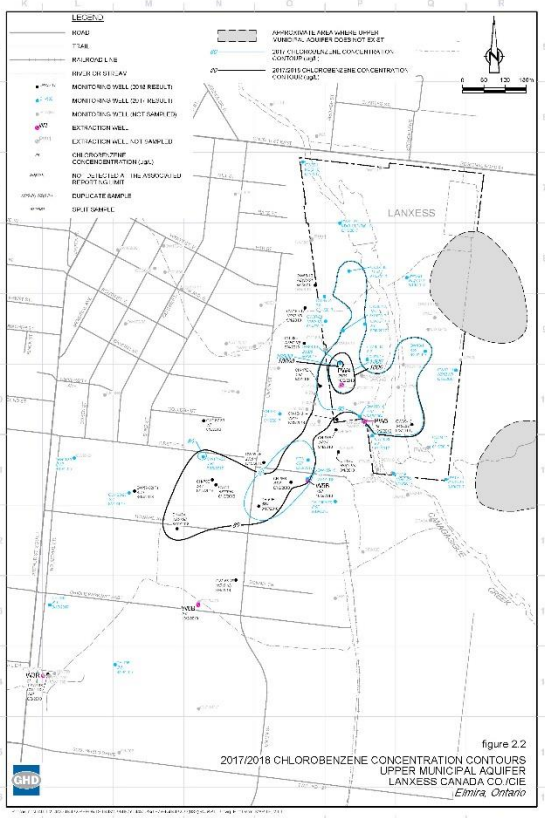
Review of Historic Chlorobenzene Users

- GHD reviewed the Environmental Risk Information Services (ERIS) database for facilities in Elmira that currently use or have used chlorinated solvents in the past.
- Several facilities that handled chlorinated solvents were identified, including the former Varnicolour facility at 84 Howard Ave.

Review of Historic Chlorobenzene Users



New Monitoring Well Nest



New Monitoring Well Nest

- Chlorobenzene was present in groundwater samples collected from new monitoring wells OW187-36 (13 µg/L) and OW187-39 (0.13 µg/L) but at concentrations less than the ODWQS (80 µg/L).
- These data address the gap in the monitoring well network and confirm the absence of additional chlorobenzene mass in the MA north of the existing plume limits.

VOCs Sample Analysis

- Peritus ROC for 84 Howard
- In August 2018, Pertius collected groundwater samples from 19 UA, MU and ML monitoring wells plus W5A &W5B and provided the results to GHD
- MW45 is a UA monitoring well located at 84 Howard Ave.
- 1,1-Dichloroethane, cis-1,2-dichloroethene, trichloroethene trans-1,2-dichloroethene and trichloroethene were detected in the sample collected from MW45 completed at 84 Howard Ave.
- Chlorobenzene was not detected in the UA.

VOCs Sample Analysis

Table 2.3

Selected Upper Aquifer VOC Results
Chlorobenzene Source Evaluation
LANXESS Canda Co./Cie
Elmira, Ontario

Sample Location:	Units	CH-43B	CH-43B (Duplicate)	CH-43C	CH-68C	CH-68D	CH-69C	CH-69D	MW45	OW56-16
1,1-Dichloroethane	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	1.87	13	ND(0.50)
1,1-Dichloroethene	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
1,2-Dichloroethane	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(1.0)	ND(0.50)
Benzene	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
Chlorobenzene	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	1.42	0.67	ND(0.50)	0.72
cis-1,2-Dichloroethene	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	1.85	84	0.92
Tetrachloroethene	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	2.2	ND(0.50)
Trichloroethene	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	22	ND(0.50)
Vinyl chloride	µg/L	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	3.27	1.24	ND(1.0)	ND(0.50)

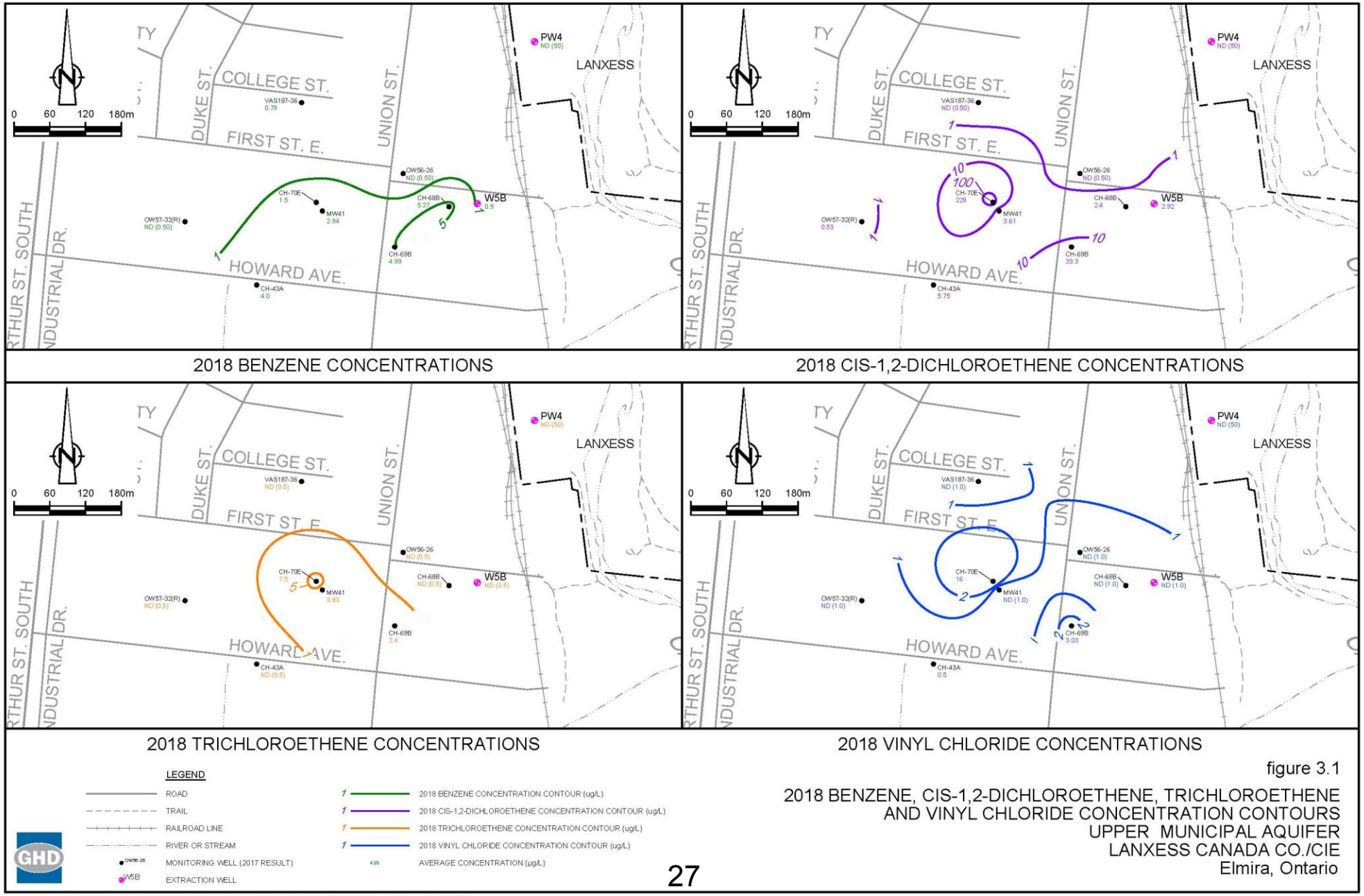


figure 3.1

2018 BENZENE, CIS-1,2-DICHLOROETHENE, TRICHLOROETHENE AND VINYL CHLORIDE CONCENTRATION CONTOURS
UPPER MUNICIPAL AQUIFER
LANXESS CANADA CO./CIE
Elmira, Ontario

P:\drawings\04000s\04432\04432-REPORTS\04432-33(087)\04432-33(087)GN\04432-33(087)GN-WA002.dwg Plot Date: MAR 06, 2019

VOCs Sample Analysis

- Trichloroethene, cis-1,2-dichloroethene, and vinyl chloride are present in the MU samples
- These VOCs are not COCs at the LANXESS Site.
- 84 Howard Ave appears to be a source of VOCs in the MA, except for chlorobenzene

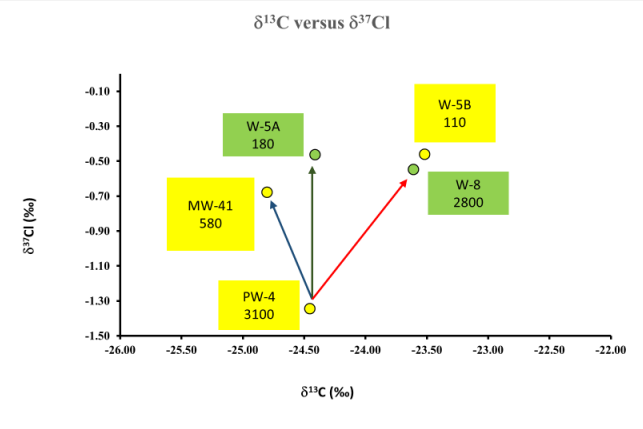
Isotope Sample Analysis

- Groundwater samples from 6 wells were collected for chlorine and carbon isotope analysis to determine if isotopes could be used to detect the presence of multiple sources of chlorobenzene.
- The imperfect relationship between the isotope data suggests that variations are not only caused by a simple transformation process, but that they might be influenced by other processes, including mixing between more than one source or the presence of more than one mechanism of transformation.
- "*This data set is very limited and it is not easy to establish a conclusion based on two or three data points*" Isotope Tracer Technologies Inc, February 2019

Thank You

Isotope Sample Analysis

$\delta^{13}C$ versus $\delta^{37}Cl$



- Generally, by assuming that the isotopic values of PW-4 to be the most representative to one of the original sources of MCB in the study area:
  - The other four points cannot be related to PW-4 unless the different points are either influenced by different conditions that cause them to change isotopically in a different directions or being influenced by mixing between different sources or both scenarios.
  - The presence of other chlorinated solvent or other organic compounds in some parts of the study area, suggest that the site contains more than one plume and possibly more than one source of contaminants.

2028 Order Deadline Remediation Frameworks Discussion Questions

1. What legal or regulatory instruments (such as a control order) should be considered to ensure continued remediation efforts post-2028?

2. What specific criteria should be included in the new instrument to hold LANXESS accountable for remediation progress beyond 2028?

3. What key lessons from the pre-2028 remediation efforts should inform the design of the post-2028 control order or other instruments?

4. What ongoing community engagement strategies should be embedded in the new instrument to ensure transparency and responsiveness post-2028?

5. How should the post-2028 instrument address potential environmental risks that may not have been fully mitigated by the original deadline?

6. What are the financial and operational commitments required from LANXESS under the new instrument to ensure the long-term success of the remediation?

7. How can the new instrument be structured to allow for flexibility in responding to unforeseen challenges while maintaining stringent oversight?

8. What role should the Ministry of the Environment, Conservation, and Parks (MECP) play in monitoring and enforcing the post-2028 instrument?

9. How will the effectiveness of the new instrument be evaluated, and what metrics will be used to assess its success over time?

10. What alternatives should be explored for the handling of treated water post-2028, especially considering the current practice of pumping, treating, and returning it to the creek?

Below is a summary of background information on the Ontario Drinking Water Quality Standard (ODWQS) for NDMA. This was an MECP action item from the TRAC meeting held on June 13, 2024 to address a comment made by Dr. Ulysses Klee (Conestoga College professor and student project advisor) following the presentation on NDMA treatment technologies provided by students at Conestoga College. Dr. Klee noted that the ODWQS for NDMA was established many years ago and drinking water standards may vary between jurisdictions. Discussed with the ministry's Drinking Water Standards team in the Environmental Sciences & Standards Division (ESSD) the following information is provided:

N-Nitrosodimethylamine (NDMA):

- Regulatory Standard –
    - Ontario was one of the first jurisdictions in the world to develop a standard for, and regulate, NDMA in drinking water. This was the result of the contamination of the drinking water (municipal) aquifers in Elmira contaminated with NDMA from industrial operations (releases to the environment). In 1991, the ministry developed an Interim Maximum Acceptable Concentration (IMAC) of **9 nanograms per litre (ng/L), or 0.009 micrograms per litre (ug/L).**
    - In 2003, the IMAC became legally enforceable as an ODWQS under Ontario Regulation 169/03 (O. Reg. 169/03: ONTARIO DRINKING WATER QUALITY STANDARDS), made under the Safe Water Drinking Act (2002) (Safe Drinking Water Act, 2002, S.O. 2002, c. 32 (ontario.ca)).
- Standard Development –
    - Drinking water standards are established using generally accepted scientific principles that include peer-reviewed publications and best available information.
    - The standards development process includes two major components:
        - Risk assessment – Scientific evaluation of the health effects or other impacts of exposure to a substance. This process results in a limit proposed that is protective of health.
        - Risk management – Evaluation of implementation issues (e.g., availability of test methods, treatment technologies, health benefits, etc.).

- Risk assessment - Life-time exposures are considered in the development of drinking water standards.
    - Carcinogenic substances are set between 10^{-5} to 10^{-6} (1 in 1,000,000 people) life-time risk.
- Risk management - Analytical capability and treatment technology are also considered.
- NDMA's carcinogenicity (cancer causing) is widely recognized. Based on results from animal studies, NDMA is an animal carcinogen.
    - The US EPA lists NDMA as a Class B2 carcinogen (probable human carcinogen) based on sufficient evidence of carcinogenicity in animals.
- The development of the ODWQS for NDMA is based on an incremental lifetime cancer risk derived at this level (0.009 ug/L) was between 1 in 100,000 (10^{-5}) and 1 in 1,000,000 (10^{-6}) people based on scientific studies at that time.

- Supporting Documentation -
    - Additional information on the ODWQS and development of standards are provided in the ministry's document "*Technical Support Document for Ontario Drinking-water Quality Standards, Objectives and Guidelines*" (MECP, Revised June 2006) (4449e Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (wcwc.ca)).
    - Table 2 of the ODWQS Technical Document provides the Chemical Standards, including the Interim Maximum Acceptable Concentration (IMAC) for NDMA of 0.009 ug/L.
    - Appendix A of the ODWQS Technical Document provides the following description of NDMA: "*The interim maximum acceptable concentration for NDMA is 0.000009 mg/L (0.009 ug/L). NDMA is rarely used industrially but has been used as an antioxidant, as an additive for lubricants and as a softener of copolymers. It has been detected in some foods particularly smoked foods and very occasionally in treated river/lake water in heavily farmed locations. NDMA is an animal carcinogen*."
- Other jurisdictions (Drinking Water Standards) -
    - Health Canada: In 2011, Health Canada published a Canadian Drinking Water Quality Guideline for NDMA (Guidelines for Canadian Drinking Water Quality: Guideline Technical Document: N-Nitrosodimethylamine

(NDMA) - Canada.ca) of 40 ng/L, or 0.04 ug/L (Maximum Acceptable Concentration or MAC). For NDMA, Health Canada's guideline is based on lifetime cancer risk per 1 in 100,000 people (i.e., 10^{-5}), which also takes into consideration treatment system limitations.

- Ontario opted to maintain its more stringent ODWQS of 9 ng/L. It was not because Health Canada's derivation was problematic, but rather, the ODWQS would ensure that wastewater and drinking water treatment systems utilizing chlorination that use chloramines for disinfection would optimize its treatment process as NDMA can be formed as an unintended byproduct during chloramination in the presence of some amine compounds.

- United States: NDMA is listed as a priority pollutant by the US EPA, but there is no US Federal drinking water standard (i.e., there is no maximum contaminant level (MCL)). The NDMA standards established by US States vary from State to State, with some being above and some below the ODWQS.
- World Health Organization (WHO): WHO's drinking water guideline for NDMA is 100 ng/L (0.1 µg/L).

Based on available science and the inherit conservatism used in the evaluation to develop the ODWQS for NDMA, the ministry does not anticipate amending the ODWQS for NDMA.

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Our ref: 11192137-LTR-56

14 June 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 May 2024

Dear Ms. Hussain

This letter presents a summary of the May 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, W3R, W5A, W5B, and W9 were less than their Target Average pumping rates during May 2024. PW4 was slightly less than its Target Average pumping rate in May 2024 due to reduced flows and downtime related to a coupling failure on the UA effluent pump. PW5 continued operating at a reduced pumping rate in May 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. W3R began to experience erratic flows and several hundred hi-hi flow alarms on December 18, 2023 and was subsequently shut down. Intermitted well flow communication signal loss, due to compromised communication cables between former extraction well W4 and W3R, was identified as the cause. LANXESS installed new wireless equipment to replace the damaged communication cables and well W3R was restarted on May 24, 2024. The pumping rates of W5A and W5B were below their respective Target Average pumping rates in May 2024 due to downtime related to Rayox PLC issues and W4 system wireless communication losses. The wells were intermittently shutdown from May 22 until June 3, 2024. LANXESS has ordered replacement parts to correct the communication issues which should prevent further unexpected shutdowns on the Rayox system. W9 continued pumping at a reduced rate during May 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 re-scheduled inspection of the pump/motor and possible video inspection of the well for June 2024, subject to contractor availability.

During May 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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Project Manager

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AB/kf/56

Encl.

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May 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 May 2024.

The Progress Report is organized as follows:

1. Monitoring and Analytical Data Page 1
2. Correspondence, Meetings, and Events Page 1
3. CTS Monitoring and Performance Page 1
4. Remedial Action Plan Page 4
5. E7 AOP Page 4
6. Environmental Audit Page 4
7. Remediation of Former Operating Pond Area Page 4
8. Additional Work/Studies Page 4

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 May 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 surface water samples collected from Canagagigue Creek (the Creek), and groundwater and surface water elevation monitoring completed on May 2, 2024, as required by ECA No. 0831-BX6JGD Section 9, is presented in Attachment C. Further details related to this requirement are described in Section 8 of this report.

2. Correspondence, Meetings, and Events

May 15, 2024	April 2024 Progress Report submitted to MECP West Central Region (WCR)
May 30, 2024	2023 Annual Environmental Report (AER) submitted to MECP WCR
May 31, 2024	LANXESS submitted “Response to MECP Comments” to MECP WCR in response to MECP’s comments on Stantec’s revised draft human health and ecological risk assessment (HHERA) for the Canagagigue Creek in Elmira, Ontario

3. CTS Monitoring and Performance

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

The May 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		
May 2024 (Litres/second [L/s])		
Containment and Extraction Wells	**Target Average (1)**	**Average**
On Site Wells		
PW4	2.9	2.8
PW5	1.8	0.6
Upper Aquifer Wells	--	0.8
Off Site Wells		
W3R	18.5	3.8
W5A	4.5	2.8
W5B	2.8 (2)	2.0
W6A	0.20	0.31
W6B	0.30	0.31
W8	0.05	0.08
W9	13.6	11.7
E7	23.9	24.4
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.

PW4 was slightly less than its Target Average pumping rate in May 2024 due to reduced flows and downtime related to a coupling failure on the UA effluent pump.

PW5 continued operating at a reduced pumping rate in May 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 and the installation of buried lines is expected to commence in June 2024.

W3R was shut down on December 18, 2023 due to well flow communication signal loss. The communication cables between former extraction well W4 and W3R are compromised at multiple locations north and south of air relief chamber #1 on Industrial Drive. The cables themselves were either pulled with the forcemain or laid down in trench excavations at the time of construction and are not encased in conduits. As a result, LANXESS cannot pull new lines with the infrastructure that is currently in place. LANXESS installed new wireless equipment to replace the damaged communication cables in May 2024. W3R was restarted on May 24, 2024.

The pumping rates of W5A and W5B were below their respective Target Average pumping rates in May 2024 due to downtime related to Rayox PLC issues and W4 system wireless communication losses. The wells were intermittently shutdown from May 22 until June 3, 2024. LANXESS has ordered replacement parts to correct the communication issues which should prevent further unexpected shutdowns on the Rayox system.

W9 continued pumping at a reduced rate during May 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 re-scheduled inspection of the pump/motor and possible video inspection of the well for June 2024, subject to contractor availability.

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 May 2024 and summarizes the effluent pH and temperature. The discharge pH was between 7.08 and 7.24 Standard Units (su), which is within the ECA discharge limit pH range of 5.5 to 9.5 su. The effluent temperature was between 14.9 and 17.2 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 May 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 25.29 L/s. The total flow rate of additional treated groundwater discharged to the Creek via Shirt Factory Creek (at storm water outfall 0800) was 0.05 L/s. The total flow rate of the combined treated groundwater discharged to the Creek (SS+890 discharge plus Shirt Factory Creek discharge) was 25.33 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 May 7, 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 May 7, 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) Routine Maintenance

Routine maintenance tasks completed on the CTS in May 2024 are summarized in Table A.5 (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.

[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 April 30, 2024 and submitted the samples for chronic toxicity analyses. The laboratory results indicate that the groundwater samples were not chronically toxic to Fathead Minnow. The laboratory results indicate that the SFE groundwater samples were not chronically toxic to water fleas (*Ceriodaphnia dubia)*, however the laboratory results for the GE groundwater samples were inconclusive for water fleas. LANXESS has scheduled re-sampling of the GE groundwater effluent for *Ceriodaphnia dubia* chronic toxicity testing in July 2024. All toxicity results have been included in Attachment A.

f) Receiver Water Quality Data

As per Amended ECA No-0831-BX6JGD, the receiver water quality monitoring program has been reduced from monthly to once every three (3) months. LANXESS will complete the next quarterly routine monitoring event in July 2024.

Summary of Efforts Made and Results Achieved

During May 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 May 2024.

5. E7 AOP

The average E7 pumping rate (24.4 L/s) was greater than its recommended Target Average pumping rate (23.9 L/s) during May 2024. Monthly samples from the E7 influent and effluent streams were collected in May 2024, however, due to delays with the data analysis, the results of the May 2024 sampling will be provided in the June Progress Report.

6. Environmental Audit

GHD submitted the 2023 Annual Environmental Report to the MECP on May 30, 2024.

7. Remediation of Former Operating Pond Area

There are no new activities to report for this item in May 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 one day. Exceptions to this requirement include periods of up to five days for routine maintenance and/or equipment repair, and periods greater than five days because of Creek water level fluctuations beyond the control of the Owner.

Figure C.1 (Attachment C) shows the continuous surface water and groundwater elevations measured at UOW+510 and USW+500 in 2024. The spring freshet and spring 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. 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 increased in the afternoon on May 2, 2024 due to an increase in the flowrate from the GRCA dam, elevations gradually decreased until May 8, 2024, where there was a slight increase in flowrate, then gradually decreased again until there was another slight increase in flowrate on May 23, 2024. On May 27 and 28, 2024 there was significant rain fall with a corresponding increase in surface water flows/elevation, then the flowrate gradually decreased over the remainder of the month. Containment was not restored at UOW+510/USW+500 in May 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 May 2, 2024 and verified the functionality of the transducers. The elevation monitoring locations are presented on Figure C.2 (Attachment C). The difference between the manual surface water elevations and the manual groundwater elevations at the key monitoring pairs completed on May 2, 2024 have been plotted on Figure C.3 (Attachment C).

On May 2, 2024, LANXESS also collected surface water samples from SS-110 West, SS+770 West, and SS+855 West and analyzed the samples for the Schedule E list of parameters. The sampling locations are presented on Figure C.2 (Attachment C). Table C.1 (Attachment C) presents the analytical results for the surface water samples collected in May 2024. All the parameters analyzed as part of the May 2024 sampling event were either not detected at their respective reporting detection limits (RDLs) or were present at concentrations that were less than their respective Provincial Water Quality Objectives (PWQOs), Interim PWQOs (IPWQOs), and/or ECA Schedule E criterion.

Based on the surface water data collected, during the period when the differential was not maintained in May 2024, there are no adverse impacts to the surface water.

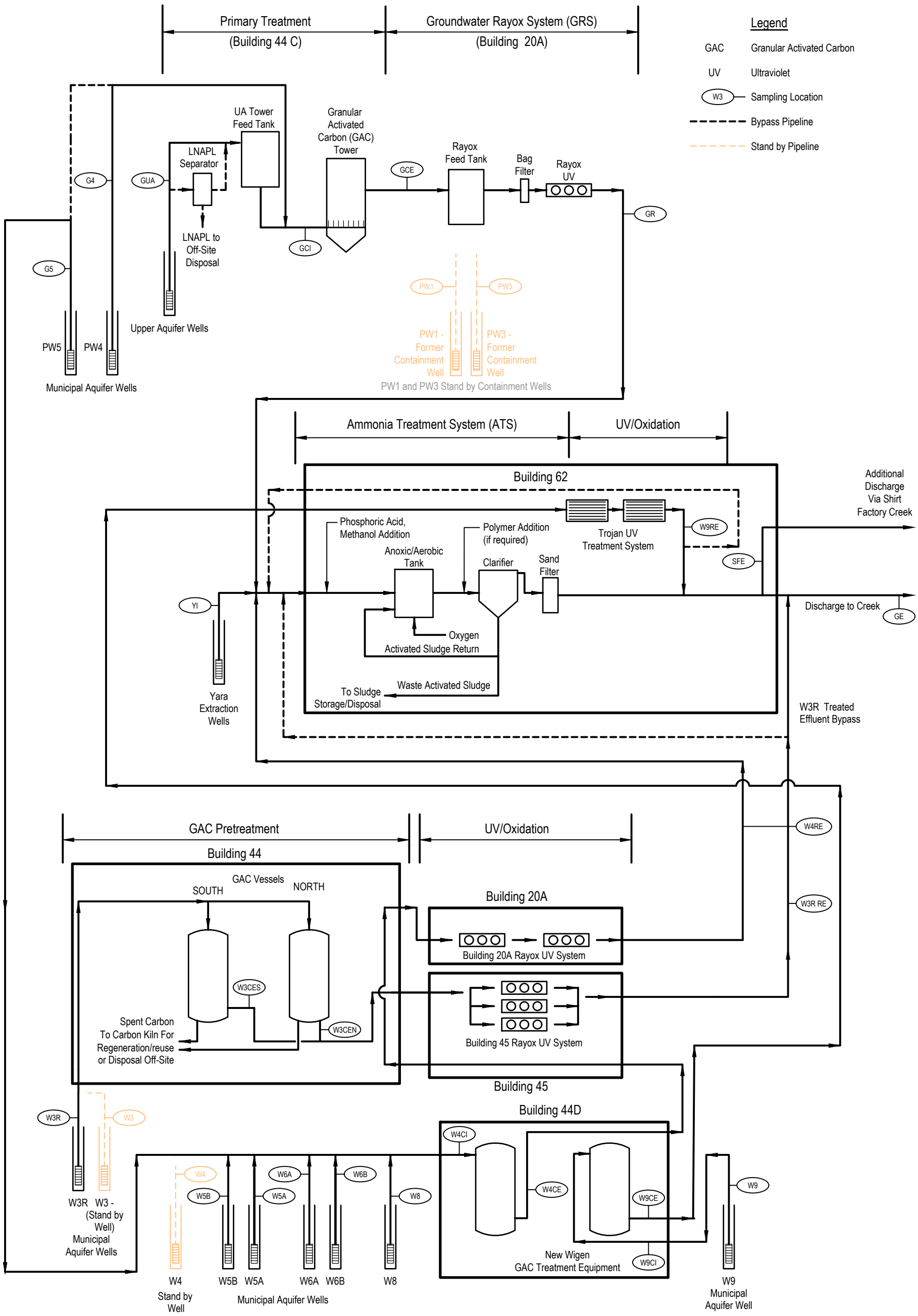
Table 1

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

Media and Sampling Program	Parameters	Frequency	May 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	-
CTS Effluent - Acute Toxicity	Not applicable	Quarterly	-
CTS Effluent - Chronic Toxicity	Not applicable	Semi-annual	Attachment A
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	-
	Effluent Broad Scan (Schedule C)	Quarterly	-
Secondary Surface Water Quality Monitoring	Indicator parameters	Quarterly	-
	Effluent Broad Scan (Schedule C)	Quarterly	-
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	-
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 **May 2024**

TREATMENT SYSTEM PROCESS FLOW SCHEMATIC

FIGURE A.1

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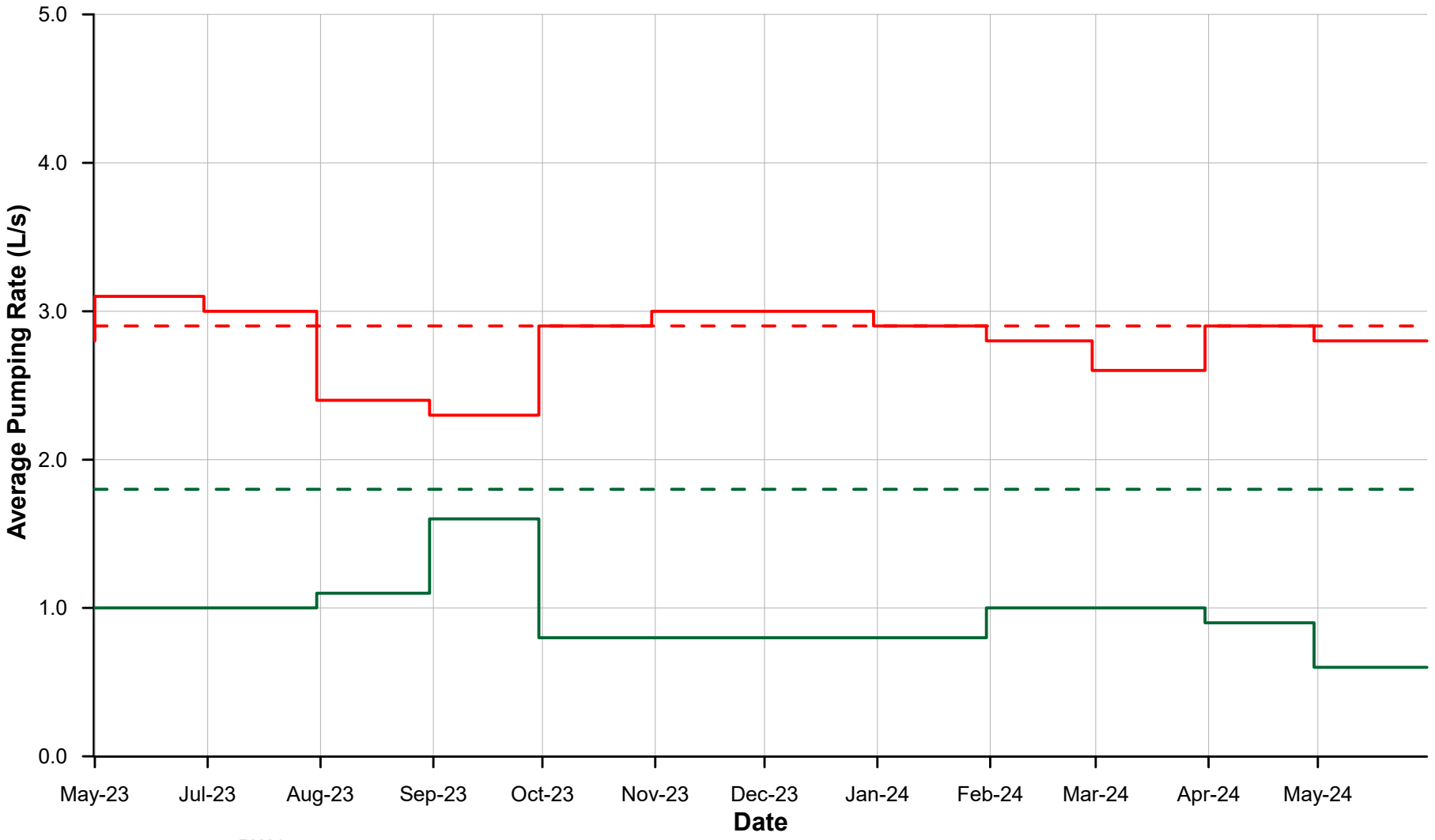


figure A.2
ON-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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.

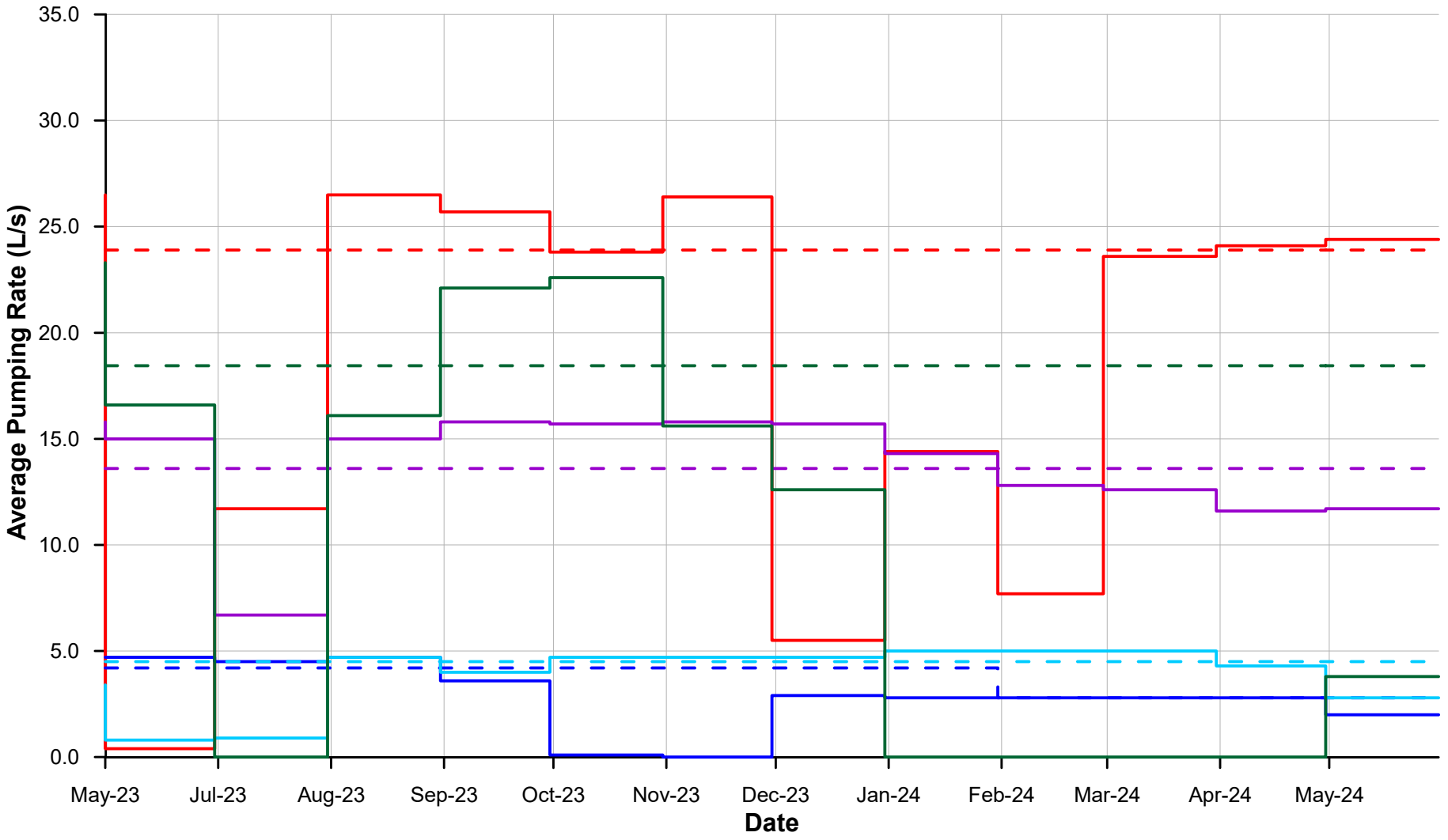


figure A.3a
OFF-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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.

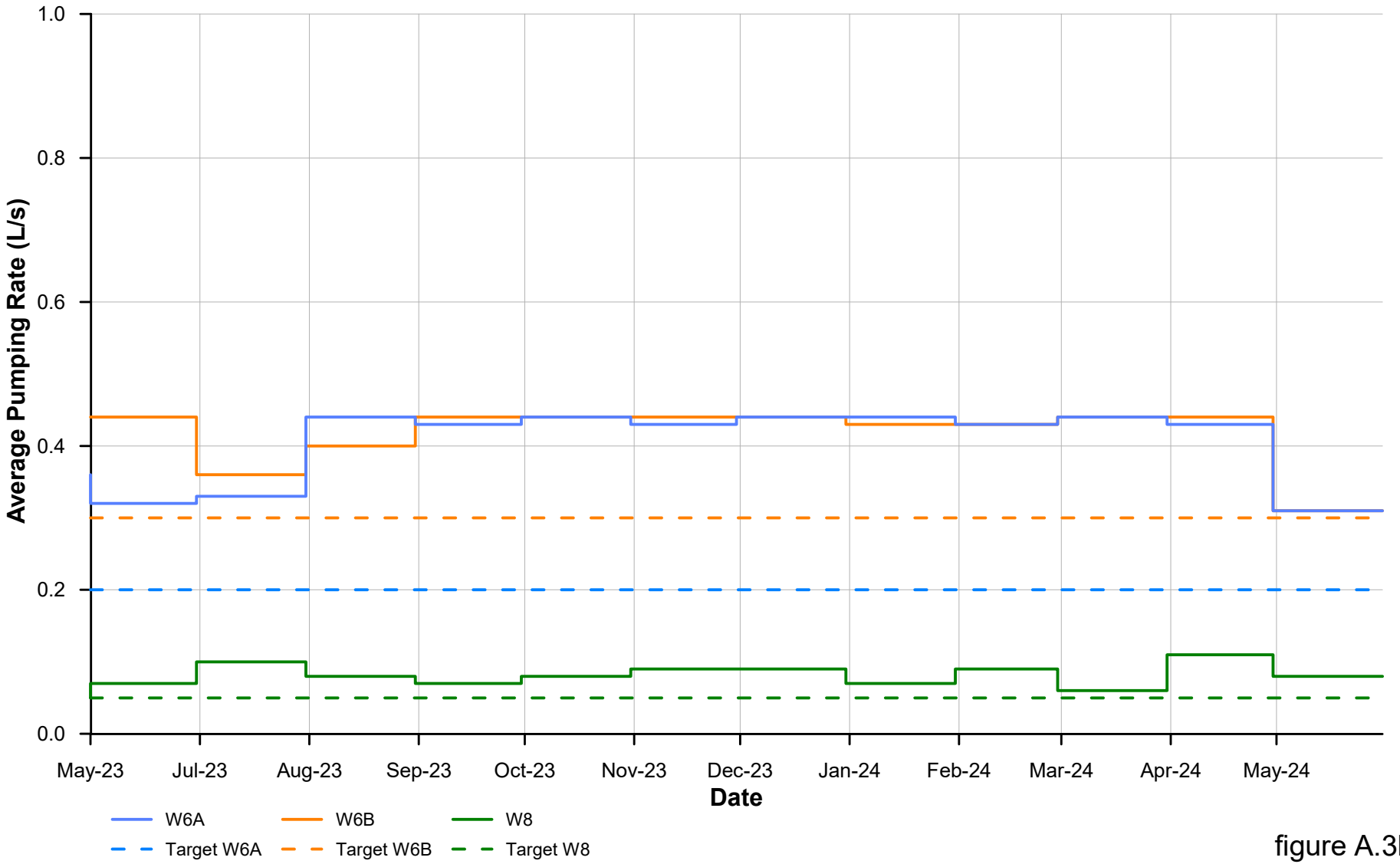


figure A.3b
OFF-SITE EXTRACTION WELL AVERAGE
VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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 - May 2024
LANXESS Canada Co./Cie
Elmira, Ontario

ON-SITE GROUNDWATER CONTAINMENT AND TREATMENT SYSTEM

May 20	Shut down at 15:40 due to a power outage, and restarted at 16:40
May 29	Shut down at 07:15 due a coupling failure on the UA effluent pump, and restarted at 14:06

OFF-SITE GROUNDWATER COLLECTION AND TREATMENT SYSTEM

W3R Groundwater Rayox System

December 18	Shut down at 03:10 due to communication issues (communication signal cables have been compromised by roots and growth in the conduits between W3R and the W4 well hut), and restarted May 24, 2024 at 07:50
May 27	Shut down at 05:35 due to loss of communication, and restarted at 06:05
May 27	Shut down at 15:05 due to a PLC error, and restarted May 28, 2024 at 13:00
May 31	Shut down at 00:30 due to loss of communication, and restarted June 4, 2024 at 11:16

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

May 13	Shut down at 16:00 due to possible communications issue, and restarted at 16:10
May 13	Shut down at 17:00 due to possible communications issue, and restarted at 17:50
May 20	Shut down at 15:40 due to a power outage, and restarted at 16:35
May 22	Shut down at 13:53 due to Rayox PLC issues, and restarted May 27, 2024 at 06:20
May 27	Shut down at 15:05 due to communication issues, and restarted June 3, 2024 at 15:45

W9 Groundwater Trojan UV/Oxidation System

May 20	Shut down at 15:40 due to a power outage, and restarted at 16:35

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]
May 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Date	Parameter [2] [3]	Primary Treatment						Secondary Treatment			Tertiary Treatment		Combined Discharge Effluent[4]	Combined Discharge Effluent		
		W4 CI	W4 CE	W9 CI	W9 CE	GCI	GCE	W4 RE	W9 RE	GR	SFE	GE		Limit	Adjusted Limit [5]	Objective
7-May-24	Ammonia-N (mg/L)										0.0057	0.0381	0.038	0.84[6]	0.84	0.62
7-May-24	Total Phosphorus (mg/L)										0.217	0.122	0.122	0.5	0.5	--
7-May-24	BOD_5 (mg/L)										ND(2.0)	ND(2.0)	ND(2.0)	15	15	--
7-May-24	Total Cyanide (µg/L)										ND(2)	ND(2)	ND(2)	14	14	ND(5)
7-May-24	Formaldehyde (µg/L)										ND(2.0)	ND(2.0)	ND(2.0)	24	24	ND(5)
7-May-24	pH (s.u.)										7.08	7.24	7.24	5.5 - 9.5	5.5 - 9.5	--
7-May-24	Temperature (°C)										17.2	14.9	14.9	<25	<25	--
7-May-24	Chlorobenzene (µg/L)	89.1	69.0	16.8	2.89	2660	8.75	24.2	1.40	10.3	ND(0.20)	0.21	0.15	10	18.2	ND(0.5)
21-May-24	Chlorobenzene (µg/L)							18.4	0.46	30.6	ND(0.20)	ND(0.20)				
7-May-24	Toluene (µg/L)					54.8	0.23				ND(0.20)	ND(0.20)	ND(0.20)	5	9.1	ND(0.4)
7-May-24	1,1-Dichloroethane (µg/L)					0.37	ND(0.20)				0.69	0.38	0.38	10	10	ND(1)
7-May-24	g-BHC (Lindane) (µg/L)										ND(0.0030)	ND(0.0030)	ND(0.0030)	0.14	0.25	ND(0.003)
21-May-24	n-Nitrosodimethylamine (NDMA) (µg/L)							ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.14	0.25	ND(0.01)
21-May-24	n-Nitrosodiethylamine (NDEA) (µg/L)[7]							ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	4	4	ND(0.06)
21-May-24	Nitrosomorpholine (NMOR) (µg/L)[7]							ND(0.06)	ND(0.06)	0.10	ND(0.06)	ND(0.06)	ND(0.06)	4	7.3	ND(0.06)
7-May-24	Benzothiazole (µg/L)					114	ND(2.0)				ND(2.0)	ND(2.0)	ND(2.0)	4	7.3	ND(2)
7-May-24	Carboxin (µg/L)					49.2	0.142				ND(0.100)	ND(0.100)	ND(0.100)	7	12.7	ND(2)

SS+890 Discharge (GE) Flow Rate	25.29 L/s
Shirt Factory Creek Discharge (SFE) Flow Rate	0.05 L/s
Total Combined Discharge Effluent Flow	25.33 L/s

Table A.2

Combined On-Site and Off-Site Groundwater Containment and Treatment System
Analytical Results [1]
May 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:		
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.
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
May 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)
5/1/2024	3.6	20.6	13.4	0.0	11.3	24.7	0.00	24.7
5/2/2024	3.7	21.1	13.3	0.0	11.9	25.1	0.00	25.1
5/3/2024	3.6	21.2	13.4	0.0	11.8	25.2	0.01	25.2
5/4/2024	3.7	21.1	13.4	0.0	11.7	25.1	0.00	25.1
5/5/2024	3.7	20.9	13.4	0.0	11.6	25.0	0.01	25.0
5/6/2024	3.7	20.8	13.5	0.0	11.4	24.9	0.00	24.9
5/7/2024	3.7	20.6	13.5	0.0	11.3	24.8	0.00	24.8
5/8/2024	3.6	20.7	13.5	0.0	11.3	24.8	0.00	24.8
5/9/2024	3.7	20.5	13.5	0.0	11.2	24.7	0.00	24.7
5/10/2024	3.6	20.5	13.1	0.0	11.2	24.3	0.00	24.3
5/11/2024	3.7	20.4	13.2	0.0	11.1	24.3	0.00	24.3
5/12/2024	3.7	20.4	13.2	0.0	11.0	24.2	0.00	24.2
5/13/2024	3.6	19.9	12.9	0.0	11.0	23.9	0.01	23.9
5/14/2024	3.7	20.3	13.3	0.0	10.9	24.2	0.00	24.2
5/15/2024	3.6	20.2	13.2	0.0	10.9	24.0	0.05	24.1
5/16/2024	3.6	19.7	12.7	0.0	10.8	23.5	0.00	23.5
5/17/2024	3.6	18.2	11.3	0.0	10.8	22.0	0.03	22.1
5/18/2024	3.5	17.7	10.8	0.0	10.7	21.5	0.00	21.5
5/19/2024	3.6	17.8	11.1	0.0	10.7	21.7	0.00	21.7
5/20/2024	3.4	16.3	9.1	0.0	10.9	20.0	0.00	20.0
5/21/2024	3.6	18.6	9.8	0.0	12.6	22.4	0.00	22.4
5/22/2024	3.6	15.1	6.2	0.0	12.6	18.8	0.00	18.8
5/23/2024	3.6	12.6	3.8	0.0	12.6	16.5	0.00	16.5
5/24/2024	3.6	23.1	3.9	10.5	12.6	26.9	0.01	26.9
5/25/2024	3.6	31.5	3.8	18.9	12.6	35.3	0.05	35.3
5/26/2024	3.6	31.5	3.8	18.9	12.6	35.3	0.05	35.4
5/27/2024	3.6	27.2	6.7	11.7	12.6	30.1	0.95	31.0
5/28/2024	3.7	21.7	3.8	9.0	12.6	25.4	0.02	25.5
5/29/2024	2.4	36.3	2.6	23.7	12.6	38.8	0.10	38.9
5/30/2024	3.4	36.3	3.6	23.7	12.6	39.7	0.14	39.9
5/31/2024	3.6	13.1	3.7	0.5	12.6	16.8	0.00	16.8
Average	**3.6**	**21.5**	**9.9**	**3.8**	**11.7**	**25.3**	**0.05**	**25.3**
Minimum	**2.4**	**12.6**	**2.6**	**0.0**	**10.7**	**16.5**	**0.00**	**16.5**
Maximum	**3.7**	**36.3**	**13.5**	**23.7**	**12.6**	**39.7**	**0.95**	**39.9**

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
May 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:	UA500I	UA500CE	UA560I	UA560CE	GCI	GCE
Sample Date:	**5/7/2024**	**5/7/2024**	**5/7/2024**	**5/7/2024**	**5/7/2024**	**5/7/2024**
Parameter [µg/L]						
Volatile Organic Compounds (VOCs)						
Benzene	14.1	1.20	10.2	23.9	9.13	ND(0.20)
Chlorobenzene	587	12.0	331	202	2660	8.75
1,1-Dichloroethane	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	0.37	ND(0.20)
Ethylbenzene	56.8	1.00	55.4	4.52	10.6	ND(0.20)
Toluene	3490	145	2480	2630	54.8	0.23
m/p-Xylenes [1]	96.1	1.63	134	6.42	6.14	ND(0.40)
o-Xylene [1]	61.6	1.15	76.6	4.15	4.32	ND(0.20)
Base/Neutral and Acid Extractable Compounds (BNAs)						
Aniline	595	111	629	1370	52.5	ND(2.0)
Benzothiazole	929	15.9	64.4	6.2	114	ND(2.0)
Carboxin (Oxathiin)	1830	33.5	1060	16.1	49.2	0.142
2-Chlorophenol	8.72	0.46	1.11	16.0	2.12	ND(0.30)
2-Mercaptobenzothiazole	1910	32	112	ND(20)	253	ND(20)
2,4-Dichlorophenol	38.1	0.96	0.69	0.68	0.63	ND(0.20)
2,6-Dichlorophenol	2.82	ND(0.20)	0.49	0.36	0.76	ND(0.20)
2,4,5-Trichlorophenol	19.5	0.41	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
2,4,6-Trichlorophenol	4.03	ND(0.20)	0.45	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.
[1]	Samples analyzed for m,p-Xylenes and o-Xylene only. No separate analysis for Total Xylenes.

Table A.5

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

Start Date	Description	Work Type
05/01/2024	Annual E7 South Compressor Preventative Maintenance	Mechanical
05/01/2024	Repair Leak on Bldg. #62 Polymer Line	Piping
05/13/2024	Repair Monitoring Well Hinges	Mechanical
05/15/2024	Clean 62-AIT-904 Probe Mid Month - Nitrification Tank Dissolved O_2	Instrumentation
05/21/2024	Check 44-LSH-502 (44TA-12) - PW5 Well Level High Switch	Instrumentation
05/27/2024	Check 44-FIT-0843 (44PM-31) - U+540 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0853 (44-ICP-853) - U+500 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0838 (44-ICP-838) - U+560 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0828 (44PM-28) - U+630 (RPW8) Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0823 (44-ICP-823) - U+655 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-818 (44-ICP-818) - U+685 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0813 (44-ICP-813) - U+710 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0808 (44-ICP-808) - U+735 Well Flow Transmitter	Instrumentation
05/30/2024	Check 44-FIT-0803 (44PM-35) - PW4 Flow Transmitter	Instrumentation

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

Work Order : 254612
Sample Number : 82171

SAMPLE IDENTIFICATION

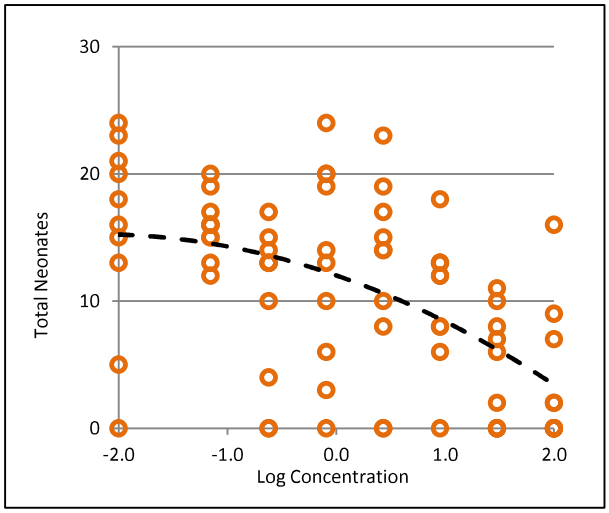
Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-04-30
Location :	Elmira ON	Sampling Time :	09:15
Substance :	GE 043024	Date Received :	2024-04-30
Sampling Method :	Grab	Time Received :	11:30
Sampled By :	A. Norris	Temperature at Receipt :	14 °C
Sample Description :	Clear, colourless.	Date Tested :	2024-04-30

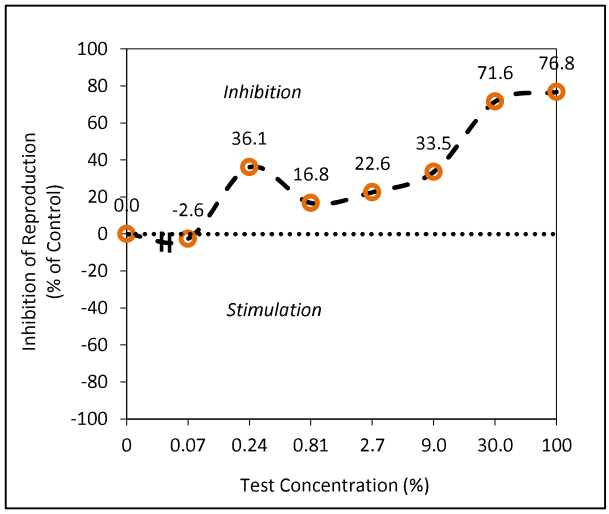
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

8-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	2.27%	0.30 – 7.68	Non-Linear Regression (CETIS)[a]
LC50	23.7%	0.07 – [1]	Nonlinear Interpolation (Stephan)[c]

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





COMMENTS

[1]The usefulness of any LC50 calculated from this data set is questionable because the concentration-effect relationship was not demonstrated over a reasonable range (i.e. <37 to >63 percent dead), and was not dose-related. A statistically valid upper 95% confidence limit could not be generated. At a confidence level of 95%, the binomial test shows that the LC50 is above 0.07%.

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

Approved By : V.Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-05-28 18:08-04:00
Project Manager

Work Order : 254612
Sample Number : 82171

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	05:30 h - 09:30 h
Organism Batch :	Cd24-04	Mean Brood Organism Mortality :	0% (previous 7 days)
Organism Origin :	Single in-house mass culture	Brood Organism Mean Young :	21.5 (first three broods)
Test Organism Origin :	Individual in-house cultures	Mean Young per Brood Organism :	12.6 (3rd or subsequent brood)
Ephippia in Culture :	None		

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	Well water [2]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	20 mL glass vial
Sample Filtration :	None	Depth of Test Solution :	4 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	None

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Analyst(s) :	ET, AS, KP, SV, JW, XD
Date Tested :	2024-05-08	Test Duration :	6 days
IC25 (Reproduction) :	1.18 g/L	LC50 :	2.27 g/L
95% Confidence Limits :	0.54 - 1.39 g/L	95% Confidence Limits :	2.05 - 2.56 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Linear Regression (MLE) (CETIS)[a]
Historical Mean IC25 :	1.00 g/L	Historical Mean LC50 :	2.00 g/L
Warning Limits (± 2SD) :	0.44 - 2.28 g/L	Warning Limits (± 2SD) :	1.05 - 3.84 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.07**	**0.24**	**0.81**	**2.7**	**9**	**30**	**100**
2024-05-01	1	0	0	0	0	0	0	0	0
2024-05-02	2	0	0	0	0	0	0	0	0
2024-05-03	3	0	0	0	0	0	0	0	0
2024-05-04	4	10	0	0	10	0	0	30	30
2024-05-05	5	10	0	10	20	0	10	30	40
2024-05-06	6	10	0	20	30	10	10	60	60
2024-05-07	7	10	0	20	30	10	10	60	60
2024-05-08	8	10	0	20	30	10	10	60	60
Total Mortality (%) :		**10**	**0**	**20**	**30**	**10**	**10**	**60**	**60**

REFERENCES

[a] CETIS™, © 2000-2022. v2.1.4.0 x64. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

[c] Stephan, C. E. 1977. Methods for calculating an LC50. pp 65-84 in : P. L. Mayer and J. L. Hamelink (eds.), Aquatic Toxicology and Hazard Evaluation. Amer. Soc. Testing and Materials, Philadelphia PA. ASTM STP 634.

Work Order : 254612
Sample Number : 82171

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2024-04-30
Initiated By : JW
Initiation Time : 15:30
Test Completion Date : 2024-05-08

Control

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0	AJS (PC)
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0	JJ (AS)
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0	PG
2024-05-04	**4**	0 x	0	5	0	0	4	4	0	0	0	1.3	ET (JL)
2024-05-05	**5**	0	0	0	2	0	7	3	3	5	5	2.5	ET (MR)
2024-05-06	**6**	0	2	0	0	0	0	0	0	0	8	1	JN (AS)
2024-05-07	**7**	0	5	0	7	8	7	6	7	8	0	4.8	PG
2024-05-08	**8**	0	9	0	12	7	–	–	10	11	10	5.9	XD
Total		**0**	**16**	**5**	**21**	**15**	**18**	**13**	**20**	**24**	**23**	**15.5 (±7.8)**	

2.7%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0	0	3	0	5	4	1	0	0	2	1.5
2024-05-05	**5**	0	0	0	0	0	10	0	0	3	0	1.3
2024-05-06	**6**	0	0	0	0 x	0	0	3	0	0	0	0.3
2024-05-07	**7**	3	0	4	0	5	9	5	4	3	4	3.7
2024-05-08	**8**	5	0	7	0	9	–	8	6	8	9	5.2
Total		**8**	**0**	**14**	**0**	**19**	**23**	**17**	**10**	**14**	**15**	**12.0 (±7.6)**

0.07%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0	6	0	2	0	1	3	0	0	0	1.2
2024-05-05	**5**	0	0	0	0	2	7	5	2	4	2	2.2
2024-05-06	**6**	0	0	0	0	0	5	0	0	0	8	1.3
2024-05-07	**7**	4	3	5	6	7	3	8	4	7	0	4.7
2024-05-08	**8**	8	6	10	9	7	–	–	7	8	10	6.5
Total		**12**	**15**	**15**	**17**	**16**	**16**	**16**	**13**	**19**	**20**	**15.9 (±2.4)**

9%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0	0	4	0	3	2	0	2	0	3	1.4
2024-05-05	**5**	0 x	0	0	0	5	8	0	0	3	0	1.6
2024-05-06	**6**	0	0	0	4	0	3	0	0	0	0	0.7
2024-05-07	**7**	0	3	2	0	10	–	0	0	1	0	1.6
2024-05-08	**8**	0	3	6	8	–	–	8	6	9	10	5
Total		**0**	**6**	**12**	**12**	**18**	**13**	**8**	**8**	**13**	**13**	**10.3 (±5.0)**

0.24%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0	0	0	2	0	4	0	0	4	4	1.4
2024-05-05	**5**	0	0	0	0	2	4	0 x	0	0	0	0.6
2024-05-06	**6**	0	0	0	2 x	0	0	0	0	0	6	0.8
2024-05-07	**7**	3	0	5	0	4	6	0	5	1	0	2.4
2024-05-08	**8**	7	0	8	0	7	0	0	10	8	7	4.7
Total		**10**	**0**	**13**	**4**	**13**	**14**	**0**	**15**	**13**	**17**	**9.9 (±6.3)**

30%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0 x	0	2	0	0 x	3	0	0	2	2 x	0.9
2024-05-05	**5**	0	0	0	0	0	7	0	0	2	0	0.9
2024-05-06	**6**	0	0 x	0	3	0	0 x	0 x	0	2	0	0.5
2024-05-07	**7**	0	0	2	0	0	0	0	–	0		0.2
2024-05-08	**8**	0	0	7	4	0	0	0	8	–	0	1.9
Total		**0**	**0**	**11**	**7**	**0**	**10**	**0**	**8**	**6**	**2**	**4.4 (±4.5)**

0.81%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0	0	2	0	0	6	0	2	0	3 x	1.3
2024-05-05	**5**	0	0 x	4	5	0	8	3	0	5	0	2.5
2024-05-06	**6**	1	0	0 x	7	0	0	0	0	0	0	0.8
2024-05-07	**7**	4	0	0	0	6	6	8	4	2	0	3
2024-05-08	**8**	5	0	0	12	8	–	9	7	12	0	5.3
Total		**10**	**0**	**6**	**24**	**14**	**20**	**20**	**13**	**19**	**3**	**12.9 (±8.0)**

100%

Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-01	**1**	0	0	0	0	0	0	0	0	0	0	0
2024-05-02	**2**	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	**3**	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	**4**	0 x	0 x	2	2	2	0	0	0 x	0	0	0.6
2024-05-05	**5**	0	0	0 x	0	4	7	0	0	0	0	1.1
2024-05-06	**6**	0	0	0	0	0	0	0	0	0 x	0 x	0
2024-05-07	**7**	0	0	0	3	0	6	0	0	0	0	0.9
2024-05-08	**7**	0	0	0	4	1	3	2	0	0	0	1
Total		**0**	**0**	**2**	**9**	**7**	**16**[3]	**2**	**0**	**0**	**0**	**3.6 (±5.4)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[3] Outlier according to Grubbs Test[b]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality
* = accidental test organism mortality
– = 4th brood (see 'NOTES')

Test Data Reviewed By : SF
Date : 2024-05-23

Work Order : 254612
Sample Number : 82171

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6	Day 6 - 7	Day 7 - 8
	Date :		2024-04-30	2024-05-01	2024-05-02	2024-05-03	2024-05-04	2024-05-05	2024-05-06	2024-05-07
Initial Chemistry (100 %)	Sub-sample Used		1	1	1	2	2	3	3	3
	Temperature (°C)		26	24	24	24	24	24	24	24
	Dissolved O_2 (mg/L)		9.0	8.3	8.5	8.7	8.8	8.3	8.7	8.4
	Dissolved O_2 (% Sat.)[4]		120	103	107	110	110	105	110	106
	pH		7.2	7.5	7.5	7.5	7.5	7.7	7.6	7.6
	Conductivity (µmhos/cm)		1485	1450	1459	1456	1455	1461	1459	1463
	Pre-aeration Time (min)[5]		20	20	20	20	20	20	20	20
	Analyst(s)	Initial	ET (PC)	NWP	NWP	ASK (PC)	JN (JL)	JN (MR)	AA (AS)	ET (AS)
		Final	AJS	JJ	PG	MR	JN (MR)	JN (AS)	PG	XD
Control	Temperature (°C)	Initial	24	24	24	24	24	24	24	24
		Final	24	25	25	24	24	24	25	25
	Dissolved O_2 (% Sat.)[4]	Initial	102	102	100	100	100	100	101	98
	Dissolved O_2 (mg/L)	Initial	8.2	8.1	8.0	8.0	8.0	7.9	8.2	7.7
		Final	7.2	7.0	7.0	7.2	7.2	7.6	7.5	7.2
	pH	Initial	8.4	8.4	8.4	8.4	8.3	8.5	8.4	8.4
		Final	8.1	8.2	8.1	8.2	8.2	8.3	8.2	8.2
	Conductivity (µmhos/cm)	Initial	410	412	415	418	428	439	413	417
	Hardness (mg/L as $CaCO_3$)		200	–	–	–	–	–	–	–
0.07 %	Temperature (°C)	Initial	24	24	24	24	24	24	24	24
		Final	24	25	25	24	24	24	25	25
	Dissolved O_2 (mg/L)	Initial	7.9	7.7	7.8	8.0	7.9	7.7	8.1	7.6
		Final	6.7	6.9	6.6	7.3	7.2	7.5	7.4	7.2
	pH	Initial	8.2	8.4	8.3	8.3	8.3	8.4	8.3	8.3
		Final	8.1	8.2	8.0	8.2	8.3	8.3	8.2	8.2
	Conductivity (µmhos/cm)	Initial	413	411	416	416	430	432	411	423
9 %	Temperature (°C)	Initial	24	24	24	24	24	24	24	24
		Final	24	25	25	24	24	24	25	25
	Dissolved O_2 (mg/L)	Initial	8.0	7.8	7.8	8.0	7.9	7.8	8.1	7.6
		Final	6.6	6.9	6.6	7.2	7.3	7.5	7.4	7.1
	pH	Initial	8.1	8.3	8.3	8.2	8.3	8.3	8.3	8.3
		Final	8.1	8.3	8.1	8.2	8.3	8.3	8.2	8.2
	Conductivity (µmhos/cm)	Initial	509	510	517	517	534	536	513	521
100 %	Temperature (°C)	Initial	24	24	24	24	24	24	24	24
		Final	24	25	25	24	24	24	25	25
	Dissolved O_2 (mg/L)	Initial	8.3	7.9	7.9	8.3	8.1	8.1	8.3	7.7
		Final	6.4	6.8	6.1	7.1	7.3	7.4	7.3	7.1
	pH	Initial	7.3	7.7	7.9	7.7	7.7	7.6	7.8	8.0
		Final	8.1	8.4	8.1	8.3	8.3	8.2	8.1	8.2
	Conductivity (µmhos/cm)	Initial	1475	1460	1460	1465	1443	1461	1463	1461
	Hardness (mg/L as $CaCO_3$)		530	–	–	–	–	–	–	–

"–" = not measured/not required
[4] adjusted for temperature and barometric pressure
[5] ≤100 bubbles/minute

Test Data Reviewed By : SF
Date : 2024-05-23

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

Work Order : 254612
Sample Number : 82171

SAMPLE IDENTIFICATION

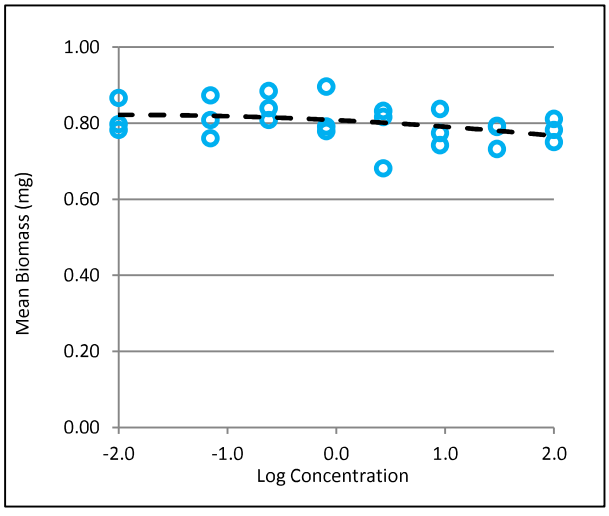
Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-04-30
Location :	Elmira ON	Sampling Time :	09:15
Substance :	GE 043024	Date Received :	2024-04-30
Sampling Method :	Grab	Time Received :	11:30
Sampled By :	A. Norris	Temperature at Receipt :	14 °C
Sample Description :	Clear, colourless.	Date Tested :	2024-04-30

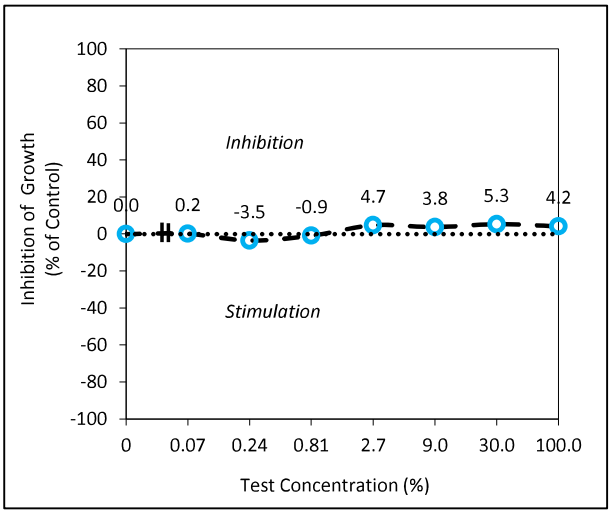
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	>100%	–	–
LC50	>100%	–	–

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





COMMENTS

[1]as a measure of Growth

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

Approved By : V.Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-05-28 18:08-04:00
Project Manager

Work Order : 254612
Sample Number : 82171

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.56 % (previous 7 days)
Organism Batch :	Fm24-04	Organism Age :	~07:00 - 23:30 h at test start
Source :	In-house culture		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Well water [3]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	300 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	420 mL polystyrene beaker
Sample Filtration :	None	Depth of Test Solution :	8 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	None

[3]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Analyst(s) :	ASK, NP, PG, AS
Date Tested :	2024-04-22	Test Duration :	7 days
IC25 (Biomass)[1] :	0.96 g/L	LC50 :	1.08 g/L
95% Confidence Limits :	0.87 - 1.03 g/L	95% Confidence Limits :	1.02 - 1.15 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Linear Regression (MLE) (CETIS)[a]
Historical Mean IC25 :	1.06 g/L	Historical Mean LC50 :	1.19 g/L
Warning Limits (± 2SD) :	0.95 - 1.19 g/L	Warning Limits (± 2SD) :	1.07 - 1.32 g/L

[1]as a measure of Growth

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2000-2022. v2.1.4.0 x64. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 254612
Sample Number : 82171

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2024-04-30	2024-05-01	2024-05-02	2024-05-03	2024-05-04	2024-05-05	2024-05-06	2024-05-07
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 16:30
Initiation Date : 2024-04-30
Completion Date : 2024-05-07

		Day 0		**Day 1**		**Day 2**		**Day 3**		**Day 4**		**Day 5**		**Day 6**		**Day 7**		**Treatment**
Date :		2024-04-30		2024-05-01		2024-05-02		2024-05-03		2024-05-04		2024-05-05		2024-05-06		2024-05-07		**Mean Mortality (± SD)**
Analyst(s):		ET (AS)		NWP		NM		NM		XD		XD		ASK (AS)		NM		
Concentration		Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	Number	**%**	**%**
%	**Replicate**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
Control	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
0.07	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
0.24	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
0.81	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
2.7	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
9	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
30	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
100	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	

Aberrant behaviour or swimming impairment : None

Test Data Reviewed By : SF
Date : 2024-05-23

Work Order : 254612
Sample Number : 82171

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.866	0.815	0.045
	B	10	0.797		
	C	10	0.782		
0.07	A	10	0.760	0.814	0.057
	B	10	0.808		
	C	10	0.873		
0.24	A	10	0.808	0.844	0.038
	B	10	0.839		
	C	10	0.884		
0.81	A	10	0.779	0.822	0.064
	B	10	0.791		
	C	10	0.896		
2.7	A	10	0.681	0.776	0.083
	B	10	0.816		
	C	10	0.832		
9	A	10	0.774	0.784	0.048
	B	10	0.742		
	C	10	0.837		
30	A	10	0.793	0.772	0.034
	B	10	0.790		
	C	10	0.732[4]		
100	A	10	0.750	0.781	0.031
	B	10	0.782		
	C	10	0.811		

NOTES :

- [4]Outlier according to Grubbs Test[b]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.
- Control average dry weight per surviving organism = 0.815 mg

Test Data Reviewed By : SF
Date : 2024-05-23

Work Order : 254612
Sample Number : 82171

WATER CHEMISTRY DATA

			Day 0 - 1 2024-04-30	Day 1 - 2 2024-05-01	Day 2 - 3 2024-05-02	Day 3 - 4 2024-05-03	Day 4 - 5 2024-05-04	Day 5 - 6 2024-05-05	Day 6 - 7 2024-05-06
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		26	24	24	24	24	24	24
	Dissolved O_2 (mg/L)		9.0	8.3	8.5	8.7	8.8	8.3	8.7
	Dissolved O_2 % Sat.[5]		120	103	107	110	110	105	110
	pH		7.2	7.5	7.5	7.5	7.5	7.7	7.6
	Conductivity (µmhos/cm)		1485	1450	1459	1456	1455	1461	1459
	Pre-aeration Time (min)[6]		20	20	20	20	20	20	20
	Analyst(s) :	Initial	ET (PC)	NWP	NWP	ASK (PC)	JN (JL)	JN (MR)	AA (AS)
		Final	ET (PC)	NM	NM	XD	XD	ASK (AS)	NM
Control	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	25	24	25	24	24
	Dissolved O_2 % Sat.[5]	Initial	102	102	100	100	100	100	101
	Dissolved O_2 (mg/L)	Initial	8.2	8.1	8.0	8.0	8.0	7.9	8.2
		Final	7.5	6.8	6.6	6.6	6.9	6.9	6.8
	pH	Initial	8.4	8.4	8.4	8.4	8.3	8.5	8.4
		Final	8.2	8.2	8.0	7.9	8.1	8.1	8.1
	Conductivity (µmhos/cm)	Initial	410	412	415	418	428	439	413
	Hardness (mg/L as $CaCO_3$)		200	–	–	–	–	–	–
0.07 %	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	25	24	25	24	24
	Dissolved O_2 (mg/L)	Initial	7.9	7.7	7.8	8.0	7.9	7.7	8.1
		Final	7.4	6.6	6.4	6.3	6.8	6.7	6.7
	pH	Initial	8.2	8.4	8.3	8.3	8.3	8.4	8.3
		Final	8.3	8.2	8.0	7.8	8.0	8.1	8.1
	Conductivity (µmhos/cm)	Initial	413	411	416	416	430	432	411
9 %	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	25	24	25	24	24
	Dissolved O_2 (mg/L)	Initial	8.0	7.8	7.8	8.0	7.9	7.8	8.1
		Final	7.3	6.5	6.0	5.9	6.6	6.9	6.7
	pH	Initial	8.1	8.3	8.3	8.2	8.3	8.3	8.3
		Final	8.2	8.2	8.0	7.9	8.1	8.2	8.1
	Conductivity (µmhos/cm)	Initial	509	510	517	517	534	536	513
100 %	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	25	24	25	24	24
	Dissolved O_2 (mg/L)	Initial	8.3	7.9	7.9	8.3	8.1	8.1	8.3
		Final	7.2	6.5	5.7	5.8	6.5	6.8	6.7
	pH	Initial	7.3	7.7	7.9	7.7	7.7	7.6	7.8
		Final	8.1	8.3	8.0	8.2	8.3	8.3	8.4
	Conductivity (µmhos/cm)	Initial	1475	1460	1460	1465	1443	1461	1463
	Hardness (mg/L as $CaCO_3$)		530	–	–	–	–	–	–

"–" = not measured/not required

[5] adjusted for temperature and barometric pressure

[6] ≤100 bubbles/minute

Test Data Reviewed By : SF
Date : 2024-05-23

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 29612

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: 4000003378
Field Sampler Name (print): Allan Norris
Signature:
Affiliation: LANXESS CANADA
Sample Storage (prior to shipping): ICE PACK
Custody Relinquished by:
Date/Time Shipped: APR 30/24 10:30

Client: LANXESS CANADA CO./CIE
25 ERB ST
ELMIRA ON
N3B 2J3
Phone: 519 669 1671
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.)
2024-04-30	9:15	GE 043024	82171 14°C					✓	✓				*		3 x 10L
2024-04-30	9:45	SFE 043024	82172 14°C					✓	✓				*		3 x 10L

For Lab Use Only
Received By: JW / ASK
Date: 2024-04-30
Time: 11:30
Storage Location:
Storage Temp (°C):

Please list any special requests or instructions:
* Grab samples as per pail labels. 2024-04-30 JW
CHRONIC TOXICITY

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

Work Order : 254612
Sample Number : 82172

SAMPLE IDENTIFICATION

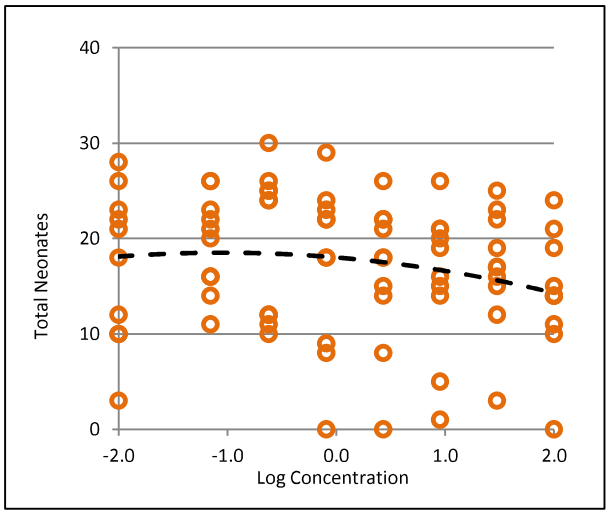
Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-04-30
Location :	Elmira ON	Sampling Time :	09:45
Substance :	SFE 043024	Date Received :	2024-04-30
Sampling Method :	Grab	Time Received :	11:30
Sampled By :	A. Norris	Temperature at Receipt :	14 °C
Sample Description :	Clear, colourless.	Date Tested :	2024-05-01

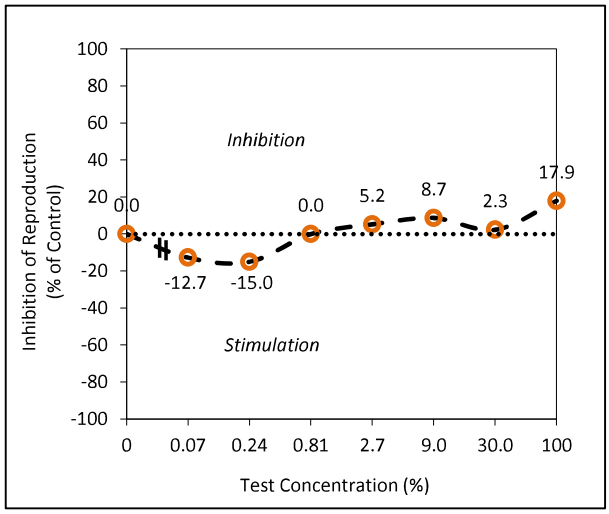
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Reproduction)	>100%	–	–
LC50	>100%	–	–

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





COMMENTS

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

Approved By : Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-05-28 10:23-04:00

Project Manager

Work Order : 254612
Sample Number : 82172

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	19:15 h - 23:55 h
Organism Batch :	Cd24-05	Mean Brood Organism Mortality :	2.5% (previous 7 days)
Organism Origin :	Single in-house mass culture	Brood Organism Mean Young :	21.9 (first three broods)
Test Organism Origin :	Individual in-house cultures	Mean Young per Brood Organism :	11.2 (3rd or subsequent brood)
Ephippia in Culture :	None		

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	Well water [2]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	20 mL glass vial
Sample Filtration :	None	Depth of Test Solution :	4 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	None

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Analyst(s) :	ET, AS, KP, SV, JW, XD
Date Tested :	2024-05-08	Test Duration :	6 days
IC25 (Reproduction) :	1.18 g/L	LC50 :	2.27 g/L
95% Confidence Limits :	0.54 - 1.39 g/L	95% Confidence Limits :	2.05 - 2.56 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Linear Regression (MLE) (CETIS)[a]
Historical Mean IC25 :	1.00 g/L	Historical Mean LC50 :	2.00 g/L
Warning Limits (± 2SD) :	0.44 - 2.28 g/L	Warning Limits (± 2SD) :	1.05 - 3.84 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.07**	**0.24**	**0.81**	**2.7**	**9**	**30**	**100**
2024-05-02	1	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0
2024-05-04	3	0	0	0	0	10	10	0	10
2024-05-05	4	0	10	0	0	10	10	0	10
2024-05-06	5	10	10	0	0	10	10	0	10
2024-05-07	6	10	10	0	0	10	10	0	10
Total Mortality (%) :		**10**	**10**	**0**	**0**	**10**	**10**	**0**	**10**

REFERENCES

[a] CETIS™, © 2000-2022. v2.1.4.0 x64. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 254612
Sample Number : 82172

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2024-05-01
Initiated By : NWP
Initiation Time : 9:55
Test Completion Date : 2024-05-07

Control

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0	JJ (AS)
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0	AS
2024-05-04	3	3	3	0	4	4	3	4	5	0	3	2.9	MR
2024-05-05	4	7	5	3	6	7	6	0	7	8	4	5.3	MR
2024-05-06	5	0	0	0	x 0	0	0	6	0	0	0	0.6	ASK (AS)
2024-05-07	6	0	14	0	13	15	12	0	16	4	11	8.5	RD
Total		**10**	**22**	**3**	**23**	**26**	**21**	**10**	**28**	**12**	**18**	**17.3 (±8.2)**	

2.7%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	4	0	2	4	5	0	2	2	3	0 x	2.2
2024-05-05	4	7	6	8	8	7	0	0	7	11	0	5.4
2024-05-06	5	0	12	0	0	0	4	6	0	0	0	2.2
2024-05-07	6	7	0	11	10	14	11	0	13	0	0	6.6
Total		**18**	**18**	**21**	**22**	**26**	**15**	**8**	**22**	**14**	**0**	**16.4 (±7.7)**

0.07%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	3	3	0	4	5	0	2	5	5	4	3.1
2024-05-05	4	9	5	2	7	7	1	6	5	11 x	6	5.9
2024-05-06	5	0	12	9	0	11	2	0	0	0	0	3.4
2024-05-07	6	4	0	15	0	0	11	13	16	0	12	7.1
Total		**16**	**20**	**26**	**11**	**23**	**14**	**21**	**26**	**16**	**22**	**19.5 (±5.1)**

9%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	1 x	3	2	3	5	3	3	4	4	2	3
2024-05-05	4	0	5	8	0	9	3	9	9	7	7	5.7
2024-05-06	5	0	0	0	2	0	0	0	0	0	0	0.2
2024-05-07	6	0	12	11	0	7	9	4	13	3	10	6.9
Total		**1**	**20**	**21**	**5**	**21**	**15**	**16**	**26**	**14**	**19**	**15.8 (±7.6)**

0.24%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	4	3	4	5	5	3	0	5	3	4	3.6
2024-05-05	4	6	8	6	6	6	7	4	8	8	11	7
2024-05-06	5	0	0	1	1	0	0	8	0	0	0	1
2024-05-07	6	0	15	13	0	13	15	0	17	0	10	8.3
Total		**10**	**26**	**24**	**12**	**24**	**25**	**12**	**30**	**11**	**25**	**19.9 (±7.7)**

30%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	0	1	1	5	4	1	0	5	3	4	2.4
2024-05-05	4	3	4	5	7	7	4	1	7	9	12	5.9
2024-05-06	5	0	0	0	0	0	0	5	0	0	0	0.5
2024-05-07	6	0	10	13	4	11	12	11	13	0	7	8.1
Total		**3[3]**	**15**	**19**	**16**	**22**	**17**	**17**	**25**	**12**	**23**	**16.9 (±6.3)**

0.81%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	0	0	4	0	3	4	4	5	5	3	2.8
2024-05-05	4	7	0	7	8	6	4	0	9	8	8	5.7
2024-05-06	5	7	0	1	0	0	0	5	0	0	0	1.3
2024-05-07	6	4	0	10	0	15	14	0	15	10	7	7.5
Total		**18**	**0**	**22**	**8**	**24**	**22**	**9**	**29**	**23**	**18**	**17.3 (±8.9)**

100%

	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-05-02	1	0	0	0	0	0	0	0	0	0	0	0
2024-05-03	2	0	0	0	0	0	0	0	0	0	0	0
2024-05-04	3	0 x	0	2	3	3	0	0	2	2	4	1.6
2024-05-05	4	0	4	0	8	3	0	0	8	6	7	3.6
2024-05-06	5	0	0	0	0	0	3	3	0	0	0	0.6
2024-05-07	6	0	10	8	0	8	11	12	14	13	8	8.4
Total		**0**	**14**	**10**	**11**	**14**	**14**	**15**	**24**	**21**	**19**	**14.2 (±6.6)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[3] Outlier according to Grubbs Test[b]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality
* = accidental test organism mortality
– = 4th brood (see 'NOTES')

Test Data Reviewed By : SF
Date : 2024-05-24

Work Order : 254612
Sample Number : 82172

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2024-05-01	2024-05-02	2024-05-03	2024-05-04	2024-05-05	2024-05-06
Initial Chemistry (100 %)	Sub-sample Used		1	1	1	2	2	3
	Temperature (°C)		25	24	24	24	24	24
	Dissolved O_2 (mg/L)		8.1	8.7	8.8	8.5	8.7	8.8
	Dissolved O_2 (% Sat.)[4]		103	110	110	107	109	110
	pH		7.5	7.5	7.6	7.5	7.5	7.6
	Conductivity (µmhos/cm)		1569	1569	1557	1560	1569	1397
	Pre-aeration Time (min)[5]		20	20	20	20	20	20
	Analyst(s)	Initial	ET (PC)	NWP	NP	JN (JL)	JN (MR)	AA (AS)
		Final	JJ	AS	MR	JN (MR)	ASK (AS)	JN (SV)
Control	Temperature (°C)	Initial	24	24	24	24	24	24
		Final	25	25	24	24	24	25
	Dissolved O_2 (% Sat.)[4]	Initial	102	100	100	100	100	101
	Dissolved O_2 (mg/L)	Initial	8.1	8.0	8.0	8.0	7.9	8.2
		Final	7.1	6.8	7.2	7.2	7.5	7.2
	pH	Initial	8.4	8.4	8.4	8.3	8.5	8.4
		Final	8.2	8.0	8.3	8.2	8.3	8.1
	Conductivity (µmhos/cm)	Initial	412	415	418	428	439	413
	Hardness (mg/L as $CaCO_3$)		200	–	–	–	–	–
0.07 %	Temperature (°C)	Initial	24	24	24	24	24	24
		Final	25	25	24	24	24	25
	Dissolved O_2 (mg/L)	Initial	7.8	7.8	7.8	7.8	7.8	8.1
		Final	7.0	6.7	7.2	7.3	7.5	7.2
	pH	Initial	8.4	8.3	8.3	8.4	8.5	8.3
		Final	8.2	8.1	8.3	8.3	8.3	8.2
	Conductivity (µmhos/cm)	Initial	409	412	419	432	438	411
9 %	Temperature (°C)	Initial	24	24	24	24	24	24
		Final	25	25	24	24	24	25
	Dissolved O_2 (mg/L)	Initial	7.8	7.8	7.8	7.8	7.9	8.1
		Final	6.9	6.7	7.3	7.3	7.4	7.2
	pH	Initial	8.3	8.3	8.2	8.2	8.3	8.3
		Final	8.2	8.1	8.3	8.3	8.3	8.2
	Conductivity (µmhos/cm)	Initial	520	526	530	537	543	504
100 %	Temperature (°C)	Initial	24	24	24	24	24	24
		Final	25	25	24	24	24	25
	Dissolved O_2 (mg/L)	Initial	7.9	7.9	8.1	8.1	8.4	8.3
		Final	6.7	6.7	7.2	7.3	6.8	7.1
	pH	Initial	7.7	7.9	7.8	7.6	7.6	7.8
		Final	8.4	8.4	8.4	8.4	8.3	8.1
	Conductivity (µmhos/cm)	Initial	1569	1566	1577	1577	1571	1394
	Hardness (mg/L as $CaCO_3$)		590	–	–	–	–	–

"–" = not measured/not required
[4] adjusted for temperature and barometric pressure
[5] ≤100 bubbles/minute

Test Data Reviewed By : SF
Date : 2024-05-24

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

Work Order : 254612
Sample Number : 82172

SAMPLE IDENTIFICATION

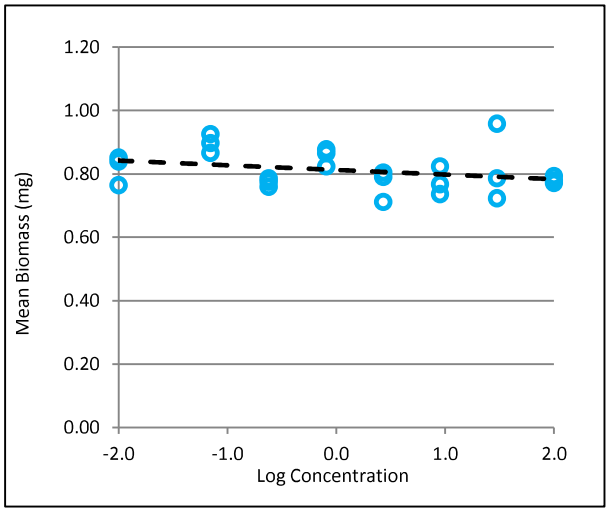
Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-04-30
Location :	Elmira ON	Sampling Time :	09:45
Substance :	SFE 043024	Date Received :	2024-04-30
Sampling Method :	Grab	Time Received :	11:30
Sampled By :	A. Norris	Temperature at Receipt :	14 °C
Sample Description :	Clear, colourless.	Date Tested :	2024-05-01

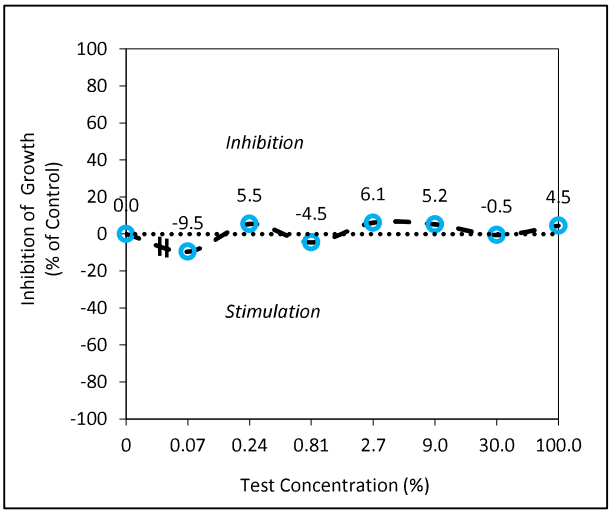
Test Method : Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).

7-DAY TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Biomass)[1]	>100%	–	–
LC50	>100%	–	–

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





COMMENTS

[1]as a measure of Growth

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

Approved By : V. Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-05-28 10:23-04:00

Project Manager

Work Order : 254612
Sample Number : 82172

TEST ORGANISM

Test Organism :	*Pimephales promelas*	Culture Mortality/Diseased :	0.56 % (previous 7 days)
Organism Batch :	Fm24-05	Organism Age :	~07:00 - 21:50 h at test start
Source :	In-house culture		

•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

TEST CONDITIONS

Test Type :	Static Renewal	Control/Dilution Water :	Well water [3]
Renewal Method :	80-85% syphoned and replaced	Test Volume / Replicate :	300 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	420 mL polystyrene beaker
Sample Filtration :	None	Depth of Test Solution :	8 cm
Test Aeration :	None	Organisms per Replicate :	10
pH Adjustment :	None	Number of Replicates :	3
Hardness Adjustment :	None	Test Method Deviation(s):	None

[3]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Analyst(s) :	ASK, NP, PG, AS
Date Tested :	2024-04-22	Test Duration :	7 days
IC25 (Biomass)[1] :	0.96 g/L	LC50 :	1.08 g/L
95% Confidence Limits :	0.87 - 1.03 g/L	95% Confidence Limits :	1.02 - 1.15 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Linear Regression (MLE) (CETIS)[a]
Historical Mean IC25 :	1.06 g/L	Historical Mean LC50 :	1.19 g/L
Warning Limits (± 2SD) :	0.95 - 1.19 g/L	Warning Limits (± 2SD) :	1.07 - 1.32 g/L

[1]as a measure of Growth

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

REFERENCES

[a] CETIS™, © 2000-2022. v2.1.4.0 x64. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Work Order : 254612
Sample Number : 82172

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT

Date :	2024-05-01	2024-05-02	2024-05-03	2024-05-04	2024-05-05	2024-05-06	2024-05-07	2024-05-08
Mortality/Impairment :	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Standard Deviation :	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)	(±0.0)

CUMULATIVE DAILY MORTALITY

Initiation Time : 10:50
Initiation Date : 2024-05-01
Completion Date : 2024-05-08

		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Treatment
Date :		2024-05-01		2024-05-02		2024-05-03		2024-05-04		2024-05-05		2024-05-06		2024-05-07		2024-05-08		Mean Mortality (± SD)
Analyst(s):		ET (PC)		NM		NP		XD		XD		AJS		ASK (SV)		ASK (VBC)		
Concentration		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	%
%	**Replicate**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
Control	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
0.07	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	**6.67**
0.24	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
0.81	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
2.7	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00**
9	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±0.00)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33**
30	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	
	A	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	1	**10**	**3.33**
100	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	(±5.77)
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	

Aberrant behaviour or swimming impairment : None

Test Data Reviewed By : SF
Date : 2024-05-24

Work Order : 254612
Sample Number : 82172

DRY WEIGHT AND BIOMASS DATA

Concentration %	Replicate	Number Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.764	0.818	0.047
	B	10	0.851		
	C	10	0.839		
0.07	A	10	0.866	0.896	0.030
	B	10	0.925		
	C	10	0.897		
0.24	A	10	0.775	0.773	0.014
	B	10	0.759		
	C	10	0.786		
0.81	A	10	0.865	0.855	0.028
	B	10	0.823		
	C	10	0.877		
2.7	A	10	0.711	0.768	0.050
	B	10	0.790		
	C	10	0.804		
9	A	10	0.736	0.775	0.044
	B	10	0.767		
	C	10	0.823		
30	A	10	0.958	0.822	0.122
	B	10	0.786		
	C	10	0.723		
100	A	10	0.779	0.781	0.011
	B	10	0.793		
	C	10	0.771		

NOTES :
- No outlying data points were detected according to Grubbs Test[b].
- Control average dry weight per surviving organism = 0.818 mg

Test Data Reviewed By : SF
Date : 2024-05-24

Work Order : 254612
Sample Number : 82172

WATER CHEMISTRY DATA

			Day 0 - 1 2024-05-01	Day 1 - 2 2024-05-02	Day 2 - 3 2024-05-03	Day 3 - 4 2024-05-04	Day 4 - 5 2024-05-05	Day 5 - 6 2024-05-06	Day 6 - 7 2024-05-07
Initial Chemistry (100%)	Sub-sample Used		1	1	1	2	2	3	3
	Temperature (°C)		25	24	24	24	24	24	24
	Dissolved O_2 (mg/L)		8.1	8.7	8.8	8.5	8.7	8.8	8.4
	Dissolved O_2 % Sat.[5]		103	110	110	107	109	110	106
	pH		7.5	7.5	7.6	7.5	7.5	7.6	7.7
	Conductivity (µmhos/cm)		1569	1569	1557	1560	1569	1397	1394
	Pre-aeration Time (min)[6]		20	20	20	20	20	20	20
	Analyst(s) :	Initial	ET (PC)	NWP	NP	JN (JL)	JN (MR)	AA (AS)	ASK/JN (SV)
		Final	NWP	NP	XD	XD	ASK (AS)	ASK (SV)	ASK (VBC)
Control	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	24	25	24	25	25
	Dissolved O_2 % Sat.[5]	Initial	102	100	100	100	100	101	98
	Dissolved O_2 (mg/L)	Initial	8.1	8.0	8.0	8.0	7.9	8.2	7.7
		Final	7.2	6.3	6.9	7.0	7.1	6.3	6.9
	pH	Initial	8.4	8.4	8.4	8.3	8.5	8.4	8.4
		Final	8.2	7.9	8.0	8.1	8.1	8.0	8.1
	Conductivity (µmhos/cm)	Initial	412	415	418	428	439	413	417
	Hardness (mg/L as $CaCO_3$)		200	–	–	–	–	–	–
0.07 %	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	24	25	24	25	25
	Dissolved O_2 (mg/L)	Initial	7.8	7.8	7.8	7.8	7.8	8.1	7.1
		Final	7.0	6.1	6.7	6.8	7.1	6.3	6.7
	pH	Initial	8.4	8.3	8.3	8.4	8.5	8.3	8.2
		Final	8.2	7.9	8.0	8.1	8.2	7.9	8.1
	Conductivity (µmhos/cm)	Initial	409	412	419	432	438	411	423
9 %	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	24	25	24	25	25
	Dissolved O_2 (mg/L)	Initial	7.8	7.8	7.8	7.8	7.9	8.1	7.3
		Final	6.9	6.0	6.7	6.7	6.3	6.3	6.8
	pH	Initial	8.3	8.3	8.2	8.2	8.3	8.3	8.2
		Final	8.2	7.9	8.0	8.1	8.0	8.0	8.2
	Conductivity (µmhos/cm)	Initial	520	526	530	537	543	504	518
100 %	Temperature (°C)	Initial	24	24	24	24	24	24	24
		Final	25	25	24	25	24	25	25
	Dissolved O_2 (mg/L)	Initial	7.9	7.9	8.1	8.1	8.4	8.3	8.1
		Final	6.9	5.7	6.4	6.6	6.2	6.2	6.8
	pH	Initial	7.7	7.9	7.8	7.6	7.6	7.8	7.4
		Final	8.3	8.2	8.2	8.2	8.2	8.2	8.3
	Conductivity (µmhos/cm)	Initial	1569	1566	1577	1577	1571	1394	1399
	Hardness (mg/L as $CaCO_3$)		590	–	–	–	–	–	–

"–" = not measured/not required

[5] adjusted for temperature and barometric pressure

[6] ≤100 bubbles/minute

Test Data Reviewed By : SF
Date : 2024-05-24

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 29612

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: 4000003378
Field Sampler Name (print): Allan Norris
Signature:
Affiliation: LANXESS CANADA
Sample Storage (prior to shipping): ICE PACK
Custody Relinquished by:
Date/Time Shipped: APR 30/24 10:30

Client: LANXESS CANADA CO./CIE
25 ERB ST
ELMIRA ON
N3B 2T3
Phone: 519 669 1671
Fax: 519 669 3273
Contact: MICHELLE YANTZI

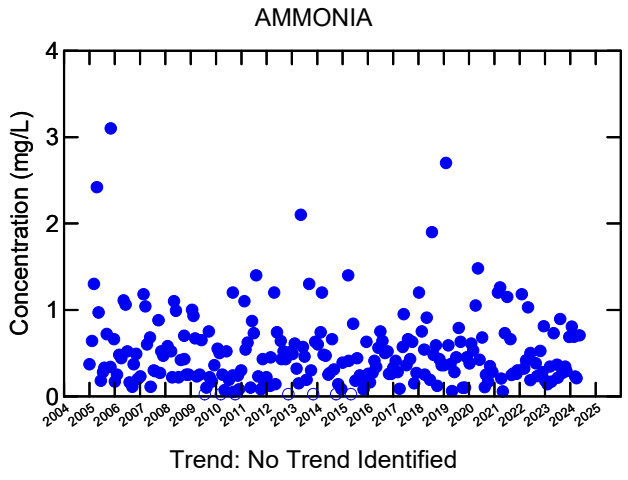
Sample Identification				Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number / Temp on Arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	Daphnia magna Single Concentration	Daphnia magna 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.)
			1												
2024-04-30	9:15	GE 043024	82171 4°C					✓	✓				*		3 x 10L
2024-04-30	9:45	SFE 043024	82172 4°C					✓	✓				*		3 x 10L

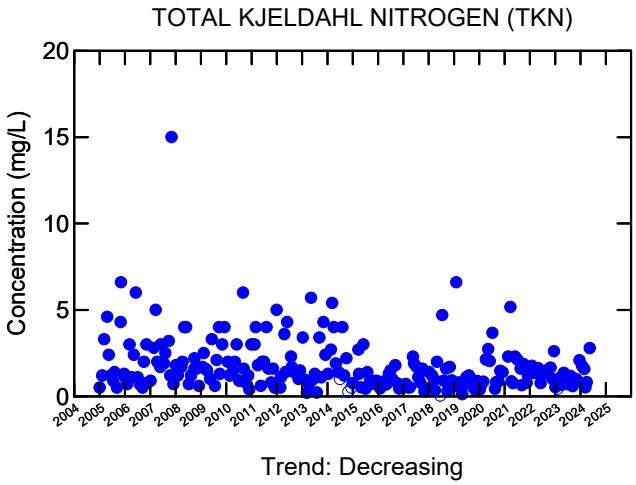
For Lab Use Only
Received By: JW / ASK
Date: 2024-04-30
Time: 11:30
Storage Location:
Storage Temp (°C):

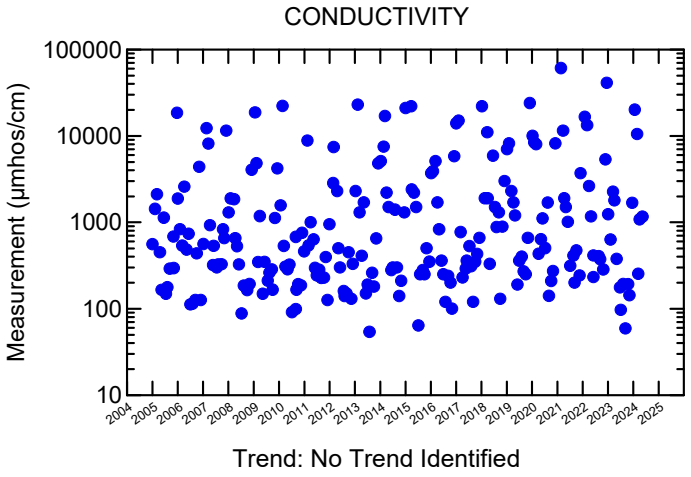
Please list any special requests or instructions:
* Grab samples as per pail labels. 2024-04-30 JW
CHRONIC TOXICITY

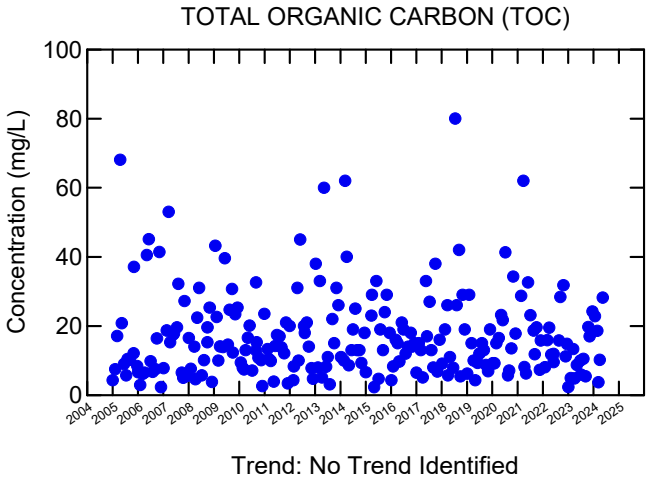
Attachment B

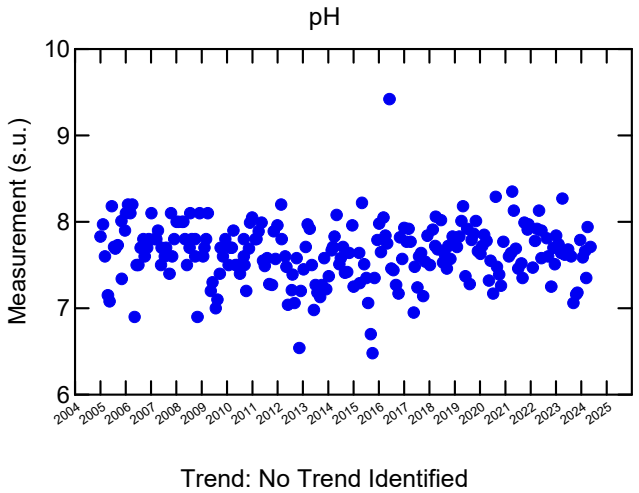
EAB Data











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.

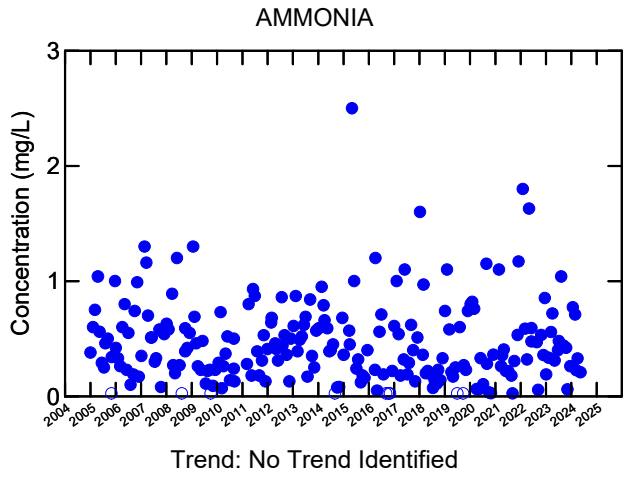
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

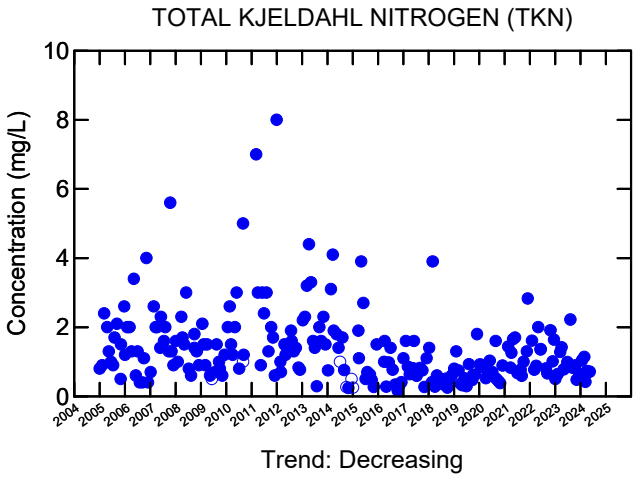
LANXESS Canada Co./Cie
Elmira, Ontario

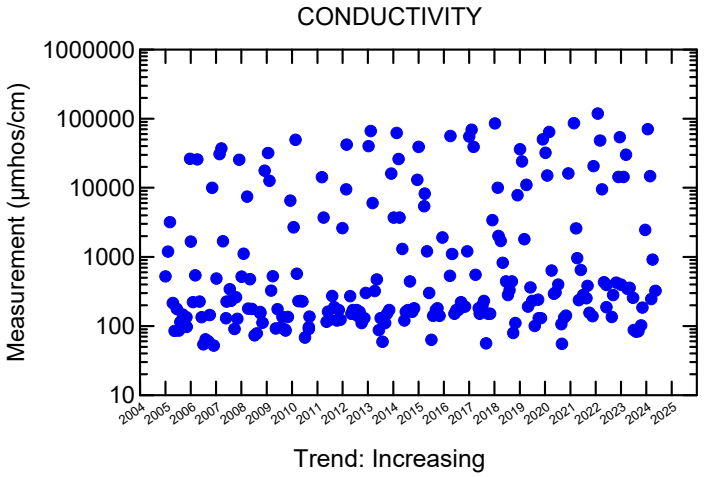
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0200

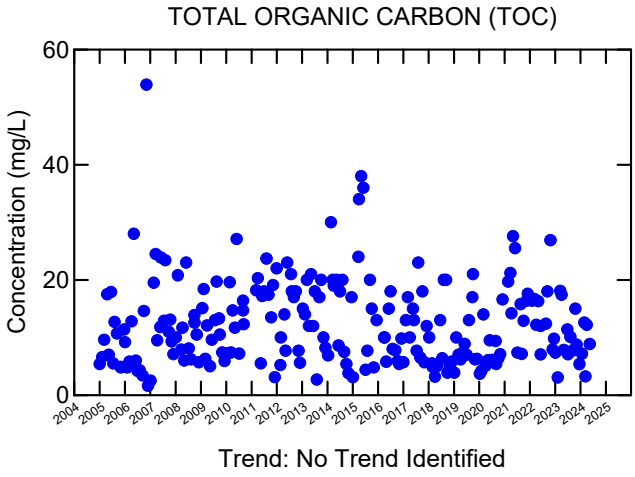
Project No. **11192137-38**
Date: **June 5, 2024**

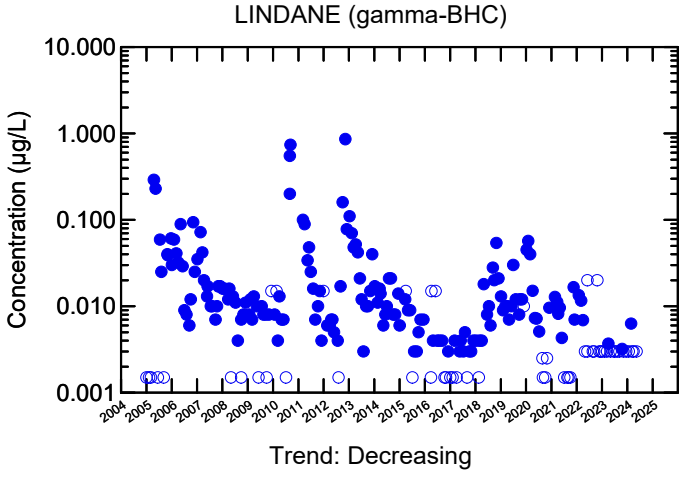
FIGURE B.1

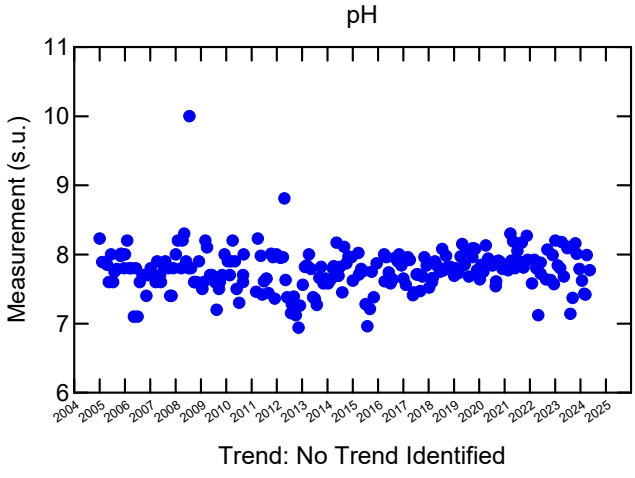












Legend:

- 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.

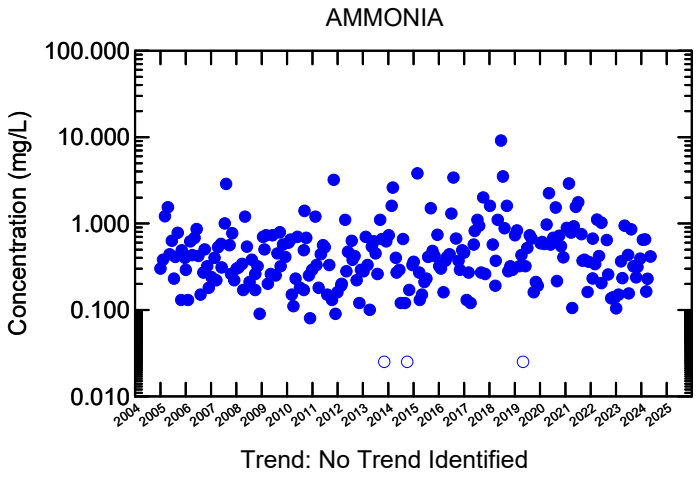
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

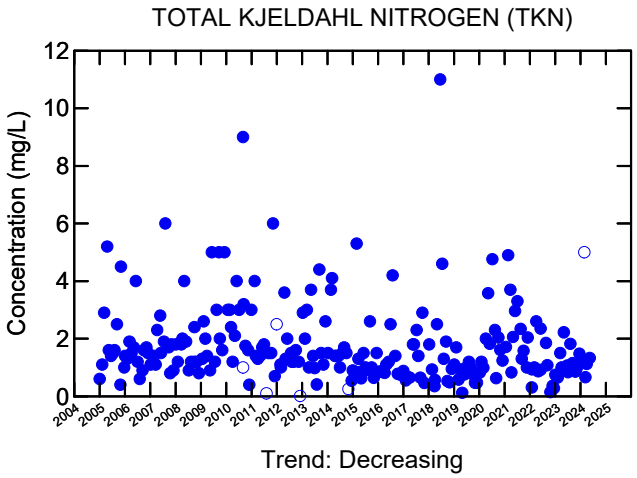
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0400

Project No. **11192137-38**
Date: **Jun 5, 2024**

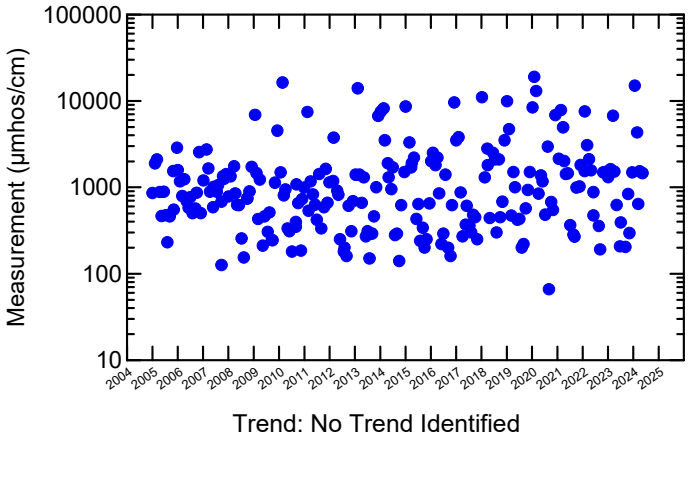
FIGURE B.2



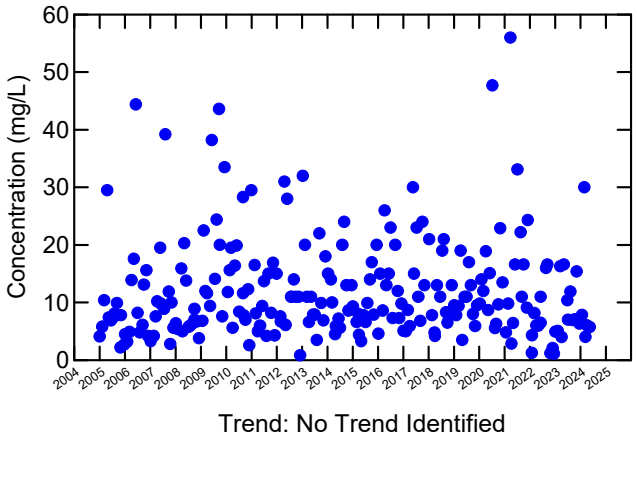
Trend: No Trend Identified



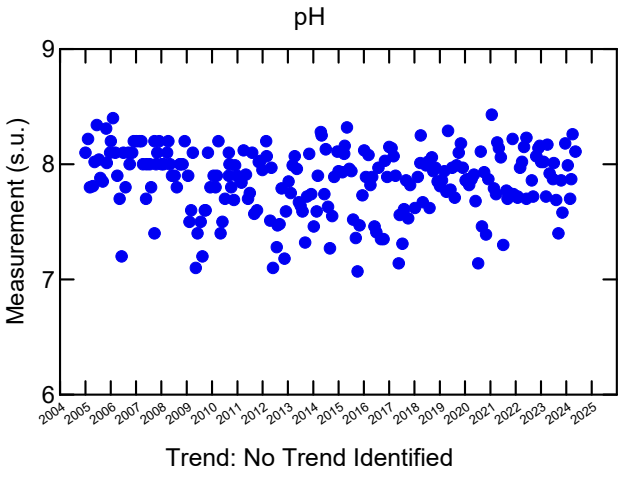
Trend: Decreasing



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.

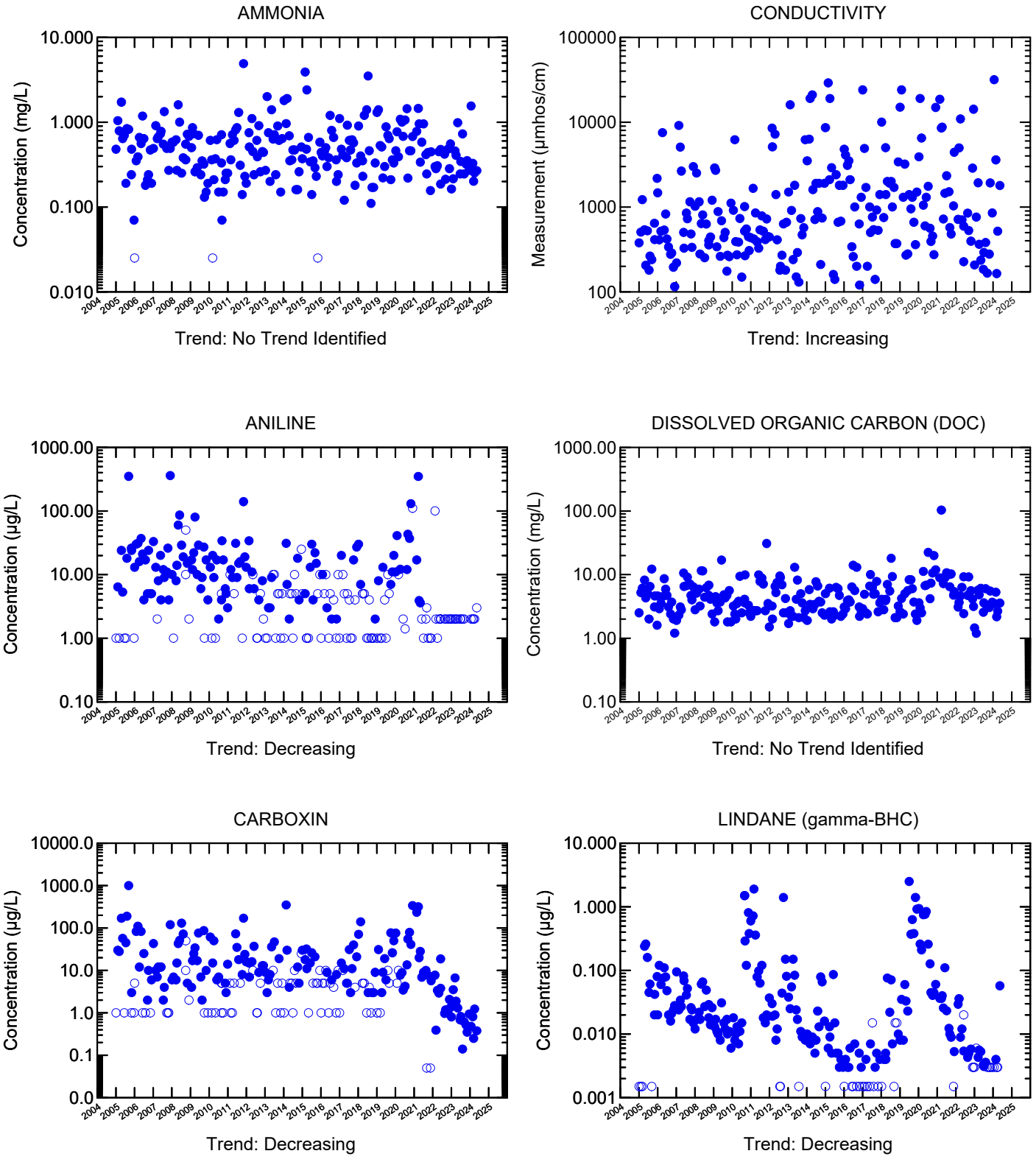
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0800

Project No. **11192137-38**
Date: **June 5, 2024**

FIGURE B.3



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.

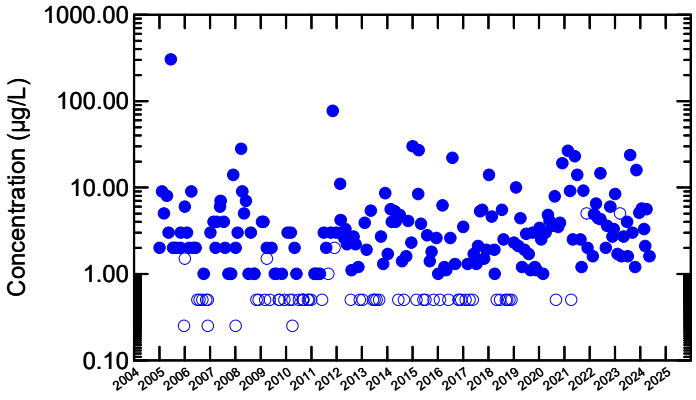
LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER SEWER

Project No. **11192137-38**
Date: **June 5, 2024**

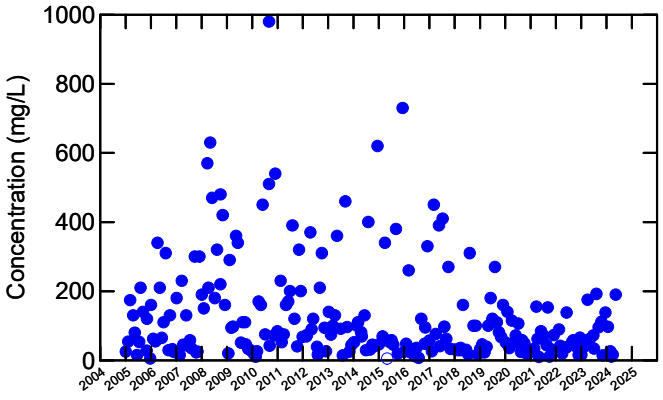
FIGURE B.4

PHENOLICS (TOTAL)



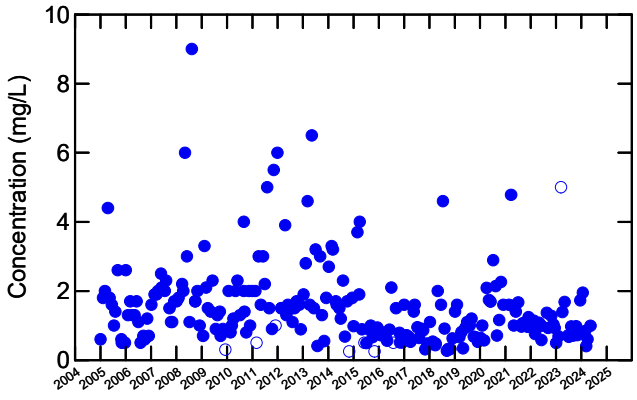
Trend: Increasing

TOTAL SUSPENDED SOLIDS (TSS)



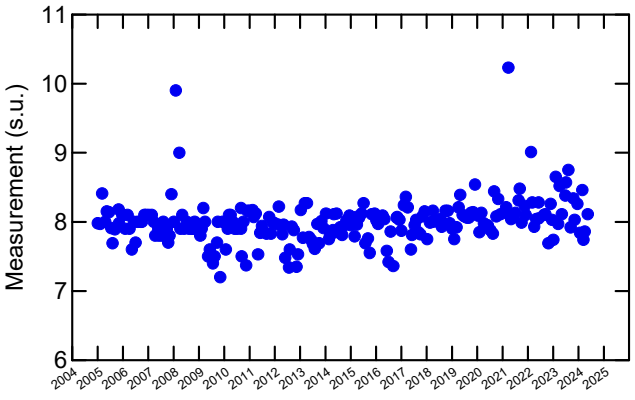
Trend: Decreasing

TOTAL KJELDAHL NITROGEN (TKN)



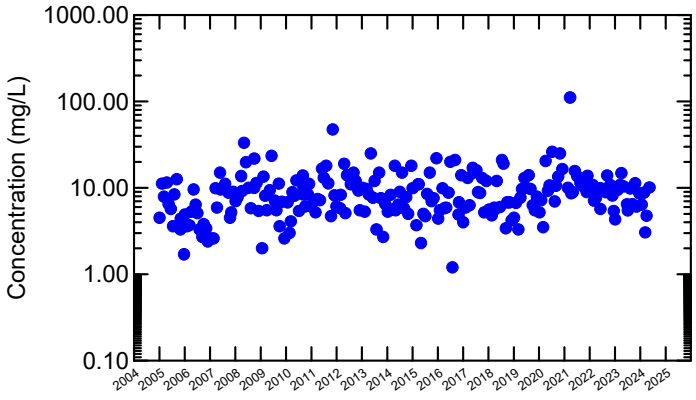
Trend: Decreasing

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: **June 5, 2024**

FIGURE B.5

Table B.1

Environmental Appeal Board (EAB)
Analytical Results - May 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 051424**	**0200 051424**	**0400 051424**	**0800 051424**
Sample Date:		**5/14/2024**	**5/14/2024**	**5/14/2024**	**5/14/2024**
Parameters	**Units**				
General Chemistry					
Ammonia-N	mg/L	0.268	0.705	0.209	0.415
Conductivity	umhos/cm	1790	1160	323	1460
Cyanide (total)	mg/L	0.0118	0.0158	0.0124	0.0023
Dissolved organic carbon (DOC) (dissolved)	mg/L	3.57	--	--	--
pH, lab	s.u.	8.11	7.71	7.77	8.11
Phenolics (total)	mg/L	0.0016	--	--	--
Sulfide	mg/L	0.048	ND(0.010)	ND(0.010)	ND(0.010)
Total kjeldahl nitrogen (TKN)	mg/L	0.991	2.79	0.712	1.33
Total organic carbon (TOC)	mg/L	10.1	28.2	8.87	5.74
Total suspended solids (TSS)	mg/L	190	--	--	--
Herbicides					
2,4,5-TP (Silvex)	µg/L	ND(0.100)	ND(0.500)	ND(0.500)	ND(0.100)
2,4-DB	µg/L	ND(0.100)	ND(0.500)	ND(0.500)	ND(0.100)
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	0.256	0.972	ND(0.500)	ND(0.100)
Pesticides					
gamma-BHC (lindane)	µg/L	0.0573	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(3.0) 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	0.377	ND(0.100)	ND(0.100)	ND(0.100)
N-Nitrosodimethylamine	µg/L	ND(0.00100)	ND(0.00460)	ND(0.00090)	ND(0.00128)
N-Nitrosodiphenylamine	µg/L	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
N-Nitrosodiphenylamine + Diphenylamine	µg/L	0.57	ND(0.40)	ND(0.40)	ND(0.40)
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

Upper Aquifer Hydraulic Containment Requirements

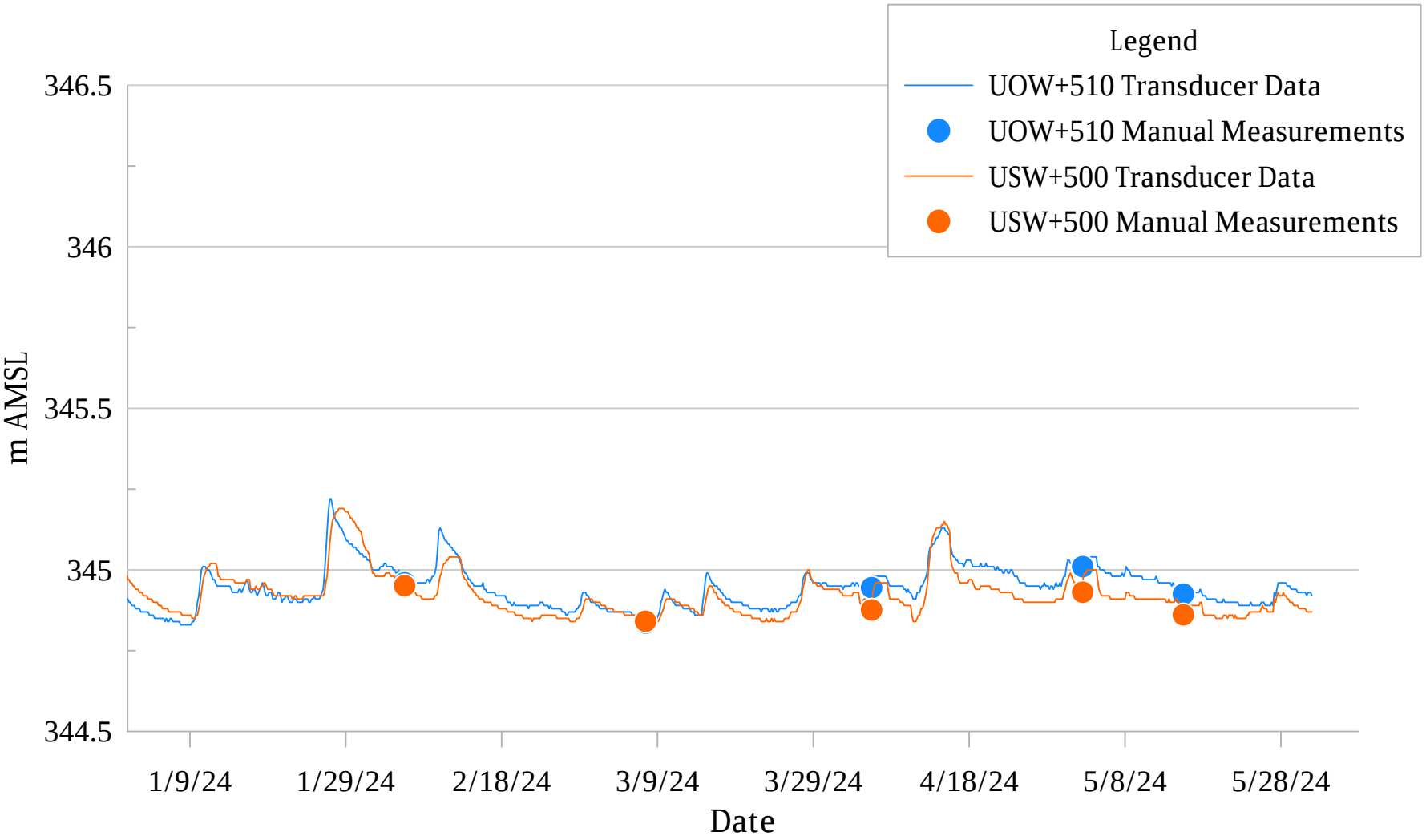
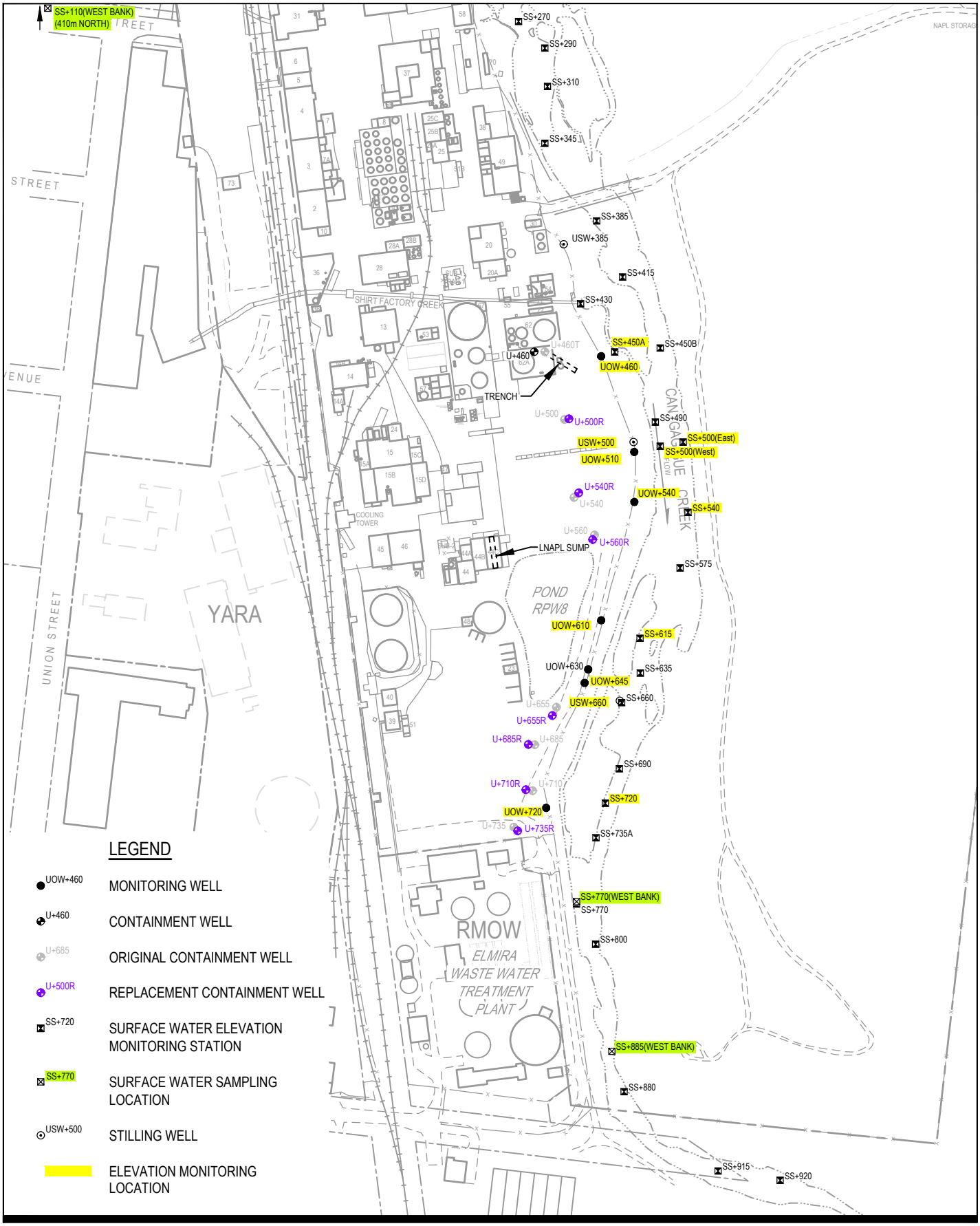


Figure C.1
2024 HYDROGRAPH - UOW+510 VS USW+500
LANXESS CANADA CO./CIE.
Elmira, Ontario



0 30 60 90m

Coordinate System:
UTM NAD 27

N

GHD

LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

Project No. **11192137**
Date **May 2024**

SURFACE WATER SAMPLING AND ELEVATION MONITORING LOCATIONS

FIGURE C.2

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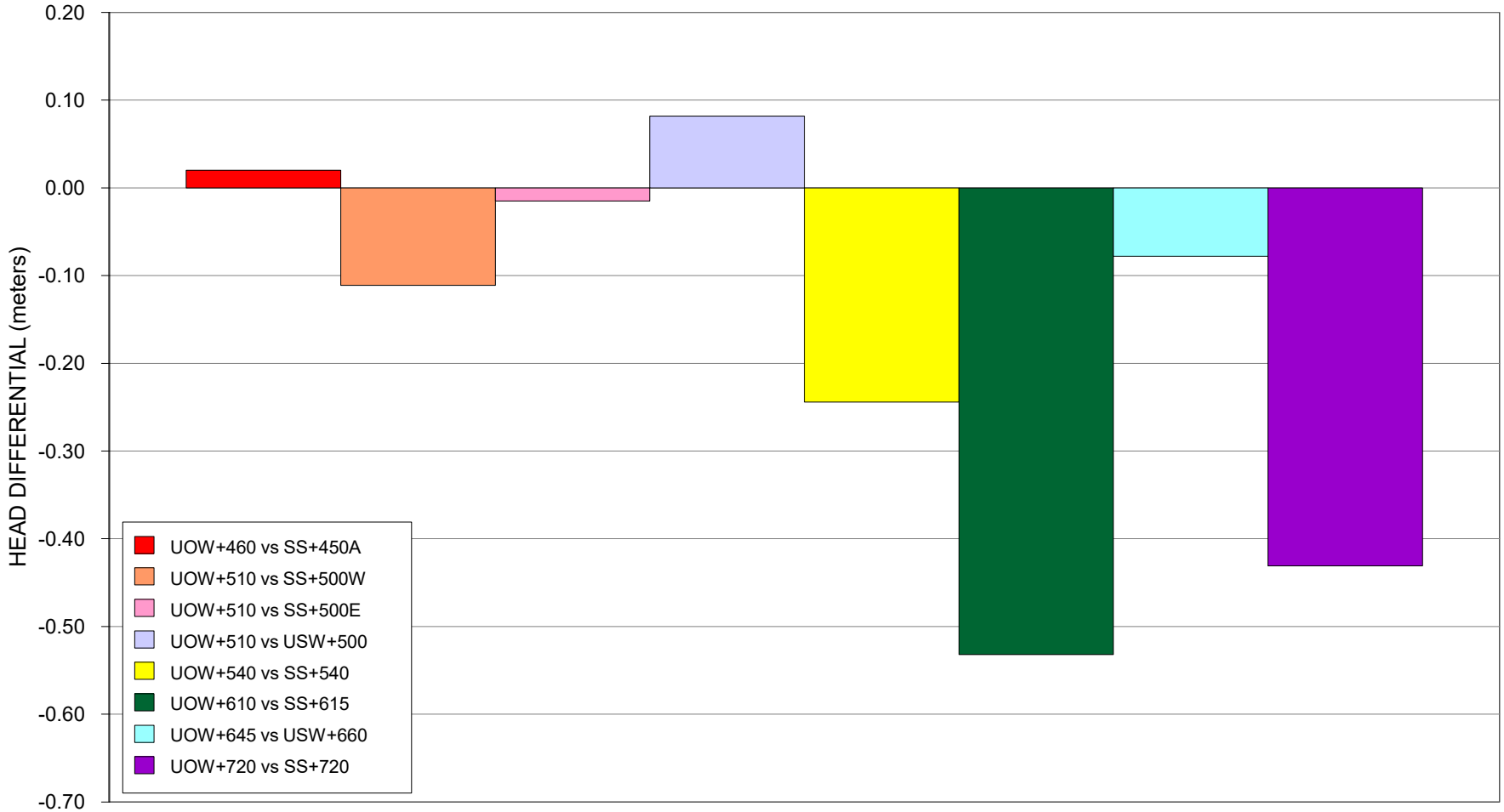

figure C.3
HEAD DIFFERENTIAL AT KEY MONITORING PAIRS - MAY 2, 2024
UPPER AQUIFER CONTAINMENT SYSTEM
LANXESS CANADA CO./CIE
Elmira, Ontario

11192137(DIRE056)GIS-OT003 May 27, 2024

Table C.1

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

Flow [2] = 2,040 L/s	Units	PWQO		ECA	Sample Location	SS-110 West (Upstream)	SS+770 West	SS+855 West
		Status	Value	Schd. E Criteria				
General Chemistry								
Ammonia as N	mg/L					0.252	0.228	0.212
Un-ionized Ammonia	mg/L	PWQO	0.020	0.016		0.0118	0.0103	0.0068
Temperature °C (Field)	°C					14.04	14.41	14.31
pH (Field)	su	PWQO	6.5-8.5			8.29	8.26	8.11
Volatile Organic Compounds (VOCs)								
All 7 VOCs Analyzed						ND	ND	ND
Base, Neutral and Acid Extractable Compounds (BNAs)								
All 17 BNAs Analyzed						ND	ND	ND
Pesticides & Herbicides								
2,4-D	µg/L	PWQO	4	1.0		0.090	ND(0.050)	ND(0.050)
Remaining 1 Pesticide and Herbicide Analyzed						ND	ND	ND

Notes:

[1] Samples were collected on May 2, 2024.
Due to a contamination source discovered in the LANXESS NDMA laboratory, the May 2, 2024 NDMA/NMOR samples had to re-sample
All three locations were re-sampled on May 15, 2024. LANXESS verified that the containment loss was still in effect on May 15, 2024.

[2] Flow measurement was obtained from the Grand River Conservation Authority (GRCA) Elmira (Arthur Street) gauge.

L/s Litres per second.

PWQO Provincial Water Quality Objective, MOE, February 1999.

ND Not detected at the associated reporting detection limit.

455 Phillip Street, Unit 100A
Waterloo, Ontario N2L 3X2
Canada
ghd.com

Our ref: 11192137-LTR-57

15 July 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 June 2024

Dear Ms. Hussain

This letter presents a summary of the June 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, W3R, W5A, W9, and E7 were less than their Target Average pumping rates during June 2024. PW4 was pumping at a slightly reduced flowrate in June 2024; LANXESS suspects either a pump/motor issue or decreased well yield. PW5 continued operating at a reduced pumping rate in June 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. W3R was shut down between May 31, 2024 and June 4, 2024 and intermittently between June 4 and June 6, 2024 due to additional communication issues. LANXESS replaced cellular components in the W4 communication system which corrected the issue. W5A was shut down from June 16 until June 25, 2024 as the well was 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 June 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 re-scheduled inspection of the pump/motor and possible video inspection of the well for July 2024, subject to contractor availability. E7 was shut down between June 22 and June 28, 2024 as a result of communication issues. The faulty communication components were replaced, and the well was restarted at its Target Average rate on June 28, 2024.

During June 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

Luis Almeida
Project Manager

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AB/kf/57

Encl.

Copy to: Jason Rice, MECP
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LANXESS Public Distribution List
Esther Wearing, MECP
Jamie Petznick, LANXESS
Michelle Yantzi, LANXESS

June 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 June 2024.

The Progress Report is organized as follows:

1. Monitoring and Analytical Data Page 1
2. Correspondence, Meetings, and Events Page 1
3. CTS Monitoring and Performance Page 1
4. Remedial Action Plan Page 4
5. E7 AOP Page 4
6. Environmental Audit Page 4
7. Remediation of Former Operating Pond Area Page 4
8. Additional Work/Studies Page 4

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 June 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 surface water samples collected from Canagagigue Creek (the Creek), and groundwater and surface water elevation monitoring completed on June 3, 2024, as required by ECA No. 0831-BX6JGD Section 9, is presented in Attachment C. Further details related to this requirement are described in Section 8 of this report.

2. Correspondence, Meetings, and Events

June 13, 2024	Technical Remediation Advisory Committee (TRAC) meeting
June 14, 2024	May 2024 Progress Report submitted to MECP West Central Region (WCR)

3. CTS Monitoring and Performance

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

The June 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		
June 2024 (Litres/second [L/s])		
Containment and Extraction Wells	**Target Average (1)**	**Average**
On Site Wells		
PW4	2.9	2.7
PW5	1.8	0.7
Upper Aquifer Wells	--	0.8
Off Site Wells		
W3R	18.5	15.6
W5A	4.5	1.2
W5B	2.8 (2)	4.0
W6A	0.20	0.35
W6B	0.30	0.38
W8	0.05	0.10
W9	13.6	12.2
E7	23.9	18.6
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 slightly less than its Target Average pumping rate in June 2024. PW4 was 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 June 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 July 2024.

W3R was shut down between May 31, 2024 and June 4, 2024 and intermittently between June 4 and June 6, 2024 due to additional communication issues. LANXESS replaced cellular components in the W4 communication system which corrected the issue.

The pumping rate of W5A was below its Target Average pumping rate in June 2024. W5A was shut down from June 16 until June 25, 2024 as the well was 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 June 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 re-scheduled inspection of the pump/motor and possible video inspection of the well for the week of July 15, 2024.

E7 was shut down between June 22 and June 28, 2024 as a result of communication issues. The faulty communication components were replaced, and the well was restarted at its Target Average rate on June 28, 2024.

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 June 2024 and summarizes the effluent pH and temperature. The discharge pH was between 7.09 and 7.21 Standard Units (su), which is within the ECA discharge limit pH range of 5.5 to 9.5 su. The effluent temperature was between 13.4 and 17.8 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 June 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 36.02 L/s. The total flow rate of additional treated groundwater discharged to the Creek via Shirt Factory Creek (at storm water outfall 0800) was 2.33 L/s. The total flow rate of the combined treated groundwater discharged to the Creek (SS+890 discharge plus Shirt Factory Creek discharge) was 38.36 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 June 4, 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 June 4, 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 June 10, 2024, LANXESS collected W3R influent samples and analyzed the samples for the ECA offsite broad scan parameters. Table A.5 (Attachment A) presents the broad scan analytical results.

e) Routine Maintenance

Routine maintenance tasks completed on the CTS in June 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

[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.

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.

f) Receiver Water Quality Data

As per Amended ECA No-0831-BX6JGD, the receiver water quality monitoring program has been reduced from monthly to once every three (3) months. LANXESS will complete the next quarterly routine monitoring event in July 2024.

Summary of Efforts Made and Results Achieved

During June 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 June 2024.

5. E7 AOP

The average E7 pumping rate (18.6 L/s) was less than its recommended Target Average pumping rate (23.9 L/s) during June 2024 due to communication issues. The influent sample collected on May 29, 2024 contained n-nitrosodimethylamine (NDMA) at a concentration of 0.0512 micrograms per litre (µg/L), and the influent sample collected on June 28, 2024 contained NDMA at a concentration of 0.02 µg/L. NDMA was not detected in the effluent samples collected on May 29, 2024 (reporting detection limit [RDL] = 0.0170 µg/L) and June 28, 2024 (RDL = 0.01 µg/L).

6. Environmental Audit

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

7. Remediation of Former Operating Pond Area

There are no new activities to report for this item in June 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.1 (Attachment C) shows the continuous surface water and groundwater elevations measured at UOW+510 and USW+500 in 2024. The spring freshet and spring 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. 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 month of June 2024, until June 20, 2024 when there was a significant rainfall event, and again on June 21, 2024 when there was a large increase in the flowrate from the Grand River Conservation Authority (GRCA) Woolwich dam. Elevations gradually decreased through the end of the month. Containment was restored at UOW+510/USW+500 on June 18, 2024 and was maintained throughout the remainder of the month.

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 June 3, 2024 and verified the functionality of the transducers. The elevation monitoring locations are presented on Figure C.2 (Attachment C). The difference between the manual surface water elevations and the manual groundwater elevations at the key monitoring pairs completed on June 3, 2024 have been plotted on Figure C.3 (Attachment C).

On June 3, 2024, LANXESS also collected surface water samples from SS-110 West, SS+770 West, and SS+855 West and analyzed the samples for the Schedule E list of parameters. The sampling locations are presented on Figure C.2 (Attachment C). Table C.1 (Attachment C) presents the analytical results for the surface water samples collected in June 2024. All the parameters analyzed as part of the June 2024 sampling event were either not detected at their respective RDLs or were present at concentrations that were less than their respective Provincial Water Quality Objectives (PWQOs), Interim PWQOs (IPWQOs), and/or ECA Schedule E criterion.

Based on the surface water data collected, during the period when the differential was not maintained in June 2024, there are no adverse impacts to the surface water.

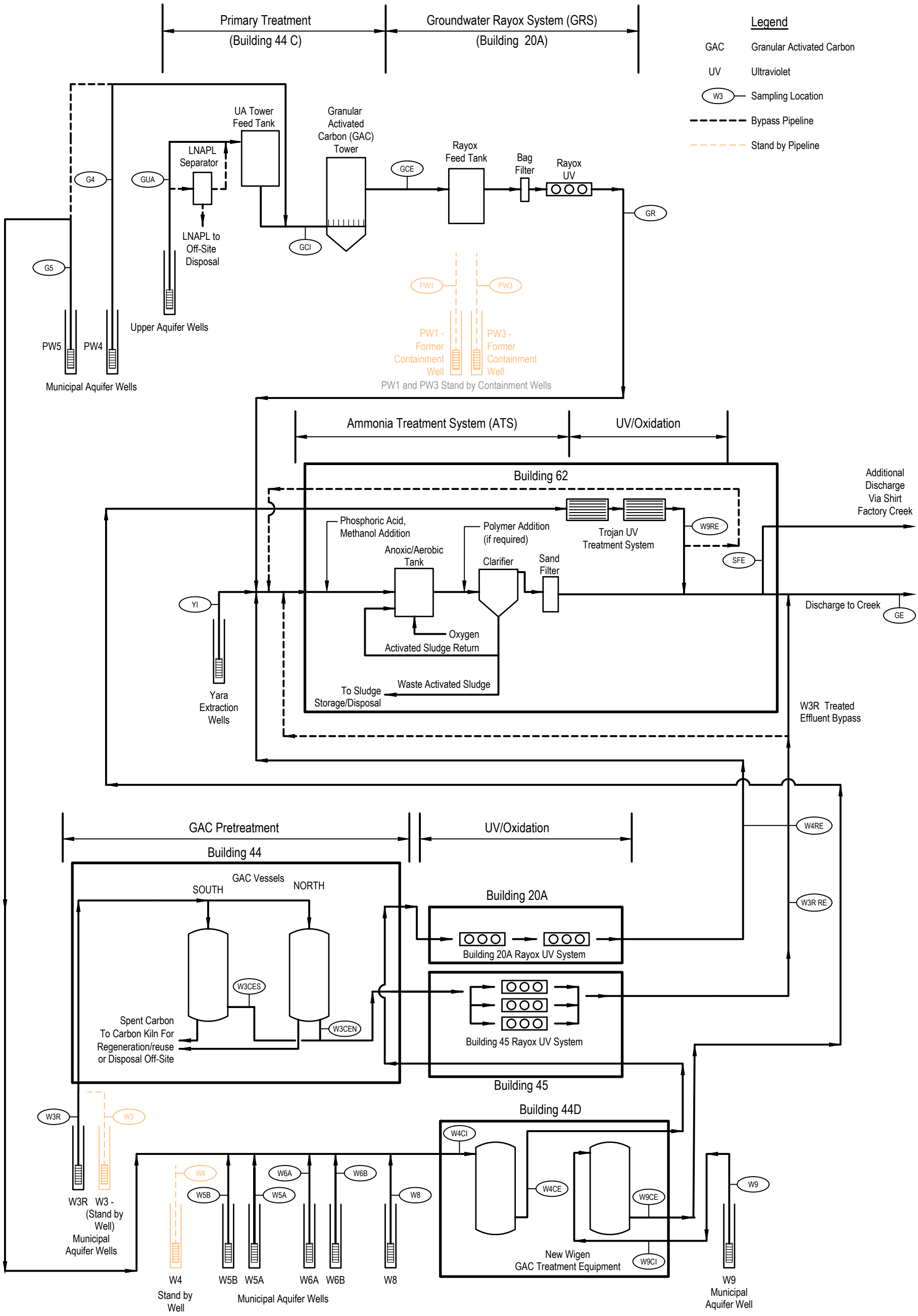
Table 1

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

Media and Sampling Program	Parameters	Frequency	June 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	-
CTS Effluent - Acute Toxicity	Not applicable	Quarterly	-
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	-
	Effluent Broad Scan (Schedule C)	Quarterly	-
Secondary Surface Water Quality Monitoring	Indicator parameters	Quarterly	-
	Effluent Broad Scan (Schedule C)	Quarterly	-
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	-
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 **June 2024**

TREATMENT SYSTEM PROCESS FLOW SCHEMATIC

FIGURE A.1

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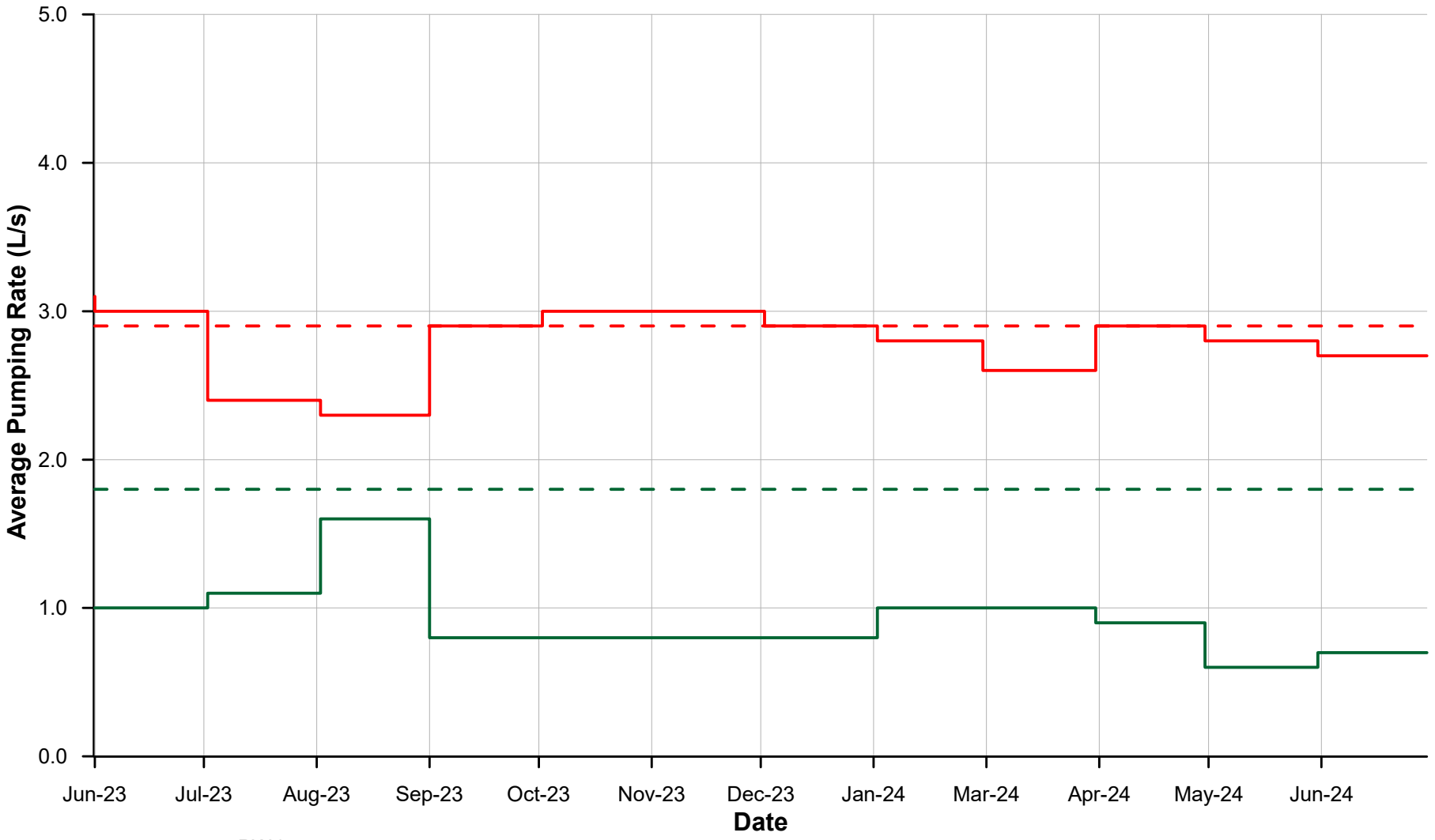


figure A.2
ON-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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.

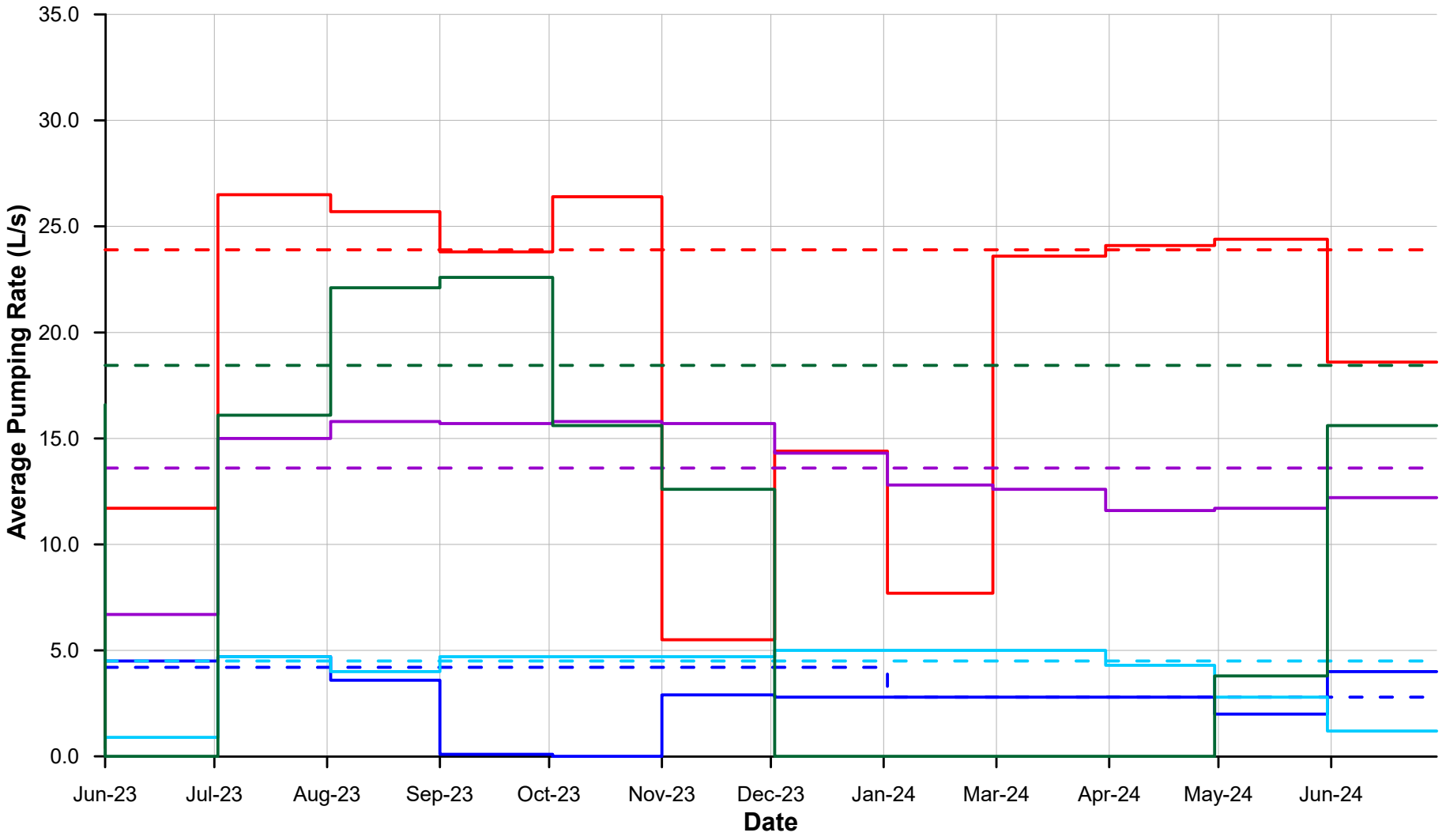


figure A.3a
OFF-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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.

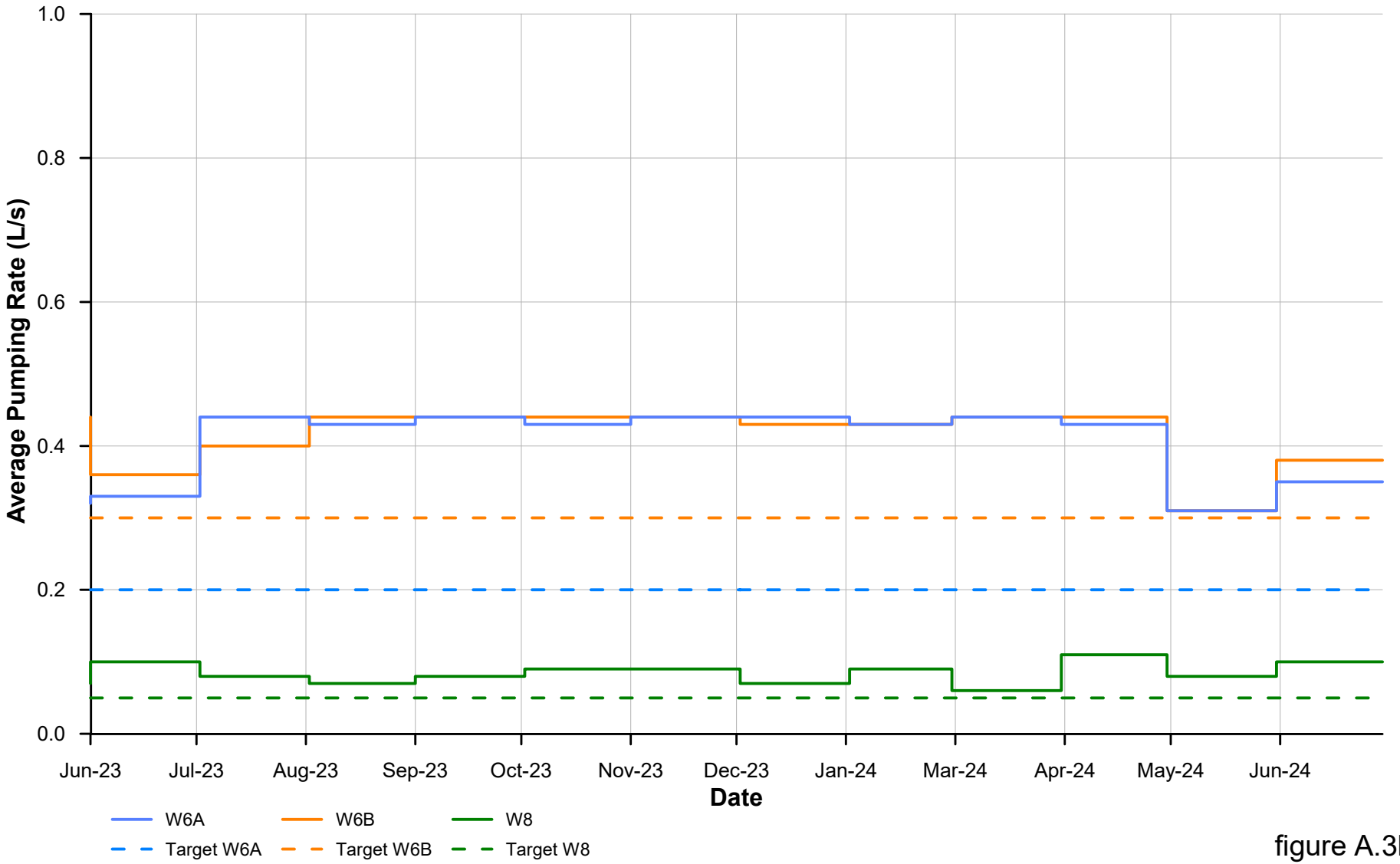


figure A.3b
OFF-SITE EXTRACTION WELL AVERAGE
VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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 - June 2024
LANXESS Canada Co./Cie
Elmira, Ontario

ON-SITE GROUNDWATER CONTAINMENT AND TREATMENT SYSTEM

June 20	Shut down at 01:45 due to a power outage, and restarted at 02:30
June 28	Shut down at 07:56 due to an unknown reason, and restarted at 08:40

OFF-SITE GROUNDWATER COLLECTION AND TREATMENT SYSTEM

W3R Groundwater Rayox System

May 31	Shut down at 00:30 due to loss of communication, and restarted June 4, 2024 at 11:16
June 5	Shut down at 13:48 due to communication issues, and restarted June 6, 2024 at 10:45
June 12	Shut down at 09:00 due to communication issues, and restarted June 13, 2024 at 15:00
June 20	Shut down at 01:45 due to a power outage, and restarted at 07:05
June 25	Shut down at 08:52 due to a power outage, and restarted at 14:57
June 28	Shut down at 07:56 due to an unknown reason, and restarted at 11:05

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

May 27	Shut down at 15:05 due to communication issues, and restarted June 3, 2024 at 15:45
June 5	Shut down at 13:48 due to communication issues, and restarted June 6, 2024 at 10:45
June 10	Shut down at 08:10 due to communication issues, and restarted at 09:25
June 12	Shut down at 09:00 due to communication issues, and restarted June 13, 2024 at 15:00
June 20	Shut down at 01:45 due to a power outage, and restarted at 02:45
June 21	Shut down at 07:45 for PLC replacement, and restarted at 14:10
June 25	Shut down at 08:52 due to a power outage, and restarted at 09:02
June 28	Shut down at 07:56 due to an unknown reason, and restarted at 09:37

W9 Groundwater Trojan UV/Oxidation System

June 20	Shut down at 01:45 due to a power outage, and restarted at 04:00
June 25	Shut down at 08:52 due to a power outage, and restarted at 19:40
June 28	Shut down at 07:56 due to an unknown reason, and restarted at 08:27

Note:

[1] Groundwater pumped by PW5 is treated in the W5A/W5B/W6A/W6B/W8 Groundwater Rayox 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]
June 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
4-Jun-24	Ammonia-N (mg/L)														0.127	0.0448	0.050	0.84[6]	0.84	0.62
10-Jun-24	Ammonia-N (mg/L)	0.201																		
4-Jun-24	Total Phosphorus (mg/L)														ND(0.0020)	0.0221	0.021	0.5	0.5	--
4-Jun-24	BOD_5 (mg/L)														ND(2.0)	ND(2.0)	ND(2.0)	15	15	--
4-Jun-24	Total Cyanide (µg/L)														ND(2)	ND(2)	ND(2)	14	14	ND(5)
4-Jun-24	Formaldehyde (µg/L)														ND(2.0)	ND(2.0)	ND(2.0)	24	24	ND(5)
10-Jun-24	Formaldehyde (µg/L)	ND(2.0)																		
4-Jun-24	pH (s.u.)														7.21	7.09	7.10	5.5 - 9.5	5.5 - 9.5	--
10-Jun-24	pH (s.u.)	7.31																		
4-Jun-24	Temperature (°C)														13.4	17.8	17.5	<25	<25	--
10-Jun-24	Temperature (°C)	11.6																		
4-Jun-24	Chlorobenzene (µg/L)		ND(0.20)	ND(0.20)	82.1	3.09	20.4	3.16	2000	6.00	ND(0.20)	16.3	1.63	3.75	1.20	ND(0.30)	0.27	10	12.0	ND(0.5)
10-Jun-24	Chlorobenzene (µg/L)	25.2																		
24-Jun-24	Chlorobenzene (µg/L)										ND(0.20) UJ	11.2 J	1.97 J	2.51 J	1.53 J	0.24 J				
4-Jun-24	Toluene (µg/L)								70.3	0.53					0.71	ND(0.20)	0.14	5	6.0	ND(0.4)
10-Jun-24	Toluene (µg/L)	ND(0.20)																		
4-Jun-24	1,1-Dichloroethane (µg/L)								0.44	ND(0.20)					ND(0.20)	ND(0.20)	ND(0.20)	10	10	ND(1)
4-Jun-24	g-BHC (Lindane) (µg/L)														ND(0.0030)	ND(0.0030)	ND(0.0030)	0.14	0.17	ND(0.003)
4-Jun-24	n-Nitrosodimethylamine (NDMA) (µg/L)										ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.0100)	ND(0.01)[7]	ND(0.01)[7]	ND(0.01)	0.14	0.17	ND(0.01)
10-Jun-24	NDMA (µg/L)	0.484																		
4-Jun-24	n-Nitrosodiethylamine (NDEA) (µg/L)														ND(0.06)[7]	ND(0.06)[7]	ND(0.06)	4	4	ND(0.06)
4-Jun-24	Nitrosomorpholine (NMOR) (µg/L)														ND(0.06)[7]	ND(0.06)[7]	ND(0.06)	4	4.8	ND(0.06)
4-Jun-24	Benzothiazole (µg/L)								96.0	ND(2.0)					ND(2.0)	ND(2.0)	ND(2.0)	4	4.8	ND(2)
10-Jun-24	Benzothiazole (µg/L)	ND(2.0)																		
4-Jun-24	Carboxin (µg/L)								62.8	0.453					ND(0.100)	ND(0.100)	ND(0.100)	7	8.4	ND(2)

SS+890 Discharge (GE) Flow Rate	36.02 L/s
Shirt Factory Creek Discharge (SFE) Flow Rate	2.33 L/s
Total Combined Discharge Effluent Flow	38.36 L/s

Table A.2

Combined On-Site and Off-Site Groundwater Containment and Treatment System
Analytical Results [1]
June 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.		
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.		

Table A.3

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

Date	On-Site Flow Rate [1] (L/s)	Off-Site Flow Rate [2] (L/s)	ATS Influent Flow Rate [3] (L/s)	W3R Bypass Flow Rate (L/s)	W9 Bypass Flow Rate (L/s)	SS+890 Discharge Flow Rate (L/s)	Shirt Factory Creek Discharge Flow Rate (L/s)	Total Combined Discharge Effluent Flow Rate [4] (L/s)
6/1/2024	3.7	12.6	3.8	0.0	12.6	16.4	0.00	16.4
6/2/2024	3.7	12.6	3.8	0.0	12.6	16.4	0.00	16.4
6/3/2024	3.7	15.1	6.4	0.0	12.6	19.0	0.00	19.0
6/4/2024	3.7	30.2	11.4	10.1	12.6	31.5	2.52	34.1
6/5/2024	3.7	34.6	8.5	17.4	12.5	35.9	2.56	38.5
6/6/2024	3.7	41.0	14.2	18.1	12.5	41.5	3.34	44.8
6/7/2024	3.7	40.3	12.7	18.9	12.6	40.4	3.85	44.2
6/8/2024	3.6	40.0	12.6	18.9	12.6	40.4	3.67	44.0
6/9/2024	3.6	40.3	12.8	18.9	12.6	40.5	3.76	44.3
6/10/2024	3.6	40.0	12.5	18.9	12.6	40.2	3.70	43.9
6/11/2024	3.6	40.5	13.0	18.9	12.5	40.2	4.24	44.4
6/12/2024	3.6	25.8	8.2	9.4	12.1	28.3	1.38	29.7
6/13/2024	3.5	23.5	7.4	7.9	12.1	25.6	1.74	27.3
6/14/2024	3.5	39.2	11.8	18.9	12.3	40.3	2.75	43.0
6/15/2024	3.5	39.7	12.5	18.9	12.2	40.3	3.28	43.5
6/16/2024	3.5	39.0	11.8	18.9	12.1	40.4	2.41	42.8
6/17/2024	3.5	37.5	10.4	18.9	12.0	40.3	1.00	41.3
6/18/2024	3.6	37.4	10.4	18.9	11.9	40.3	0.96	41.3
6/19/2024	3.4	37.3	10.3	18.9	11.8	40.1	0.96	41.0
6/20/2024	2.8	30.6	7.7	14.7	11.3	33.3	0.46	33.8
6/21/2024	3.3	38.1	10.3	18.9	12.6	40.3	1.54	41.8
6/22/2024	3.5	38.1	10.4	18.9	12.6	40.2	1.65	41.9
6/23/2024	3.6	37.9	10.5	18.9	12.5	40.1	1.74	41.9
6/24/2024	2.9	37.8	9.8	18.9	12.3	40.4	0.57	41.0
6/25/2024	3.6	29.0	11.9	14.0	7.0	31.9	1.03	32.9
6/26/2024	3.6	40.5	12.9	18.9	12.6	40.0	4.40	44.4
6/27/2024	3.5	40.2	12.5	18.9	12.6	39.8	4.28	44.1
6/28/2024	3.4	36.9	11.9	16.3	12.3	36.9	3.70	40.6
6/29/2024	3.6	40.2	12.6	18.9	12.6	40.0	4.15	44.2
6/30/2024	3.6	40.2	12.6	18.9	12.6	39.8	4.30	44.1
Average	**3.5**	**34.5**	**10.6**	**15.6**	**12.2**	**36.0**	**2.33**	**38.4**
Minimum	**2.8**	**12.6**	**3.8**	**0.0**	**7.0**	**16.4**	**0.00**	**16.4**
Maximum	**3.7**	**41.0**	**14.2**	**18.9**	**12.6**	**41.5**	**4.40**	**44.8**

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
June 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:	UA500I	UA500CE	UA560I	UA560CE	GCI	GCE
Sample Date:	**6/4/2024**	**6/4/2024**	**6/4/2024**	**6/4/2024**	**6/4/2024**	**6/4/2024**
Parameter [µg/L]						
Volatile Organic Compounds (VOCs)						
Benzene	14.9	4.08	10.6	26.8	9.50	ND(0.20)
Chlorobenzene	642	50.2	296	242	2000	6.00
1,1-Dichloroethane	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	0.44	ND(0.20)
Ethylbenzene	59.0	3.39	48.9	4.87	11.1	ND(0.20)
Toluene	1880	380	1280	2560	70.3	0.53
m/p-Xylenes [1]	102	4.92	118	6.98	10.8	ND(0.40)
o-Xylene [1]	62.6	3.48	67.6	4.47	6.38	ND(0.20)
Base/Neutral and Acid Extractable Compounds (BNAs)						
Aniline	699	294	650	1360	48.5	ND(2.0) UJ
Benzothiazole	1780	54.2	23.6	5.7	96.0	ND(2.0)
Carboxin (Oxathiin)	1360	81.1	870	12.6	62.8	0.453
2-Chlorophenol	5.94	1.70	0.33	13.8	3.71	ND(0.30)
2-Mercaptobenzothiazole	3040	150	29	ND(25)	298	ND(20)
2,4-Dichlorophenol	20.4 J+	2.34 J+	ND(0.40)	ND(1.00)	0.50 J+	ND(0.20)
2,6-Dichlorophenol	1.96	0.34	ND(0.20)	0.27	0.38	ND(0.20)
2,4,5-Trichlorophenol	10.5	0.80	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
2,4,6-Trichlorophenol	3.03	0.42	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.
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, 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

Off-Site Groundwater Collection and Treatment System
Influent Broad Scan Analytical Results - June 2024
LANXESS Canada Co./Cie
Elmira, Ontario

	Sample Station
Parameter [µg/L unless otherwise noted] [1]	**W3R**
General Chemistry	
Ammonia as N (mg/L)	0.201
Formaldehyde	ND(2.0)
pH (field)	7.31
Temperature (field) (^{o}C)	11.6
Volatile Organic Compounds (VOCs)	
Benzene	ND(0.20)
Chlorobenzene	25.2
Toluene	ND(0.20)
Base/Neutral/Acid Extractables and Nitrosoamines	
Aniline	ND(2.0)
Benzothiazole	ND(2.0)
n-Nitrosodimethylamine (NDMA)	0.484
Metals (mg/L)	
Aluminum	0.0086
Arsenic	0.00315
Beryllium	ND(0.000020)
Boron	0.054
Chromium	ND(0.00050)
Cobalt	0.00014
Copper	ND(0.00050)
Iron	1.04
Lead	ND(0.000050)
Nickel	ND(0.00050)
Vanadium	ND(0.00050)
Zinc	ND(0.0030)

Notes:

ND(RDL) Not detected at the associated reporting detection limit.
[1] Analyses completed by ALS Canada Ltd. unless otherwise noted.

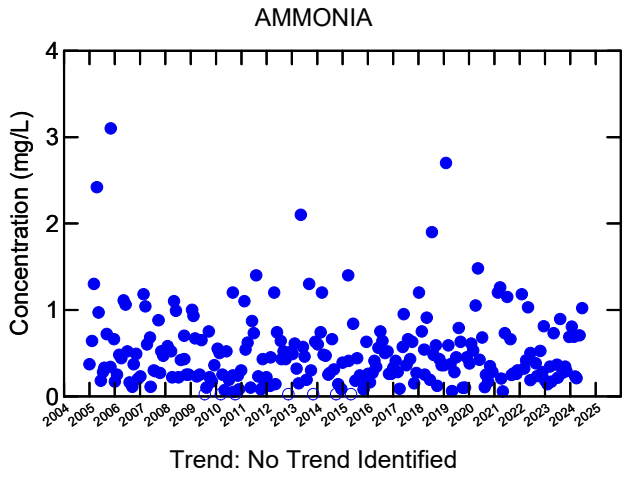
Table A.6

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

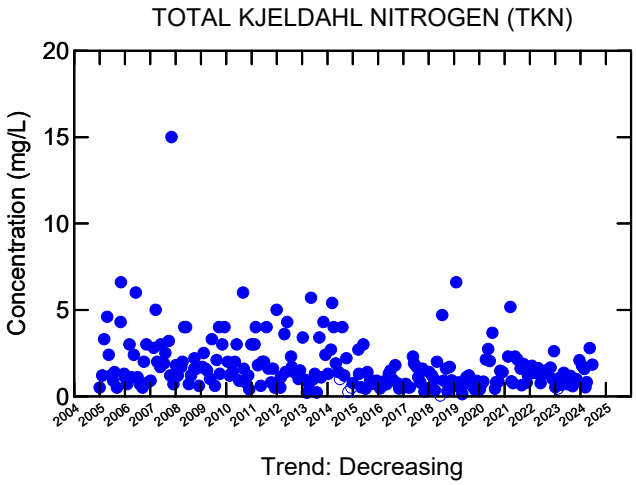
Start Date	Description	Work Type
06/06/2024	Check Fuses in Bldg. #62 North Aeration Pump	Electrical
06/06/2024	Communication from Bldg. #20 to W4	Instrumentation
06/06/2024	ATS South RAS Pump Turning but Not Pumping	Mechanical
06/07/2024	W6A Well Level Transmitter PV Won't Run	Instrumentation
06/11/2024	Change UA Carbon Drum U+560	Piping
06/18/2024	Check 62-LSHH-890 (62TA-03) - Bldg. #62 South Sump Level High-High Switch	Instrumentation
06/19/2024	Repair E7 South Compressor	Mechanical
06/20/2024	Repair Leak on North Carbon Adsorber in Bldg. #44D	Piping
06/26/2024	Check Communication with W9 and W8	Instrumentation

Attachment B

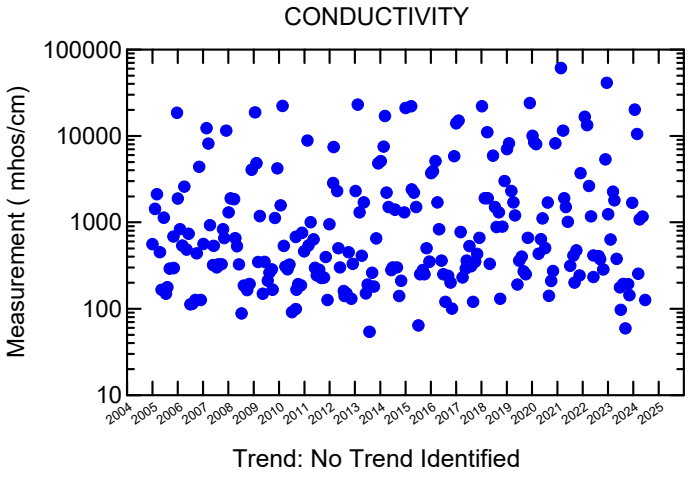
EAB Data



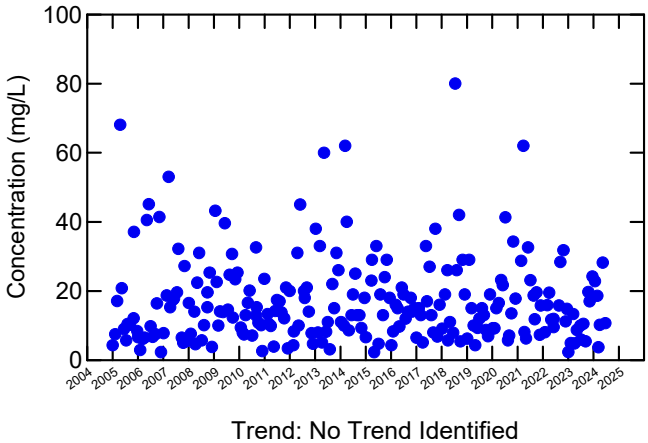
Trend: No Trend Identified



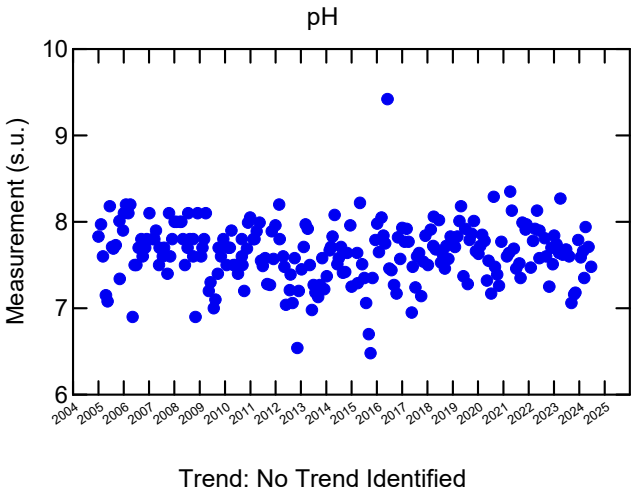
Trend: Decreasing



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.

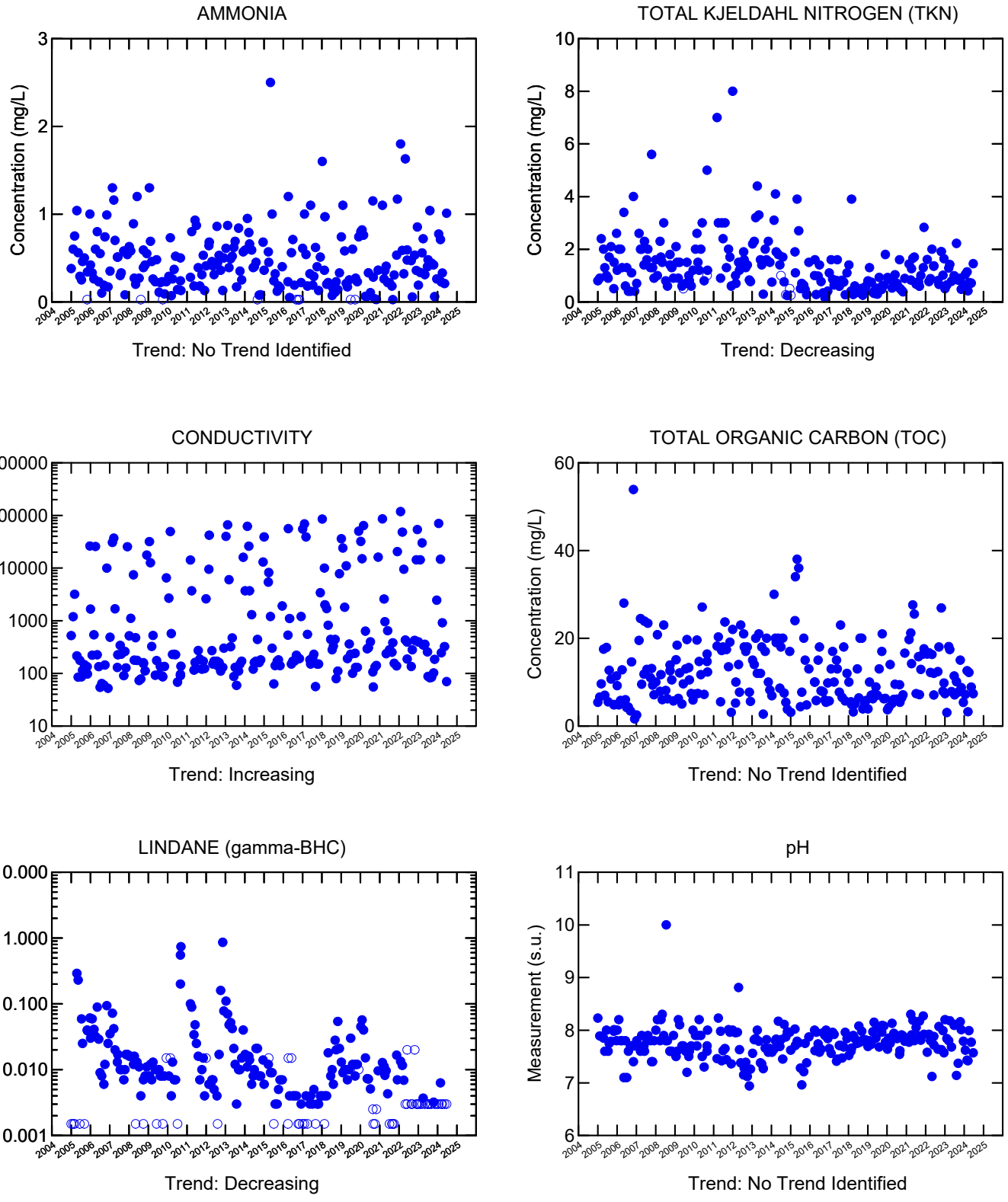
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0200

Project No. **11192137-38**
Date: **July 11, 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.

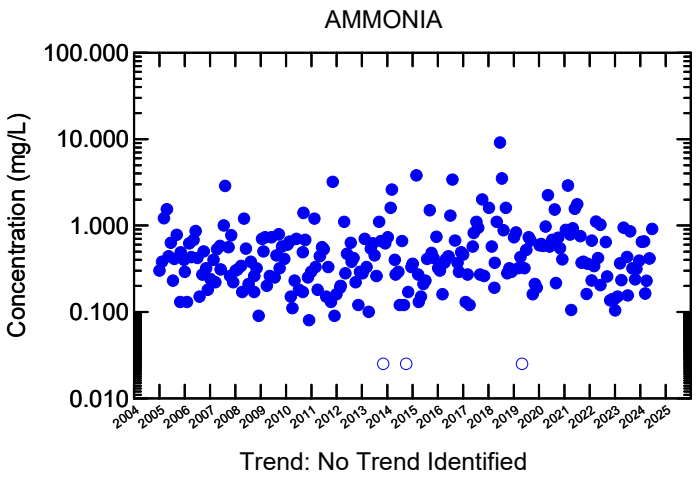
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

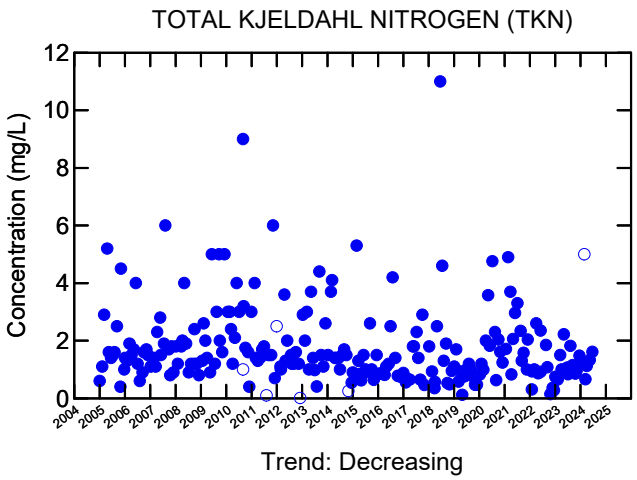
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0400

Project No. **11192137-38**
Date: **July 11, 2024**

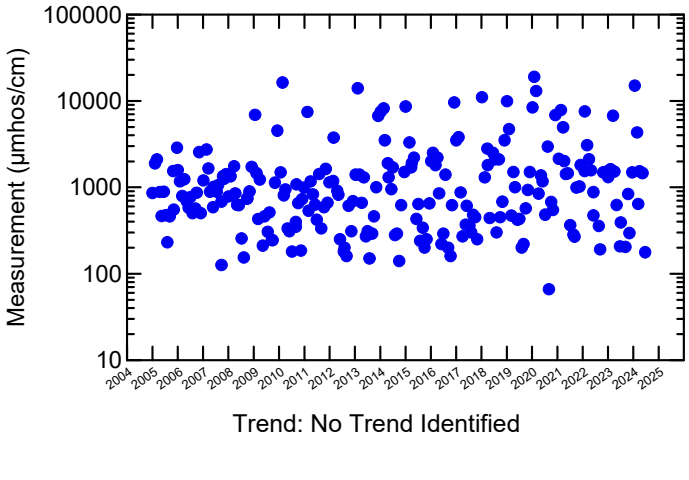
FIGURE B.2



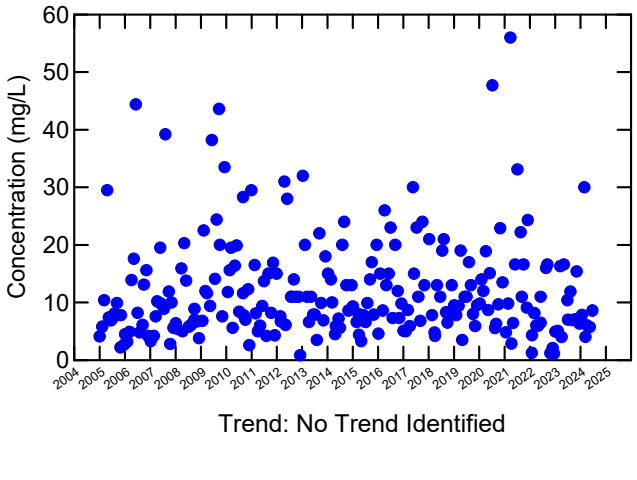
Trend: No Trend Identified



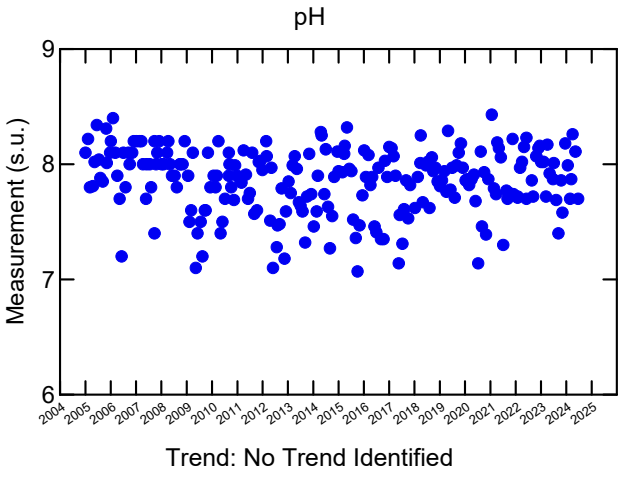
Trend: Decreasing



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.

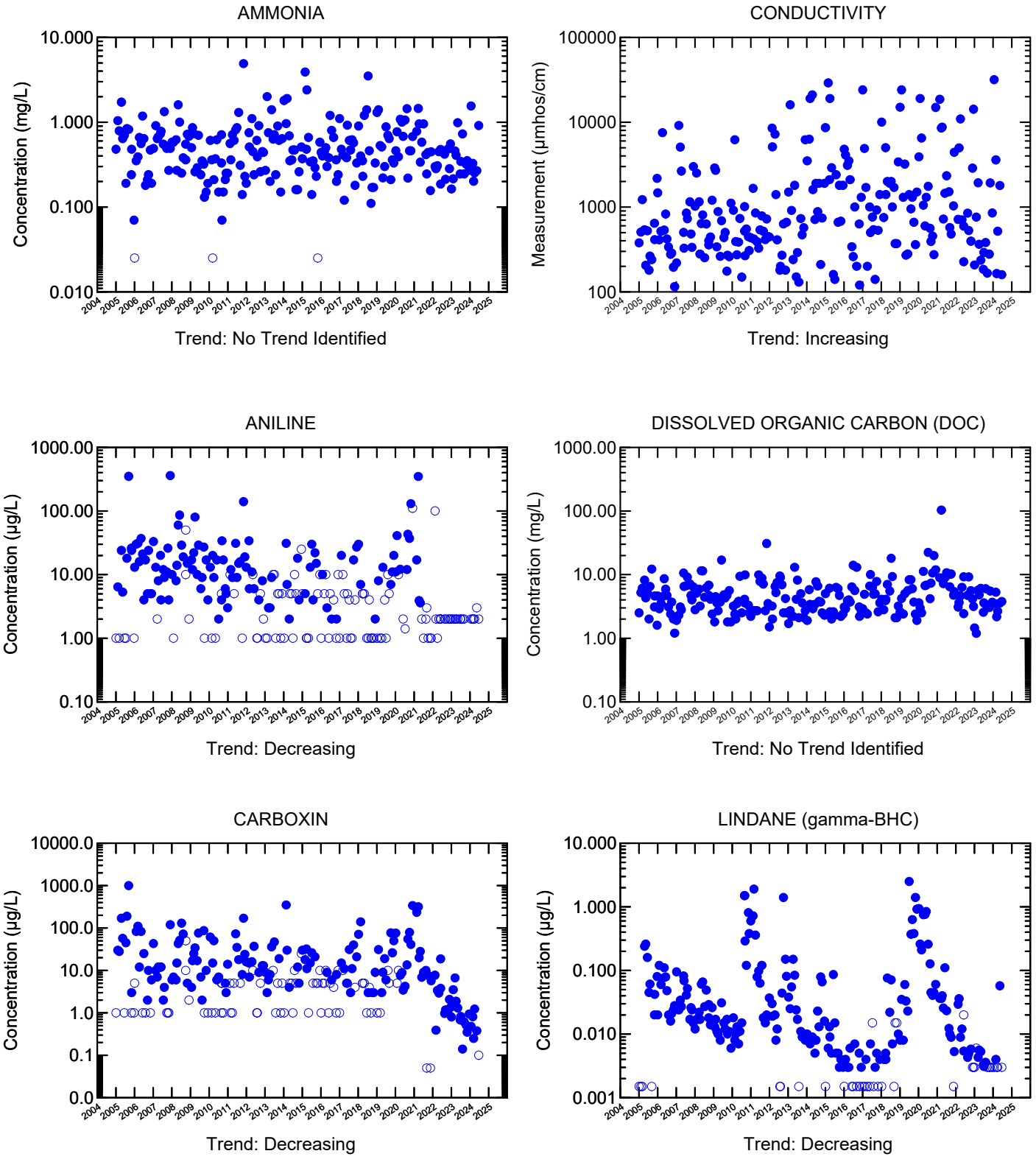
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0800

Project No. **11192137-38**
Date: **July 11, 2024**

FIGURE B.3



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.

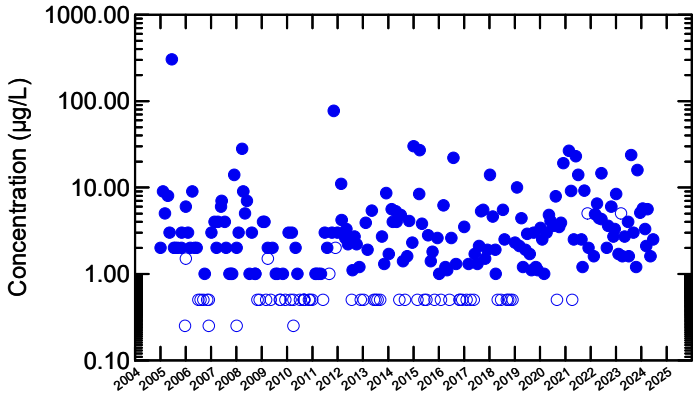
LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER SEWER

Project No. **11192137-38**
Date: **July 11, 2024**

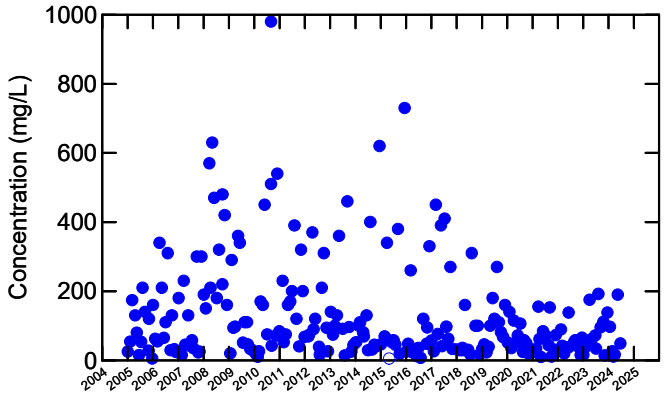
FIGURE B.4

PHENOLICS (TOTAL)



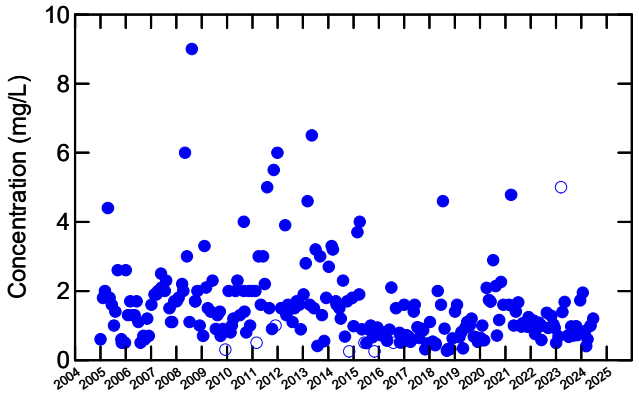
Trend: Increasing

TOTAL SUSPENDED SOLIDS (TSS)



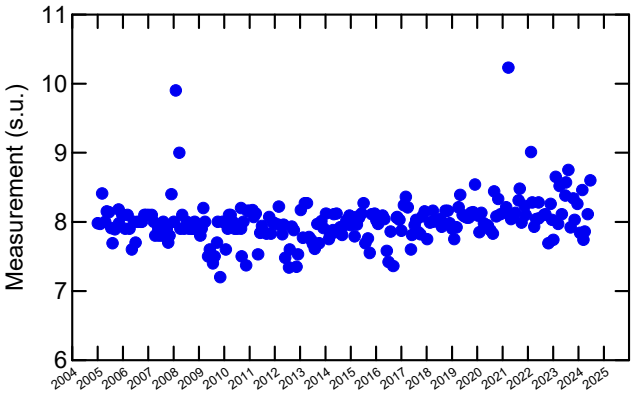
Trend: Decreasing

TOTAL KJELDAHL NITROGEN (TKN)



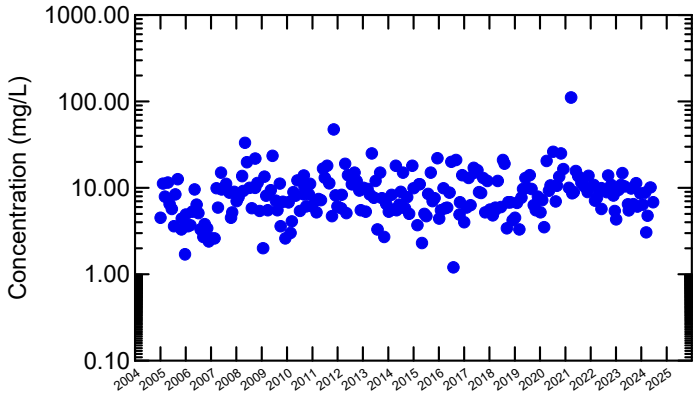
Trend: Decreasing

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: **July 11, 2024**

FIGURE B.5

Table B.1

Environmental Appeal Board (EAB)
Analytical Results - June 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 062224**	**0200 062224**	**0400 062224**	**0800 062224**
Sample Date:		**6/22/2024**	**6/22/2024**	**6/22/2024**	**6/22/2024**
Parameters	**Units**				
General Chemistry					
Ammonia-N	mg/L	0.912	1.02	1.01	0.913
Conductivity	umhos/cm	159	126	69.7	177
Cyanide (total)	mg/L	ND(0.0020)	ND(0.0020)	ND(0.0020)	ND(0.0020)
Dissolved organic carbon (DOC) (dissolved)	mg/L	3.77 J	--	--	--
pH, lab	s.u.	8.60	7.48	7.57	7.70
Phenolics (total)	mg/L	0.0025	--	--	--
Sulfide	mg/L	ND(0.010)	ND(0.010)	ND(0.010)	ND(0.010)
Total kjeldahl nitrogen (TKN)	mg/L	1.20	1.83	1.45	1.61
Total organic carbon (TOC)	mg/L	6.81	10.7	7.37	8.60
Total suspended solids (TSS)	mg/L	48.6	--	--	--
Herbicides					
2,4,5-TP (Silvex)	µg/L	ND(0.250)	ND(0.250)	ND(0.250)	ND(0.250)
2,4-DB	µg/L	ND(0.250)	ND(0.250)	ND(0.250)	ND(0.500)
2,4-Dichlorophenoxyacetic acid (2,4-D)	µg/L	ND(0.250)	ND(0.250)	ND(0.250)	ND(0.500)
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)	ND(2.0)	ND(2.0)	ND(2.0)
Benzothiazole	µg/L	ND(2.0)	ND(2.0)	ND(2.0)	ND(2.0)
Carboxin	µg/L	ND(0.100)	0.110	ND(0.100)	ND(0.100)
N-Nitrosodiethylamine	µg/L	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)
N-Nitrosodimethylamine	µg/L	0.02	0.01	0.02	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	3.56 J+	0.48 J+	1.58 J+	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.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
--	The parameter was not analyzed for.

Attachment C

Upper Aquifer Hydraulic Containment Requirements

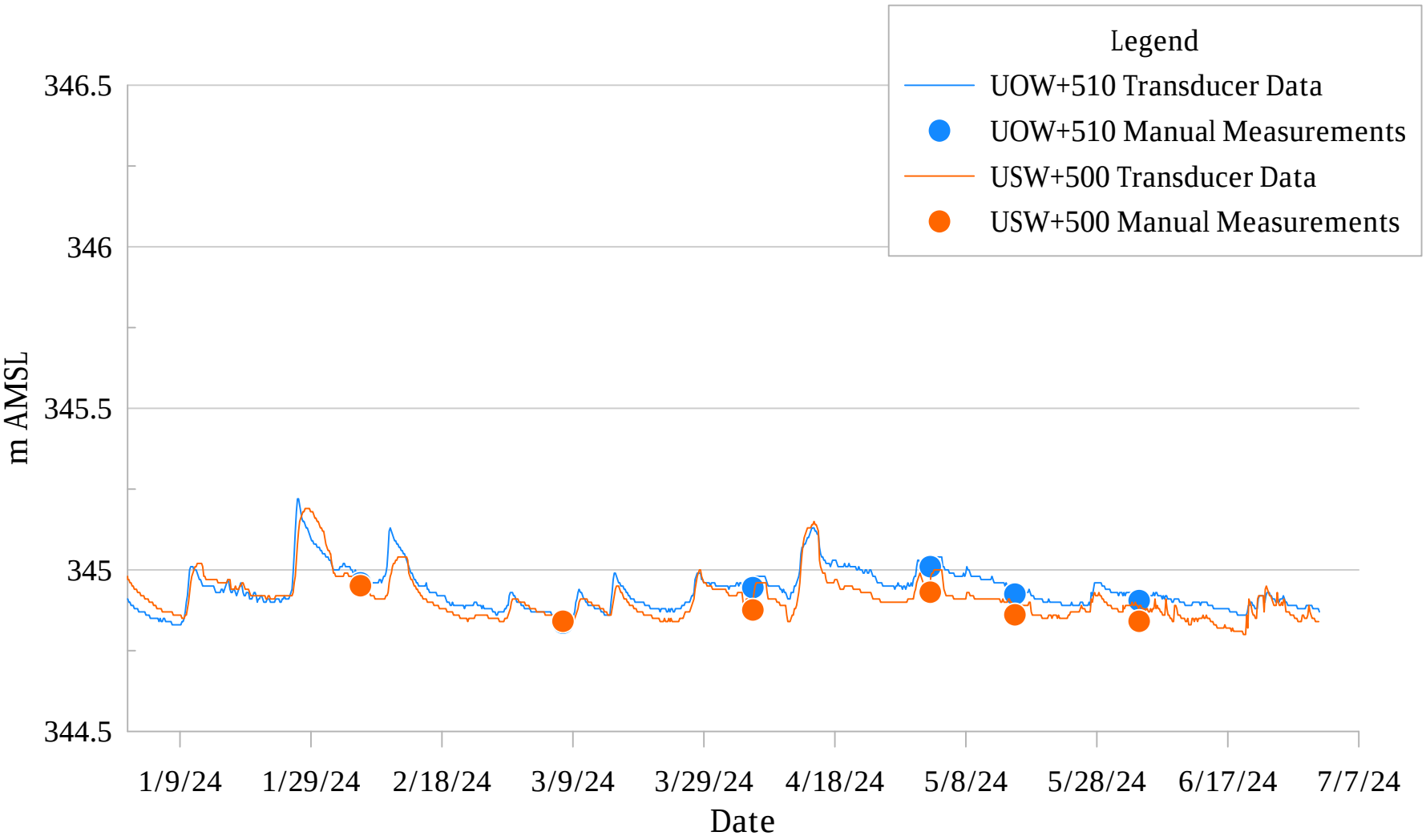
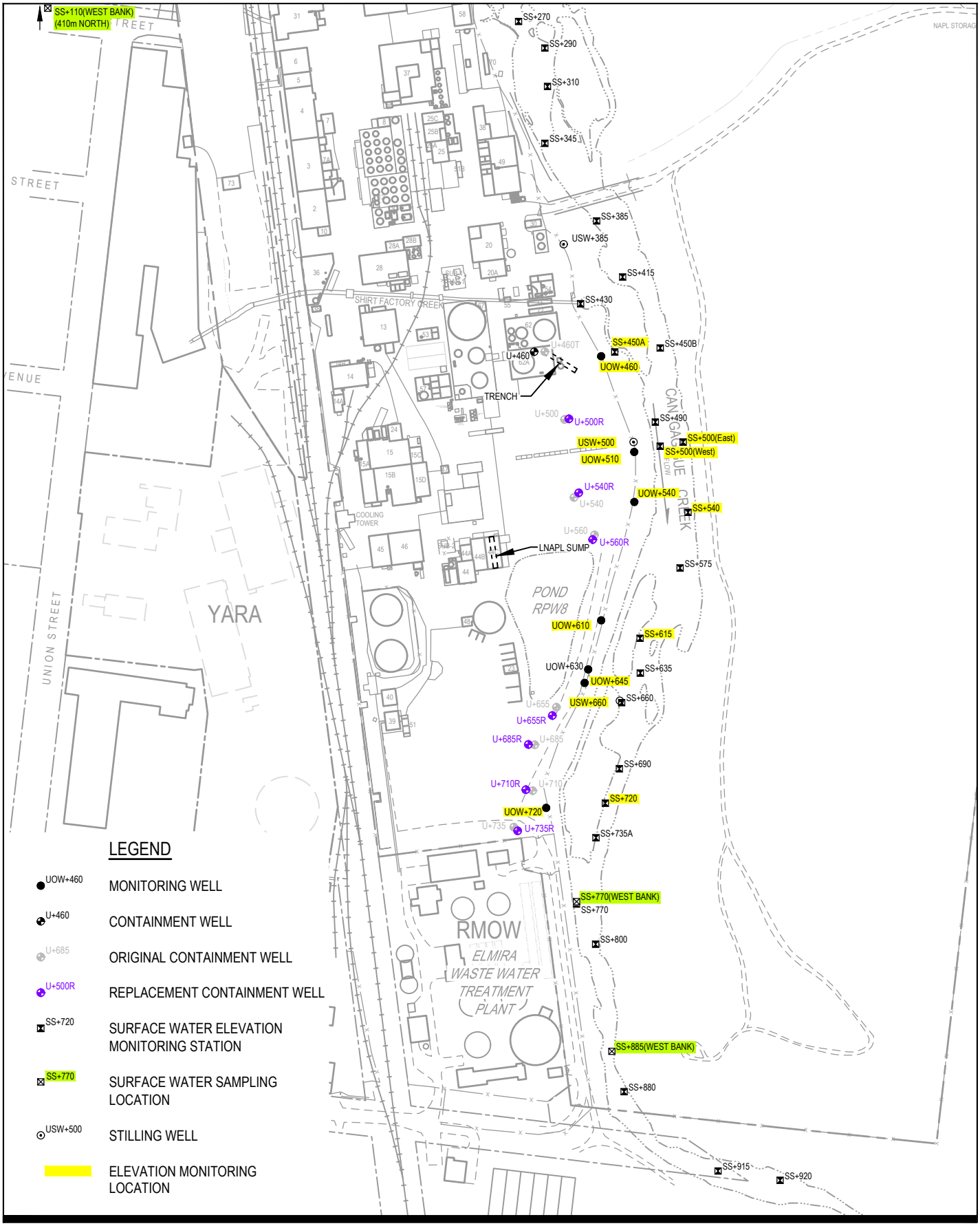


Figure C.1
2024 HYDROGRAPH - UOW+510 VS USW+500
LANXESS CANADA CO./CIE.
Elmira, Ontario



LEGEND

- UOW+460 — MONITORING WELL
- U+460 — CONTAINMENT WELL
- U+685 — ORIGINAL CONTAINMENT WELL
- U+500R — REPLACEMENT CONTAINMENT WELL
- SS+720 — SURFACE WATER ELEVATION MONITORING STATION
- SS+770 — SURFACE WATER SAMPLING LOCATION
- USW+500 — STILLING WELL
- ELEVATION MONITORING LOCATION

0 30 60 90m

Coordinate System: UTM NAD 27

N

GHD

LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

Project No. **11192137**
Date **June 2024**

SURFACE WATER SAMPLING AND ELEVATION MONITORING LOCATIONS

FIGURE C.2

Filename: N:\CA\Waterloo\Projects\662\11192137\Digital_Design\ACAD 2020\Figures\LTR-GEMP2024JUNE-DIR057\11192137-GHD-00-00-LTR-EN-D102_WA-GEMP2024JUNE-DIR057.dwg
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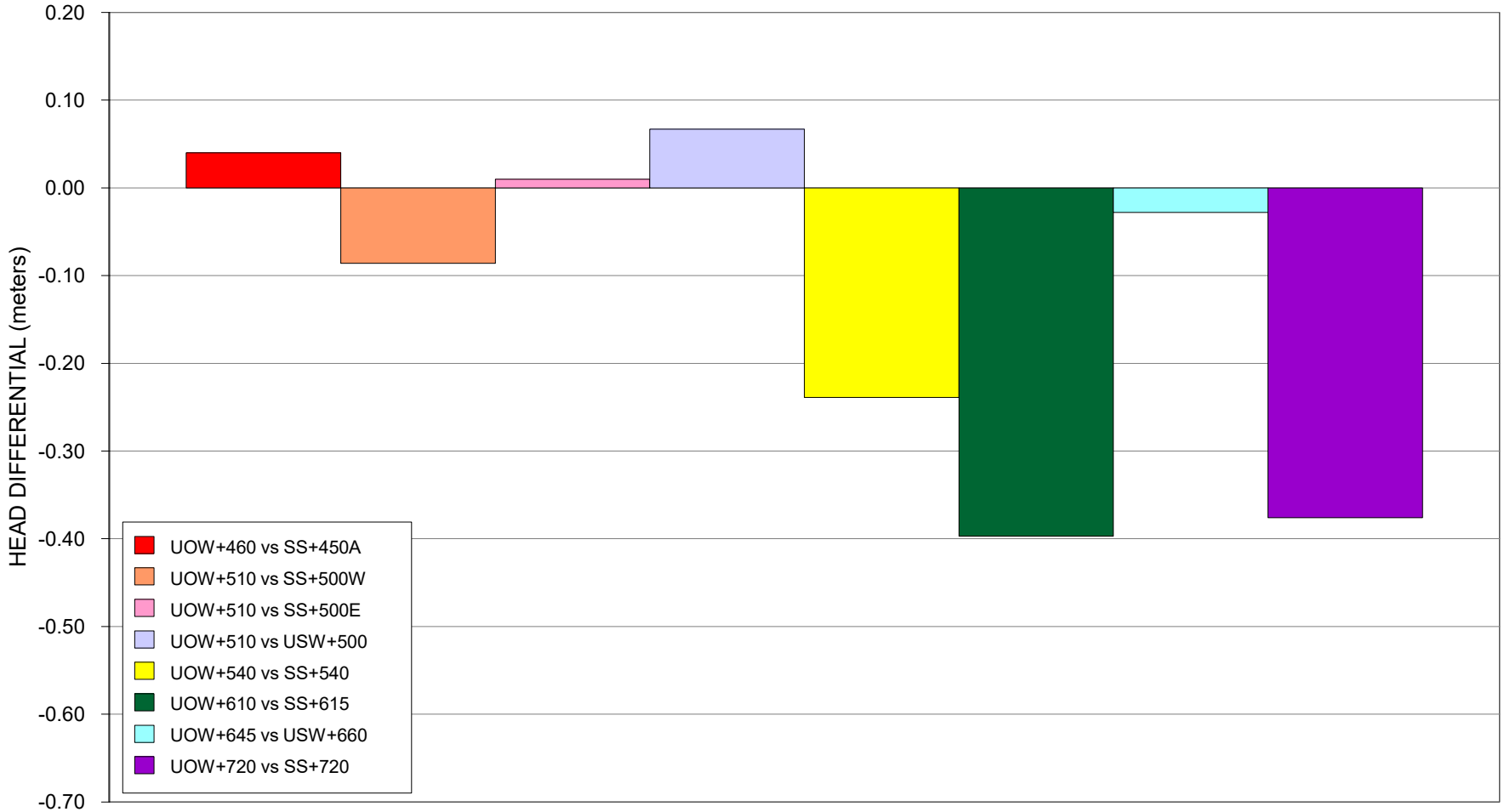

figure C.3
HEAD DIFFERENTIAL AT KEY MONITORING PAIRS - JUNE 3, 2024
UPPER AQUIFER CONTAINMENT SYSTEM
LANXESS CANADA CO./CIE
Elmira, Ontario

11192137(DIRE057)GIS-OT003 July 04, 2024

Table C.1

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

Flow [2] = 470 L/s	Units	PWQO		ECA	Sample Location	SS-110 West (Upstream)	SS+770 West	SS+855 West
		Status	Value	Schd. E Criteria				
General Chemistry								
Ammonia as N	mg/L					0.208	0.212	0.209
Un-ionized Ammonia	mg/L	PWQO	0.020	0.016		0.0092	0.0145	0.0128
Temperature °C (Field)	°C					17.66	18.70	18.33
pH (Field)	su	PWQO	6.5-8.5			8.14	8.31	8.27
Volatile Organic Compounds (VOCs)								
All 7 VOCs Analyzed						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
2,4,6-Trichlorophenol	µg/L	PWQO	18	2.6		ND(0.20)	ND(0.20)	0.21
Aniline	µg/L	IPWQO	2	4.0		ND(2.0) UJ	ND(2.0) UJ	ND(2.0) UJ
Remaining 14 BNAs Analyzed						ND	ND	ND
Pesticides & Herbicides								
All 2 Pesticide and Herbicide Analyzed						ND	ND	ND

Notes:

[1] Samples were collected on June 3, 2024.
[2] Flow measurement was obtained from the Grand River Conservation Authority (GRCA) Elmira (Arthur Street) gauge.
L/s Litres per second.
PWQO Provincial Water Quality Objective, MOE, February 1999.
IPWQO Interim Provincial Water Quality Objective, MOE, February 1999.
ND 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.

455 Phillip Street, Unit 100A
Waterloo, Ontario N2L 3X2
Canada
ghd.com

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

Luis Almeida
Project Manager

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luis.almeida@ghd.com

AB/kf/58

Encl.

Copy to: Jason Rice, MECP
Helder Botelho, LANXESS
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LANXESS Public Distribution List
Esther Wearing, MECP
Jamie Petznick, LANXESS
Michelle Yantzi, LANXESS

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 Page 1
2. Correspondence, Meetings, and Events Page 1
3. CTS Monitoring and Performance Page 1
4. Remedial Action Plan Page 5
5. E7 AOP Page 5
6. Environmental Audit Page 5
7. Remediation of Former Operating Pond Area Page 5
8. Additional Work/Studies Page 5

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.

---

[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.

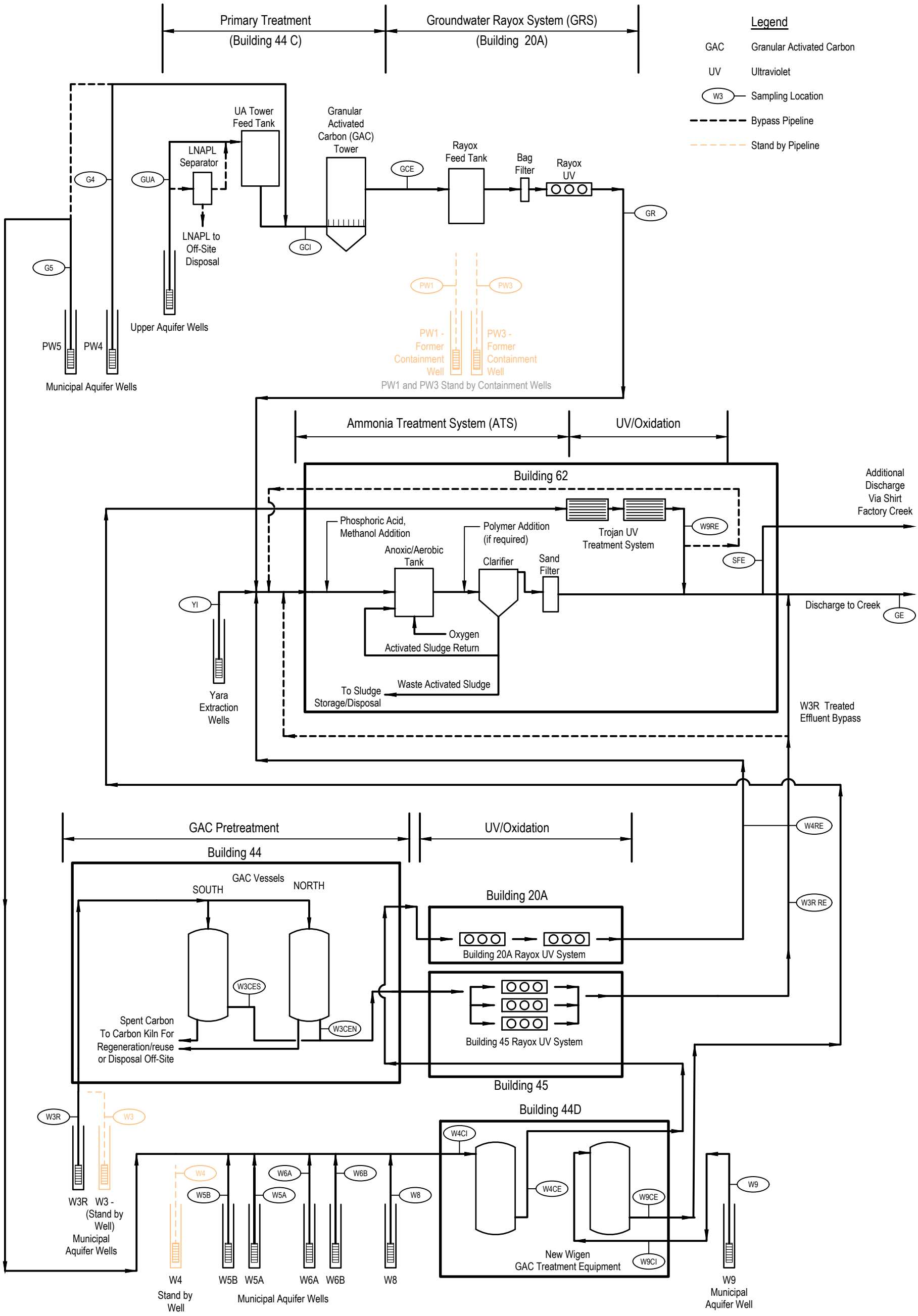
Table 1

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

Filename: N:\CA\Waterloo\Projects\662\11192137\Digital_Design\ACAD 2020\Figures\LTR-GEMP2024JULY-DIR058\11192137-GHD-00-00-LTR-EN-D101_WA-GEMP2024JULY-DIR058.dwg
Plot Date: 08 August 2024 9:00 AM

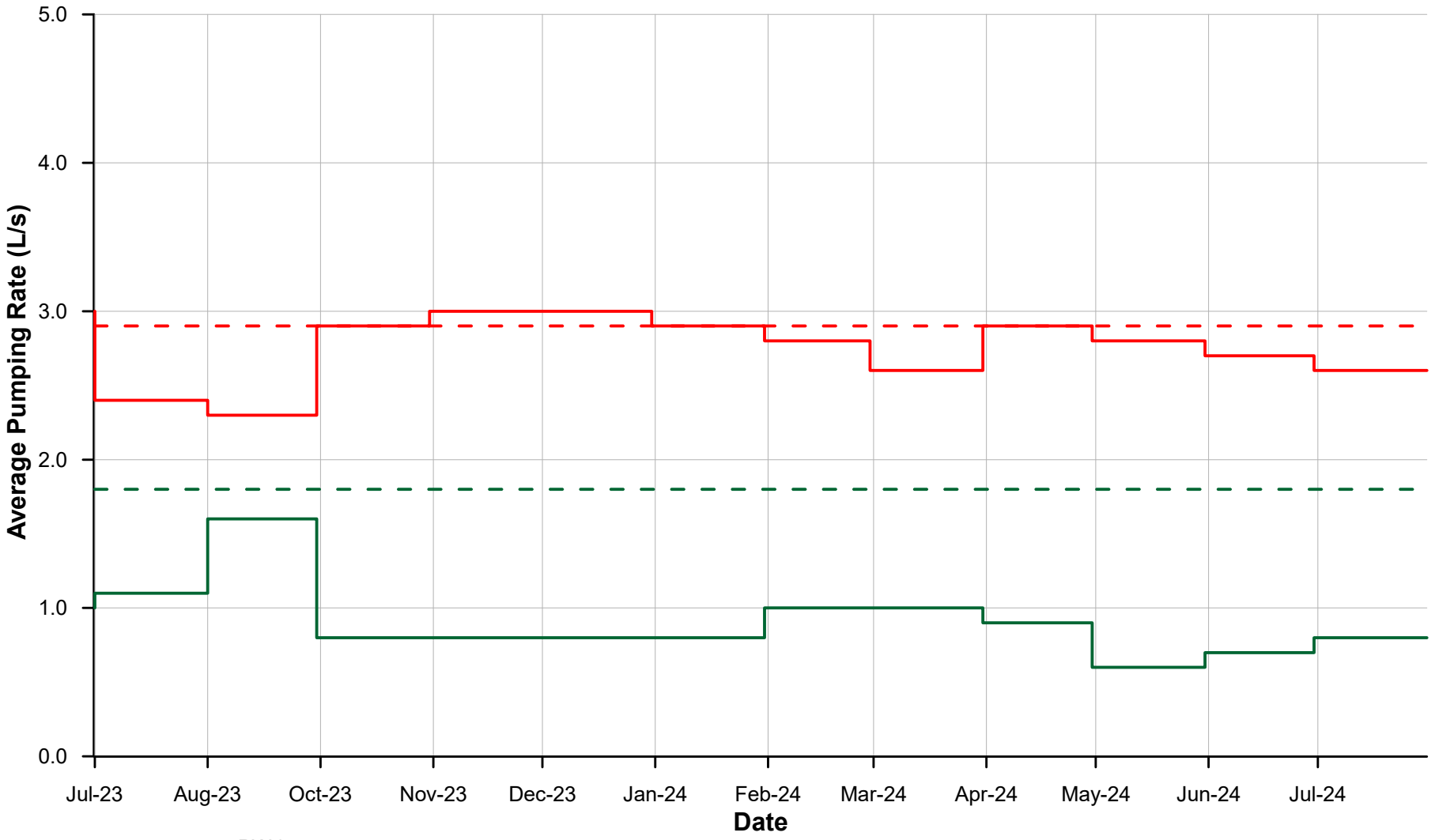


figure A.2

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.

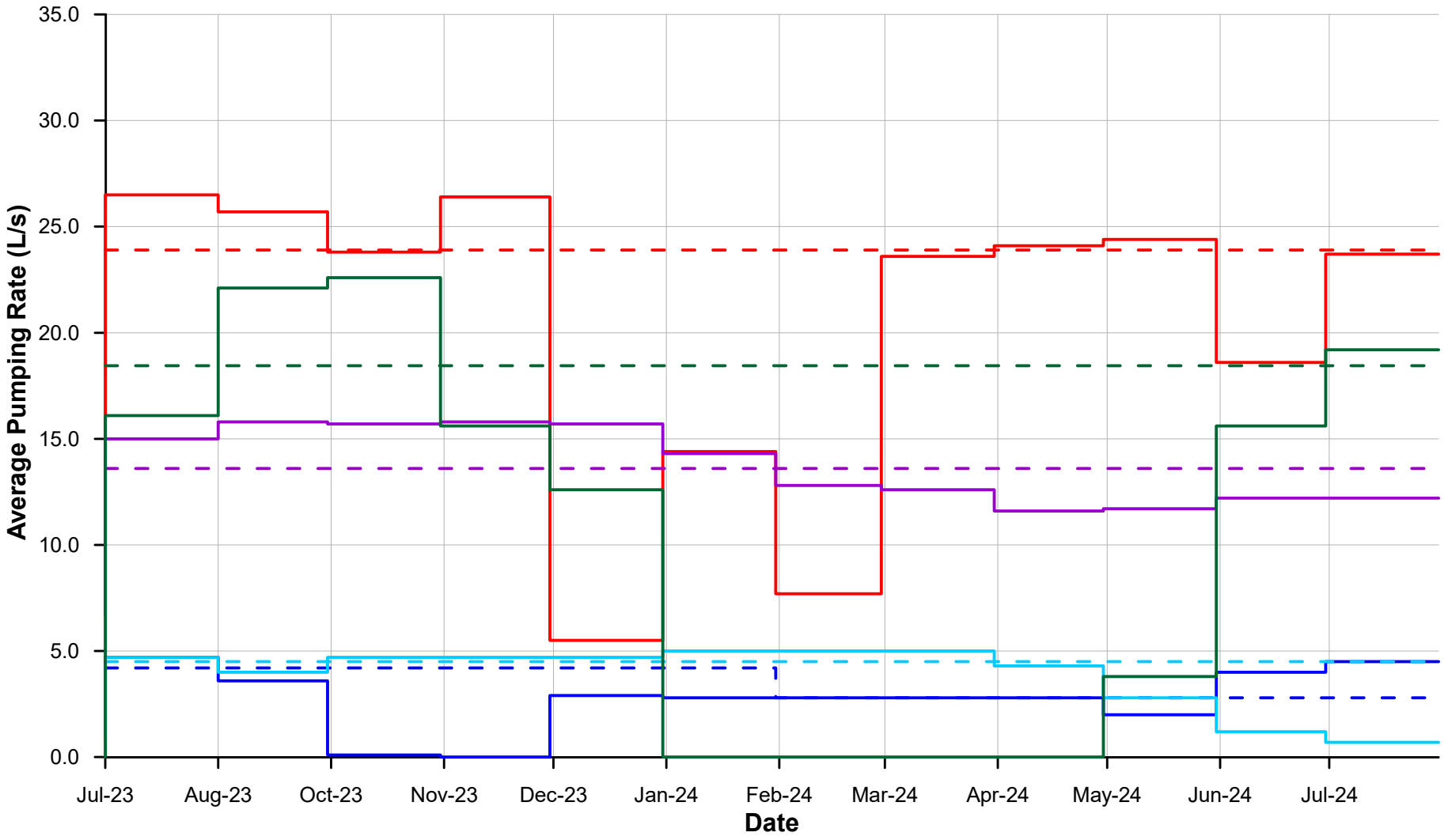


figure A.3a
OFF-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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.

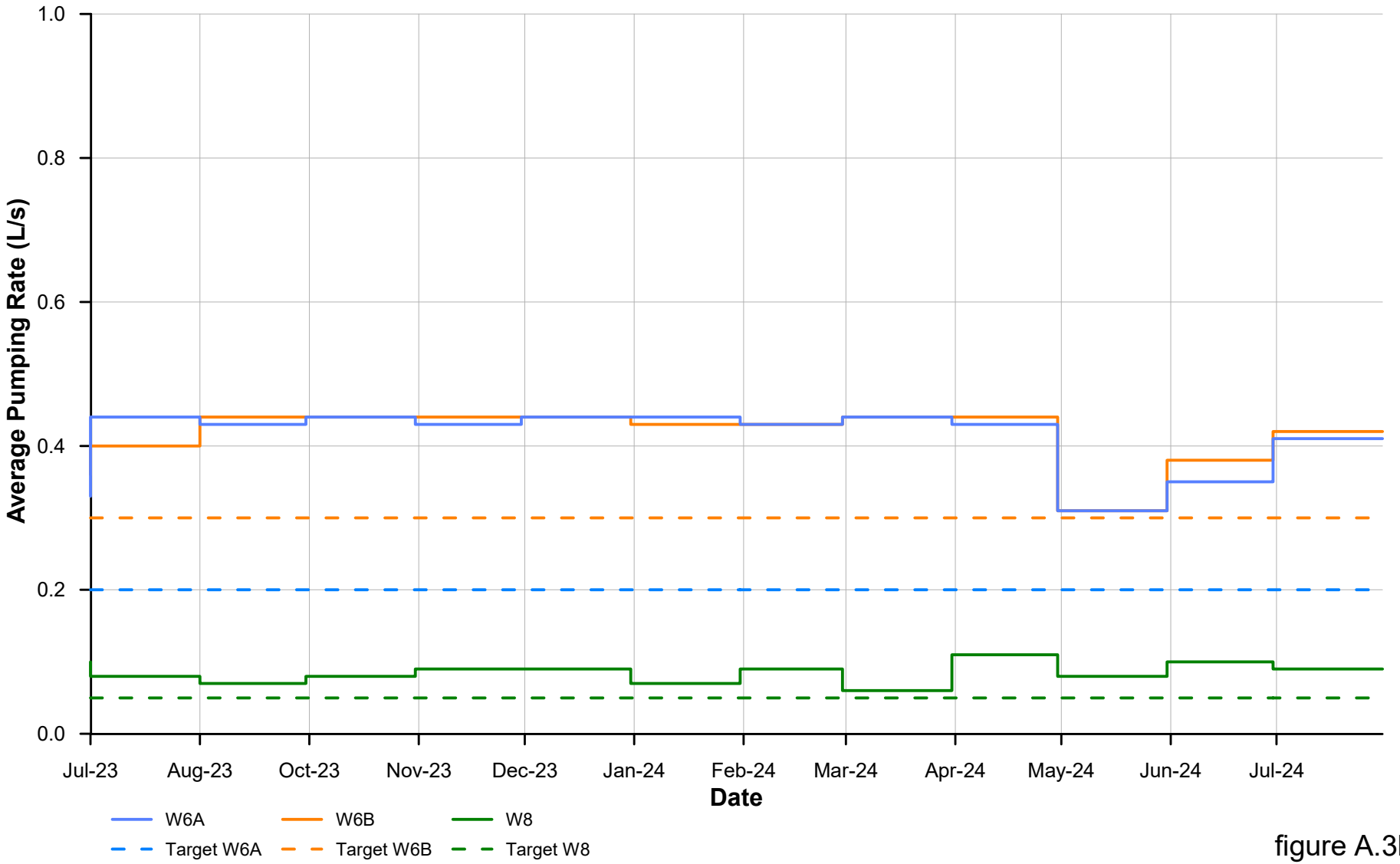


figure A.3b
OFF-SITE EXTRACTION WELL AVERAGE
VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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	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

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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

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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

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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

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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/DT
Date:	2024/07/02
Time:	14:10
Storage Location:	
Storage Temp (°C):	

Please list any special requests or instructions:

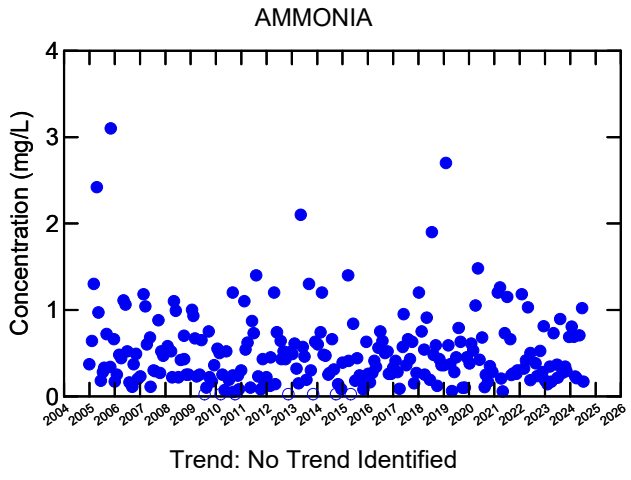
ACUTE TOXICITY

Standard COC rev 3 2019 09 01 TC

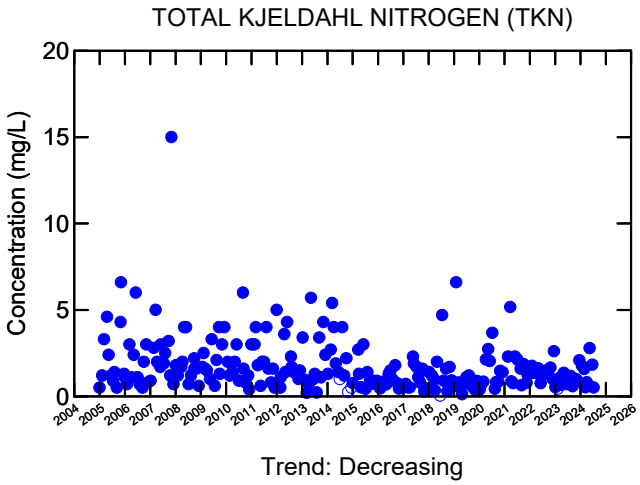
149

Attachment B

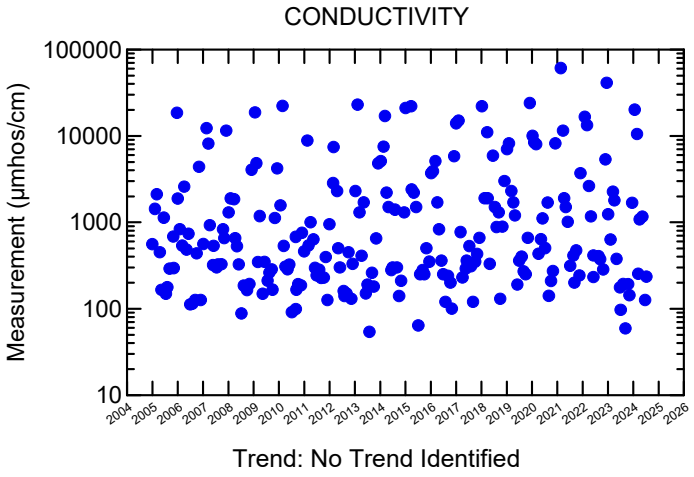
EAB Data



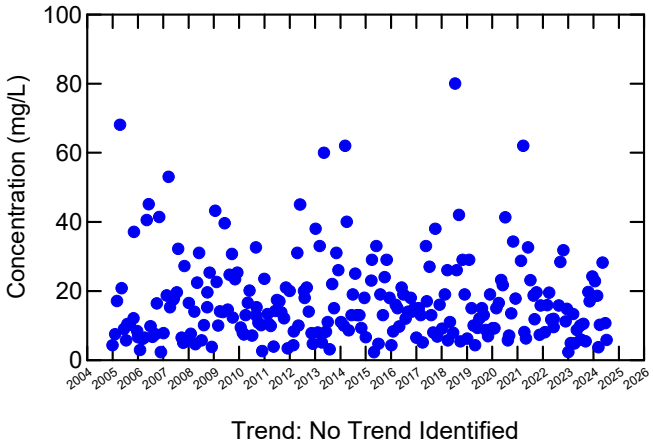
Trend: No Trend Identified



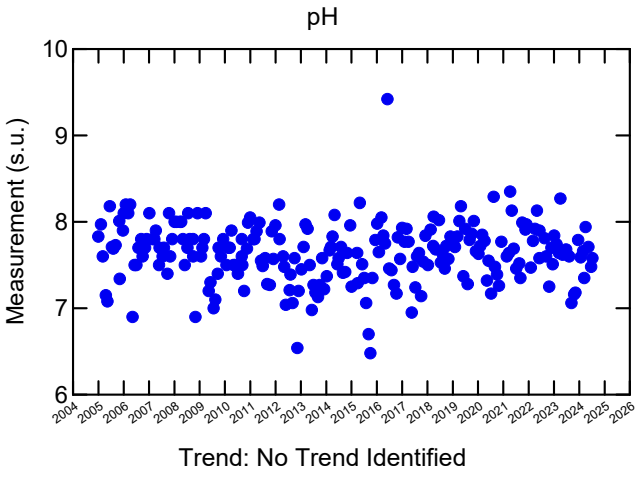
Trend: Decreasing



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.

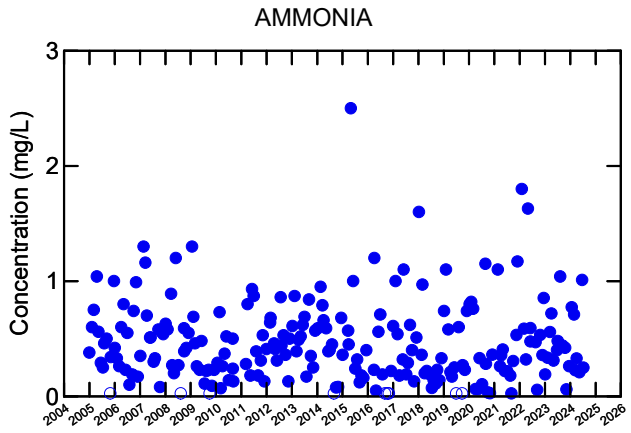
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

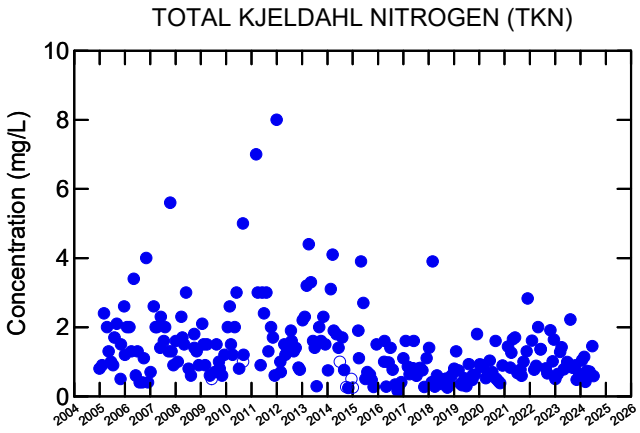
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0200

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

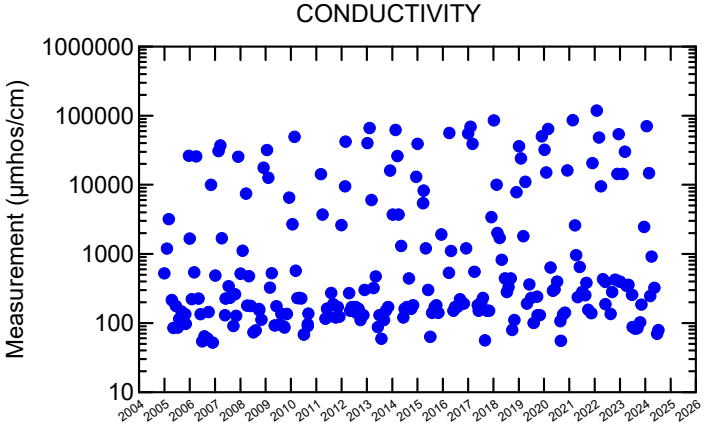
FIGURE B.1



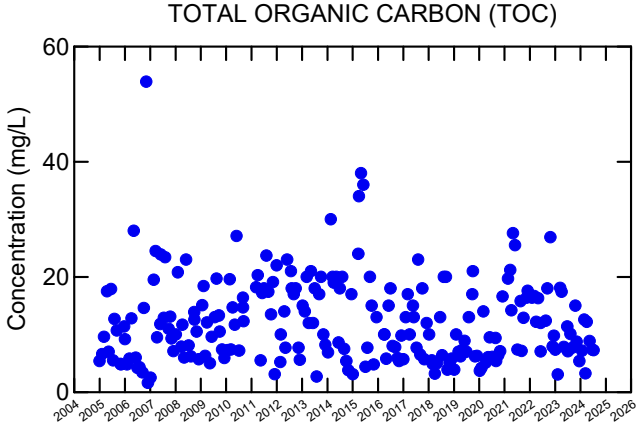
Trend: No Trend Identified



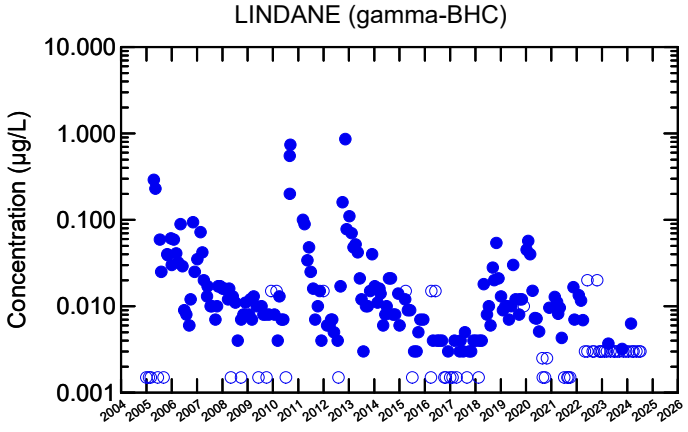
Trend: Decreasing



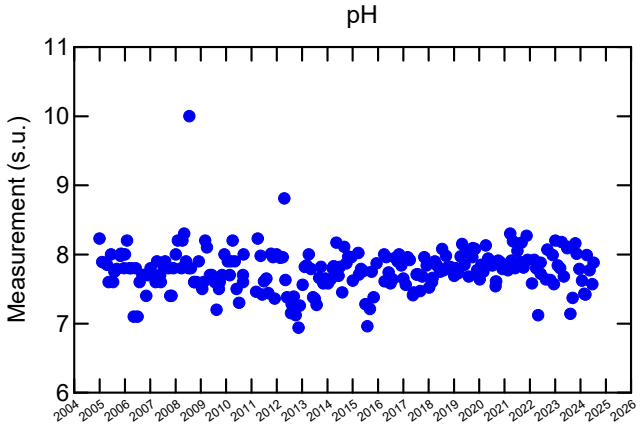
Trend: Increasing



Trend: No Trend Identified



Trend: Decreasing



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.

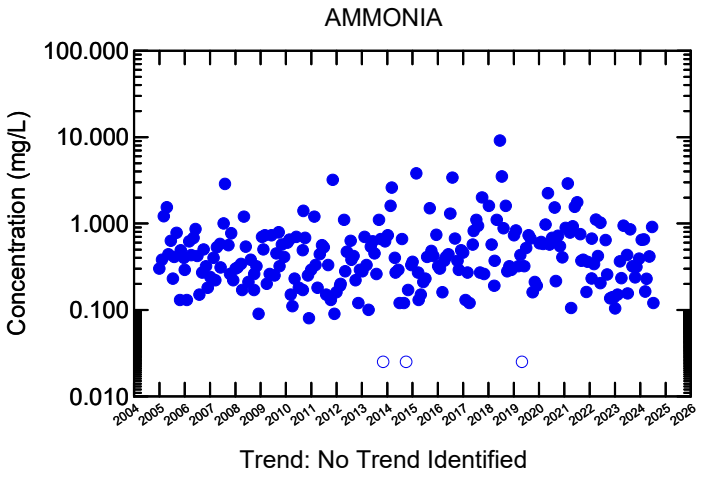
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

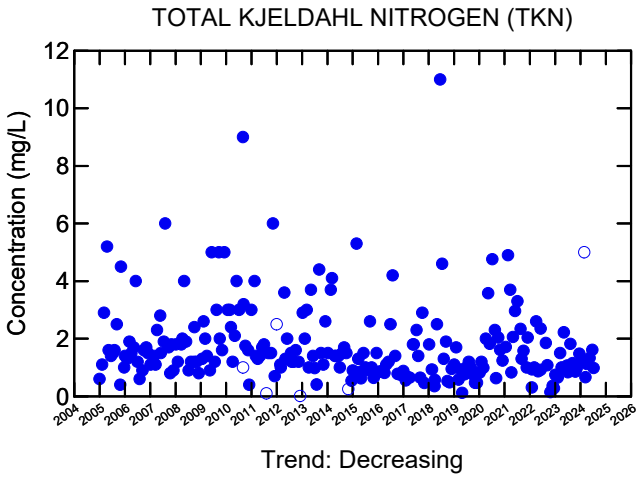
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0400

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

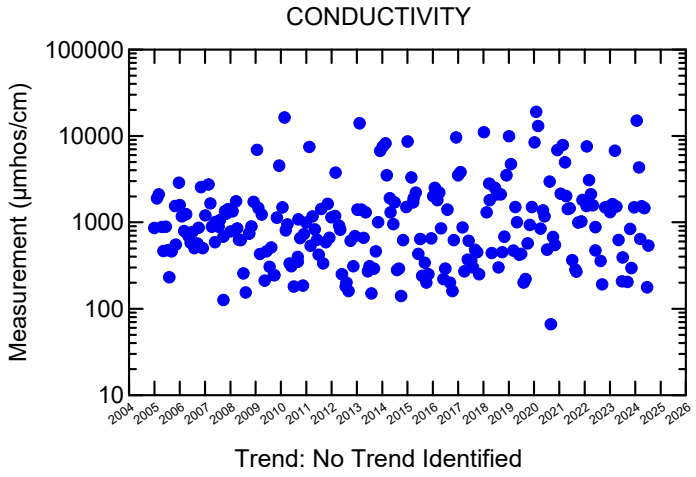
FIGURE B.2



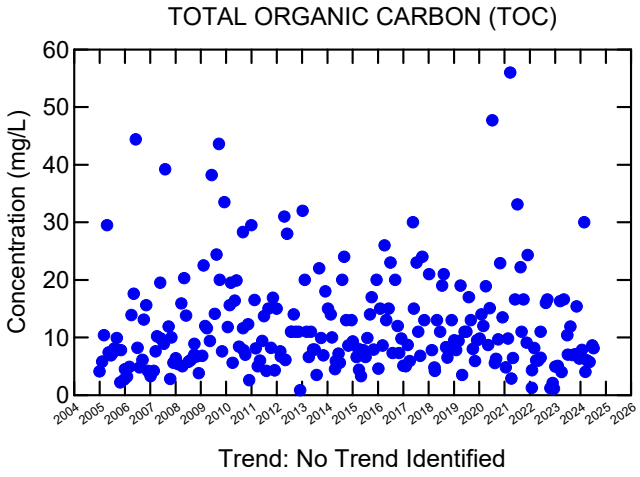
Trend: No Trend Identified



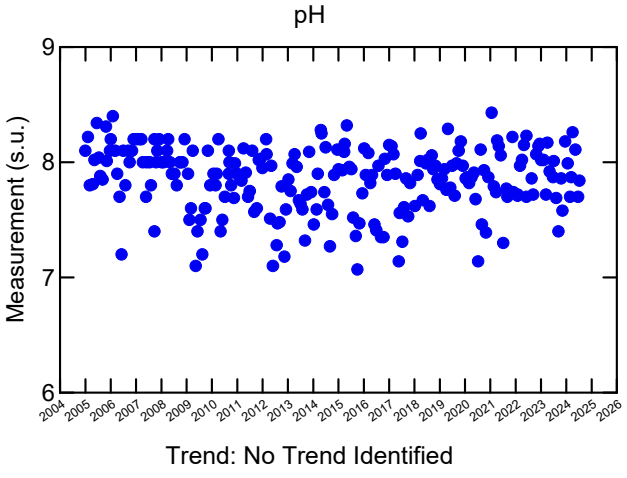
Trend: Decreasing



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.

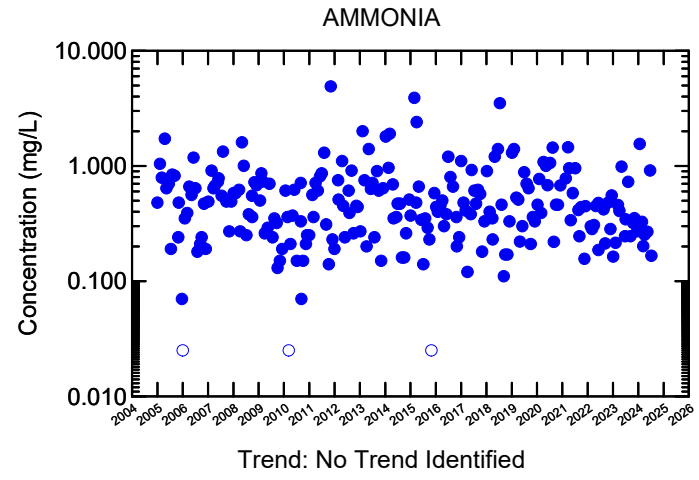
No Trend: trend analysis did not detect a significant trend above 95 percent confidence.

LANXESS Canada Co./Cie
Elmira, Ontario

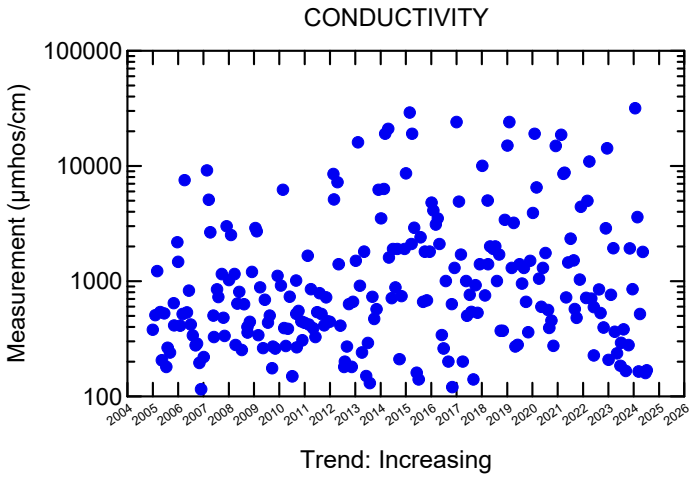
ANALYTE CONCENTRATION vs. TIME
STORM WATER OUTFALL 0800

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

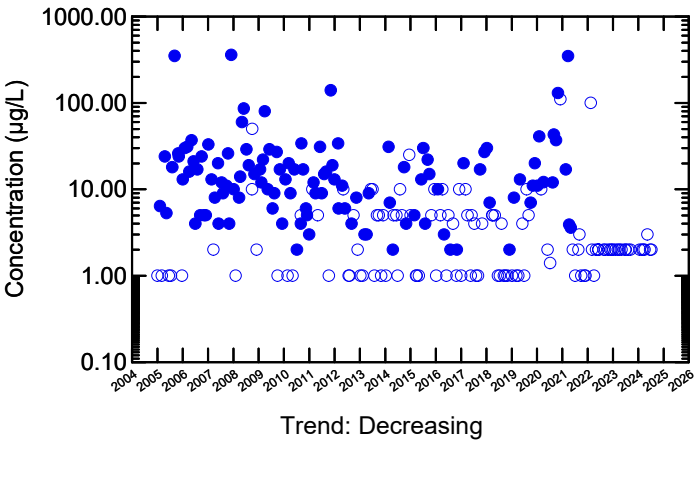
FIGURE B.3



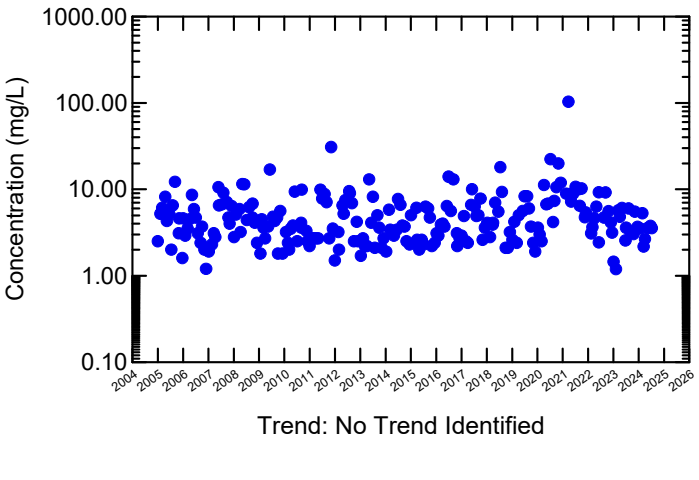
Trend: No Trend Identified



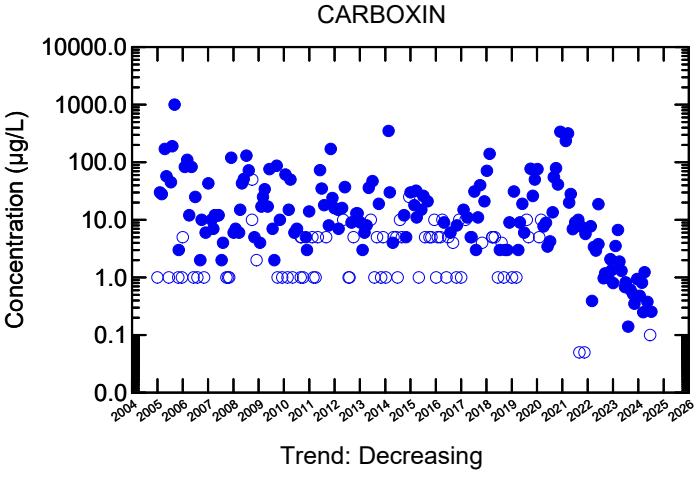
Trend: Increasing



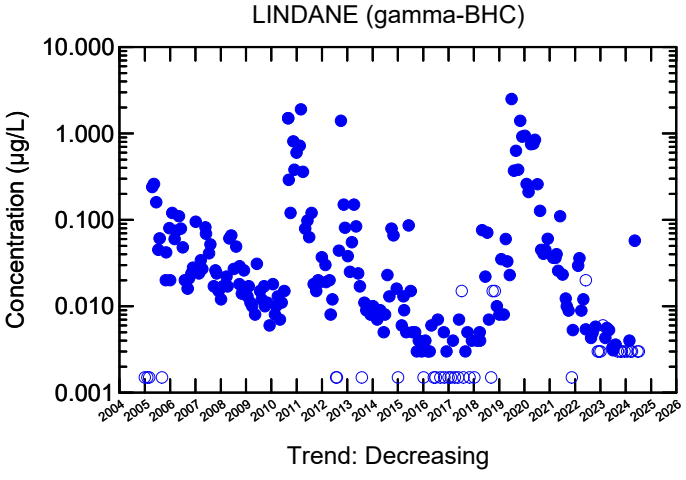
Trend: Decreasing



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.

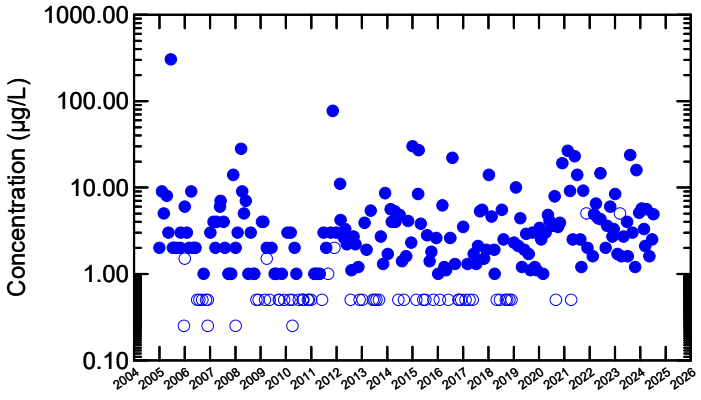
LANXESS Canada Co./Cie
Elmira, Ontario

ANALYTE CONCENTRATION vs. TIME
STORM WATER SEWER

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

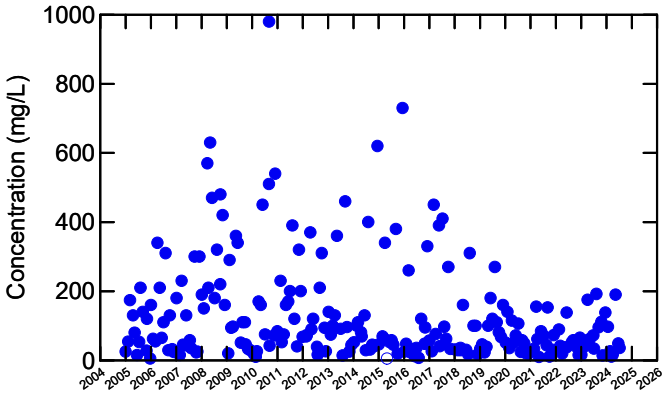
FIGURE B.4

PHENOLICS (TOTAL)



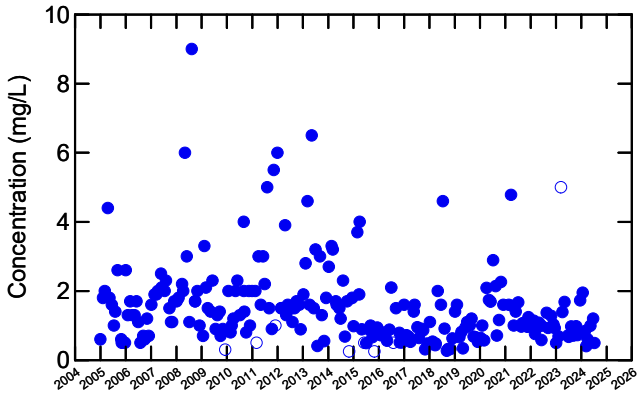
Trend: Increasing

TOTAL SUSPENDED SOLIDS (TSS)



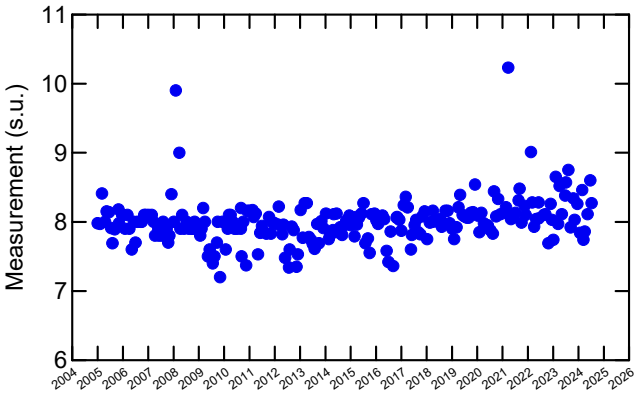
Trend: Decreasing

TOTAL KJELDAHL NITROGEN (TKN)



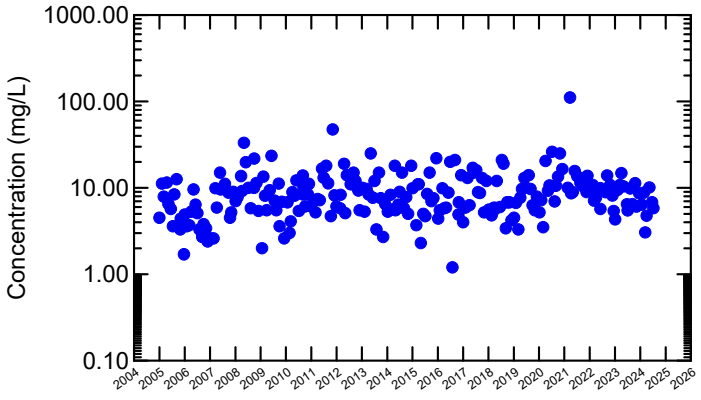
Trend: Decreasing

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

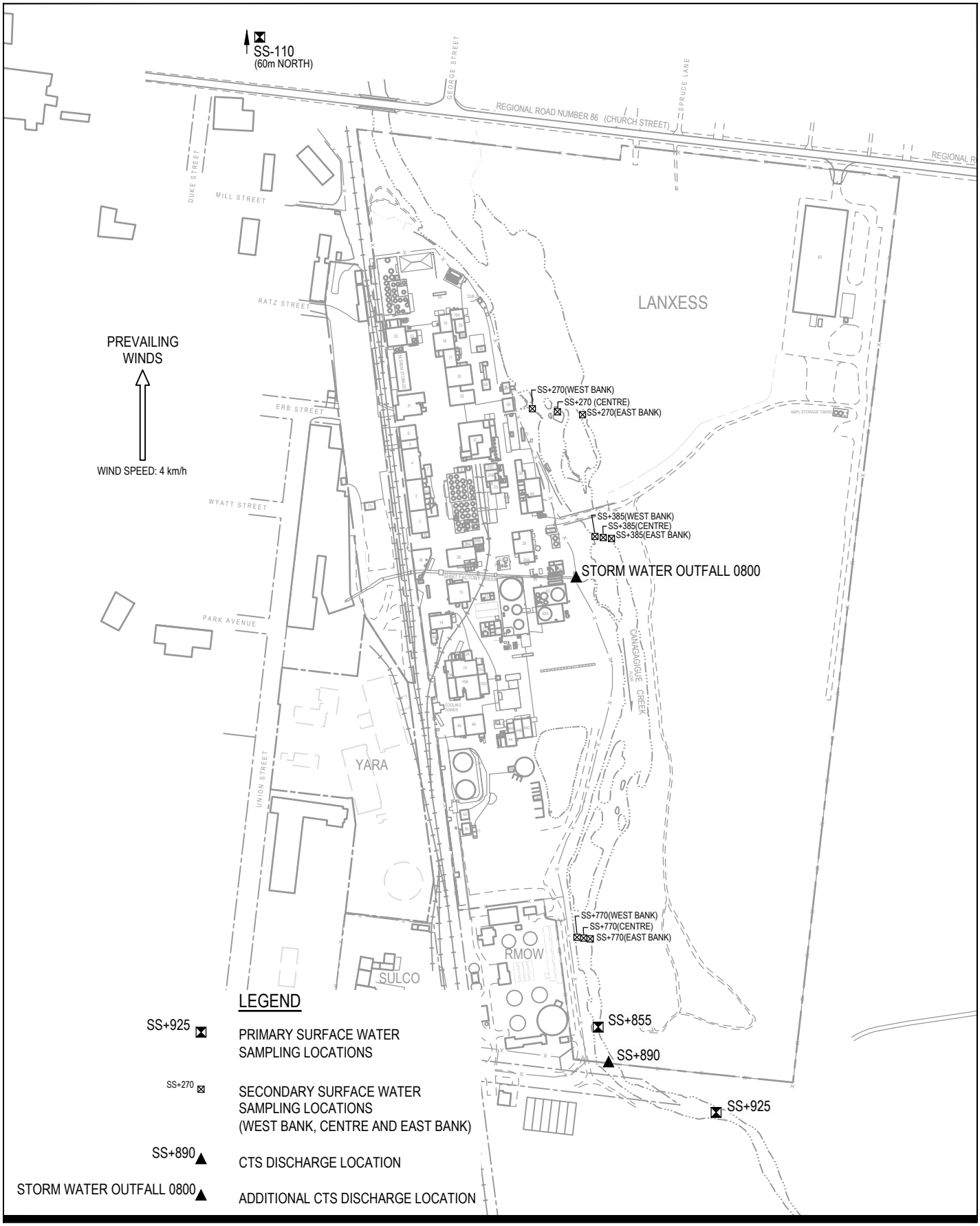
Sample Location:		**Storm Water Sewer**	**Storm Water Outfall 0200**	**Storm Water Outfall 0400**	**Storm Water Outfall 0800**
Sample ID:		**SWS 071024**	**0200 071024**	**0400 071024**	**0800 071024**
Sample Date:		**7/10/2024**	**7/10/2024**	**7/10/2024**	**7/10/2024**
Parameters	**Units**				
General 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

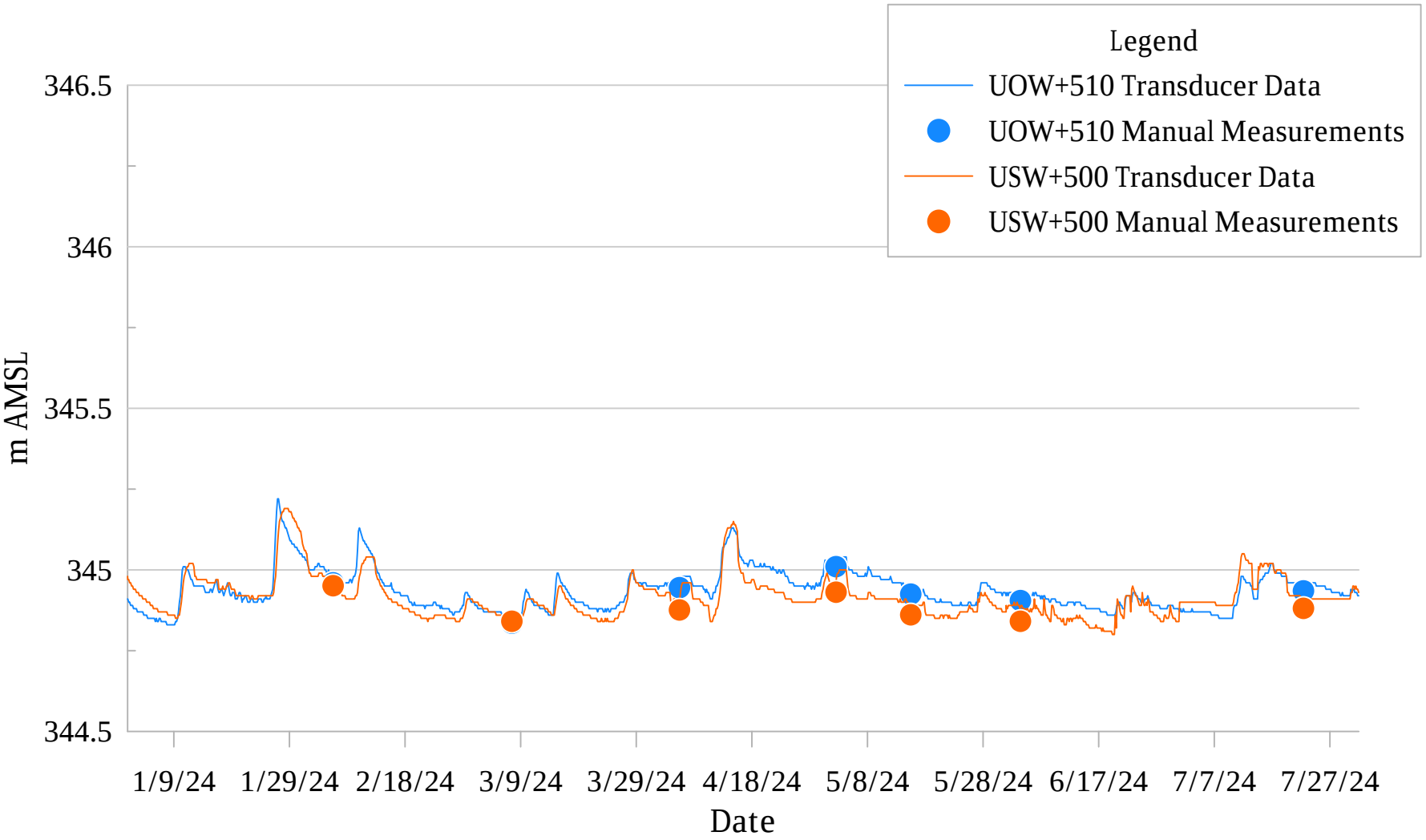
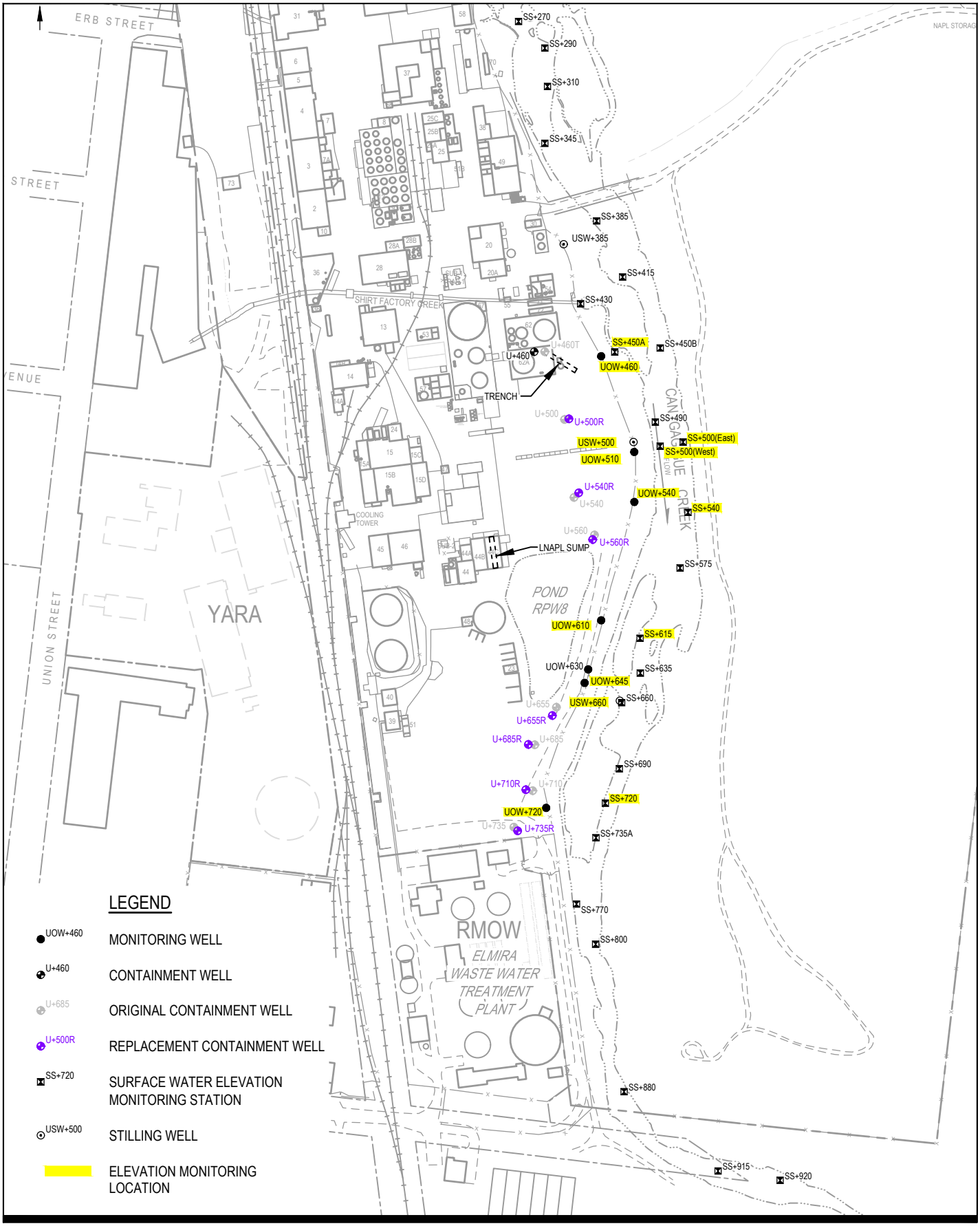


Figure C.2
2024 HYDROGRAPH - UOW+510 VS USW+500
LANXESS CANADA CO./CIE.
Elmira, Ontario



0 30 60 90m

Coordinate System: UTM NAD 27

N

GHD

LANXESS CANADA CO./CIE
ELMIRA, ONTARIO

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

160

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
Plot Date: 08 August 2024 8:59 AM

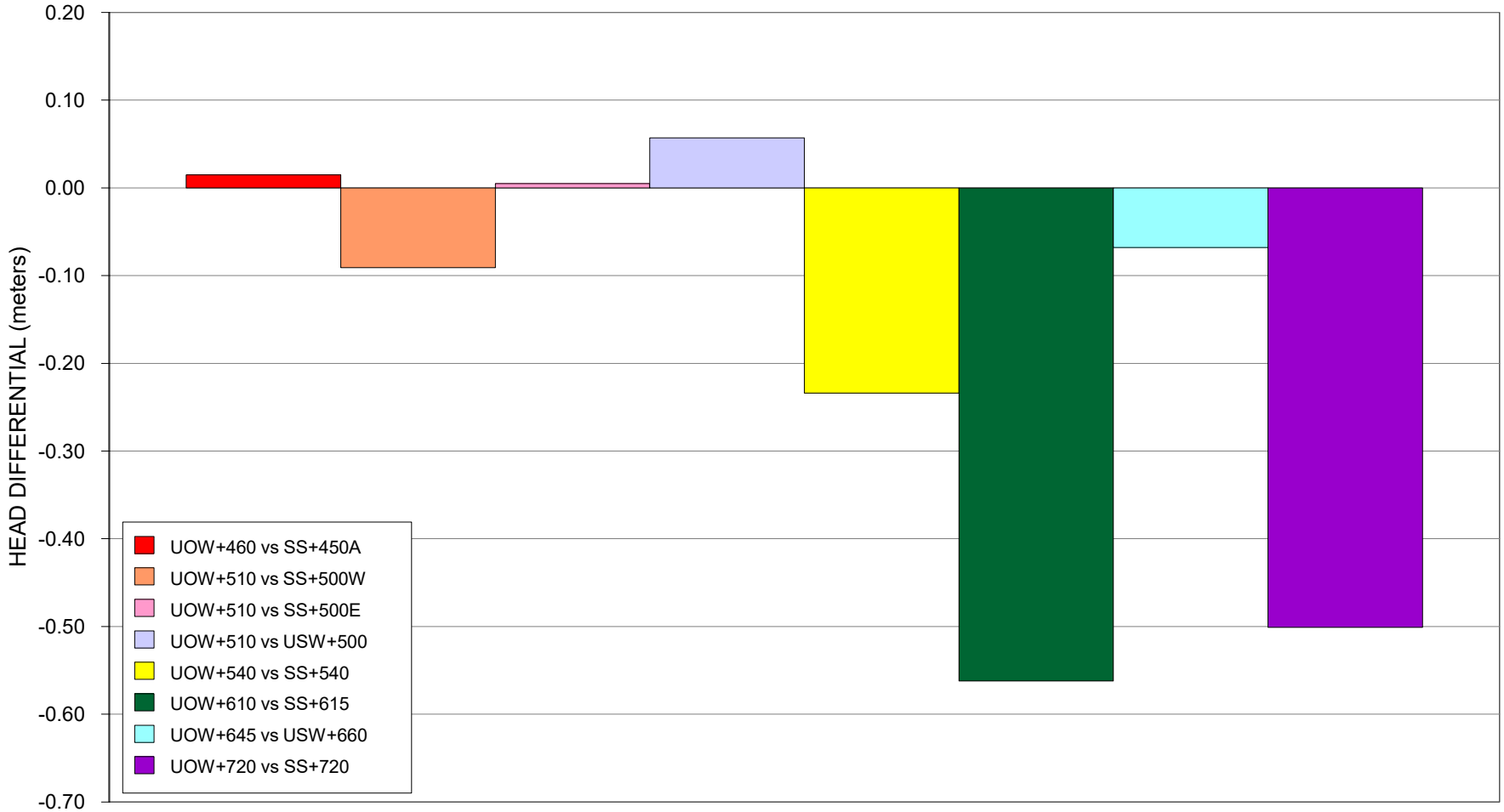


figure C.4
HEAD DIFFERENTIAL AT KEY MONITORING PAIRS - JULY 22, 2024
UPPER AQUIFER CONTAINMENT SYSTEM
LANXESS CANADA CO./CIE
Elmira, Ontario

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

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.

Monthly report summary for May, June and July 2024

CTS

PW4 operating at reduced flows and downtime as a result of a coupling failure on the UA effluent pump. PW4 was still down in June and July and issues is believed to be the pump and motor or decreased well yields. Lanxess is scheduling inspection of pump and motor based upon contractor availability.

W3R was shut down in October due to flow deviation caused by instrumentation issues. Problem was determined to be a defective input/output card on the Delta V system. Erratic flows and several hi-hi flow alarms have occurred. Well was shut down. Intermittent flow communication identified as cause. Communication cables between W4 and W3R were determined to be compromised at multiple locations on Industrial Drive. Options were considered and wireless equipment was ordered and installed. Well was restarted on May 24. Well was shut down again due to communication issues. Lanxess replaced the cellular components which resolved the issue.

Lanxess is in the process of having the new PW6 well connected to the existing treatment system in order to bring the well online. Excavation for the pit less adaptor, effluent pipeline, communication and power lines for new well to begin in August subject to contractor availability.

W5A and W5B pumping rate was decreased due to downtime related to the Rayox PLC issues and W$ system wireless communications issues. They were intermittently shut down between May 22 and June. Replacement parts have been ordered. W5A was shut down from June 16 to June 15 as the well was not able to maintain pumping rate due to low water levels. Lanxess is investigating next steps. The well was rehabilitated in May 2023 and the motor and pump were replaced in July 2023.

W9 continues to operate with reduced pumping rates. Lanxess believes issue to be with pump/motor and/or decreased well efficiency. Inspection and possible video inspection was expected in April but has been rescheduled to July 2024 based upon contractor availability.

E7 was down from June 22 to June 28 due to communication issues. Components replaced and it was restarted on June 28 at target rate. A power outage and leak in the Rayox trains affected E7 in July. Repairs made and well was restarted.

Toxicity

No acute toxicity found but resampling of GE groundwater effluent was requested as results were inconclusive for water fleas. Resampling is scheduled for July. No issues noted with samples taken in July.

Quarterly Receiver Water Quality Data

Except for Formaldehyde detected in samples taken on July 22, all other parameters were either non detect or were at levels less than the PWQOs, IPWQOs and the ECA. Formaldehyde was detected in samples upstream and downstream.

Loss of Containment

There were several periods of loss of containment in May, June and July. Increases noted in surface water elevations May 2 as a result of increase flowrates from the Woolwich Dam. Decreases in elevation noted until May 23. On May 28 there was a significant rainfall event and elevations decreased

gradually for the remaindered of the month. Elevation decreased until June 20 when another significant rainfall event occurred and again on June 21 when flows were increased from the dam. There was a decrease until July 10 when another significant rainfall event and increases to dam flowrates occurred.

Containment was restored at UOW+S10 USW+500 in May, on June 18 and July 31.

As per the ECA surface water samples were collected during the periods of loss of containment. No adverse impacts were noted.

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Our ref: 11192137-LTR-59

12 September 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 August 2024

Dear Ms. Hussain

This letter presents a summary of the August 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 August 2024. PW4 can currently only pump at 1.3 litres per second (L/s). LANXESS suspects this is due to a buildup of carbon fines in the UA Carbon Tower which has resulted in plugging of the tower screens and pore spaces within the granular activated carbon in the tower. Additional fines were inadvertently added to the UA Carbon Tower in late July 2024 when the carbon was replaced and backwashed in the W4 Carbon Adsorber. LANXESS has discontinued using regenerated carbon and has switched to virgin carbon for the foreseeable future to reduce the carbon fines in the tower. PW5 continued operating at a reduced pumping rate in August 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 August 2024. The well is unable to maintain its pumping rate; LANXESS will schedule inspection and rehabilitation of the well, subject to contractor availability. W9 continued pumping at a reduced rate during August 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 August 2024 due to one minor power outage, a significant power outage, and several Rayox train moisture alarms. The moisture alarms/leaks were investigated and repaired, and the system was restarted at its target pumping rate.

During August 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/59

Encl.

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LANXESS Public Distribution List
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Jamie Petznick, LANXESS
Michelle Yantzi, LANXESS

August 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 August 2024.

The Progress Report is organized as follows:

1. Monitoring and Analytical Data Page 1
2. Correspondence, Meetings, and Events Page 1
3. CTS Monitoring and Performance Page 1
4. Remedial Action Plan Page 4
5. E7 AOP Page 4
6. Environmental Audit Page 4
7. Remediation of Former Operating Pond Area Page 4
8. Additional Work/Studies Page 4

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 for groundwater samples collected as part of the 2024 Off-Site Routine Groundwater Monitoring (R.G.M.) Program is presented in Attachment B.

Due to delays with the analytical data, the analytical results from the monthly August 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), will be provided in the October Progress Report.

2. Correspondence, Meetings, and Events

August 15, 2024 July 2024 Progress Report submitted to MECP West Central Region (WCR)

3. CTS Monitoring and Performance

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

The August 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		
August 2024 (Litres/second [L/s])		
Containment and Extraction Wells	**Target Average (1)**	**Average**
On Site Wells		
PW4	2.9	1.4
PW5	1.8	0.8
Upper Aquifer Wells	--	0.8
Off Site Wells		
W3R	18.5	22.6
W5A	4.5	1.4
W5B	4.2	4.7
W6A	0.20	0.44
W6B	0.30	0.44
W8	0.05	0.12
W9	13.6	13.4
E7	23.9	22.3
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.

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 August 2024. At this time, PW4 can only pump at 1.3 L/s. LANXESS suspects this is due to a buildup of carbon fines in the UA Carbon Tower which has resulted in plugging of the tower screens and pore spaces within the granular activated carbon in the tower. Additional fines were inadvertently added to the UA Carbon Tower in late July 2024 when the carbon was replaced and backwashed in the W4 Carbon Adsorber. LANXESS has discontinued using regenerated carbon and has switched to virgin carbon for the foreseeable future to reduce the carbon fines in the tower. LANXESS' well contractor inspected the well on August 23, 2024 and determined that the pump performance is normal, the equipment is operating without issues, and the well screen does not appear to be plugged. LANXESS has also determined that plugging in the piping from the well to the treatment system is not an issue. As detailed in ECA No. 0831-BX6JGD, LANXESS shall measure and maintain on-site containment at the western site boundary between monitoring wells OW58-13 and OW105d. If the water level in on-Site monitoring well OW62-17 is not at least 1 centimetre (cm) lower than the water level in off Site monitoring well CH-47E, LANXESS shall adjust pumping rates to maintain containment, and if containment is not attained within five working days (or in the event of routine maintenance, equipment repair, or circumstances beyond LANXESS' control, the elevation differential required need not be maintained for periods of time up to two weeks), LANXESS will initiate monthly groundwater sampling for chlorobenzene and n-nitrosodimethylamine (NDMA) analyses, collected from six off-Site sentry monitoring wells. With PW4 operating at its current decreased pumping rate, this 1 cm differential could not be maintained. LANXESS collected groundwater samples from off-Site sentry monitoring wells OW58-13, OW165-17, CH-47E, CH-97B, CH-56B, and CH-89B on August 29, 2024. A summary of the analytical results for groundwater samples collected on August 29, 2024, and trend analysis including these results, will be provided in the October Progress Report.

PW5 continued operating at a reduced pumping rate in August 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. The trench for PW6 was excavated the week of August 12, 2024. LANXESS' well contractor installed the pit less adapter and effluent pipeline on August 23, 2024. The communication and power lines are scheduled to be installed in September 2024. PW6 is on schedule for completion by the end of the year as previously committed to by LANXESS.

W5A continued pumping at a reduced rate in August 2024 as the well is unable to maintain its pumping rate. LANXESS will schedule inspection and rehabilitation of the well, subject to contractor availability.

W9 continued pumping at a reduced rate during August 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-schedule 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 August 2024 due to one minor power outage, a significant power outage, and several Rayox train moisture alarms. The moisture alarms/leaks were investigated and 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 August 2024 and summarizes the effluent pH and temperature. The discharge pH was between 7.16 and 7.18 Standard Units (su), which is within the ECA discharge limit pH range of 5.5 to 9.5 su. The effluent temperature was between 13.1 and 14.9 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 August 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 37.1 L/s. The total flow rate of additional treated groundwater discharged to the Creek via Shirt Factory Creek (at storm water outfall 0800) was 9.3 L/s. The total flow rate of the combined treated groundwater discharged to the Creek (SS+890 discharge plus Shirt Factory Creek discharge) was 46.4 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 August 6, 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 August 6, 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

[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.

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) Routine Maintenance

Routine maintenance tasks completed on the CTS in August 2024 are summarized in Table A.5 (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.

e) Toxicity

LANXESS collected a groundwater sample from the GE SS+890 discharge outfall on July 9, 2024 and submitted the sample for *Ceriodaphnia dubia* chronic toxicity analyses. The laboratory results indicate that the groundwater sample was not chronically toxic to *Ceriodaphnia dubia*. The toxicity results have been included in Attachment A.

f) Receiver Water Quality Data

As per Amended ECA No-0831-BX6JGD, the receiver water quality monitoring program has been reduced from monthly to once every three (3) months. LANXESS will complete the next quarterly routine monitoring event in October 2024.

Summary of Efforts Made and Results Achieved

During August 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 August 2024.

5. E7 AOP

The average E7 pumping rate (22.3 L/s) was slightly less than its recommended Target Average pumping rate (23.9 L/s) during August 2024 due to two power outages and several moisture alarms within the Rayox trains. The influent sample collected on August 13, 2024 contained NDMA at a concentration of 0.02 micrograms per litre (µg/L). NDMA was not detected in the effluent sample collected on August 13, 2024 (reporting detection limit [RDL] = 0.01 µg/L).

6. Environmental Audit

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

7. Remediation of Former Operating Pond Area

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

8. Additional Work/Studies

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

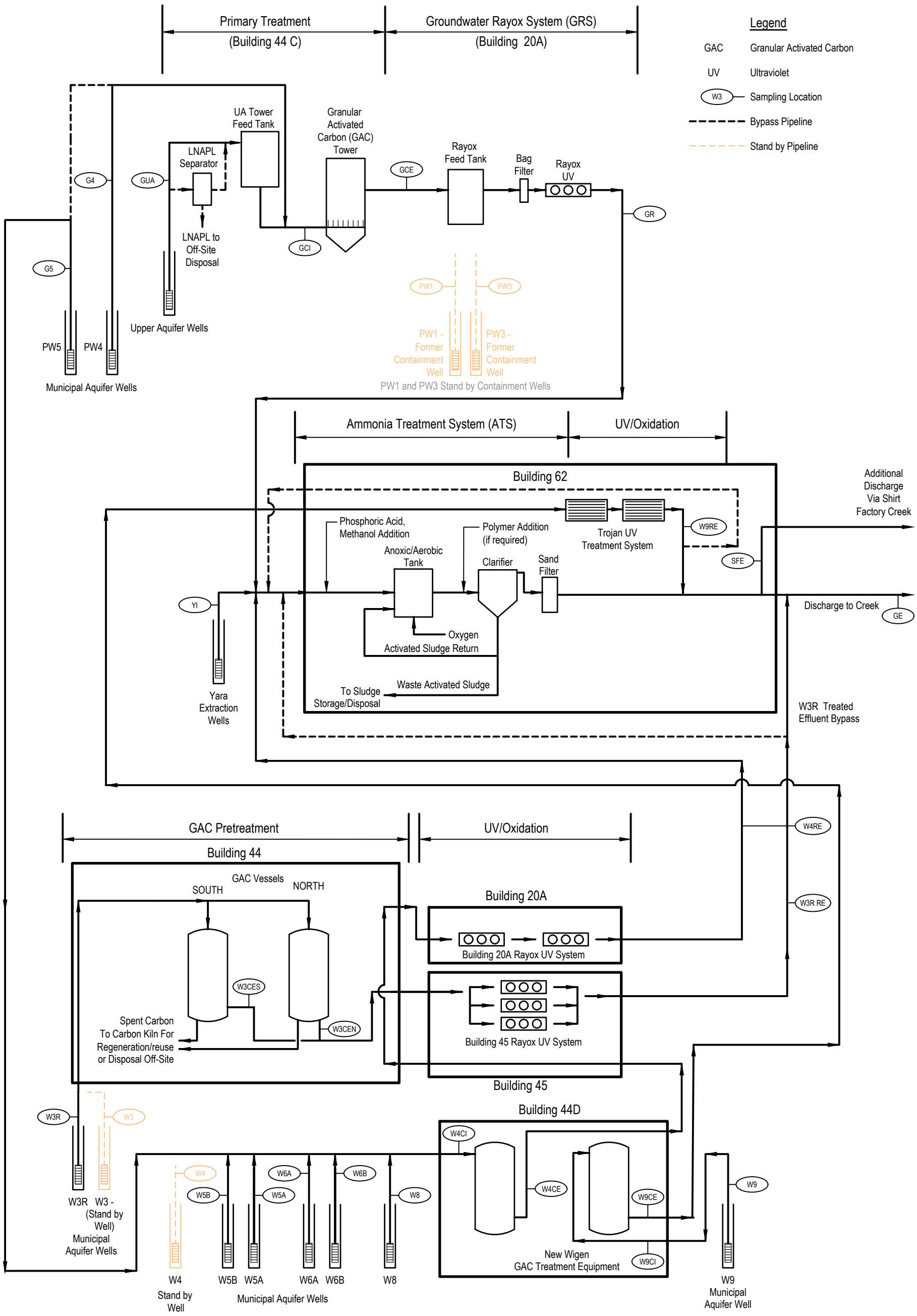
Table 1

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

Media and Sampling Program	Parameters	Frequency	August 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	-
CTS Effluent - Acute Toxicity	Not applicable	Quarterly	-
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	-
Primary Surface Water Quality Monitoring	Indicator parameters	Quarterly	-
	Effluent Broad Scan (Schedule C)	Quarterly	-
Secondary Surface Water Quality Monitoring	Indicator parameters	Quarterly	-
	Effluent Broad Scan (Schedule C)	Quarterly	-
Upper Aquifer Hydraulic Containment Requirement	Schedule E	As required	-
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	-
Off-Site Sentry Well Monitoring Program	NDMA +/- chlorobenzene	Annual	Attachment B
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 **September 2024**

TREATMENT SYSTEM PROCESS FLOW SCHEMATIC

FIGURE A.1

Filename: N:\CA\Waterloo\Projects\662\11192137\Digital_Design\ACAD 2020\Figures\LTR-GEMP2024AUGUST-DIR059\11192137-GHD-00-00-LTR-EN-D101_WA-GEMP2024AUGUST-DIR059.dwg
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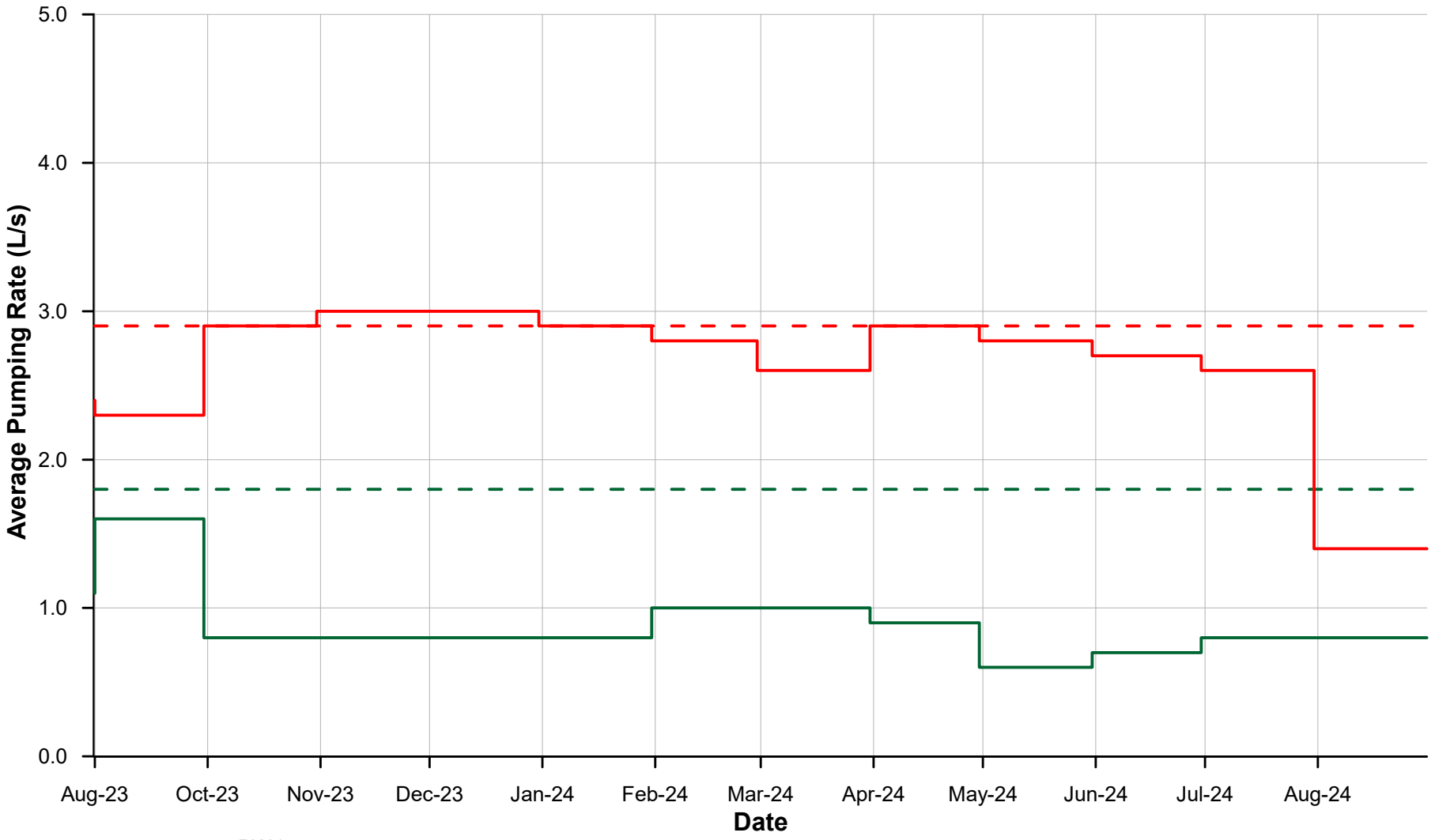


figure A.2

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.

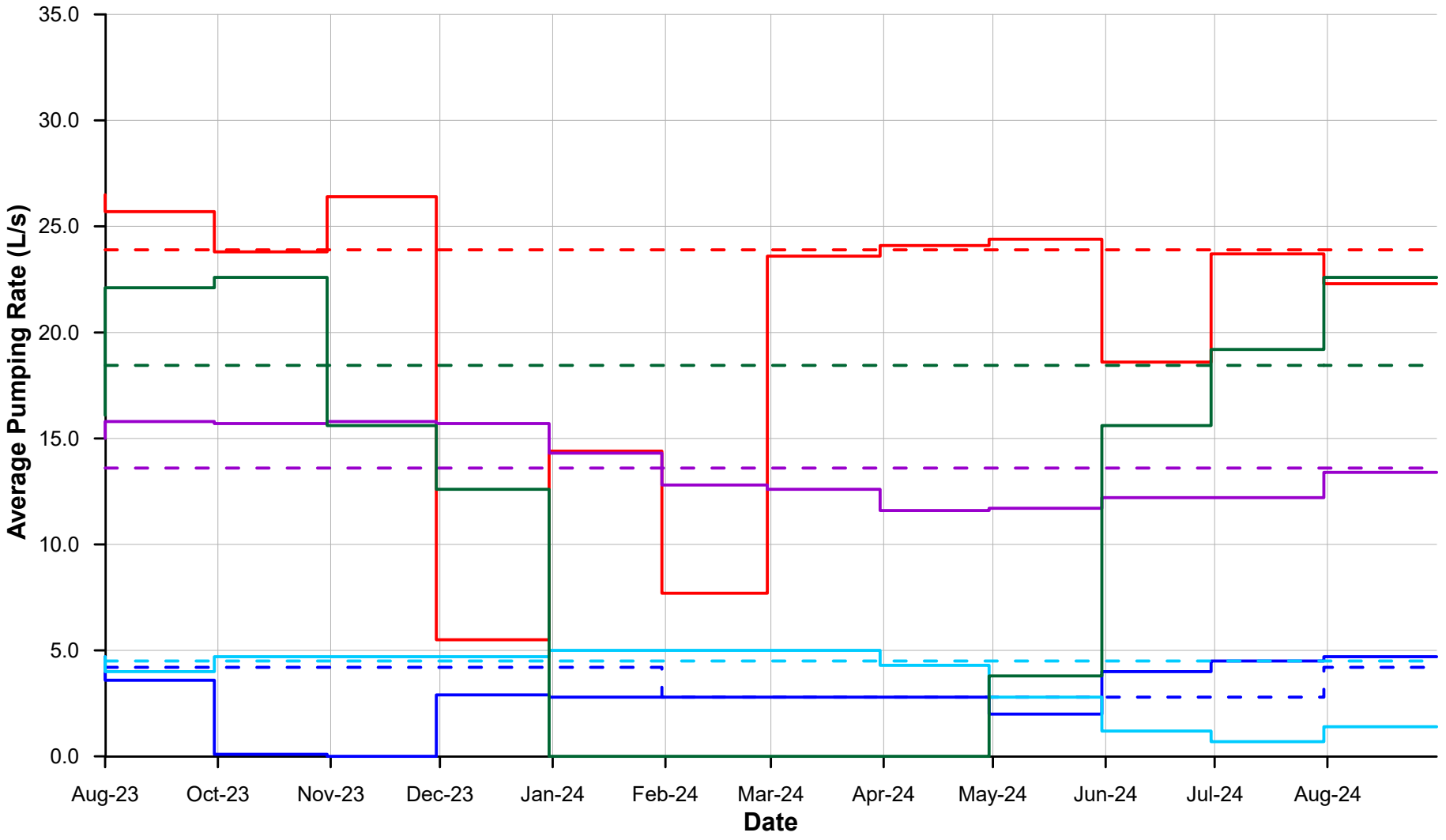


figure A.3a
OFF-SITE EXTRACTION WELL AVERAGE VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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.

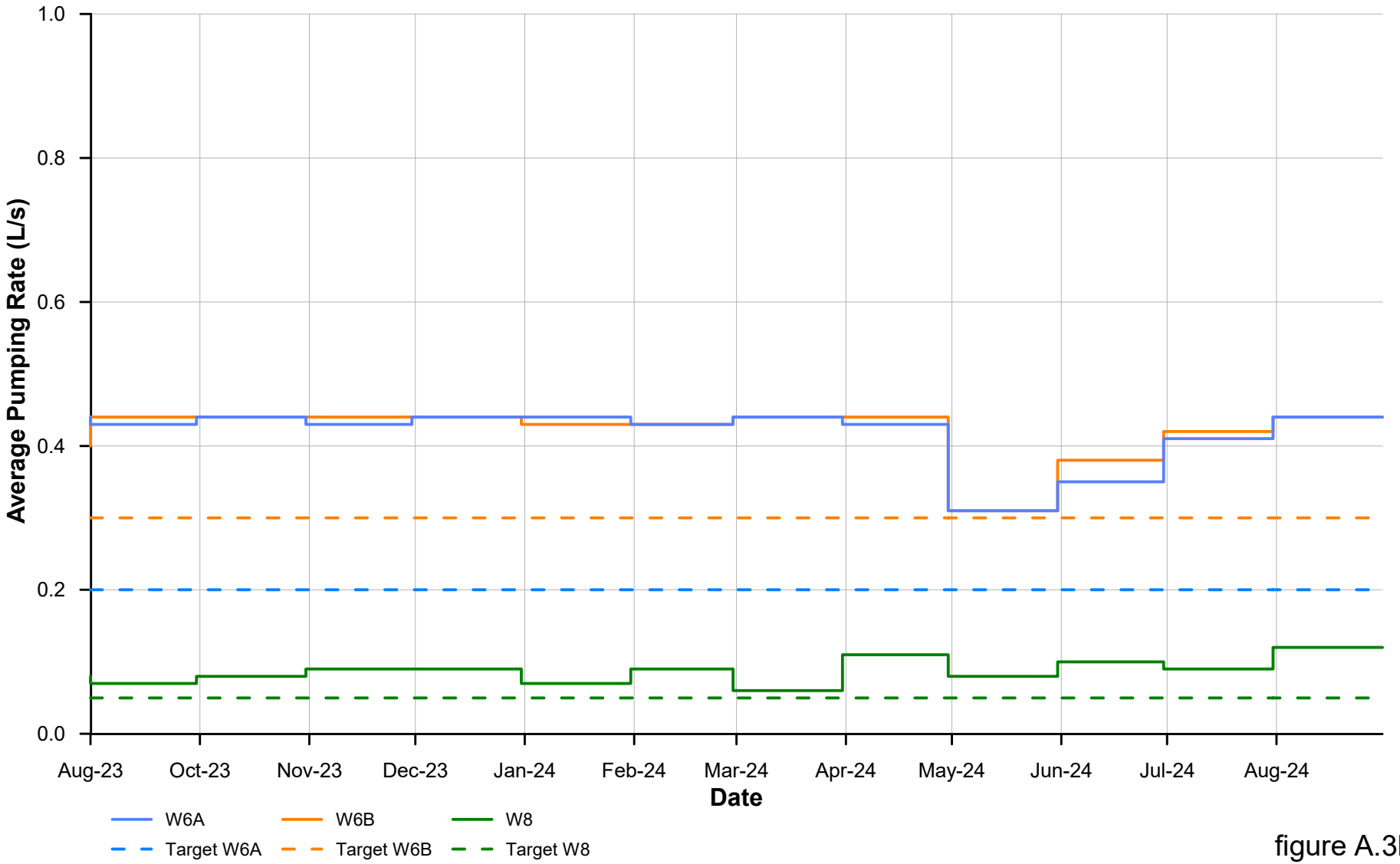


figure A.3b
OFF-SITE EXTRACTION WELL AVERAGE
VS. TARGET PUMPING RATES
LANXESS CANADA CO./CIE
Elmira, Ontario

*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 - August 2024
LANXESS Canada Co./Cie
Elmira, Ontario

ON-SITE GROUNDWATER CONTAINMENT AND TREATMENT SYSTEM

August 8	Shut down at 12:00 for cleaning of the feed tank, and restarted August 9, 2024 at 07:40
August 30	Shut down at 22:00 due to a power outage, and restarted at 22:15

OFF-SITE GROUNDWATER COLLECTION AND TREATMENT SYSTEM

W3R Groundwater Rayox System

August 13	Shut down at 08:20 for scheduled maintenance, and restarted at 13:30
August 15	Shut down at 13:45 to backwash the Building 44C W3R sorth carbon adsorber, and restarted at 14:30
August 22	Shut down at 11:00 to backwash the Building 44C W3R north carbon adsorber, and restarted at 11:30
August 30	Shut down at 22:00 due to a power outage, and restarted August 31, 2024 at 10:45

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

August 8	Shut down at 12:00 for cleaning of the feed tank, and restarted at 16:10
August 30	Shut down at 22:00 due to a power outage, and restarted at 22:15

W9 Groundwater Trojan UV/Oxidation System

August 30	Shut down at 22:00 due to a power outage, and restarted August 31, 2024 at 02:45

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]
August 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
6-Aug-24	Ammonia-N (mg/L)	0.222 J													0.190 J	0.140 J	0.150	0.84[6]	0.84	0.62
6-Aug-24	Total Phosphorus (mg/L)														0.0042 J	0.102 J	0.082	0.5	0.5	--
6-Aug-24	BOD_5 (mg/L)														ND(2.0) UJ	ND(2.0) UJ	ND(2.0)	15	15	--
6-Aug-24	Total Cyanide (µg/L)														ND(2) UJ	ND(2) UJ	ND(2)	14	14	ND(5)
6-Aug-24	Formaldehyde (µg/L)														ND(2.0) UJ	ND(2.0) UJ	ND(2.0)	24	24	ND(5)
6-Aug-24	pH (s.u.)														7.18	7.16	7.16	5.5 - 9.5	5.5 - 9.5	--
6-Aug-24	Temperature (°C)														13.1	14.9	14.5	<25	<25	--
6-Aug-24	Chlorobenzene (µg/L)	25.9 J	ND(0.20) UJ	0.88 J	42.9 J	ND(0.20) UJ	20.0 J	1.07 J	1800 J	2.22 J	0.43 J	ND(0.20) UJ	0.44 J	2.34 J	0.38 J	0.28 J	0.43	10	9.9	ND(0.5)
20-Aug-24	Chlorobenzene (µg/L)										0.90	ND(0.20)	0.80	4.84	0.60	0.54				
6-Aug-24	Toluene (µg/L)								74.7 J	ND(0.20) UJ					0.82 J	0.20 J	0.32	5	5.0	ND(0.4)
6-Aug-24	1,1-Dichloroethane (µg/L)								ND(0.20) UJ	ND(0.20) UJ					ND(0.20) UJ	ND(0.20) UJ	ND(0.20)	10	10	ND(1)
6-Aug-24	g-BHC (Lindane) (µg/L)														ND(0.0030) UJ	ND(0.0030) UJ	ND(0.0030)	0.14	0.14	ND(0.003)
6-Aug-24	n-Nitrosodimethylamine (NDMA) (µg/L)[7]	0.51									ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	0.14	0.14	ND(0.01)
20-Aug-24	NDMA (µg/L)[7]										ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)				
6-Aug-24	n-Nitrosodiethylamine (NDEA) (µg/L)[7]	ND(0.06)									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)
20-Aug-24	NDEA (µg/L)[7]										ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)				
6-Aug-24	Nitrosomorpholine (NMOR) (µg/L)[7]	ND(0.06)									ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	4	4.0	ND(0.06)
20-Aug-24	NMOR (µg/L)[7]										ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)	ND(0.06)				
6-Aug-24	Benzothiazole (µg/L)								112 J	ND(2.0) UJ					ND(2.0) UJ	ND(2.0) UJ	ND(2.0)	4	4.0	ND(2)
6-Aug-24	Carboxin (µg/L)								102 J	0.977 J					ND(0.100) UJ	ND(0.100) UJ	ND(0.100)	7	6.9	ND(2)

SS+890 Discharge (GE) Flow Rate	37.1 L/s
Shirt Factory Creek Discharge (SFE) Flow Rate	9.3 L/s
Total Combined Discharge Effluent Flow	46.4 L/s

Table A.2

Combined On-Site and Off-Site Groundwater Containment and Treatment System
Analytical Results [1]
August 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.		
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.		
J+	The result is an estimated quantity, but the result may be biased high.		

Table A.3

Combined On-Site and Off-Site Groundwater Collection and Treatment System Flow Rates
August 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)
8/1/2024	2.4	44.1	9.3	23.7	13.9	38.2	8.7	46.9
8/2/2024	2.4	44.1	9.3	23.7	13.9	38.0	8.8	46.8
8/3/2024	2.4	43.3	9.2	22.9	13.9	36.8	9.1	46.0
8/4/2024	2.4	44.1	9.1	23.7	13.9	37.9	8.7	46.6
8/5/2024	2.4	45.5	10.5	23.7	13.9	37.3	10.7	48.0
8/6/2024	2.6	40.0	9.3	19.6	13.9	37.6	5.2	42.7
8/7/2024	2.7	38.3	10.0	17.3	13.9	34.7	6.5	41.2
8/8/2024	1.4	44.8	8.8	23.7	13.9	37.9	8.4	46.4
8/9/2024	1.9	46.6	11.2	23.7	13.9	37.5	11.2	48.7
8/10/2024	2.4	46.6	11.8	23.7	13.9	37.6	11.7	49.3
8/11/2024	2.1	46.6	11.5	23.7	13.9	37.4	11.7	49.1
8/12/2024	2.2	46.0	11.0	23.7	13.9	37.7	10.9	48.6
8/13/2024	2.2	41.5	11.7	18.6	13.9	34.6	9.5	44.1
8/14/2024	2.1	45.3	10.3	23.7	13.9	37.7	10.1	47.8
8/15/2024	2.1	43.6	9.1	23.2	13.9	38.0	8.2	46.2
8/16/2024	2.1	44.4	9.4	23.7	13.9	38.2	8.7	46.9
8/17/2024	2.1	44.9	11.6	21.9	13.9	36.8	10.7	47.4
8/18/2024	2.1	46.7	11.7	23.7	13.9	37.7	11.6	49.2
8/19/2024	2.1	46.6	11.6	23.7	13.9	37.6	11.4	49.1
8/20/2024	2.1	46.0	11.1	23.7	13.7	37.8	10.7	48.5
8/21/2024	2.1	45.7	10.9	23.7	13.6	37.9	10.3	48.2
8/22/2024	2.1	45.3	11.1	23.2	13.4	37.9	9.9	47.7
8/23/2024	2.0	45.3	10.7	23.7	13.3	37.7	9.9	47.6
8/24/2024	2.1	45.5	11.1	23.7	13.2	37.6	10.3	47.9
8/25/2024	2.1	44.6	10.4	23.7	13.0	37.7	9.3	47.0
8/26/2024	2.1	43.7	9.6	23.7	12.9	37.9	8.2	46.1
8/27/2024	2.1	44.6	10.6	23.7	12.7	37.5	9.5	47.0
8/28/2024	2.1	42.8	9.0	23.7	12.6	37.9	7.3	45.2
8/29/2024	2.1	42.5	8.9	23.7	12.1	37.1	7.5	44.6
8/30/2024	2.1	41.9	10.9	21.6	11.5	34.8	9.2	44.0
8/31/2024	2.1	32.2	10.4	13.0	11.0	29.5	4.9	34.4
Average	**2.2**	**44.0**	**10.4**	**22.6**	**13.4**	**37.1**	**9.3**	**46.4**
Minimum	**1.4**	**32.2**	**8.8**	**13.0**	**11.0**	**29.5**	**4.9**	**34.4**
Maximum	**2.7**	**46.7**	**11.8**	**23.7**	**13.9**	**38.2**	**11.7**	**49.3**

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
August 2024
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:	**UA500I**	**UA500CE**	**UA560I**	**UA560CE**	**GCI**	**GCE**
Sample Date:	**8/6/2024**	**8/6/2024**	**8/6/2024**	**8/6/2024**	**8/6/2024**	**8/6/2024**
Parameter [µg/L]						
Volatile Organic Compounds (VOCs)						
Benzene	15.1 J	ND(0.20) UJ	15.2 J	ND(0.20) UJ	9.36 J	ND(0.20) UJ
Chlorobenzene	767 J	0.30 J	508 J	ND(0.20) UJ	1880 J	2.22 J
1,1-Dichloroethane	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ
Ethylbenzene	67.2 J	ND(0.20) UJ	50.3 J	ND(0.20) UJ	13.7 J	ND(0.20) UJ
Toluene	1170 J	0.84 J	9570 J	ND(0.20) UJ	74.7 J	ND(0.20) UJ
m/p-Xylenes [1]	108 J	ND(0.40) UJ	128 J	ND(0.40) UJ	10.8 J	ND(0.40) UJ
o-Xylene [1]	72.0 J	ND(0.20) UJ	72.7 J	ND(0.20) UJ	7.77 J	ND(0.20) UJ
Base/Neutral and Acid Extractable Compounds (BNAs)						
Aniline	826 J	ND(2.0) UJ	1620 J	ND(2.0) UJ	64.5 J	ND(2.0) UJ
Benzothiazole	1210 J	ND(2.0) UJ	15.1 J	ND(2.0) UJ	112 J	ND(2.0) UJ
Carboxin (Oxathiin)	1880 J	1.98 J	1190 J	ND(0.100) UJ	102 J	0.977 J
2-Chlorophenol	6.90 J	ND(0.30) UJ	ND(0.30) UJ	ND(0.30) UJ	3.05 J	ND(0.30) UJ
2-Mercaptobenzothiazole	2910 J	ND(20) UJ	ND(20) UJ	ND(20) UJ	280 J	ND(20) UJ
2,4-Dichlorophenol	37.8 J+	ND(0.20) UJ	0.25 J+	ND(0.20) UJ	0.51 J+	ND(0.20) UJ
2,6-Dichlorophenol	3.56 J	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	0.22 J	ND(0.20) UJ
2,4,5-Trichlorophenol	5.00 J	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ
2,4,6-Trichlorophenol	17.2 J	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ	ND(0.20) UJ

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.
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.
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

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

Start Date	Description	Work Type
06/25/2024	Dig Trench from PW5 to PW6	General
08/01/2024	Monthly E7 North Compressor Inspection	General
08/01/2024	Monthly E7 South Compressor Inspection	General
08/06/2024	Check 62-AIT-901 (62PM-13) - Nitrification Tank pH	Instrumentation
08/06/2024	Check 62-AIT-904 (62-ICP-904) - Nitrification Tank Dissolved O2	Instrumentation
08/08/2024	Repair Multiple Lamps on W3R Building #45 Rayox	Electrical
08/08/2024	North Aeration Pump Kicked Out	Electrical
08/12/2024	Replace Lamp in Rayox A - Lamp 4 Over Hours	Electrical
08/12/2024	Check Rayox A Effluent Discharge Pump	Electrical
08/12/2024	Rayox Issues - Building #20A	Instrumentation
08/19/2024	Check 62-LSHH-969 (62TA-02) - Building #62 North Sump	Instrumentation
08/21/2024	Troubleshoot Rayox B Alarms	Instrumentation
08/30/2024	Repair UA+500 Carbon Drum Leak	Piping

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

Work Order : 255257
Sample Number : 83068

SAMPLE IDENTIFICATION

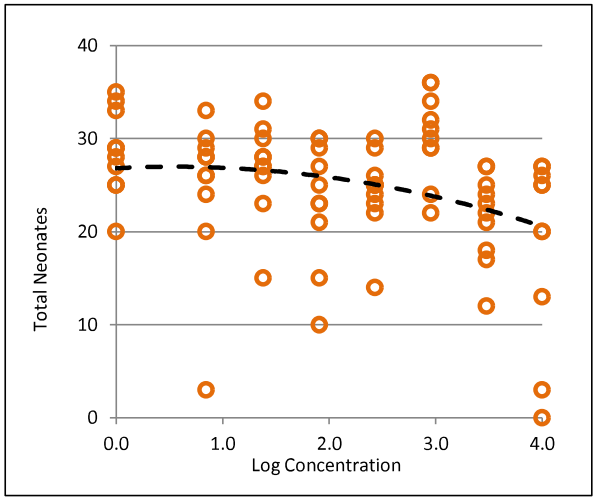
Company :	LANXESS Canada Co./Cie	Sampling Date :	2024-07-09
Location :	Elmira ON	Sampling Time :	08:30
Substance :	GE 070924	Date Received :	2024-07-09
Sampling Method :	Grab	Time Received :	12:00
Sampled By :	A. Norris	Temperature at Receipt :	11 °C
Sample Description :	Clear, colourless	Date Tested :	2024-07-09

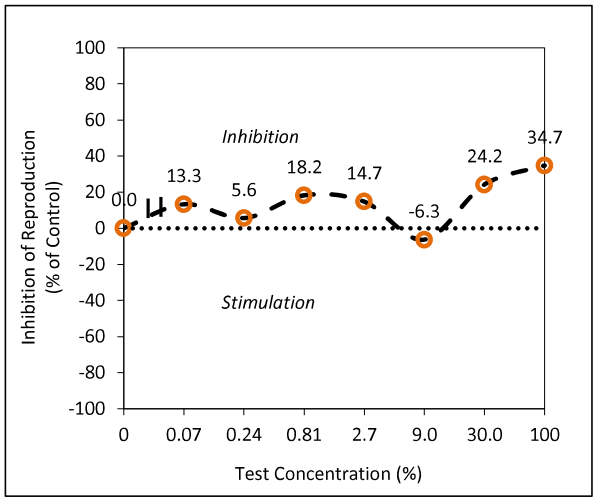
Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia* . Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

6-DAY TEST RESULTS

Effect	Value	95% Confidence Limits			Statistical Method
IC25 (Reproduction)	32.8%	12.2%	–	74.0%	Linear Interpolation (Toxstat)[d]
LC50	>100%		–		–

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





COMMENTS

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

•Statistical analysis for the IC25 (Reproduction) endpoint could not be conducted using Non-Linear Regression, because a suitable model could not be identified. Therefore, test results were calculated using Linear Interpolation (Toxstat)[d]. In test concentrations where hormesis was observed (9.0%), data was replaced with control values for the purposes of statistical analysis, as recommended by Environment Canada (2005).

Approved By : V.Carleton
Victoria (Tori) Carleton
I am approving this document
Nautilus Environmental
2024-09-09 16:28-04:00
Project Manager

Work Order : 255257
Sample Number : 83068

TEST ORGANISM

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	09:35 h - 21:35 h
Organism Batch :	Cd24-07	Mean Brood Organism Mortality :	0% (previous 7 days)
Organism Origin :	Single in-house mass culture	Brood Organism Mean Young :	23.1 (first three broods)
Test Organism Origin :	Individual in-house cultures	Mean Young per Brood Organism :	13.8 (3rd or subsequent brood)
Ephippia in Culture :	None		

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST CONDITIONS

Test Type :	Static renewal	Control/Dilution Water :	Well water [2]
Renewal Method :	Transferred to fresh solutions	Test Volume per Replicate :	15 mL
Renewal Frequency :	≤ 24 hours	Test Vessel :	20 mL glass vial
Sample Filtration :	None	Depth of Test Solution :	4 cm
Test Aeration :	None	Organisms per Replicate :	1
pH Adjustment :	None	Number of Replicates :	10
Hardness Adjustment :	None	Test Method Deviation(s) :	None

[2]no additional chemicals

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Analyst(s) :	ASK, XD
Date Tested :	2024-07-25	Test Duration :	6 days
IC25 (Reproduction) :	1.16 g/L	LC50 :	2.21 g/L
95% Confidence Limits :	0.98 - 1.25 g/L	95% Confidence Limits :	2.00 - 2.43 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Spearman-Kärber (CETIS)[a]
Historical Mean IC25 :	1.04 g/L	Historical Mean LC50 :	2.10 g/L
Warning Limits (± 2SD) :	0.50 - 2.15 g/L	Warning Limits (± 2SD) :	1.50 - 2.95 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

CUMULATIVE DAILY MORTALITY DATA

		Test Concentration (%)							
Date	Test Day	**Control**	**0.07**	**0.24**	**0.81**	**2.7**	**9**	**30**	**100**
2024-07-10	1	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	0
2024-07-13	4	0	10	0	0	0	0	0	10
2024-07-14	5	0	10	0	0	0	0	0	10
2024-07-15	6	0	10	0	0	0	0	0	10
Total Mortality (%) :		**0**	**10**	**0**	**0**	**0**	**0**	**0**	**10**

REFERENCES

[a] CETIS™, © 2000-2022. v2.1.4.0 x64. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

[d] West, Inc. and D. Gulley. 1996. Toxstat Release 3.5. Western Ecosystems Technology. Cheyenne, WY, U.S.A.

Environment Canada, 2005. Guidance Document on Statistical Methods for Environmental Toxicity Tests. Environmental Protection Series, Ottawa, Ont., Rept. EPS 1/RM/46.

Work Order : 255257
Sample Number : 83068

SURVIVAL AND REPRODUCTION

Test Initiation Date : 2024-07-09
Initiated By : JN (AS)
Initiation Time : 15:35
Test Completion Date : 2024-07-15

Control

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0	AS
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0	JN (AS)
2024-07-12	3	0	0	0	0	0	0	0	0	6	0	0.6	ASK (AS)
2024-07-13	4	4	5	4	7	4	5	3	8	0	3	4.3	ET (SV)
2024-07-14	5	11	11	10	8	11	10	14	9	14	7	10.5	ET (SV)
2024-07-15	6	13	13	13	14	10	10	17	16	15	10	13.1	JN (AS)
Total		**28**	**29**	**27**	**29**	**25**	**25**	**34**	**33**	**35**	**20**	**28.5 (±4.6)**	

2.7%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	0	2	6	0.8
2024-07-13	4	5	5	5	4	6	3	5	4	0	0	3.7
2024-07-14	5	11	11	10	7	9	10	10	11	8	12	9.9
2024-07-15	6	13	9	11	11	10	11	10	8	4	12	9.9
Total		**29**	**25**	**26**	**22**	**25**	**24**	**25**	**23**	**14**[3]	**30**	**24.3 (±4.4)**

0.07%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	0	5	0	0.5
2024-07-13	4	4	4	7	6	5	6	4	6	0	3 x	4.5
2024-07-14	5	16	9	13	9	11	12	10	14	13	0	10.7
2024-07-15	6	13	11	0	11	10	11	14	8	12	0	9
Total		**33**	**24**	**20**	**26**	**26**	**29**	**28**	**28**	**30**	**3**[3]	**24.7 (±8.4)**

9%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	0	4	0	0.4
2024-07-13	4	7	6	5	5	5	5	5	7	0	4	4.9
2024-07-14	5	12	10	9	12	8	13	14	12	13	12	11.5
2024-07-15	6	17	14	8	12	11	16	13	17	14	13	13.5
Total		**36**	**30**	**22**	**29**	**24**	**34**	**32**	**36**	**31**	**29**	**30.3 (±4.6)**

0.24%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	0	0	5	0.5
2024-07-13	4	6	4	4	6	7	6	7	5	3	0	4.8
2024-07-14	5	11	13	12	13	13	8	14	11	6	13	11.4
2024-07-15	6	11	11	7	8	11	12	13	11	6	12	10.2
Total		**28**	**28**	**23**	**27**	**31**	**26**	**34**	**27**	**15**[3]	**30**	**26.9 (±5.1)**

30%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	3	5	4	1.2
2024-07-13	4	6	6	4	6	6	5	6	0	0	0	3.9
2024-07-14	5	10	11	10	13	11	11	15	12	13	6	11.2
2024-07-15	6	11	10	11	5	0	7	0	7	0	2	5.3
Total		**27**	**27**	**25**	**24**	**17**	**23**	**21**	**22**	**18**	**12**	**21.6 (±4.8)**

0.81%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	5	5	0	1
2024-07-13	4	3	4	6	2	3	5	7	0	0	4	3.4
2024-07-14	5	12	9	9	8	11	11	12	14	10	10	10.6
2024-07-15	6	10	10	0	0	9	11	11	10	15	7	8.3
Total		**25**	**23**	**15**	**10**	**23**	**27**	**30**	**29**	**30**	**21**	**23.3 (±6.6)**

100%

Day		Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2024-07-10	1	0	0	0	0	0	0	0	0	0	0	0
2024-07-11	2	0	0	0	0	0	0	0	0	0	0	0
2024-07-12	3	0	0	0	0	0	0	0	0	0	0	0
2024-07-13	4	8	5	6	0 x	4	5	6	6	2	5	4.7
2024-07-14	5	11	11	7	0	10	11	12	11	0	10	8.3
2024-07-15	6	8	9	0	0	6	9	9	9	1	5	5.6
Total		**27**	**25**	**13**	**0**	**20**	**25**	**27**	**26**	**3**	**20**	**18.6 (±10.0)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•[3] Outlier according to Grubbs Test[b]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

x = test organism mortality

* = accidental test organism mortality

– = 4th brood (see 'NOTES')

Test Data Reviewed By : KP

Date : 2024-08-13

Work Order : 255257
Sample Number : 83068

WATER CHEMISTRY DATA

			Day 0 - 1	Day 1 - 2	Day 2 - 3	Day 3 - 4	Day 4 - 5	Day 5 - 6
	Date :		2024-07-09	2024-07-10	2024-07-11	2024-07-12	2024-07-13	2024-07-14
	Sub-sample Used		1	1	1	2	2	3
Initial Chemistry (100 %)	Temperature (°C)		25	24	24	24	24	24
	Dissolved O_2 (mg/L)		7.7	8.2	8.5	8.2	8.6	8.4
	Dissolved O_2 (% Sat.)[4]		98	105	107	102	107	106
	pH		7.2	7.4	7.6	7.4	7.5	7.5
	Conductivity (µmhos/cm)		1453	1425	1436	1447	1444	1438
	Pre-aeration Time (min)[5]		0	20	20	20	20	20
	Analyst(s)	Initial	AL (AS)	AA (AS)	JN (AS)	ASK (AS)	ASK (SV)	ET (SV)
		Final	AS	JN (AS)	ASK (AS)	ET (SV)	ET (SV)	JN (AS)
Control	Temperature (°C)	Initial	25	25	25	24	24	25
		Final	25	25	25	24	24	24
	Dissolved O_2 (% Sat.)[4]	Initial	101	101	102	101	101	101
	Dissolved O_2 (mg/L)	Initial	8.0	7.9	8.0	8.1	8.1	8.1
		Final	7.1	7.2	7.1	7.2	7.0	7.2
	pH	Initial	8.3	8.3	8.4	8.4	8.3	8.4
		Final	8.1	8.2	8.1	8.2	8.2	8.1
	Conductivity (µmhos/cm)	Initial	478	479	476	475	463	488
	Hardness (mg/L as $CaCO_3$)		220	–	–	–	–	–
0.07 %	Temperature (°C)	Initial	25	25	25	24	24	25
		Final	25	25	25	24	24	24
	Dissolved O_2 (mg/L)	Initial	7.9	7.9	8.1	7.5	8.0	8.0
		Final	6.9	6.9	6.9	7.1	6.9	7.0
	pH	Initial	8.2	8.3	8.3	8.2	8.3	8.4
		Final	8.1	8.2	8.1	8.2	8.1	8.1
	Conductivity (µmhos/cm)	Initial	482	477	480	479	458	497
9 %	Temperature (°C)	Initial	25	25	25	24	24	25
		Final	25	25	25	24	24	24
	Dissolved O_2 (mg/L)	Initial	7.8	7.9	8.0	7.8	8.0	8.0
		Final	6.9	7.1	7.2	7.1	7.0	7.1
	pH	Initial	8.0	8.2	8.2	8.2	8.2	8.3
		Final	8.2	8.3	8.2	8.2	8.2	8.2
	Conductivity (µmhos/cm)	Initial	572	577	566	578	558	581
100 %	Temperature (°C)	Initial	25	25	25	24	24	25
		Final	25	25	25	24	24	24
	Dissolved O_2 (mg/L)	Initial	8.0	8.0	8.1	8.0	8.2	8.3
		Final	6.2	6.1	6.6	7.0	6.8	6.8
	pH	Initial	7.3	7.6	7.7	7.8	7.7	7.6
		Final	7.7	7.9	8.2	8.3	8.2	8.3
	Conductivity (µmhos/cm)	Initial	1446	1452	1442	1446	1445	1442
	Hardness (mg/L as $CaCO_3$)		580	–	–	–	–	–

"–" = not measured/not required
[4] adjusted for temperature and barometric pressure
[5] ≤100 bubbles/minute

Test Data Reviewed By : KP
Date : 2024-08-13

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 25525.7

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

Voice: (519) 763-4412 Fax: (519) 763-4418

P.O. Number: 4000003377

Field Sampler Name (print): Allan Norris

Signature:

Affiliation: LANXESS CANADA

Sample Storage (prior to shipping): ICE PACK

Custody Relinquished by:

Date/Time Shipped: JUL 9/24 12:30

Client: LANXESS CANADA CO. /CIE
25 ERB ST
ELMIRA ON
N3B 2J3

Phone: 519 669 1671

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 (lab use only)	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 (ea. 2 x 1L, 3 x 10L, etc.)
			33068.11												
2024-07-09	08:30	GE 070924						** ✓	✓				✓*		3 x 5L

For Lab Use Only

Received By: SV

Date: 2024-07-09

Time: 12:00

Storage Location:

Storage Temp (°C):

Please list any special requests or instructions:

CHRONIC TOXICITY

*grab as per bladder label. SV 2024-07-09

**Testing required for ceriodaphnia only as per client email SV 2024-07-09

Attachment B

Analytical Results
Off-Site Routine Groundwater Monitoring Program

Table B.1

2024 Off-Site Routine Groundwater Monitoring
August 2024 Analytical Results
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:		**CH-14**	**CH-16A**	**CH-20A**	**CH-20B**	**CH-30B**	**CH-50A**	**CH-50B**
Sample ID:		**GW-4432-081324-AB-026**	**GW-4432-080724-AB-002**	**GW-4432-081324-AB-019**	**GW-4432-081324-AB-020**	**GW-4432-080724-AB-006**	**GW-4432-081524-AB-032**	**GW-4432-081424-AB-031**
Sample Date:		**8/13/2024**	**8/7/2024**	**8/13/2024**	**8/13/2024**	**8/7/2024**	**8/15/2024**	**8/14/2024**
Sample Type:		**Original**	**Original**	**Original**	**Original**	**Original**	**Original**	**Original**
Parameters	**Units**							
Field Parameters								
Conductivity	mS/cm	1.18	1.29	0.868	1.17	0.673	1.55	1.23
pH	s.u.	7.52	7.08	7.40	7.40	7.83	7.57	7.59
Temperature	Deg C	14.72	11.54	12.73	12.75	11.41	12.48	14.53
Turbidity	NTU	0.0	9.4	70.9	39.2	6.5	23.6	47.6
Semi-Volatiles								
n-Nitrosodimethylamine (NDMA)	µg/L	ND(0.00570)	ND(0.0142)	ND(0.00380)	ND(0.00495)	ND(0.00230)	ND(0.00450)	ND(0.00500)
Volatiles								
Chlorobenzene	µg/L	--	--	--	--	--	--	--

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
J	Estimated concentration.
--	The parameter was not analyzed for.

Table B.1

2024 Off-Site Routine Groundwater Monitoring
August 2024 Analytical Results
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:		**CH-54A**	**CH-72A**	**CH-72B**	**CH-75E-P3**	**CH-80C-P3**	**CH-88A**	**CH-90A**
Sample ID:		**GW-4432-080924-AB-018**	**GW-4432-080924-AB-016**	**GW-4432-080924-AB-017**	**GW-4432-081324-AB-025**	**GW-4432-081324-AB-021**	**GW-4432-081424-AB-030**	**GW-4432-081424-AB-028**
Sample Date:		**8/9/2024**	**8/9/2024**	**8/9/2024**	**8/13/2024**	**8/13/2024**	**8/14/2024**	**8/14/2024**
Sample Type:		**Original**	**Original**	**Original**	**Original**	**Original**	**Original**	**Original**
Parameters	**Units**							
Field Parameters								
Conductivity	mS/cm	1.48	0.947	0.752	0.687	2.13	2.15	1.29
pH	s.u.	7.48	7.42	7.61	7.80	7.26	7.34	7.35
Temperature	Deg C	14.72	12.93	13.55	15.46	12.69	14.62	9.99
Turbidity	NTU	6.0	9.8	8.0	14.7	0.0	10.5	21.2
Semi-Volatiles								
n-Nitrosodimethylamine (NDMA)	µg/L	ND(0.00540)	ND(0.00580)	ND(0.00450)	ND(0.00310)	ND(0.00300)	ND(0.00500)	ND(0.00500)
Volatiles								
Chlorobenzene	µg/L	--	--	--	--	--	--	--

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
J	Estimated concentration.
--	The parameter was not analyzed for.

Table B.1

2024 Off-Site Routine Groundwater Monitoring
August 2024 Analytical Results
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:		**CH-90C**	**CRA9A**	**CRA10**	**CRA10B**	**MOE1E**	**OW57-32(R)**	**OW57-32(R)**
Sample ID:		**GW-4432-081424-AB-029**	**GW-4432-081424-AB-027**	**GW-4432-080824-AB-011**	**GW-4432-080824-AB-012**	**GW-4432-081524-AB-033**	**GW-4432-080824-AB-007**	**GW-4432-080824-AB-008**
Sample Date:		**8/14/2024**	**8/14/2024**	**8/8/2024**	**8/8/2024**	**8/15/2024**	**8/8/2024**	**8/8/2024**
Sample Type:		**Original**	**Original**	**Original**	**Original**	**Original**	**Original**	**Field Duplicate**
Parameters	**Units**							
Field Parameters								
Conductivity	mS/cm	1.48	1.52	0.824	1.89	1.87	1.36	1.36
pH	s.u.	7.39	7.18	7.25	7.32	7.34	7.23	7.23
Temperature	Deg C	9.48	10.30	10.93	10.95	18.44	13.41	13.41
Turbidity	NTU	7.6	>1000	2.6	12.0	4.9	16.7	16.7
Semi-Volatiles								
n-Nitrosodimethylamine (NDMA)	µg/L	ND(0.00450)	ND(0.00650)	ND(0.00675)	ND(0.00540)	ND(0.00360)	0.0456	0.0482
Volatiles								
Chlorobenzene	µg/L	--	--	ND(0.20)	--	--	0.57	0.57

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
J	Estimated concentration.
--	The parameter was not analyzed for.

Table B.1

2024 Off-Site Routine Groundwater Monitoring
August 2024 Analytical Results
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:		**OW104d**	**OW161-P3**	**OW161-P3**	**OW166-25**	**OW166-39**	**OW172-33**	**OW173-30**
Sample ID:		**GW-4432-080824-AB-010**	**GW-4432-081324-AB-022**	**GW-4432-081324-AB-023**	**GW-4432-080824-AB-013**	**GW-4432-080824-AB-014**	**GW-4432-080724-AB-003**	**GW-4432-080824-AB-015**
Sample Date:		**8/8/2024**	**8/13/2024**	**8/13/2024**	**8/8/2024**	**8/8/2024**	**8/7/2024**	**8/8/2024**
Sample Type:		**Original**	**Original**	**Feld Duplicate**	**Original**	**Original**	**Original**	**Original**
Parameters	**Units**							
Field Parameters								
Conductivity	mS/cm	1.68	1.06	1.06	1.19	0.798	1.32	1.56
pH	s.u.	7.25	7.45	7.45	7.49	7.52	7.78	7.55
Temperature	Deg C	14.40	14.65	14.65	13.75	15.12	14.41	14.09
Turbidity	NTU	23.3	0.0	0.0	12.3	52.0	23.9	39.5
Semi-Volatiles								
n-Nitrosodimethylamine (NDMA)	µg/L	0.0260	ND(0.00300)	ND(0.00360)	ND(0.00770)	ND(0.00360)	0.0522	ND(0.00630)
Volatiles								
Chlorobenzene	µg/L	5.14	--	--	ND(0.20)	ND(0.20)	--	--

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
J	Estimated concentration.
--	The parameter was not analyzed for.

Table B.1

2024 Off-Site Routine Groundwater Monitoring
August 2024 Analytical Results
LANXESS Canada Co./Cie
Elmira, Ontario

Sample Location:		**OW176-24**	**OW177-21**	**OW186-49**
Sample ID:		**GW-4432-080724-AB-004**	**GW-4432-080724-AB-005**	**GW-4432-080724-AB-001**
Sample Date:		**8/7/2024**	**8/7/2024**	**8/7/2024**
Sample Type:		**Original**	**Original**	**Original**
Parameters	**Units**			
Field Parameters				
Conductivity	mS/cm	1.81	1.74	0.991
pH	s.u.	7.58	7.54	6.93
Temperature	Deg C	12.97	12.43	12.28
Turbidity	NTU	13.5	16.0	3.9
Semi-Volatiles				
n-Nitrosodimethylamine (NDMA)	µg/L	ND(0.0120)	0.0170	3.27 J
Volatiles				
Chlorobenzene	µg/L	--	--	--

Notes:

ND(RDL)	Not detected at the associated reporting detection limit.
J	Estimated concentration.
--	The parameter was not analyzed for.