

**O.Reg. 206/24 – Air Pollution – Discharge of Benzene from INEOS Styrolution  
Hourly Benzene Exceedances (October 1<sup>st</sup>, 3<sup>rd</sup> and 4<sup>th</sup>, 2024)**

Ontario Regulation 206/24: Air Pollution – Discharge of Benzene from INEOS Styrolution (“O.Reg. 206/24”) requires a report to be submitted to the District Manager of the Ministry of the Environment, Conservation and Parks’ (“MECP”) Sarnia District Office, the Chief of the Aamjiwnaang First Nation (“AFN”), and the Ministry’s Spills Action Centre within 14 days after an exceedance notification. This report describes the benzene concentration measured at eGC#5 and eGC#2 above 90 µg/m<sup>3</sup> over any hour that occurred on October 1<sup>st</sup>, 3<sup>rd</sup>, and 4<sup>th</sup>, 2024 during the removal of benzene from Tank 8.

This report contains the information requested in the regulation to the best of our abilities, with the understanding that eGC emission contributors cannot be considered with 100% certainty, as it is difficult to find exact source of emissions from such low concentrations. However, INEOS Styrolution has made every effort reasonable to attempt to identify any potential processes, events and/or sources from onsite activities during this period that may have contributed to the final value. The attached table summarizes these findings.

**Summary of Hourly Exceedances at eGC#5 on October 1, 2024:**

Time Period	Measured Benzene Concentration (Rolling Hourly Average)	Wind Direction	Wind Speed
18:30	108.84 µg/m <sup>3</sup>	WNW	5.55 km/hr
19:30	93.40 µg/m <sup>3</sup>	NNW	8.98 km/hr

**Summary of Hourly Exceedance at eGC#2 on October 3, 2024:**

Time Period	Measured Benzene Concentration (Rolling Hourly Average)	Wind Direction	Wind Speed
15:50	120.23 µg/m <sup>3</sup>	SSW	8.37 km/hr

**Summary of Hourly Exceedances at eGC#5 on October 4, 2024:**

Time Period	Measured Benzene Concentration (Rolling Hourly Average)	Wind Direction	Wind Speed
11:30	107.22 µg/m <sup>3</sup>	NNE	7.59 km/hr
13:00	107.50 µg/m <sup>3</sup>	N	6.53 km/hr
14:00	149.23 µg/m <sup>3</sup>	NW	9.02 km/hr
15:00	110.47 µg/m <sup>3</sup>	NW	6.78 km/hr

**Analysis of the Contravention:**

Tank 8 is a benzene storage tank at the Styrene 1 site (located offsite and primarily used for storage). Operations remained shutdown and idle during the time period of October 1 - 4, 2024. The design specifications to safely store material and maintain the integrity of Tank 8 requires vents to be opened for sufficient pressure/vacuum relief and to minimize organic vapor accumulation in the tank vapor space below flammable concentrations. A Thermal Oxidizer with a 99.9% destruction efficiency was installed on Tank 8 in 2021 and has assisted with keeping emission levels below the previous hourly benchmark of 580 µg/m<sup>3</sup> and below 30 µg/m<sup>3</sup> over a two-week for a majority of the time. However, due to the open vents and normal rim and deck seal losses from storage tanks (unrelated to withdrawal losses) there are routine atmospheric benzene emissions from Tank 8 that are not captured by the Thermal Oxidizer. Further, wind and ambient temperature conditions can influence the emission loss from the storage tank.

The eGC#5 and eGC#2 monitoring station was temporarily relocated adjacent to Tank 8 on September 25, 2024 to provide continuous air monitoring during the benzene removal activities scheduled to commence October 2<sup>nd</sup>. As a consequence of eGC#5 and eGC#2 close proximity to Tank 8, it was concluded that the exceedances were likely due to the normal breathing emissions from the benzene storage tank (Tank 8) as well as the benzene removal activities that begun on October 2<sup>nd</sup>. Emission reduction efforts and engineering evaluations were completed to support removing benzene from Tank 8. On October 1<sup>st</sup>, INEOS Styrolution begun opening the vents on Tank 8 in order to commission a larger Thermal Oxidizer to control emissions during the upcoming benzene removal activities. Subsequently, benzene was removed from Tank 8 on October 2<sup>nd</sup> and the internal floating roof was landed on October 3<sup>rd</sup>, which involved a few necessary steps that resulted in hourly exceedances:

- Isolation of Tank 8 inlet line to prevent material from re-entering the tank after emptying. This required the use of a vacuum truck to remove material from a small portion of the piping and then installing a blank flange to positively isolate the line to the tank. The vacuum truck with carbon scrubber was connected to the thermal oxidizer to control emissions. However, a fugitive leak developed on the gasket on the carbon scrubber portion of the vacuum truck which resulted in benzene emissions coming from the truck. The vacuum truck was switched out and Operations began troubleshooting immediately to find the source of the emissions. The third-party vacuum truck company also began their own investigation, which led to revised preventative maintenance practices.

A third-party company that specializes in controlling emissions during tank de-inventory activities was engaged throughout the entire process, however it was expected that there would be increased emissions from Tank 8 during the benzene removal activities which resulted in exceedances above 90 µg/m<sup>3</sup> for some periods of time. With that understanding, INEOS Styrolution has been actively working in collaboration with MECP, AFN, Environment and Climate Change Canada ("ECCC") and the City of Sarnia over the last few months to develop a benzene removal plan for Tank 8 that minimizes emissions, provides open communication, includes proactive air monitoring and prioritizes the removal of benzene in a safe and responsible manner. On August 14, 2024, INEOS Styrolution received approvals of the site's Suspension Plan (including the removal of benzene from Tank 8). This written approval from MECP allowed INEOS Styrolution to begin coordinating resources from various third-party suppliers and transportation services to receive and transport benzene while controlling emissions.

This approved plan includes the requirement to seal tank MT303 prior to transferring the remainder of benzene material from Tank 8 to tank MT303. Several steps have been taken to proceed towards the benzene removal plan as soon as possible:

- Completed risk assessment for sealing tank MT303.
- Scheduled and secured resources for controlling emissions during landing the floating roof of Tank 8.
- Completed third-party engineering assessment with design specifications for MT-303 PVRV, nitrogen regulator, pressure transmitter and emergency valve.
- Ordered equipment with expedited delivery.
- Arrange variety of logistics for the benzene removal plan (select temporary pump, schedule community air monitoring, diesel, etc).

A schedule (start and duration) of each step of the benzene removal plan was provided to MECP, AFN, ECCC and City of Sarnia on September 1, 2024, along with weekly updates. The removal of benzene from Tank 8 was completed on October 6, 2024. Fenceline emissions at the Styrene 1 site are very low; it was confirmed on October 9, 2024 that Tank 8 met ECCC Interim Order (section 4) requirements of "not in service".

In conclusion, benzene removal from Tank 8 has eliminated this source of benzene that likely contributed to these exceedances and the corrective action have been completed to date as shown below:

Corrective Action:	Implementation Date:
<p>Remove benzene from Tank 8 to eliminate this known source of benzene at the Styrene 1 site.</p>	<p>Benzene removal activities were completed on October 6, 2024. Measurements of LEL% were taken inside the tank on October 9, 2024 (above and below the internal floating roof) to verify that the tank is “not in service” as per the ECCC Interim Order.</p>
<p>Complete investigation to inquire why third-party vac truck company did not detect or address this issue during preventative maintenance completed prior to the benzene removal. Incorporate these learnings in future site decontamination/decommissioning plans to prevent reoccurrence.</p>	<p>Vacuum truck company completed their investigation on November 7, 2024 and found that a fouled flame arrestor caused high pressure in the carbon vessels, resulting in a gasket leak. They have now instituted a preventative maintenance program on their trucks for this component.</p>