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July 15, 2025

Ellen Klupfel, A/Supervisor
Terrestrial Assessment and Field Services Unit
Air Monitoring and Modelling Section
Environmental Monitoring and Reporting Branch (EMRB)
Ministry of the Environment, Conservation and Parks
125 Resources Road
Toronto, ON M9P 3V6

**RE: Durham York Energy Centre
Response to MECP Comments, 2023 York Durham Energy Centre Soil Assessment Report
RWDI Reference No. 2301083**

Dear Ms. Klupfel,

On behalf of the Regional Municipalities of Durham (Durham Region) and York (York Region), RWDI AIR Inc. (RWDI) is pleased to submit this letter in response to comments noted by the Terrestrial Assessment and Field Services Unit (TAFSU) of the Environmental Monitoring and Reporting Branch of the Ministry of Environment, Conservation and Parks (MECP) with respect to the 2023 Soil Testing Report for the Durham York Energy Centre (DYEC) located at 1835 Energy Drive in Courtice, Ontario (hereinafter the "Site"). The TAFSU comments were provided to RWDI as an attached letter dated May 12, 2025, in an email dated June 23, 2025.

Operating requirements for DYEC are governed by the MECP Environmental Assessment (EA) Notice of Approval (File No. 04-EA-02-08) (hereinafter "EA Approval") and the Multi-Media Environmental Compliance Approval (ECA) Number 7306-8FDKNX, issued on June 28, 2011, and amended December 23, 2021 (hereinafter "ECA"). A baseline soil quality study was undertaken as part of the EA to characterize background soil conditions in the vicinity of DYEC prior to its operation. The soil quality results of the baseline study satisfied the generic Site Condition Standards (SCS) provided in Table 1 of the MECP document entitled Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MOECC, April 15, 2011). Per Condition 7(10) and 13 (4) of the ECA, the Soil Testing Plan (Durham York Energy Centre Soil Testing Plan, The Regional Municipality of Durham, dated March 7, 2014) was prepared. The Soil Testing Plan was based, in part, on the findings of the baseline soil study.

Monitoring and compliance reporting of soil conditions is carried out by RWDI on behalf of the Durham and York Regions in accordance with the approved Soil Testing Program. Representative soil samples are collected and analysed. Soil concentration data is evaluated with comparison to the Site Condition Standards (SCS) provided in Table 1: Full Depth Background Site Condition Standards of the MECP document entitled Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. Table 1 SCS are considered to be representative background soil quality conditions in the province of Ontario.



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RWDI would like to highlight the fact that all measured concentrations are well below the Table 1 SCS. Given the conservative nature of these standards and the consistent results observed, we believe the conclusions regarding soil quality remain valid and are not materially impacted by the absence of statistical analysis. As such, the findings presented in the 2023 Soil Testing Report should be viewed as reliable within the context of the approved monitoring framework.

Furthermore, it is important to note that the DYEC is not a primary source of the monitored constituents. The presence of measured parameters in soil can be attributed to a combination of multiple local sources, including but not limited to vehicle emissions along Highway 401, nearby industrial facilities, and a significant fire that occurred at the Durham police property bureau building in Clarington in 2022. We also note that Toronto Public Health has identified traffic-related emissions as the largest source of air pollution in the region (Toronto Public Health, 2016).

*In their review, the TAFSU provided comments regarding the 2023 soil quality data with respect to concentrations of metals, polycyclic aromatic hydrocarbons (PAHs), and total dioxin and furan toxic equivalent quotient (TEQ). A summary of the TAFSU comments for these specific parameter groups is provided below, followed by RWDI's responses in italics. For reference, the full TAFSU review letter is included as **Attachment 1**.*

Metals

TAFSU acknowledges that all trace metal concentrations reported in 2023 were below Table 1 SCS. However, they note that the Soil Testing Report did not include a statistical evaluation of trends over time. Using the submitted data, TAFSU conducted its own analysis and observed potential increasing trends in barium and vanadium concentrations at the downwind location, depending on the statistical test used. TAFSU stated "Regardless of the statistical nuance, there may have been an impact on soil by Ba and V downwind of the facility, albeit small and inconsequential to date". Although the results were not uniformly statistically significant, TAFSU advised that future reports incorporate formal trend analysis to assess potential changes over time.

While we acknowledge TAFSU's comment regarding potential trends in barium and vanadium concentrations, we do not agree with the conclusion that there "may have been an impact on soil" downwind of the facility. The concentrations of these parameters in soil remain low, and the minor fluctuations over time are not indicative of a trend attributable to DYEC operations. For example, barium concentration measured in 2023 at the Downwind location (98 µg/g) is 45% of the Table 1 SCS (220 µg/g) and remains below the concentration observed at the Upwind location in 2016 (100 µg/g). Similarly, the vanadium concentration in 2023 at the Downwind location (31 µg/g) is only 34% of the Table 1 SCS (86 µg/g), comparable to the concurrent Upwind concentration (29 µg/g), and below historical concentrations recorded Upwind (33 µg/g in 2016 and 32 µg/g in 2017). The low-level concentrations and their consistency with historical data at both Upwind and Downwind locations reflects a clear absence of evidence of impact to soil quality.



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Statistical analysis was not included in the 2023 assessment, as it is neither warranted based on the consistently low concentrations observed nor required by the Soil Testing Plan. RWDI has not identified evidence of environmental concern in the current or historical dataset. To enhance future reporting, RWDI will incorporate trend analysis for trace metal parameters. Statistical methods may be considered appropriate if measured concentrations approach the Table 1 SCS, at which point the methods may offer insight into potential long-term trends.

PAHs

TAFSU agrees that there were no issues with PAH concentrations in soil up- or downwind of the facility. They observed that only five PAH parameters were reported, while recognizing that TFSU may not have complete information regarding the PAH congeners that require monitoring under the facility's ECA.

The PAH parameters included in the assessment align with those outlined in the Soil Testing Plan. Familiarity with the monitoring program, as well as related initiatives such as ambient air monitoring and the broader study area, is critical to fully understand the context of the facility. The Soil Testing Plan was developed and approved with direct involvement from the MECP and serves as the basis for both the assessment and the selection of parameters tested, all of which were carried out in accordance with the approved plan and the facility's ECA.

Dioxins and Furans

MECP advised that the conclusion attributing observed dioxin and furan concentrations in soil to background sources should be interpreted with caution. While concentrations remained well below Table 1 SCS and did not indicate degraded soil quality, the Ministry's analysis identified a potential increasing trend at the downwind location. TAFSU believes a portion of the concentrations of dioxins and furans detected in soil downwind may be the result of emissions from the facility, but more time is needed before a discernible trend can be accepted or refuted mathematically.

The interpretation that observed soil concentrations are not attributed to facility emissions was provided based on ambient air quality data collected during monitoring events and source testing of dioxins and furans conducted in April 2023. These results confirm that the facility was operating well below the applicable regulatory limits. As previously stated, the DYEC is not a primary contributor of dioxins and furans, and several other potential sources are present in the vicinity. Notable contributors include vehicle emissions along the Highway 401 corridor, and a significant fire that occurred July 17, 2022, which involved the destruction of numerous vehicles less than one kilometer from the Site. This fire represents a localized point source and corresponds with the slight increases in TEQ concentrations observed at both the Upwind and Downwind locations following the previous monitoring event. RWDI assumes that the TAFSU was aware of this event, however the reviewer's comments do not reference it as potential contributing factor. Despite these external influences, TEQ concentrations measured at the Downwind location remain low at only 34% of the Table 1 SCS.



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RWDI recommended that soil quality monitoring should continue to assess for emerging trends. There is now sufficient historical concentration data to evaluation of temporal trends, and this analysis will be incorporated into future soil quality monitoring reports.

It is important to note that, based on current data, there is no evidence of adverse effect or degraded soil quality. Soil concentrations of all parameters measured during the 2023 sampling event, including trace metals, PAHs, and dioxin/furan TEQ were below the provincial background levels.

We trust that the above responses are sufficient for the MECP's requirements. Should there be any questions or comments, please contact us.

RWDI AIR Inc.

A handwritten signature in black ink that reads "Scott Pitsch". The signature is fluid and cursive, with a long horizontal stroke extending from the end of the name.

Scott Pitsch, P. Geo. Ltd, QP_{ESA}
Technical Director

SP/hta

CC: Nicia Williams, Durham Region

The background features a large, light gray circular shape on the right side, partially overlapping a blue triangular shape on the left. A white curved line separates the two shapes.

ATTACHMENT 1

**Ministry of the Environment,
Conservation and Parks**

**Ministère de l'Environnement, de la
Protection de la nature et des Parcs**



Environmental Monitoring and Reporting
Branch

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May 12, 2025

To: Celeste Dugas, Manager
York Durham District Office
Central Region

From: Ellen Klupfel, A/Supervisor
Terrestrial Assessment and Field Services Unit
Air Monitoring and Modelling Section
Environmental Monitoring and Reporting Branch (EMRB)

**Re: Review of the York Durham Energy Centre Soil Assessment Report
2023**

At the request of Central Region, York Durham District Office, the Terrestrial Assessment and Field Services Unit (TAFSU) of the Environmental Monitoring and Reporting Branch (EMRB) has reviewed the report prepared by RWDI Consulting Engineers (RWDI) entitled Regional Municipality of Durham Whitby, Ontario Durham York Energy Centre: 2023 Soil Testing Report RWDI# 2301083 and offers the following for consideration.

The Report was prepared as part of an ongoing Durham and York municipal government monitoring programme designed to measure the potential effects of select trace elements, polycyclic aromatic hydrocarbons, dioxin, and furans deposition from the Durham York Energy Centre.

The Report provides a detailed description of the soil sampling methodology and quality assurance and quality control measures undertaken up- and down-wind of the Durham York Energy Centre. By and large, RWDI followed all traditional procedures and methods established under the programme and the TAFSU does not take issue with their sampling methodology. The results indicate that soil concentrations for the parameters considered do not exceed the

provincial Table 1 background soil standards under *Ontario Regulation 153/04 - Record of Site Condition (O.Reg. 153/04)* and that soil quality at these two sites is in good standing. The report, however, does not include statistical analysis of the results and as such some of the conclusions should be interpreted with caution.

For example, RWDI concluded there were no issues with trace element concentrations in soil, considering all values were below the Table 1 of background soil standards under *O. Reg. 153/04*. RWDI noted, in generic terms, that the 2023 data were reasonably comparable to the historical results. Importantly, there was no mathematical/statistical interpretation presented to support this position. While it is encouraging that all trace element concentrations were found below the Table 1 soil standards, the lack of meaningful interpretation of trends over time ought to be addressed in the future. For example, depending on the statistical approach taken, barium (Ba), and vanadium (V) concentrations in soil may have increased at the downwind soil location with time (Figure 1). To reach this conclusion, the TAFSU used the data reported by RWDI to conduct a linear regression analysis between the reported trace element concentrations in soil (y-axis) and time (x-axis). When regression was applied, there were significant effects of time on concentrations of Ba ($p = 0.01$, $r^2 = 0.79$) and V ($p = 0.02$, $r^2 = 0.8$) at the downwind location, but there was no such relationship upwind of the facility ($p > 0.05$). However, when a Mann Kendall test was applied, no significant relationship ($p > 0.05$) was found for Ba and V, but there was a muted trend response approaching significance for the downwind locations. For example, Ba showed a stronger positive increase trend at the downwind location ($p = 0.13$, Sen's slope = 6), when compared to the upwind location ($p = 0.71$, Sen's slope = 2.3). Similarly, V downwind of the facility nominally increased ($p = 0.06$, Sen's slope = 1.3) but upwind, the slope was flat ($p = 0.84$, Sen's slope = 0).

Applying the theoretical basis of the current sampling design - soil concentrations downwind will respond accordingly to deposition from the facility- the two sampling sites may not be truly independent from one another. They are both tethered to their proximity to the facility for interpretation. The question of independence has an impact on the statistical test selected for interpreting results. This is why, both tests were applied (linear regression and Mann Kendall) in this case. For example, Mann Kendall is generally considered a strong test to identify monotonic trends over time; however, an assumption of the model requires data independence (Waldner *et al.*, 2014). If one makes the argument that the monitoring sites are not independent, then linear regression could apply. Regardless of the statistical nuance, there may have been an impact on soil by Ba and V downwind of the facility, albeit small and inconsequential to date. If these relationships and trends are real, RWDI should be able to identify them in the future as more data are available and statistical methodology is applied. This type of analysis should encompass all parameters being monitored, not simply those noted above.

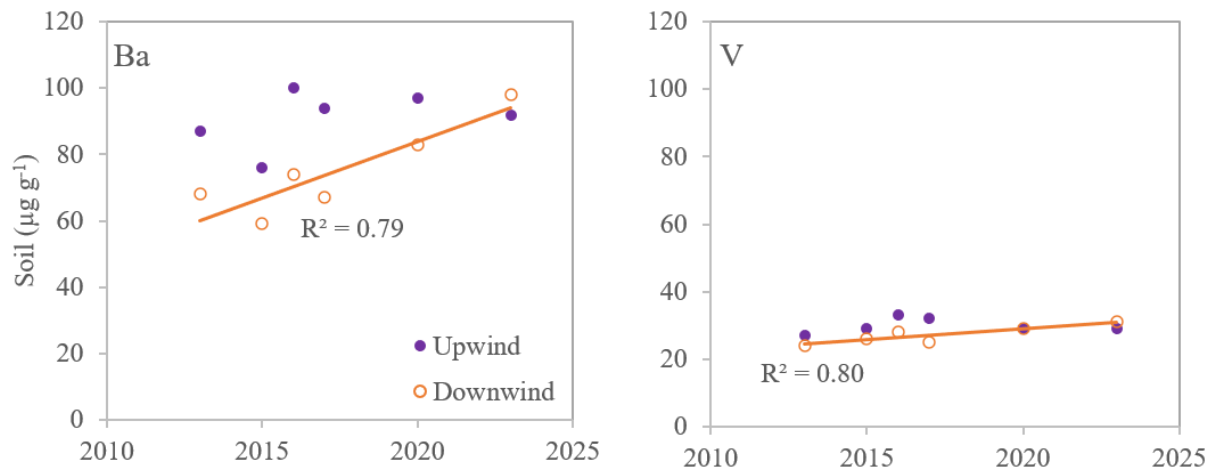


Figure 1: Barium (Ba), and vanadium (V) concentrations in soil (y-axis), compared with time (year, x-axis) upwind (solid purple circles) and downwind (open orange circles) of the Durham York Energy Centre.

With respect to polycyclic aromatic hydrocarbons (PAHs), the TAFSU agrees with RWDI that there were no issues with concentrations in soil up- or downwind of the facility. It should be noted that only five PAHs were reported, and that the Record of Site Condition regulation includes many more. It is recognized that the Terrestrial Assessment and Field Services Unit may not have complete information regarding the PAH congeners that require monitoring under the facility's Environmental Compliance Approval.

Like trace elements, RWDI's interpretation of total dioxin and furan toxic equivalent quotient (TEQ) requires some discussion. Most of the discussion by RWDI in their report dismisses the notion that dioxin and furan concentrations in soil are from the facility. RWDI conjectures that concentrations have increased at both up- and downwind locations. Despite this, there is little quantified evidence to support that claim. For example, using linear regression, there is evidence that nominal concentrations of total dioxin and furan TEQ may have increased over time at the downwind location ($p = 0.06$, $r^2 = 0.63$), while the trend at the upwind location remained largely flat ($p = 0.9$, $r^2 = 0.00$). Regardless, because both groups (upwind and downwind) do not meet the threshold to be classified as statistically significant (which is $\alpha = 0.05$) there is only a perception of the steepness of the curve at the downwind location, as again, the concentration of total dioxin and furan TEQ in soil was not significantly related to time ($p = 0.06$, $r^2 = 0.63$) (Figure 2) (same trend when the Mann Kendall was applied). Therefore, based on the data presented here, RWDI was correct to highlight there was a nominally elevated concentration at the downwind location (2.4 pg g^{-1}), but they were incorrect when they said there was an increase at the upwind location. As such, the general conclusion by RWDI that the nominal increase of dioxin and furans were not attributed to the facility should be interpreted with some caution. Caution is urged here because of RWDI's interpretation of the data, not because of degraded soil quality. There is no evidence that soil quality has been compromised and the concentrations do not exceed the provincial soil standards.

The purpose of the designed study is to compare differences between down- and upwind locations of the facility; therefore, there is an inherent assumption that differences of concentrations between the two locations are the result of emissions from the facility. From the

TAFSU's understanding, while the concentration of dioxin and furans were measured in air, deposition ($\text{g m}^{-2} \text{yr}^{-1}$) was not measured at the site. Note, that atmospheric concentrations have been reviewed separately by the ministry. Importantly, atmospheric concentrations – on their own provide an incomplete picture of the total mass of dioxins and furans deposited to the soil surface; however, based on RWDI's monitoring design, it would be logical to assume that differences between the sites are likely the result of emissions from the facility. To summarize, based on the current design of the monitoring programme, the TAFSU believes a portion of the concentrations of dioxins and furans detected in soil downwind may be the result of emissions from the facility, but more time is needed before a discernible trend can be accepted or refuted mathematically. While RWDI reported that dioxin and furan concentrations increased at both sites, this is simply conjecture, as they have not provided statistical evidence for this claim. The statistical work here suggests that there was no real increase in the soil concentrations upwind of the facility, but there may have been downwind, as results over time are trending towards significance. Future monitoring should be able to reconcile this question.

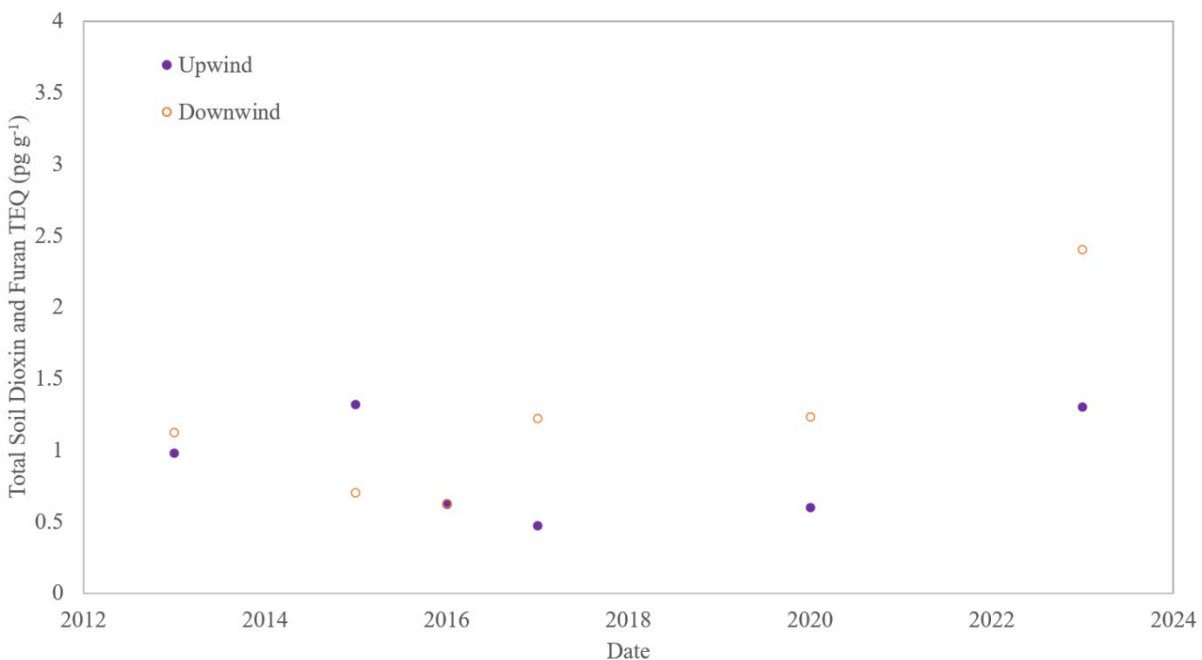


Figure 2: Total dioxin and furan TEQ (pg g^{-1}) (y-axis) in soil compared with time (x-axis) for upwind and downwind locations at the York Durham Energy Centre.

Conclusion

The concentrations of the various parameters reported by RWDI are well within the Table 1 background soil standards established under *O.Reg. 153/04*, and the TAFSU believes soil quality at these sites remains in good standing. The TAFSU can confirm that RWDI has followed the established soil sampling protocols properly. Nevertheless, it is the opinion of the TAFSU that the results need to be interpreted with caution, as RWDI has not provided statistical analysis to support their conclusions. Based on the limited analysis by the TAFSU, there could be trends emerging that future monitoring and analysis should consider.

If you have any further questions or would like to discuss further, please feel free to contact me by e-mail (ellen.klupfel@ontario.ca) or by phone 437-995-8828.

Regards,



Ellen Klupfel

On behalf of Chris Charron, Manager
Air Monitoring and Reporting Section, EMRB

References

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