



REPORT

METRO VANCOUVER QUATERLY AIR PERMIT REPORTING

Neptune Bulk Terminal Ltd

Prepared for:

Neptune Bulk Terminal Ltd.

1001 Low Level Road

North Vancouver, BC, V7L 1A7

Envirochem Project No.: 8005-23

Reporting Period: 2023 – Q1

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1.0 BACKGROUND

To meet Metro Vancouver Air Permit GVA0081 (issued September 23rd, 2016) requirements, Neptune Bulk Terminals Ltd. (Neptune) has implemented a procedure for periodic permit reporting requirements to Metro Vancouver including this quarterly reporting.

Fulfilling these requirements requires processing and checking large amounts of data. The procedures in this report provide an efficient means of processing large amounts of data and ensuring that all calculations and outputs generated are completed accurately. In order to increase the efficiency of this process, Neptune has implemented a data management system which allows for uploading of data to the Neptune database and generation of outputs. Envirochem Services Inc. (Envirochem) has been retained to calculate, tabulate and report these requirements to Metro Vancouver and ensure that:

- Raw data being collected and used for generating outputs is valid,
- Correct methodologies are used to generate these outputs, and
- Any outputs being generated undergo quality assurance/quality control (QA/QC) before being submitted electronically to Metro Vancouver.

All of the procedures contained within this report detail methodologies in conformance with Section 3 Schedules A and B of the current version of the permit (September 23rd, 2016).

This report includes quarterly particulate matter monitoring reporting requirements.

2.0 QUARTERLY REPORTING

2.1 ON-SITE PM_{2.5} AND PM₁₀ MONITORING – 24 HR ROLLING AVERAGES

2.1.1 METHODOLOGY

Neptune is conducting continuous PM_{2.5} and PM₁₀ monitoring using two Met-One E-BAM Plus monitors on-site near the northwest boundary of Neptune Terminals on the roof of the terminal's electrical substation building.

Ambient Air Monitoring data for PM_{2.5} and PM₁₀ are stored in Neptune's database. These data are retrieved and verified by Envirochem. QA/QC is performed on the raw data and any invalid data are flagged. Neptune's data management system is then updated accordingly.

2.1.2 RESULTS

Using Neptune's data management system, Envirochem:

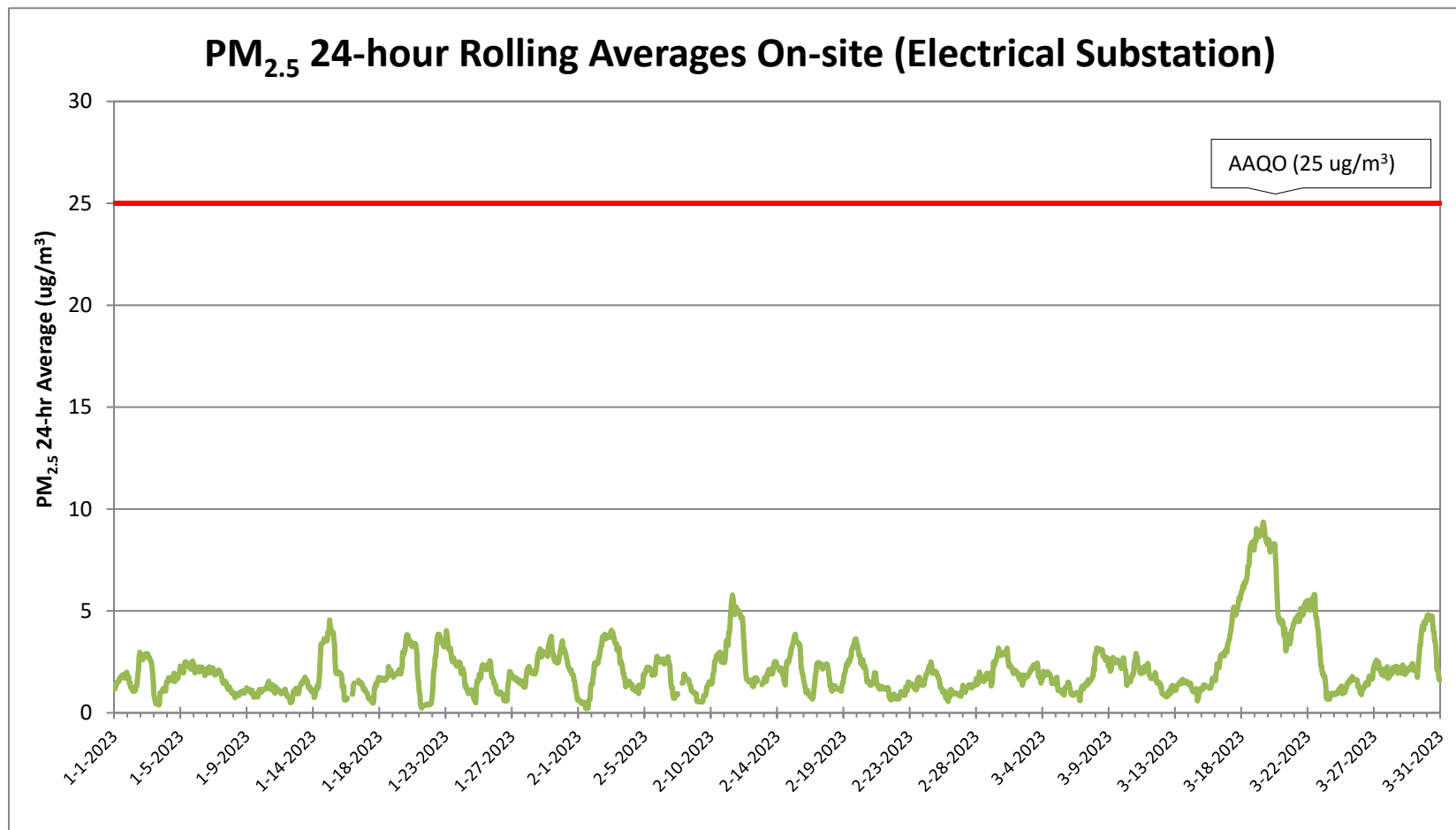
- Converts the vetted PM_{2.5} and PM₁₀ data to 24-hour rolling averages and performs QA/QC;
- On a quarterly basis, submits the graphs (**Figure 1** and **Figure 2**) to Metro Vancouver.

During Quarter 1 of 2023, there were a few exceedances of the 24-hour PM₁₀ AAQO at Neptune's on-site monitor (see **Figure 2**). No exceedances of the PM_{2.5} AAQO were observed.

To investigate the attributable particulate to the PM₁₀ exceedances:

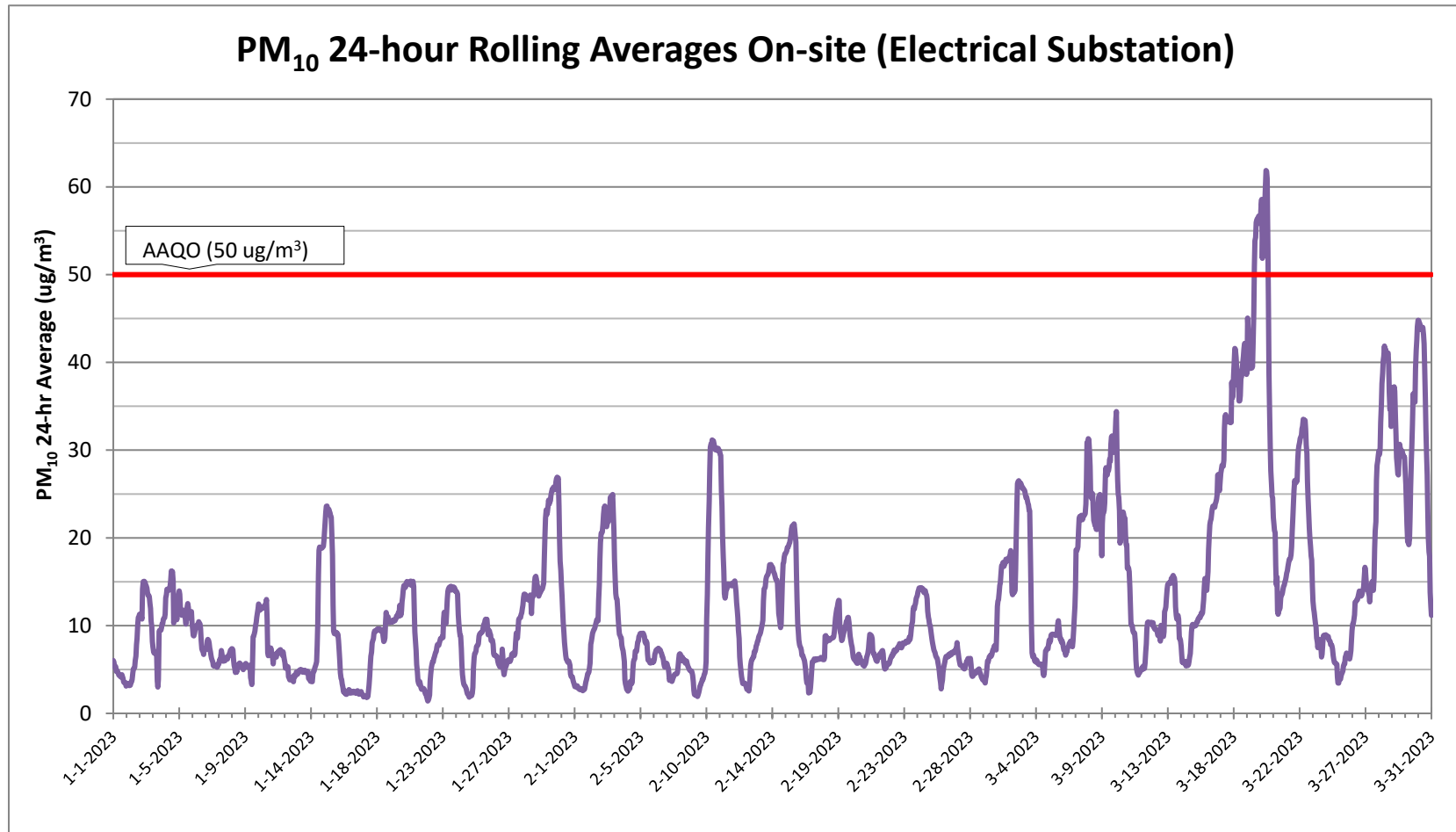
- Wind speed and direction during hours with PM₁₀ concentrations at or above 50 µg/m³ were analyzed (**Figure 3**).

Results and findings are summarized below.



**Figure 1: 24-hour rolling averages of PM_{2.5} data from on-site monitor for the first calendar quarter 2023
(January 1st to March 31st, 2023)**

Note 1: Blank space indicates that no data is available due to power failure or instrument maintenance.



**Figure 2: 24-hour rolling averages of PM₁₀ data from on-site monitor for the first calendar quarter 2023
(January 1st to March 31st, 2023)**

Note 1: Blank space indicates that no data is available due to power failure or instrument maintenance.

2.1.3 WIND ANALYSIS

To investigate the attributable particulate to the observed PM₁₀ exceedances, wind speed and direction during hours of those events with hourly average PM₁₀ concentrations of 50 µg/m³ or greater were analyzed. 50 µg/m³ was conservatively chosen as it is the 24-hour AAQO for PM₁₀. Hence, hours with 50 µg/m³ PM₁₀ or above were considered to have a possible contribution to the AAQO exceedances. Hours during periods impacted by Metro Vancouver Air Quality Advisories were not considered. As can be seen in **Figure 3**, during hours with 50 µg/m³ of PM₁₀ or higher, the wind was mostly calm and the most frequent wind direction was from the west.



Figure 3: Wind rose during hours contributing to PM₁₀ 24-hr rolling average AAQO exceedance with PM₁₀ concentrations greater than 50 µg/m³ for the first calendar quarter (January 1st to March 31st, 2023)

Note: The presented wind rose is based on "winds blowing from"

2.2 OFF-SITE PM_{2.5} AND PM₁₀ MONITORING – 24 HR ROLLING EXCEEDANCES OF PM_{2.5} AND PM₁₀ FROM AAQO

2.2.1 METHODOLOGY

Neptune is conducting continuous PM_{2.5} and PM₁₀ monitoring off-site from the terminal at these two locations (in the neighbouring areas):

- To the northeast of the Neptune Terminals, on the roof of 340 Brooksbank Avenue (Neptune's office) equipped with a PM₁₀ monitor (Met One E-BAM Plus) and a PM_{2.5} monitor (SHARP 5030i).
- To the northwest of the Neptune Terminals in the residential area at 618 2nd Street East using two pole mounted PM_{2.5} and PM₁₀ monitors (Met One E-BAM Plus).

Ambient Air Monitoring data for PM_{2.5} and PM₁₀ is stored in Neptune's database. These data are retrieved and verified by Envirochem. QA/QC is performed on the raw data and any invalid data are flagged. Neptune's data management system is then updated accordingly.

2.2.2 RESULTS

Using Neptune's data management system, Envirochem:

- Converts the vetted PM_{2.5} and PM₁₀ data to 24-hour rolling averages;
- Retrieves the quarterly 24-hour rolling averages from Neptune's database;
- Identifies and flags any 24-hour rolling averages which exceed Metro Vancouver Ambient Air Quality Objectives (AAQOs) for PM_{2.5} and PM₁₀;
- On a quarterly basis, tabulates all exceedances (**Table 1**) and submits them to Metro Vancouver.

Table 1: Off-Site 24-hour rolling average PM_{2.5} and PM₁₀ AAQO exceedances for the first quarter (January 1st to March 31st, 2023)

METRO VANCOUVER PERMIT GVA 0081	
Neptune Bulk Terminals (Canada) Ltd.	
OFF-SITE 24-HR ROLLING AVERAGE PM _{2.5} AND PM ₁₀ AAQO EXCEEDANCES	
Reporting Period:	January 1 st – March 31 st , 2023

Exceedance Event	MV AAQO		Neptune Office (340 Brooksbank Ave)	Neighbourhood Pole (618 E 2 nd St.)	Possible Cause
	Contaminant	µg/m³	Period of Exceedance		
1	PM _{2.5}	25	No exceedances	No exceedances	N/A
	PM ₁₀	50	No exceedances	14:00 February 23 rd – 08:00 February 25 th	Demolition of the house adjacent to the Station location

Note: AAQOs are based on 24-hour rolling averages. For hours presented above, periods are representative of the previous 24 hours.