

**Caroline Russell AM**

Chair of the Environment Committee

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13 February 2019

**Jill Collis**

Director of Health, Safety and Environment  
Transport for London (via email)

Dear Jill Collis,

**Tube dust**

We are aware of longstanding concerns about high levels of airborne particulate matter (PM) in the air of London's underground rail network. Whilst these concerns have previously been partly allayed by arguments that these particles are less harmful than those causing such concern as part of outdoor air pollution, questions continue to be raised. The Mayor in 2017 agreed work by the Department of Health's independent expert Committee on the Medical Effects of Air Pollutants (COMEAP).<sup>1</sup>

We understand that the conclusion of this work is contained in a *Statement on the evidence for health effects in the travelling public associated with exposure to particulate matter in the London Underground*, issued by COMEAP in January 2019. This finds that 'We cannot rule out the possibility that there is a health risk from exposure to underground PM. Given that there is strong evidence that both long- and short-term exposure to particle pollutants in ambient air are harmful to health, it is likely that there is some health risk associated with exposure to underground PM. With regards to toxicity of underground PM, the evidence is limited and there is no strong suggestion that underground PM is significantly different to ambient PM.'<sup>2</sup>

The statement shows that concentrations of PM on London Underground platforms are typically much higher than in ambient outdoor air. A number of measurements from

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<sup>1</sup> See Mayoral Answers 2017/3044 and 2017/3955..

<sup>2</sup>

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/769884/COMEAP TfL Statement.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/769884/COMEAP_TfL_Statement.pdf)

different studies are reported, from  $250\mu\text{g}/\text{m}^3$  to  $492\mu\text{g}/\text{m}^3$   $\text{PM}_{2.5}$ . Previous statements of Tube dust concentrations have revealed some levels over  $1,000\mu\text{g}/\text{m}^3$ .<sup>3</sup> These compare to measurements from beside busy London roads quoted in the COMEAP statement of  $16\mu\text{g}/\text{m}^3$  and  $26\mu\text{g}/\text{m}^3$ .

TfL statements about Tube dust concentrations tend to refer to occupational exposure limits and guidelines. The relevant occupation exposure limit is  $4,000\mu\text{g}/\text{m}^3$  respirable dust, set by the Health and Safety Executive (HSE). There is also a guideline level of  $1,000\mu\text{g}/\text{m}^3$ , set by the Institute of Occupational Medicine (IOM). These levels are 8-hour averages.

For comparison, the limit and guideline for  $\text{PM}_{2.5}$  in ambient air are  $25\mu\text{g}/\text{m}^3$  (a limit set in EU and UK law, to come in to force in 2020 and which the UK Government has pledged not to weaken as part of exiting the EU) and  $10\mu\text{g}/\text{m}^3$  (a guideline set by the World Health Organisation, which the Mayor has adopted as a goal for 2030). These are annual averages, but there is also an hourly concentration limit of  $50\mu\text{g}/\text{m}^3$  for the broader category of  $\text{PM}_{10}$ , which is to be exceeded for no more than 35 hours in total in the course of a year.<sup>4</sup> It is clear that both measured concentrations of Tube dust and the occupational exposure limit and guideline to which TfL refers are several times higher than those in outdoor air.<sup>5</sup>

We have been told that TfL accepts the findings of the COMEAP statement, including the encouragement to continue to find practicable ways of reducing PM levels on the Underground network.<sup>6</sup> We have some information about TfL's efforts to reduce PM. This includes, from June 2017, that there is a team of around 50 staff cleaning tunnel dust in engineering hours when trains are not running.<sup>7</sup> There was a trial of a tunnel-cleaning train from about 2010 to 2014, but this was found not to be feasible.<sup>8</sup>

The COMEAP statement reported that an expanded cleaning regime was introduced by TfL in 2017, with 46 stations and five tunnel sections cleaned with industrial vacuums and

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<sup>3</sup> For example Mayoral Answer 2017/0482, which reported that in 2016 nine readings from four central London stations (out of 110 taken across the network in a survey that year) were over  $1,000\mu\text{g}/\text{m}^3$ , with the highest at around  $1,300\mu\text{g}/\text{m}^3$ . See also *Air quality on the Tube 2016* (the most recent published report at <https://tfl.gov.uk/corporate/publications-and-reports/environment-reports>) which shows top readings as high as  $1,760\mu\text{g}/\text{m}^3$  (station) and  $1,810\mu\text{g}/\text{m}^3$  (train) in 2014/15 and levels recorded over  $1,000\mu\text{g}/\text{m}^3$  in most years. Some levels of over  $1,000\mu\text{g}/\text{m}^3$  also seem to be implied by the wording of statements in Mayoral Answer 2017/1654 and the TfL *Health, Safety and Environment report 2017/18* (page 53).

Please note that, for clarity, we are giving all concentrations in  $\mu\text{g}/\text{m}^3$  (millionths of a gram of particulates per cubic metre of air), though occupational health limits and guidelines are generally given in  $\text{mg}/\text{m}^3$  (thousandths of a gram of particulates per cubic metre of air) and some TfL publications follow this practice. Some numbers are therefore accurate only to the nearest  $0.01\text{mg}/\text{m}^3$  or  $10\mu\text{g}/\text{m}^3$ .

<sup>4</sup> *London Environment Strategy, Evidence Base* (pages 3-4). <https://www.london.gov.uk/what-we-do/environment/london-environment-strategy>.  $\text{PM}_{10}$  comprises all particles up to 10 millionths of a metre in diameter. It therefore includes  $\text{PM}_{2.5}$  so its level will always be higher than the level of  $\text{PM}_{2.5}$  in the same air. A limit on  $\text{PM}_{10}$  therefore implies a lower level of  $\text{PM}_{2.5}$ .

<sup>5</sup> The COMEAP report notes that elevated concentrations are also found in other indoor environments. A study of  $\text{PM}_{2.5}$  in non-smoking London homes found an annual average concentration of  $28.4\mu\text{g}/\text{m}^3$  and peak concentrations around  $400\mu\text{g}/\text{m}^3$  in houses with gas cooking.

<sup>6</sup> London Assembly Environment Committee meeting of 16 January 2019.

<sup>7</sup> Mayoral Answers 2017/1652 and 2017/1654. With about 45 per cent of the 400km London Underground network actually underground, this could equate to about 3.6km of tunnel to keep clean per person

<sup>8</sup> Mayoral Answer 2017/1652

magnets. It reports that cleaning whole tunnel sections was found to be much more effective at reducing particulate levels than cleaning only stations and platform approach tunnels.<sup>9</sup> However, the monitoring in 2017 did not provide information about how long the post-cleaning reduction lasts. To understand this, TfL is currently cleaning one line, including walls and subway tunnels, and taking PM measurements before, during and following the clean. We understand from GLA officers that this work is also on a trial basis, to identify the most effective cleaning techniques, timings, sequencing, frequency and locations, and other potential effective techniques like sealing to prevent resuspension, electrostatic precipitation, and regenerative braking. The GLA has assured us that TfL is working to achieve the lowest possible levels of particles in the Underground air, to ensure that staff and customers breathe the cleanest air possible.<sup>10</sup>

As well as continuing to work to reduce tunnel dust, COMEAP recommended that TfL should continue to monitor PM concentrations and the levels of particular metals, and the effect of various factors influencing PM concentrations. It also called for TfL to share its data and samples with researchers, which we understand from the GLA TfL is doing.

We also understand from GLA officers that there are no plans to make specific information about Underground air quality, for example daily updates, available to the travelling public.

If you have any comments, clarifications or updates on our understanding of the situation set out in this letter, I would be pleased to receive them.

Specifically at this stage, we also request answers to the following questions:

1. TfL's website has an *Air Quality on the Tube* summary and a Dust Monitoring consultants' report from 2016. Has there been similar monitoring since then? If so, please supply and publish the reports.
2. Please supply information (including results) on any other London Underground air quality monitoring from 2016 onwards, on measures to reduce or keep down dust and air pollution levels on the Underground, on assessment data so far on the effectiveness of these measures, and on any investigations into the health impacts of Underground air pollution on staff.
3. When was the COMEAP statement first communicated to TfL a) in draft and b) in a final version?
4. For purposes of comparing different limits and guidelines, and for comparing measured concentrations in the air, is there a difference between PM<sub>2.5</sub> and 'respirable dust', as regulated by the HSE? And similarly between PM<sub>10</sub> and 'inhalable dust'? If so, what is the difference and how does it affect concentration measurements?

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<sup>9</sup> 44 per cent reduction in PM from cleaning whole tunnel sections, compared to 8 per cent reduction from cleaning focused on the stations.

<sup>10</sup> London Assembly Environment Committee meeting of 16 January 2019.

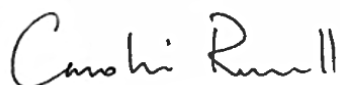
## LONDON ASSEMBLY

Please provide this information by Wednesday 13 March. Please copy your response to the committee's support staff at [EnvironmentCommittee@london.gov.uk](mailto:EnvironmentCommittee@london.gov.uk).

If some of the information will take longer to supply, please provide available information first, and then send additional information afterwards.

Thank you very much in advance for your help.

Yours sincerely

A handwritten signature in black ink that reads "Caroline Russell". The signature is written in a cursive style with a large initial 'C'.

Caroline Russell AM  
**Chair of the Environment Committee**