

BARRICK Hemlo

DPM Management

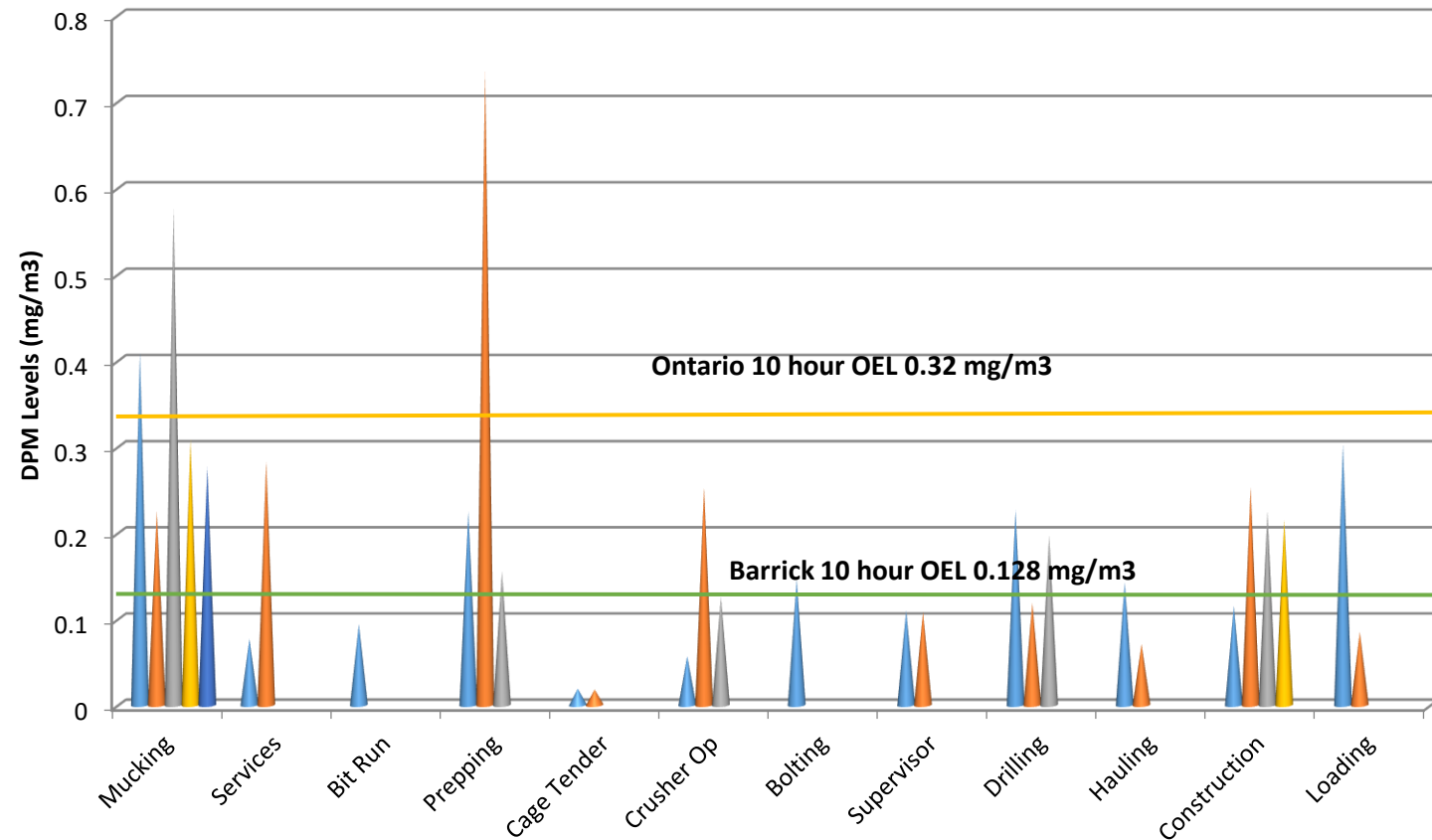
**NYSE : GOLD
TSX : ABX**

**World class mines.
World class people.**



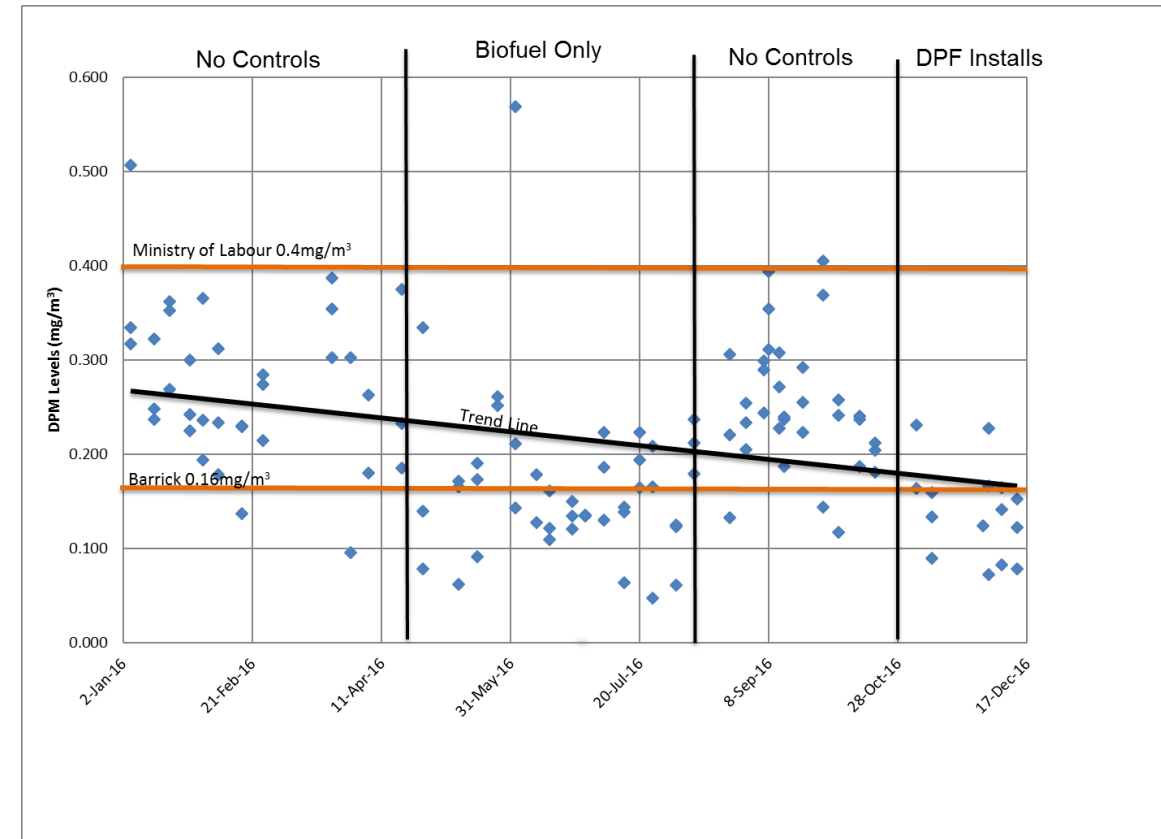
Background

- Tasked with achieving compliance with the Barrick and MSHA OEL of 0.16mg/m³ as opposed to the Ontario OEL of 0.4mg/m³
- Initial sampling of various positions UG 2013-2014

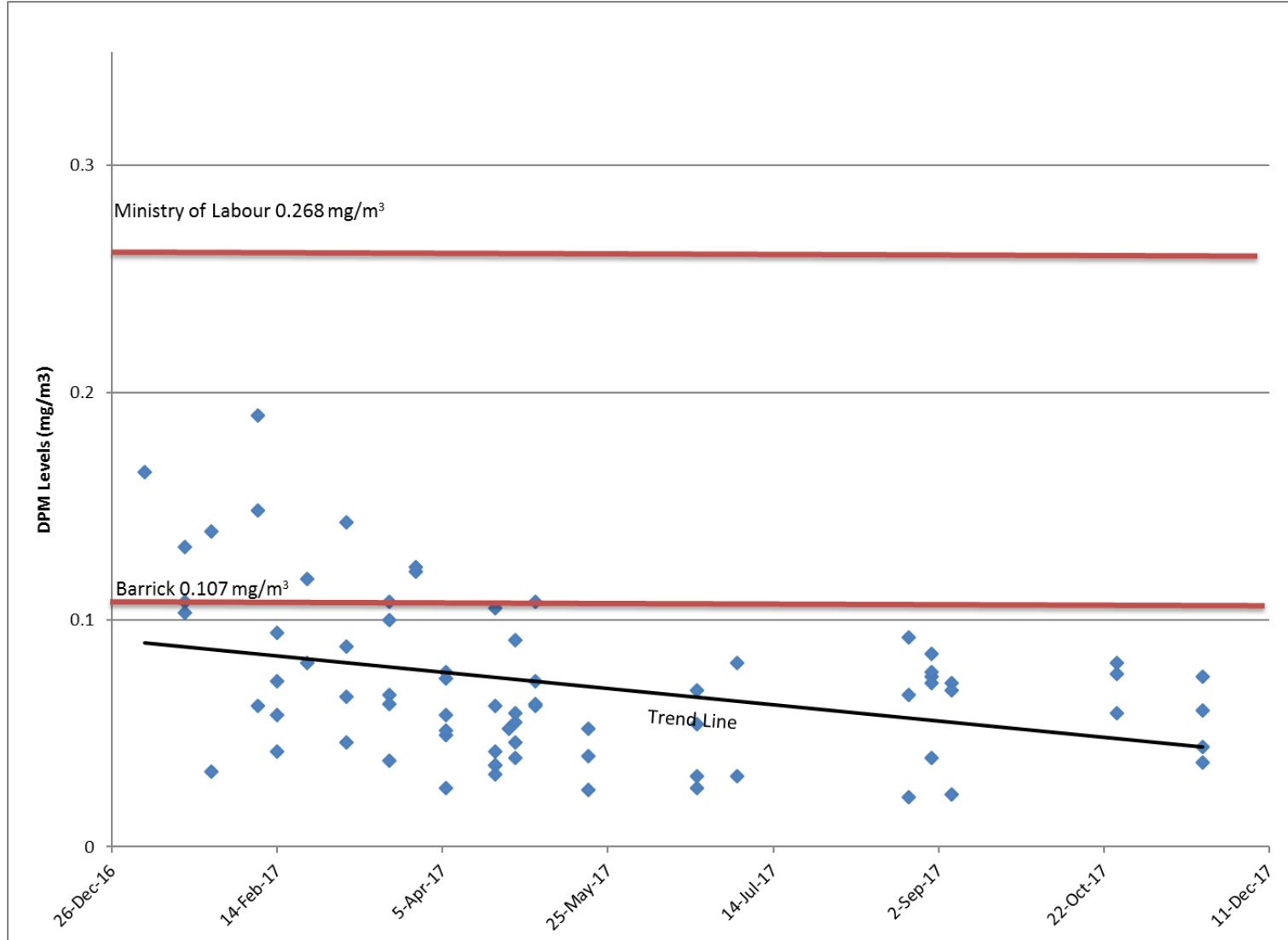


Initial Decisions

- Introduce biofuel (2015)
- Installation of diesel particulate filters on all scoops (R1700Gs) and trucks (AD30s) – fleet wide installations began December 2016
- UG area sampling during 2017
- Challenges:
 - Biofuel temperature sensitivity
 - Filter installations and changes, especially on trucks
 - Regeneration
- 2017 was full first year of all controls fully in place

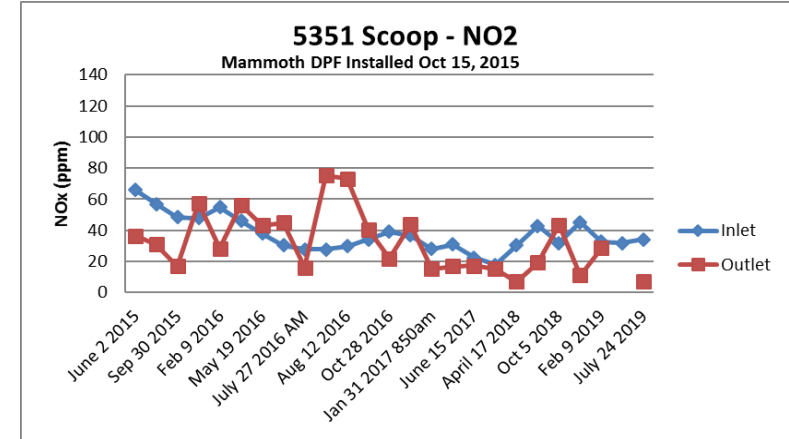
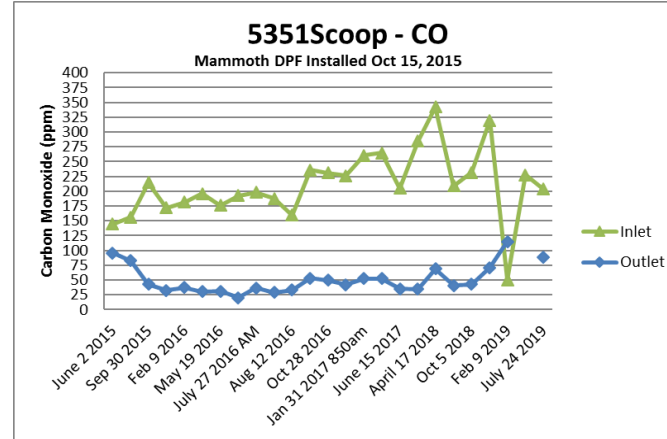
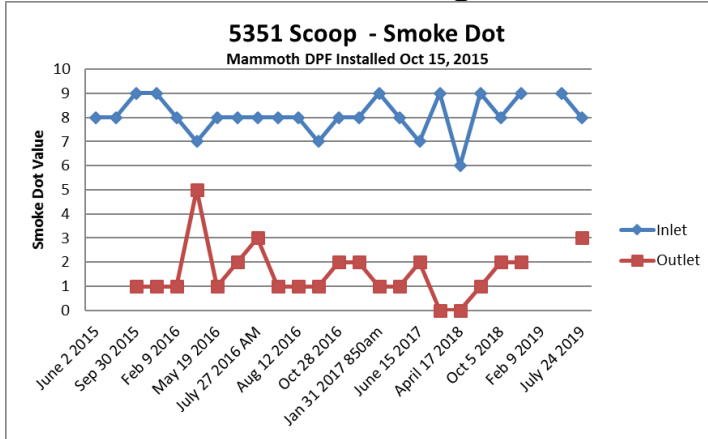


2017 Personal Sampling Results

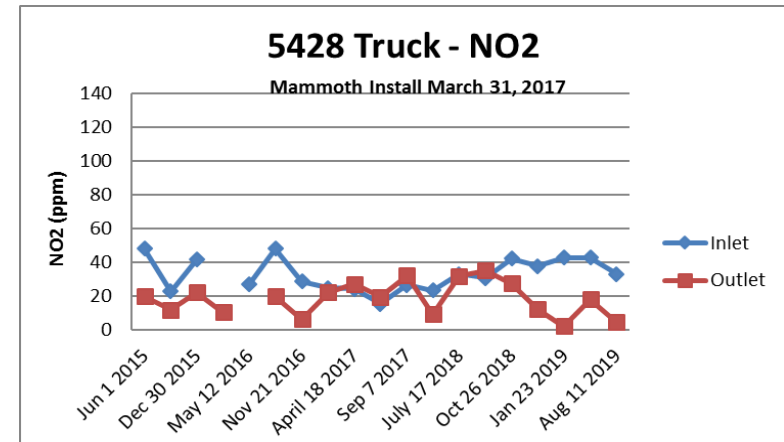
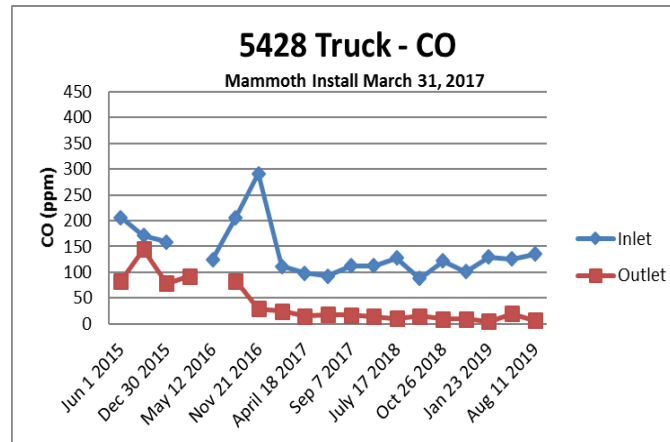
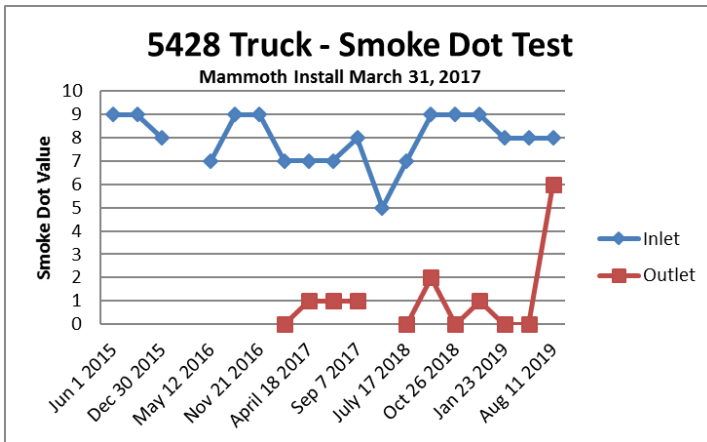


2018-2019: Hands Off!

- Emissions testing on 250hr PMs – tracking emissions
- Filter and engine health indicators

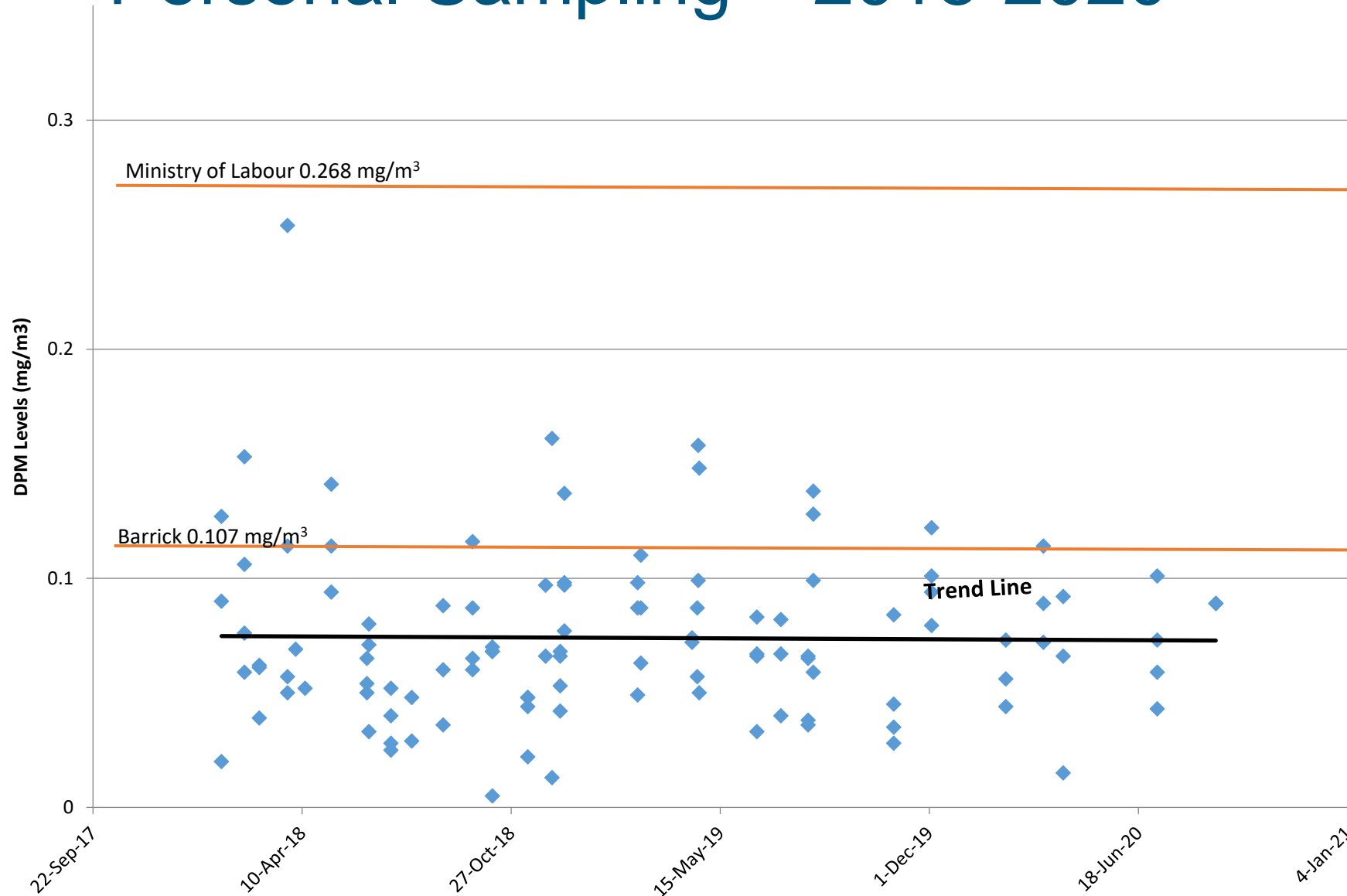


5351 Scoop – longest piece of gear running with a DPF (Oct. 2015)



5428 Truck – DPF installed immediately following midlife engine rebuild (Mar. 2017)

Personal Sampling – 2018-2020



- With the introduction of the DPFs, the amount of exceedances decreased
- Sampling remained consistently below the Barrick OEL through 2020
- A handful of filters had been replaced – cleaning reports suggested more to follow

Moving Forward



- Continual ventilation upgrades – more than doubling flows in the busiest mining areas

 - Installation of a fuel line direct from surface to underground in order to expand use of higher biodiesel blends throughout the year (operational end of 2022)

 - Updating the fleet with new equipment with Tier 4 Final engines
 - As of the end of 2022:
 - Scoops:
 - 1 CAT R1700G (DPF installed) – 3176C engine – 270hp
 - 6 Sandvik LH517i (Tier 4 Final – SCR system, no DPF) – TAD1372VE – 422hp
 - Trucks:
 - 2 CAT AD30s (DPFs installed) – C15 engine – 400hp
 - 6 Sandvik TH545I – (Tier 4 Final – SCR system, no DPF) – TAD1670 – 603hp
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Lessons Learned

■ This is not just “Hannah’s Problem”

- Multidisciplinary team effort:
 - Maintenance department at all levels
 - Operations
 - Welders
 - Ventilation
 - Suppliers

■ Sampling – establishment of baseline and ongoing verification sampling

■ Training

- Basic DPM understanding – what it is, how it is produced, what can be done to prevent it (e.g. issues with idling)
 - Operators need to understand their roles and responsibilities – without their understanding and support it will be a struggle to successfully implement
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Lessons Learned

■ DPF Management Program

- Tracking of filters, cleaning, condition of filters, replacement scheduled

■ Emissions Testing

- Regularly scheduled e.g. monthly, follow the PM schedule, etc.
- Track changes over time, help indicate issues with equipment if results go off trend, effectiveness of any filtration system, condition of filters

- If any of the abovementioned areas are not maintained the program will lose effectiveness
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