

Hemlo DPM Management Update



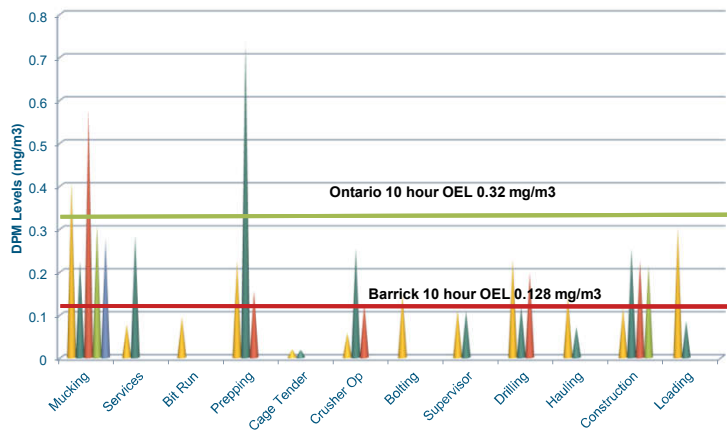
2019 MDEC Conference, Hannah Demers, Industrial Hygienist, (Barrick Hemlo)

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Background



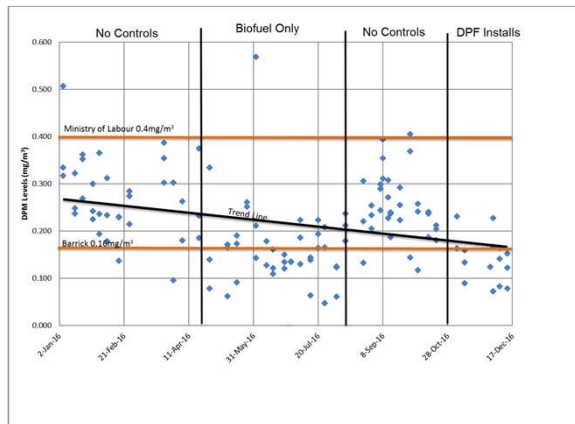
- Tasked with achieving compliance with the Barrick and MSHA OEL of 0.16mg/m³ as opposed to the Ontario OEL of 0.4mg/m³
- Initial sampling of various positions UG 2013-2014



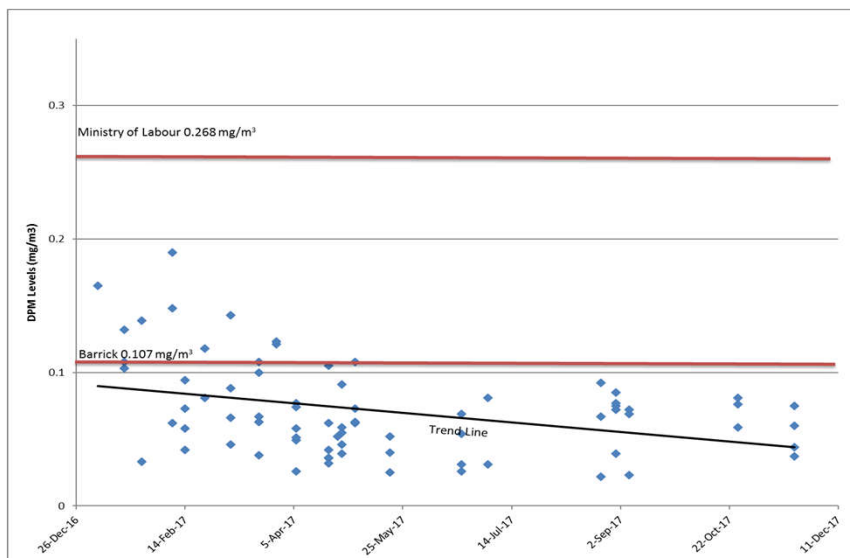
Initial Decisions



- 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 on trucks
 - Filter changes
- 2017 was first full year of all controls fully in place



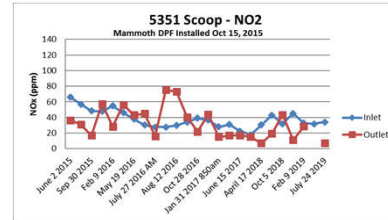
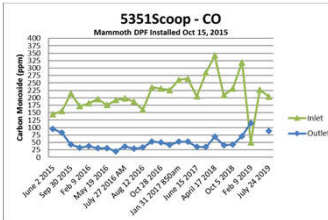
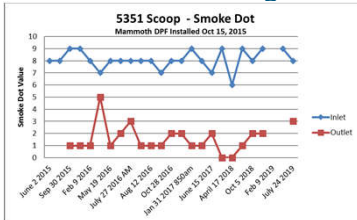
2017 Personal Sampling Results



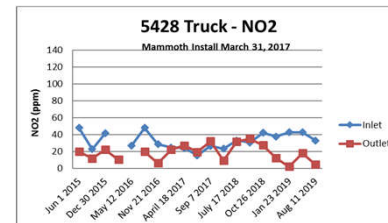
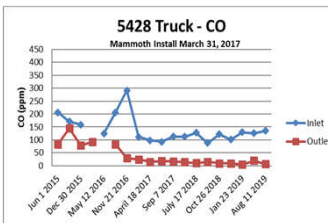
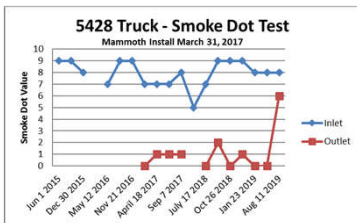
2018-2019: Hands Off!



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

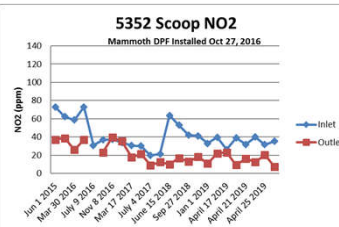
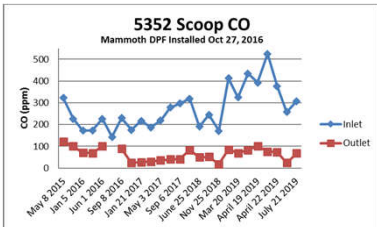
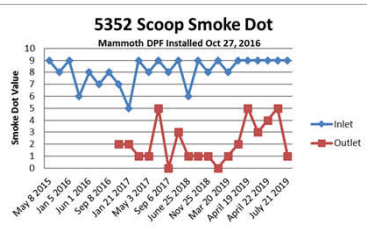


5351 Scoop – longest piece of gear running with a DPF (Oct. 2015)

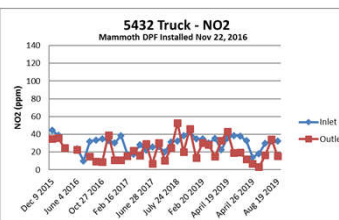
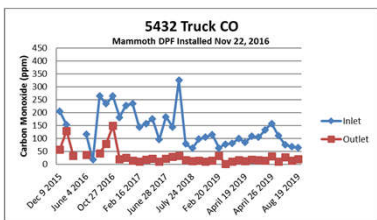
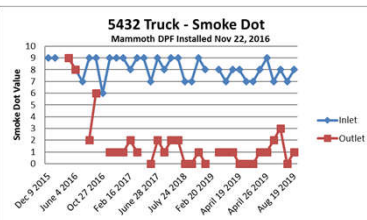


5428 Truck – DPF installed immediately following midlife engine rebuild (Mar. 2017)

Testing New Diesel Supplier (Apr 17-25, 2019)



- Cost savings, a higher cetane level, higher flash point, no biofuel option



- Some increases in smoke dot values and CO, backpressure at least doubled in 1 week in both pieces of equipment – filters plugging very fast

Filter Changes and Cleaning

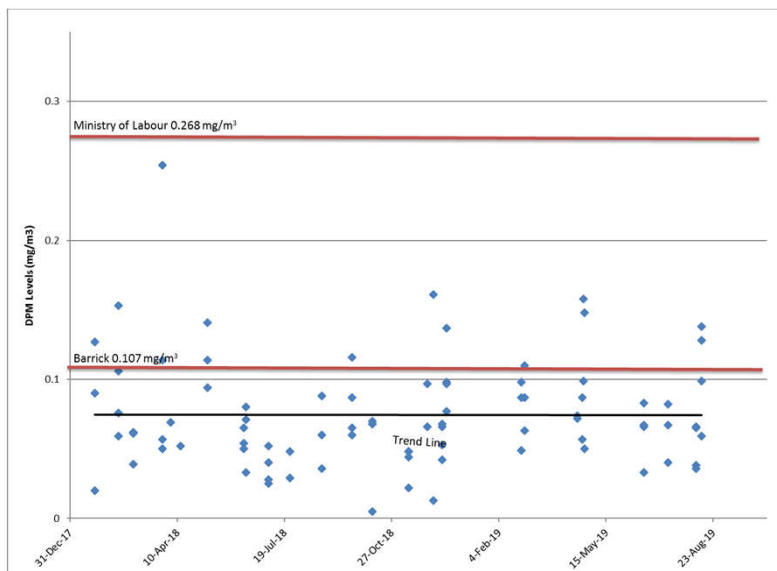
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- Cleaning continuing to be conducted with a local shop – turn around time approximately 24 - 36 hours barring unforeseen circumstances
- Provide a report on condition of filters, changes, damage etc.
- Scoop filters regularly go 500 hours between changes
- Truck filters are more problematic due to a lack of consistent engine temperatures, but generally have been reaching the 250 hour PM cycle
- Most filter changes can be planned and are relatively quick (30 minutes)
 - Practice makes perfect



Personal Sampling 2018-2019

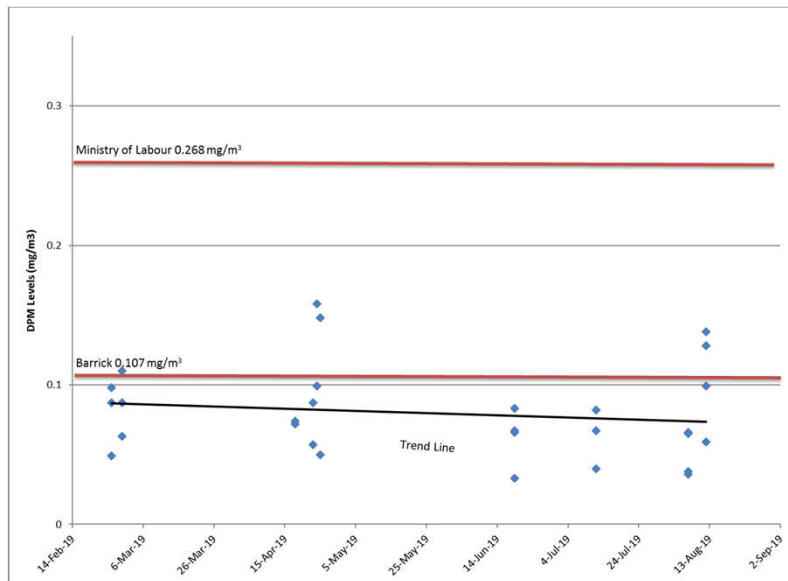
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- With the introduction of the DPFs, the amount of exceedances decreased
- Most recent exceedances are caused by overloading of a vent zone
 - Human behavior plays a large role

Personal Sampling 2019

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- Sampling results remain consistently below the Barrick OEL even into the 3rd Quarter of 2019
- A handful of filters have already been replaced, but cleaning reports have suggested that many are starting to reach the end of their lifespan

Moving Forward

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- Continual ventilation upgrades, more than doubling flows in the lowest and busiest mining areas
- Project to install a fuel line direct from surface in order to expand the use of higher biodiesel blends throughout the year (remove the human element)
- Purchase of battery powered equipment (Jumbo ETA September 2019, bolters to come)
- Purchase of new scoops and trucks with Tier 4 final engines into Q4 of 2020 and into 2021