



Introducing CANMET Ventilation
Prescriptions into Operations:
Lab vs Real Time Monitoring

Overview

- Opportunity – Potential to move towards CANMET new ventilation regs.
 - CANMET engine certification revision.
 - Good previous history of DPM personal monitoring & tail-pipe exhaust monitoring.
 - Theoretical application of the CANMET certification to existing fleet.
 - Determining new Ventilation Requirements.
- Validation
 - Continuation of increased personal monitoring
 - Introduce real-time monitoring
 - Real-Time DPM Monitoring vs Fans Output (VoD)
- Proposal for change
 - Presenting plan to Health and Safety Committee for Review
 - Ongoing testing and sampling
- Post implementation – validation
 - Comparative tests of personal pumps with real-time monitors of elements of concern.
 - EC/DPM
 - RCS/Silica
 - Respirable Dust
- Summary

Opportunity

With the new ventilation regulations, would we have the capacity to safely increase production?

- In 2023, CANMET updated their ventilation requirements for certified equipment with improved diesel engines and technology.
- In 2023, the OEL for DPM was reduced from 400ug/m³ (TC) to 120ug/m³ (EC) .
- Prior to this opportunity, both mines had performed well with DPM testing (both personal & exhaust).

Opportunity

Subsection 183.1(1) requires that where diesel-powered equipment is operating in an underground mine, a mechanical ventilation system must produce a flow of air in accordance with the following rules:

- Rule 1 - A piece of diesel-powered equipment that has an airflow rate certified in accordance with CSA M424.2 must have a flow of air at least equal to the airflow rate as posted on the certificate of homologation.
- Rule 2 - A piece of diesel-powered equipment that does not have an airflow rate certified in accordance with CSA M424.2 must have a flow of air at least equal to the engine power multiplied by unit airflow requirement, $0.06 \text{ m}^3/\text{s}$ per kilowatt engine power (known informally as the 100 CFM per brake horsepower rule).
- Rule 3 - If a piece of diesel-powered equipment with an airflow rate determined under rule 1 or 2 has been fitted with a diesel exhaust after-treatment device and a new airflow rate with this after-treatment device has not been certified or recertified in accordance with CSA M424.2, then the employer must determine a suitable flow of air in consultation with the JHSC or HSR, if any based on certain specified criteria (such as, applicable rates determined prior to modification, good engineering practices, results of testing after modification).
- Rule 4 - If more than one piece of diesel-powered equipment is operating in a single continuous course of air in an underground mine, then the total airflow rate must be at least equal the cumulative airflow rates as determined in Rules 1-3 for each piece of equipment.

Evaluation of CANMET Ventilation Regulations at a Site Level

NIOSH

- Site A – DPM (VoD)
 - Baseline/ Before/ Real-Time
 - After
- Vale CCNM– EC/ RCS/ Dust/ Gas
 - Baseline/ Before/ Real-Time
 - Compounding and Separate
 - Next Steps

Opportunity – Site A (VoD)

With the new ventilation regulations, would we have the capacity to safely increase production?

- In 2023, CANMET updated their ventilation requirements for certified equipment with improved diesel engines and technology.
- In 2023, the OEL for DPM was reduced from 400ug/m³ (TC) to 120ug/m³ (EC) . However, the mine was already pro-actively following a stricter corporate std of 100 µg/m³ EC.
- Prior to this opportunity, the mine had performed well with DPM testing (both personal & exhaust).
- Existing ventilation capacity of 220 CMS available at 100% VoD.
- Can we increase the number of haulage trucks in our operations safely?

Previous DPM sampling results (personnel pumps)

Site A – DPM (VoD)

- 65 tests in 2023, only 2 exceedances. Both involved a scoop operator with SC35.
- A DPM filter was installed in September 2023, no exceedances following install.
- The results of the 2024 sampling campaign showed no exceedances.

Date	Area	Job Position	Shift Length (hr)	EC TWA (mg/m3)	Adjusted OEL (mg/m3)	Equipment
4/30/2023	330 WEZ, 360 WEZ, 285 CEZ	Scoop Operator	11	0.182	0.100	SC 035
6/20/2023	345 W W0Z	Scoop Operator	11	0.111	0.100	SC 035

Previous tail-pipe exhaust testing

Site A – DPM (VoD)

- Diesel vehicle tail-pipe exhaust testing by the maintenance department on all diesel equipment every month.
- Only two failed their test across 2023 and 2024:
 - FP01 (Minecat face prep tractor) failed its test for 723ppm NOX in Feb 2023
 - ET30 (Minecat electrical tractor) failed its test for 739ppm NOX in Jan 2024
- Note: When an equipment fails the test they redo the test. Sometimes it could be due to the equipment not being hot enough.

CO 480 PPM+ is a fail

NOX 650 PPM+ is a fail

NO2 50 PPM+ is a fail

Electric Equipment List

Site A – DPM (VoD)

Equipment Number	Equipment Type
DD01-DD02-DD03-DD30	Jumbo
BL04-BL05	Bolter
CC01-CC02-CC03-CC04	Cassette Carrier
BH01	Blockholer
SL01-SL02-SL03	Scissor Lift
FP02	Face Prep Tractor
LH01	Production Drill
SC02-SC03-SC04-SC05	Scoop
GP01-GP03-GP04 GP06 thru to GP14	Gopher (Light Vehicle)
LT33	Electric Toyota
ET01	Electric Tractor
Total	34 Electric Equipment

Review of Ventilation Requirement Changes

Site A – DPM (VoD)

Equipment	Previous CMS	CANMET CMS	Proposed	Equipment	Previous CMS	CANMET CMS	Proposed
TR01-TR02	$24.3 * 2 = 48.6$	$7.88 * 2 = 15.76$	$11.82 * 2 = 23.64$	Kubota RTV-1140 or MMX4 x 6	$1.1 * 6 = 6.6$	$0.85 * 6 = 5.1$	$1.1 * 6 = 6.6$
TR03-TR04-TR05-TR06	$24.3 * 4 = 97.2$	$7.98 * 4 = 31.92$	$11.97 * 4 = 47.88$	LT01-LT Major-LT Orica-Redpath Personnel Carrier	$6 * 4 = 24$	$3.4 * 4 = 13.6$	$6 * 4 = 24$
TR07-TR08	$30.9 * 2 = 61.8$	$10.81 * 2 = 21.62$	$16.22 * 2 = 32.44$	TH01	6.3	Not Certified	6.3
TR09	35.1	12.74	19.11	TH04	5.4	3.3	5.4
SC06	14.1	8.07	12.11	BT Boom Truck	9.6	5.66	8.49
SC35	11.8	9.77	11.8 (DPF installed)	UT99-UT30	$4.7 * 2 = 9.4$	$2.83 * 2 = 5.66$	$4.7 * 2 = 9.4$
SC37	15.9	5.9	8.85	GENMB01 (Genset)	18.9	6.61	9.92
SC07	15.9	6.37	9.56	GR02	8.82	6.7	8.82
SC40 (Rental extended to October 2025)	12.6	4.34	6.51	Polaris x 2 (RTV7-RTV8)	$1.1 * 2 = 2.2$	Not Certified	15.66
LH30 (Leaves in June 2025)	6.8	4.34	6.8 (Not counted in Total)	Electric Equipment	0	0	0
CB01	7.62	6.4	7.62	Personnel	0.83	0.83	0.83
LH31 (DL-431)	6.6	4.34	6.51	Total (all equipment)	458.99	217.18	308.82
LH31 diesel compressor	8.28	7.1	8.28		*410.39		**285.18
FP01-Major Minecat-ET30	$4.43 * 3 = 13.29$	$4.8 * 3 = 14.4$	$4.8 * 3 = 14.4$	Maximum Mine Ventilation output	220	220	220

9 haulage trucks total
 * 6 haulage trucks
 ** 7 haulage trucks

Opportunity

With the new ventilation regulations, would we have the capacity to safely increase production?

- Yes, theoretically 6 haulage trucks could be increased to 7.
 - This includes multiple safety factors
- This theoretical will need to be tested and validated with practical testing.
- If validated, this will need approval from the health and safety committee.

Planning the validation of ventilation needs

- Continue tail-pipe exhaust testing of diesel equipment.
- Increase the frequency of personal NIOSH-5040 DPM sampling among personnel to validate a safe working environment for underground workers.
- Introduce real-time DPM monitoring to validate contamination levels and ventilation system health.
- Test changes in ventilation requirements by equipment and capacity.

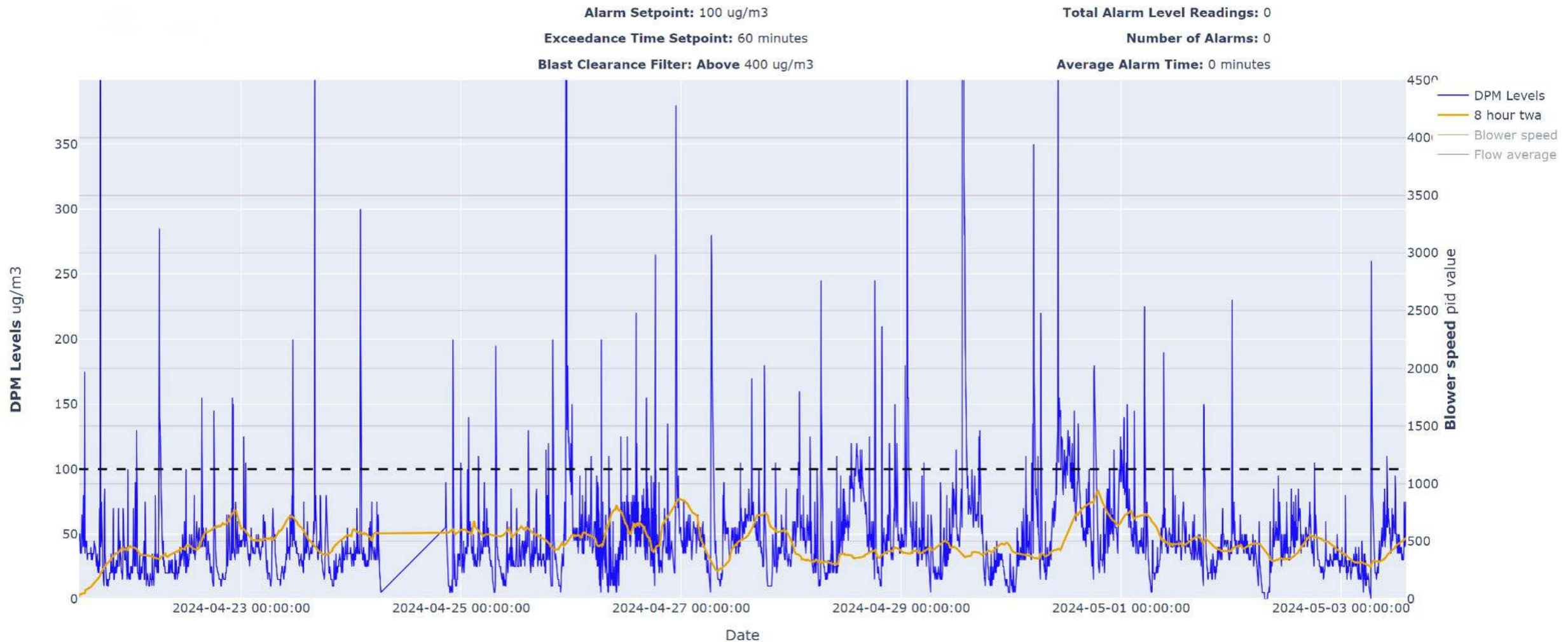
Introduce real-time DPM Monitoring

- The real time DPM monitor has been in operation since March 20, 2024.
- Sampling occurs every 5-minutes, 24/7. (Continuous monitoring)
- The mine now has the advantage of investigating if DPM increases – in real time.



DPM Monitoring Data– May 7th, 2024

DPM Monitor Data



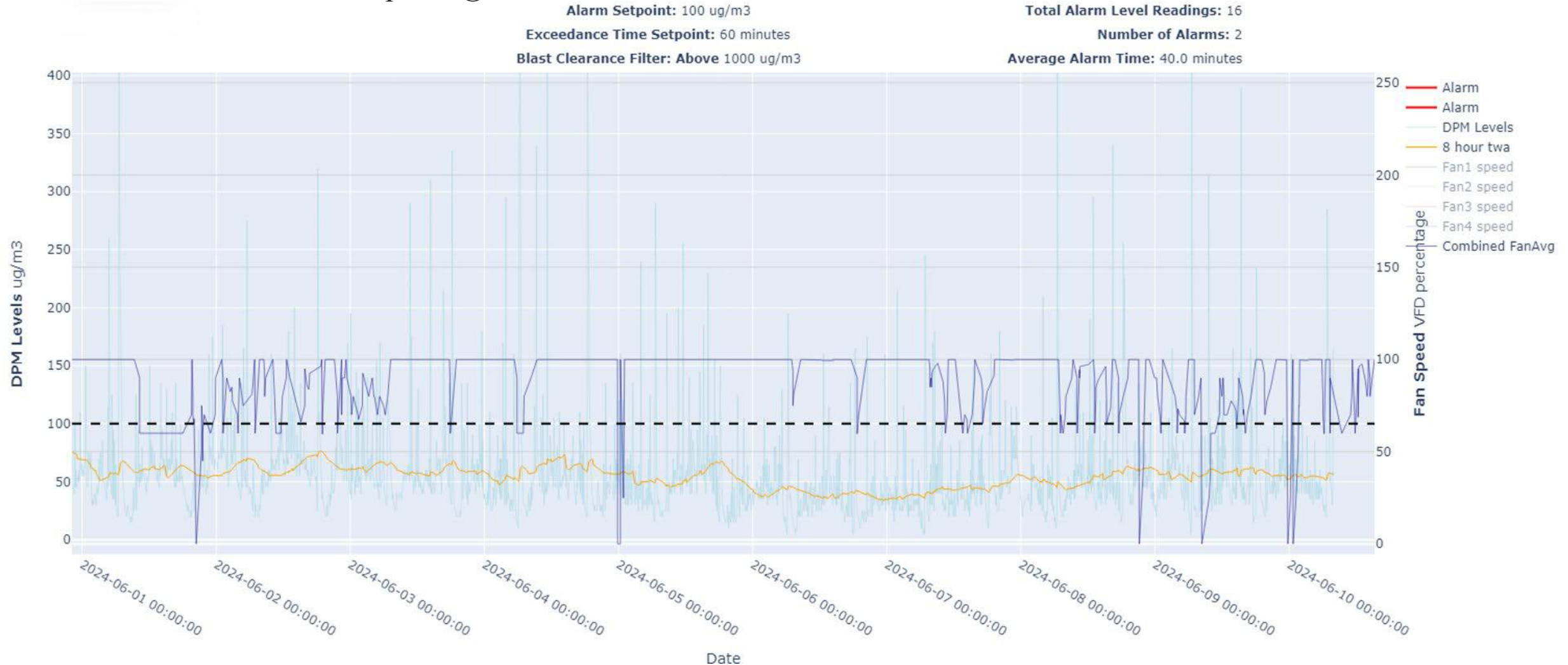
Continuous DPM Monitoring testing with fans– June, 2024

Continuous DPM Monitor

- We conducted a test comparing the DPM monitor to the main fan settings. It was shown that manually switching to 90% of the main fans, which were set at 60% VOD, was very effective in reducing DPM values.
- The test with the main fans at 100% was carried out on June 4, 5 and 6, 2024.
- We obtained two additional months of real-time DPM data. This data was reviewed by the manufacturer and presented on July 3.
- The test shows a direct relationship between main fan speed and DPM level. With the main fans at 100%, we fluctuated between 40 and 50 $\mu\text{g}/\text{m}^3$ for 8 hours. When the fans are in VOD mode, DPM values reach a peak of approximately 75 $\mu\text{g}/\text{m}^3$.

Continuous DPM Monitoring data with fans– June, 2024

DPM Monitor Data vs Fan Speed @100%



DPM Monitor Data vs Fan Speed



Ventilation Management Proposal

Adding a haulage truck to the equipment list

- Allow 7 haulage trucks underground at any time, up from the previous maximum of 6.
- Use CANMET ventilation requirements with a 50% safety factor for trucks and loaders (except SC35). Continue to use CMS ventilation requirements per kW or CANMET ventilation requirements if higher for all light vehicles and SC35.
- Request increased individual oversight of DPMs during the transition.
- Review DPM results quarterly basis to ensure DPM levels remain within guidelines.

Outcome

Adding a haulage truck to the equipment list

- The ventilation and DPM management strategy was presented to the health and safety committee.
- The proposal was accepted on August 13, 2024.
- Installed signs to identify the equipment's ventilation requirements. Authorization for a seventh haulage truck began in November 2024.

Post implementation - validation

Adding a haulage truck to the equipment list

- A new review of the DPM data was conducted in April 2025.
- The real-time DPM monitor was recording high values, but within the standards. This is including blasting and total DPM particle.
- Personal pumps were showing significantly lower results, as Elemental Carbon.
- We decided to conduct several tests where personal pumps were installed at the location where the real-time DPM monitor was installed.
- Comparison testing was conducted through NIOSH 5040 method of two sample pumps at monitor's location to compare live readings vs EC regulatory results.

EC/OC/TC/DPM - Information

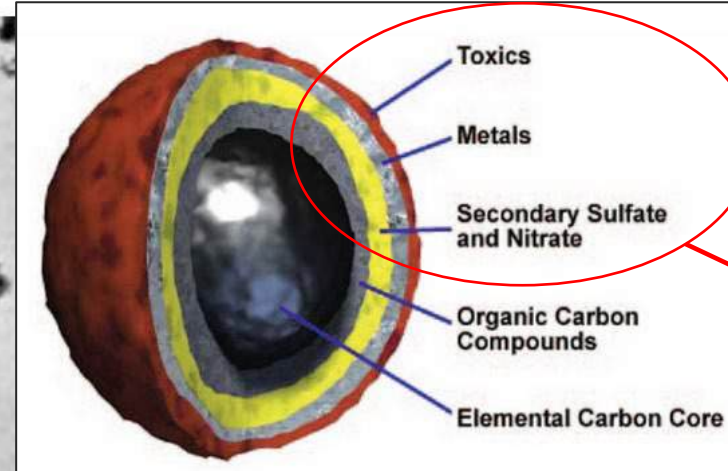
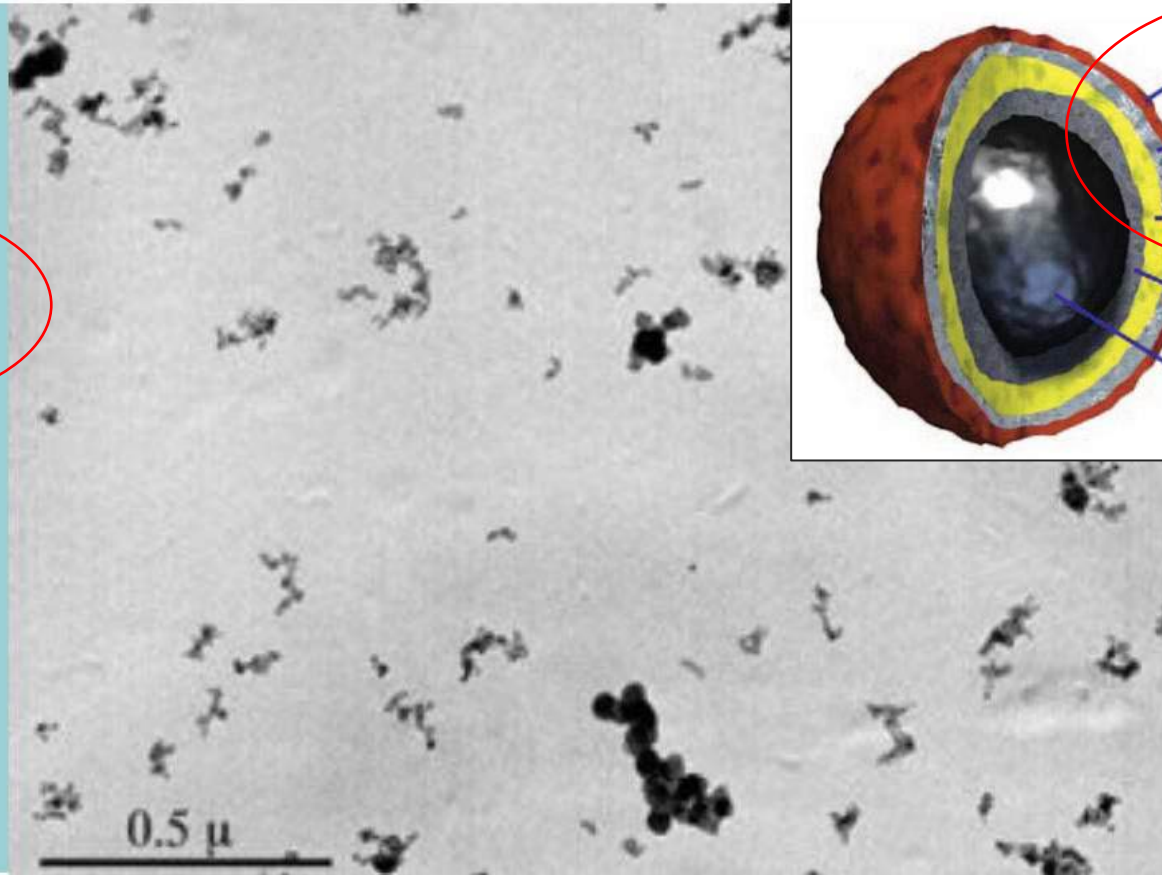
Slide from Professor Sandra Dorman, Ontario, Canada

Physical/Chemical Properties

- Shape

- Contents

- Size



DPM consists of:-
1. Non-Carbon portion
2. Total carbon portion (OC + EC)
3. Elemental Carbon

Key point:-

Elemental carbon is a portion of DPM



SITE SAMPLING DATA:

NIOSH 5040 SAMPLE RESULTS Vs. DPM MONITORING DATA

DATE	NIOSH 5040 - GRAVIMETRIC SAMPLES						REAL TIME DPM DATA		
	SAMPLE TIMES	EC (ug/m3)	TC (ug/m3)	EC/TC RATIO	Relative Percent Difference (RPD) EC	Relative Percent Difference (RPD) TC	DPM DATA Avg (ug/m3)	EC VS DPM DATA	SAMPLE TIMES
2025-05-03	8:00 - 15:00	37	60	62%	2.7%	5.1%	55.79	0.66	8:00-14:57
2025-05-03	8:00 - 15:00	36	57	63%				0.65	
2025-05-03	20:00-4:00	46	66	70%	4.3%	7.3%	75.21	0.61	20:00-3:57
2025-05-03	20:00-4:00	48	71	68%				0.64	
2025-05-06	8:00 - 16:00	25	44	57%	0.0%	4.7%	38.40	0.65	8:02-15:59
2025-05-06	8:00 - 15:00	25	42	60%			38.29	0.65	8:02-14:58
2025-05-06	20:00-4:00	21	34	62%	4.7%	11.1%	30.05	0.70	20:00-3:57
2025-05-06	20:00-4:00	22	38	58%				0.73	

EC/TC ratios ranged from 57-70%. (range of 13%)

EC over live DPM Data ratios ranged from 61-73%. (range of 12%)

SITE SAMPLING DATA:

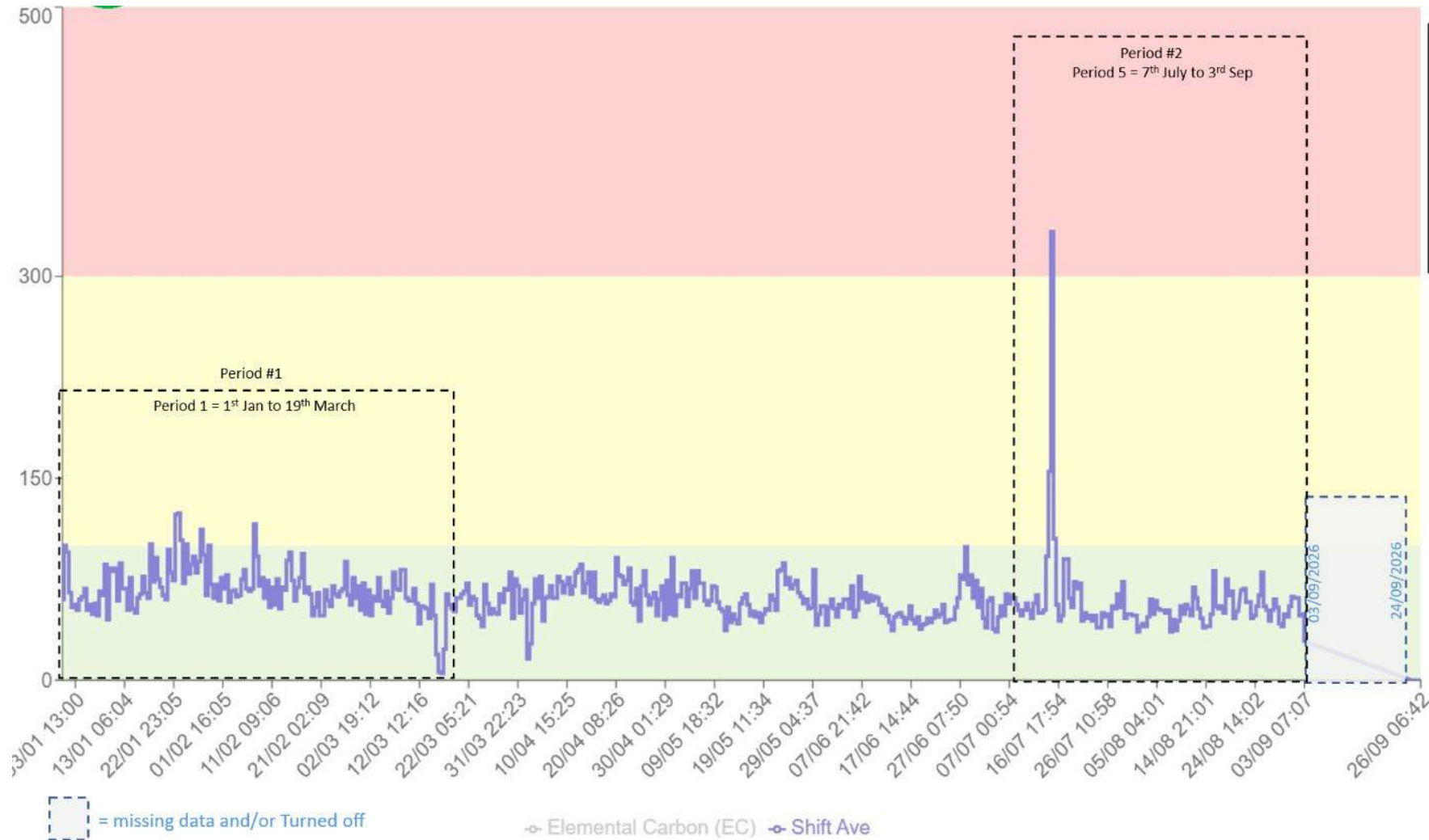
NIOSH 5040 SAMPLE RESULTS Vs. DPM MONITORING DATA

- Based on the testing conducted in May 2025
 - NIOSH 5040 sample results of EC/TC ratios ranged from 57-70%. (range of 13%)
 - EC over live DPM Data ratios ranged from 61-73%. (range of 12%)
- For future reference, the real time DPM data could be viewed at 0.75 or 75% conservatively as a guide to regulatory EC levels in real time or 0.66 (66%) as an average ratio.

Summary

- Opportunity identified following CANMET engine certification revision.
- Validation using practical monitoring
- Proposal for change with data was approved
- The allowance of an additional haulage truck underground in November 2024 resulted in a 17% increase in haulage capacity.
- Increase utilization across current fleet of haulage trucks.
- Post implementation – validation of decision, more data.

2026 Data



249 days of data
68,680 samples

Average over this period :-
61µg/m³ (EC DPM with blasting)
(EC factor of 0.66, no SF)

Site and Monitor Information

SITE :	
SITE EC OEL :	100 µg/m ³
MONITOR LOCATION :	AIT-2701R(DPM)
LOCATION FACTOR :	0.66
MONITOR SERIAL # :	PIN23R1000066

Period Reported

PERIOD REPORTED :	01/01/26 to 30/09/26
NUMBER OF DAYS :	249
NUMBER OF HOURS :	5890
NUMBER OF SAMPLES :	68680
EC AVE OVER PERIOD :	61 µg/m ³

Ongoing initiatives

- Review real-time alerts with EC/DPM factor.
- Adhere to TARPs with alerts as trigger points.
- Continued and ongoing testing/review data of sample pumps, exhaust and real time DPM.

Opportunity – Vale North Mine

With the new ventilation regulations, would we have the capacity to safely increase equipment?

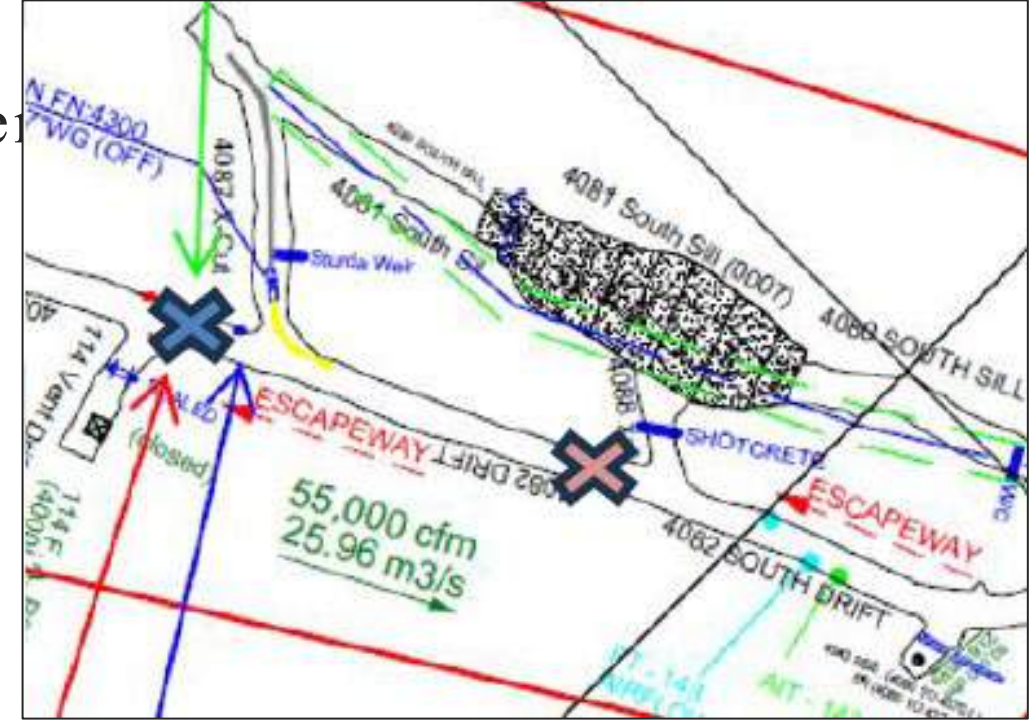
- With the new ventilation rates available on improved engine designs the mine was interested in understanding if they could moved to the new rates while maintaining a safe working environment.
- Theoretically equipment numbers could be increased.
- This theoretical must be tested and validated with practical testing.

Planning the validation of ventilation needs

- Existing fleet offers the opportunity of moving to new ventilation rates for equipment within operations.
- Increase the frequency of personal NIOSH testing and sampling among personnel and areas to validate a safe working environment for underground workers.
- Choose locations to introduce real-time monitoring to validate contamination levels and ventilation system health under current 100CFM per braking horsepower airflow rate.
 - DPM Monitoring – To understand Elemental Carbon (EC) levels
 - Silica Monitoring – To understand Respirable Crystalline Silica (RCS) levels
 - Dust Monitoring – To understand Respirable Dust levels
 - Gas Monitoring – To understand CO and NO2 levels
 - Airflow Monitoring – To confirm proper ventilation
- Choose one of those locations to compare monitors to the results of NIOSH testing to validate the reliability and confidence of the individual monitoring technologies. Analyze the data collected and determine coefficients.

North Mine – Testing location

- ❌ • Location A: 4082 hauling drift near the 114 vein
 - Monitoring station with Pinessar DPM
 - AIR XD/ XS (dust & Silica) Monitor
 - Gasses monitored : CO, NO2
- Location B: 4082 hauling drift just before the 4088 crosscut
- ❌ • No Real-time monitors at this location
 - Downstream from Location A



North Mine – Monitoring Station of Testing Location



DPM Sampling in Mining

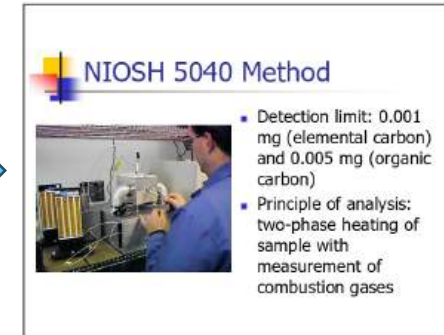
NIOSH 5040 Method



Samples taken u/g



Samples transported off-site



Samples treated in furnace in laboratory, to obtain **carbon** reading.

Carbon results
sent to site
Hygienist

DIESEL PARTICULATE MATTER (as Elemental Carbon)			5040
C	AW: 12.01	CAS: none	RTECS: none
METHOD: 5040, Issue 2	EVALUATION: FULL		Issue 1: 15 May 1996 Issue 2: 15 March 1998
OSHA: no PEL	PROPERTIES:		nonvolatile solid
NIOSH: no REL			
ACGIH: 0.5 mg/m ³ as elemental carbon (propagated) (1)			
SYNONYMS (related terms): diesel particulate matter, diesel exhaust, diesel soot, diesel emissions			
SAMPLING		MEASUREMENT	
SAMPLER:	FL/75% quartz filter, 37-mm, open-ventilation sampler may be required (2)	TECHNIQUE:	Thermal-optical analysis: flame oxidation detector (TOA)
FLOW RATE:	2 to 4 L/min (typical)	ANALYTE:	Elemental carbon (EC), Total suspended particulate (TSP), and organic carbon (OC) (See also ref. [2])
VOL. MIN:	140 L @ 40 µg/m ³	FILTER SIZE:	5 µm (or other (2))
MAX:	10 m ³ (for detection of ~ 50 µg/m ³)	CALIBRATION:	Methane injection
SHIPMENT:	Routine	RANGE:	1 to 100 µg per filter portion (See also ref. [2])
STABILITY:	Stable	ESTIMATED LOD:	0.3 µg per filter portion
BLANKS:	2 to 10 (40 blank per set)	PRECISION (2):	1.10 @ 1 µg/m ³ 0.81 @ 10 to 50 µg/m ³
ACCURACY			
RANGE STUDIED:	23 to 240 µg/m ³ (See also ref. [2])		
BIAS:	None (See also ref. [2])		
OVERALL PRECISION (2):	0.085 at 23 µg/m ³ (See also ref. [2])		
ACCURACY:	± 16.7% at 23 µg/m ³ (See also ref. [2])		
APPLICABILITY: The working range is approximately 0.3 to 50 µg/m ³ with an LOD of ~ 2 µg/m ³ for a 100% air sample collected on a 37-mm filter with a 5 L/min flow rate. A flow rate of 2 L/min to 4 L/min is limited by the sample volume and the 50-mm filter may be used up to a 1932-L sample on 25-mm filter, given an LOD of 0.4 µg/m ³ . The split between elemental carbon (EC) and OC may be measured using the weight difference technique. The EC/OC split may be measured using the weight difference technique. In general, the OC/EC split may be inaccurate when EC readings are above 20 µg/m ³ . High readings can give (and variable) EC results because the filter saturation occurs and the EC/OC ratio and both of the EC, TOA, and OC results. The split should be measured and prior to EC, TOA, and OC results. An average EC limit of 800 µg/m ³ (80 µg/m ³) can be determined.			
INTERFERENCES: Total carbon (as EC and OC) is determined by the method, but EC is recommended as a measure of ambient exposure to particulate OC. Interference may be present (1, 2). Organic matter is a confounding interference due to its solubility in the EC determination. Less than 1% of the carbon is soluble in water. If any readings of carbon are anticipated, a solubility test (using a 100% organic solvent) is required (2). For measurement of ambient EC, it is required that a cyclone and impactor with a submicron cutoff point are required to minimize collection of coarse dust. A cyclone and impactor may be necessary in other applications. If EC-containing gases are present.			
OTHER METHODS: Other methods for determinations of EC and OC have been developed, but these are not equivalent to the method described herein. Information on methods of EC and OC has been developed, but these are not equivalent to the method described herein.			

NIOSH Manual of Analytical Methods (NMAM), Fourth Edition

ACCURACY	
RANGE STUDIED:	23 to 240 µg/m ³ (See also ref. [2].)
BIAS:	None (See also ref. [2].)
OVERALL PRECISION (2):	0.085 at 23 µg/m ³ (See also ref. [2].)
ACCURACY:	± 16.7% at 23 µg/m ³ (See also ref. [2].)

- Samples are very sensitive and care needed during handling & transport.
- Usually 2 weeks to get a result back from the laboratory. (sometimes longer, sometimes shorter).
- This is the method recognized and used by Regulators world-wide, to measure the carbon portion of DPM.
- NIOSH 5040 method developed around 30 years ago, released 1994.
- NIOSH 5040 method does not claim to be accurate, especially at low levels..
- NIOSH 5040 method personal DPM sampling is usually directed by the **Regulator or by legislation**.
- Typically sampling occurs for **less than 1% of operating time** per year. (yet the mine is dynamic)



Results – North mine NIOSH-5040 testing compared with Pinssar data

All 18 shifts / 63 samples

Legend:		
EC considered invalid	3	5%
questionable	3	5%

Elemental Carbon (EC) / Total Particle (Pinssar) ratio :-

Ave of ALL 63 results = 0.25

Ave after 3 invalid samples removed = 0.26

Ave after 3 invalid & 3 questionable samples removed = 0.26

Suggested co-efficient = 0.25 (without safety factor).

- Testing has showed that Elemental Carbon (EC) is much more stable compared to Organic Carbon (OC)
- Ontario in 2024 revised OEL to $120\mu\text{g}/\text{m}^3$ EC (from $400\mu\text{g}/\text{m}^3$ OC)



		UNCLASSIFIED - NIOSH 5040							Pinssar	
#	Shift #	test #	Sample Cassette #	Date	Monitoring start	Sample Duration (minutes)	Monitoring End	Elemental Carbon $\mu\text{g}/\text{m}^3$	NIOSH 5040	Pinssar DPM measure $\mu\text{g}/\text{m}^3$
1	1	1.1	274091	27-Mar-2026	7:15	480	15:15	28	104	0.27
2		1.2	274122	27-Mar-2026	7:15	480	15:15	27		0.26
3		1.3	20080	27-Mar-2026	7:15	480	15:15	26		0.25
4		1.4	250244730	27-Mar-2026	7:15	480	15:15	30		0.29
5		1.5	240134784	27-Mar-2026	7:15	420	14:15	25		0.24
6		1.6	250244724	27-Mar-2026	7:15	420	14:15	25		0.24
7	2	2.1	274038	27-Mar-2026	15:20	480	23:20	13	61	0.22
8		2.2	277130	27-Mar-2026	15:20	480	23:20	12		0.20
9		2.3	20089	27-Mar-2026	15:20	480	23:20	10		0.17
10	3	3.1	274115	27-Mar-2026	23:20	480	7:20	18	131	0.14
11		3.2	274151	27-Mar-2026	23:20	480	7:20	18		0.14
12		3.3	20084	27-Mar-2026	23:20	480	7:20	17		0.13
13	4	4.1	277556	8-Apr-2026	5:45	480	13:45	28	84	0.33
14		4.2	273781	8-Apr-2026	5:45	480	13:45	21		0.25
15		4.3	277681	8-Apr-2026	5:45	480	13:45	29		0.34
16		4.4	24-0134787	8-Apr-2026	5:45	480	13:45	27		0.32
17		4.5	24-0134780	8-Apr-2026	5:45	480	13:45	28		0.33
18		4.6	24-0134788	8-Apr-2026	5:45	480	13:45	28		0.33
19	5	5.1	274157	8-Apr-2026	13:50	480	21:50	9	42	0.22
20		5.2	277529	8-Apr-2026	13:50	480	21:50	9		0.22
21		5.3	277533	8-Apr-2026	13:50	480	21:50	4		0.10
22	6	6.1	277582	8-Apr-2026	21:50	480	5:50	47	147	0.32
23		6.2	274090	8-Apr-2026	21:50	480	5:50	46		0.31
24		6.3	27774	8-Apr-2026	21:50	480	5:50	44		0.30
25	7	7.1	277735	29-Apr-2026	6:15	480	14:15	20	76	0.26
26		7.2	277587	29-Apr-2026	6:15	480	14:15	22		0.29
27		7.3	260103825	29-Apr-2026	6:15	480	14:15	22		0.29
28	8	8.1	260103820	29-Apr-2026	14:15	480	22:15	9	40	0.22
29		8.2	277522	29-Apr-2026	14:15	480	22:15	10		0.24
30		8.3	277535	29-Apr-2026	14:15	480	22:15	10		0.24
31	9	9.1	260103818	29-Apr-2026	22:15	480	6:15	20	91	0.22
32		9.2	277457	29-Apr-2026	22:15	480	6:15	16		0.18
33		9.3	277625	29-Apr-2026	22:15	480	6:15	17		0.19
34	10	10.1	277699	2-May-2026	6:30	480	14:30	18	72	0.25
35		10.2	277824	2-May-2026	6:30	480	14:30	21		0.29
36		10.3	260103814	2-May-2026	6:30	480	14:30	19		0.26
37		10.4	260103815	2-May-2026	6:30	480	14:30	19		0.26
38		10.5	260103812	2-May-2026	6:30	480	14:30	21		0.29
39		10.6	260103813	2-May-2026	6:30	135	8:45	6		0.08
40	11	11.1	277489	2-May-2026	14:30	480	22:30	8	35	0.24
41		11.2	277424	2-May-2026	14:30	480	22:30	9		0.24
42		11.3	260103821	2-May-2026	14:30	480	22:30	9		0.26
43	12	12.1	277632	2-May-2026	22:30	480	6:30	9	46	0.20
44		12.2	277718	2-May-2026	22:30	480	6:30	10		0.21
45		12.3	260103822	2-May-2026	22:30	480	6:30	10		0.21
46	13	13.1	20490	5-May-2026	6:00	480	14:00	19	92	0.21
47		13.2	273572	5-May-2026	6:00	480	14:00	20		0.22
48		13.3	277479	5-May-2026	6:00	480	14:00	17		0.18
49	14	14.1	20487	5-May-2026	14:00	480	22:00	6	32	0.19
50		14.2	273653	5-May-2026	14:00	480	22:00	7		0.23
51		14.3	273698	5-May-2026	14:00	480	22:00	3		0.09
52	15	15.1	20491	5-May-2026	22:00	480	6:00	19	64	0.30
53		15.2	277333	5-May-2026	22:00	480	6:00	19		0.29
54		15.3	277680	5-May-2026	22:00	480	6:00	19		0.29
55	16	16.1	20475	10-May-2026	6:00	480	14:00	21	68	0.31
56		16.2	277468	10-May-2026	6:00	480	14:00	21		0.31
57		16.3	273710	10-May-2026	6:00	480	14:00	21		0.31
58	17	17.1	20492	10-May-2026	14:00	480	22:00	7	20	0.36
59		17.2	273549	10-May-2026	14:00	480	22:00	7		0.35
60		17.3	277782	10-May-2026	14:00	480	22:00	6		0.30
61	18	18.1	20494	10-May-2026	22:00	480	6:00	18	48	0.37
62		18.2	273526	10-May-2026	22:00	480	6:00	19		0.40
63		18.3	277620	10-May-2026	22:00	480	6:00	19		0.40



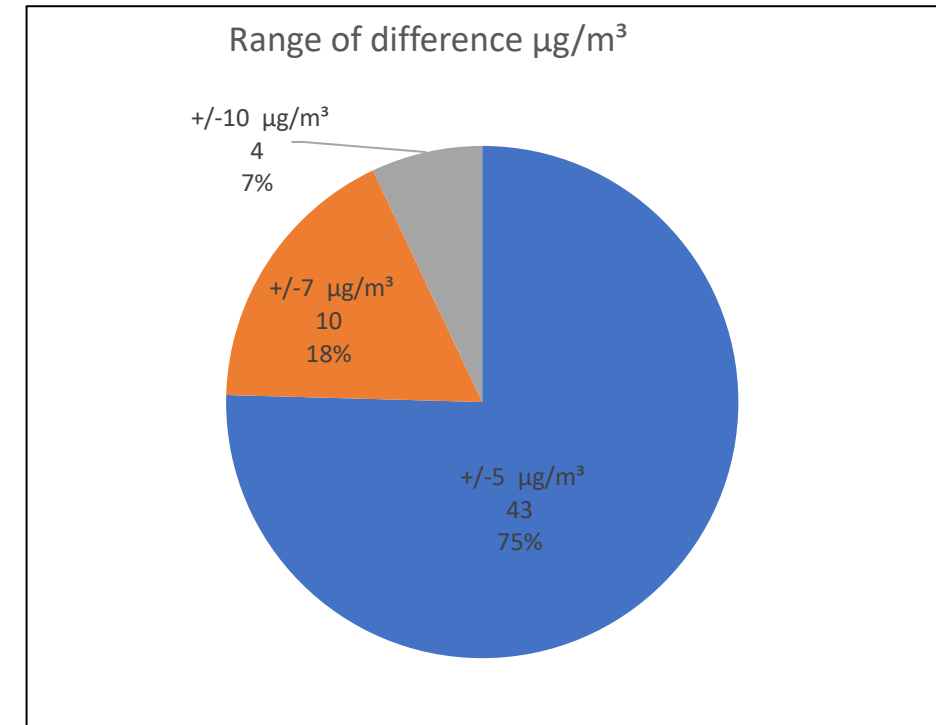
Results – North mine NIOSH-5040 compare with Pinssar data

Retrospective review : if 0.25 coefficient was applied to the Pinssar...

The Pinssar reported shift average would compare very close to the 57 samples:-

- 43 / 75% would fall within $\pm 5 \mu\text{g}/\text{m}^3$
- 53 / 93% would fall within $\pm 7 \mu\text{g}/\text{m}^3$
- 57 / 100% would fall within $\pm 10 \mu\text{g}/\text{m}^3$

This can be kept in mind when considering a safety factor



Based on 57 X valid NIOSH 5040 EC samples

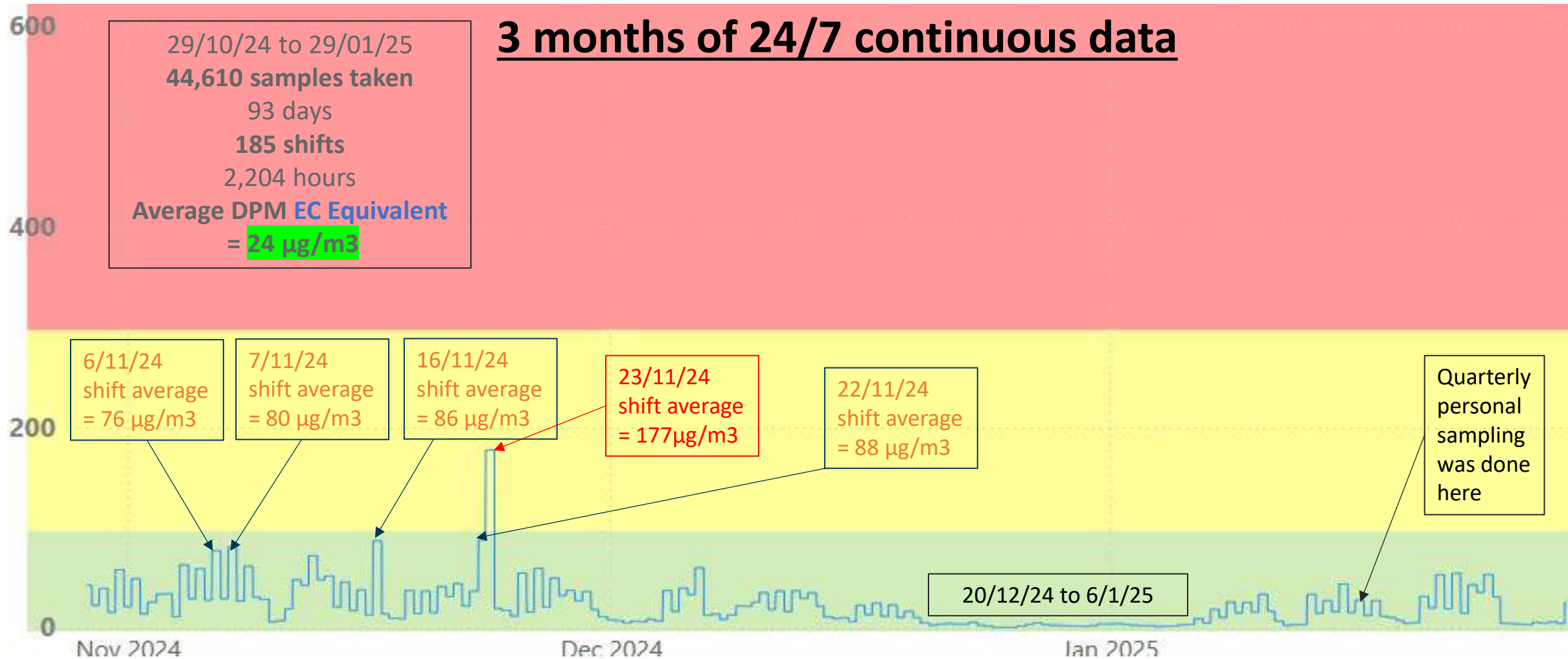




EXAMPLE : 24/7 CONTINUOUS MONITORING

EXAMPLE ONLY (this is not Copper Cliff)

3 months of 24/7 continuous data





Traditional monitoring

“we don’t have a DPM problem”

You can’t manage what you don’t monitor

- Typically sampling occurs for **less than 1% of operating time** per year.



Quarterly personal sampling was done here

Nov 2024

Dec 2024

Jan 2025

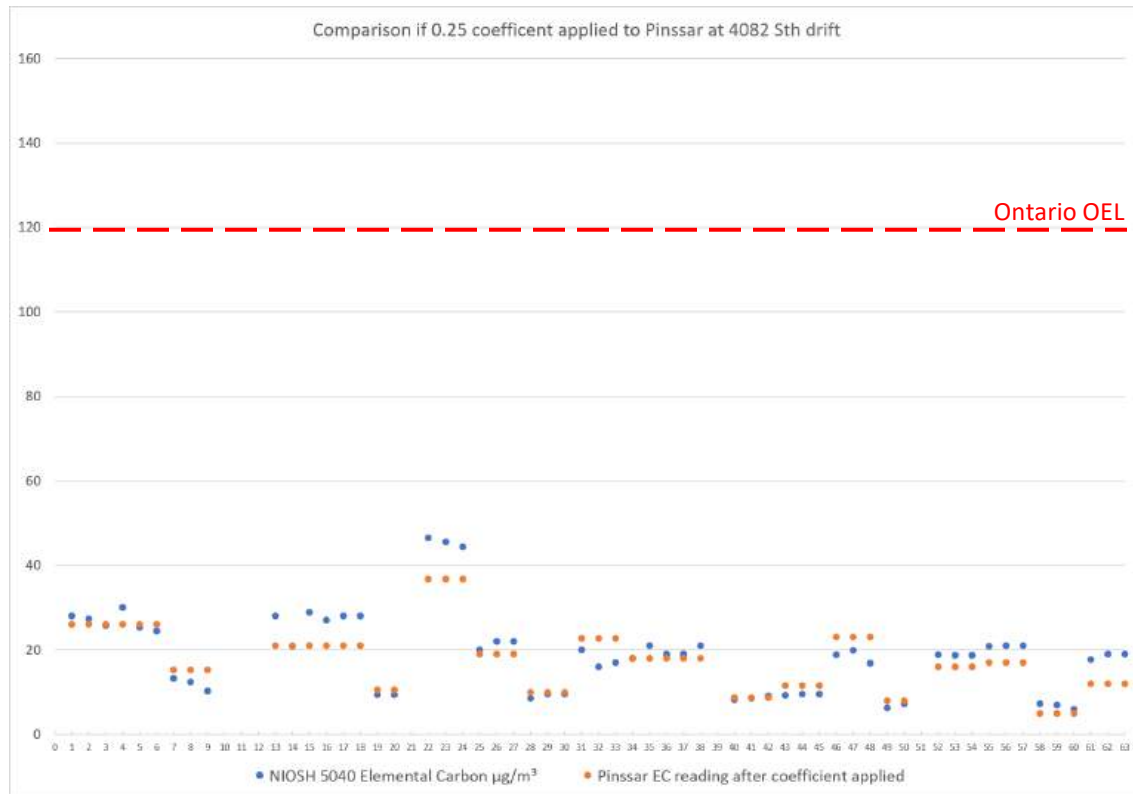


Co-efficient with safety factor considerations (North)

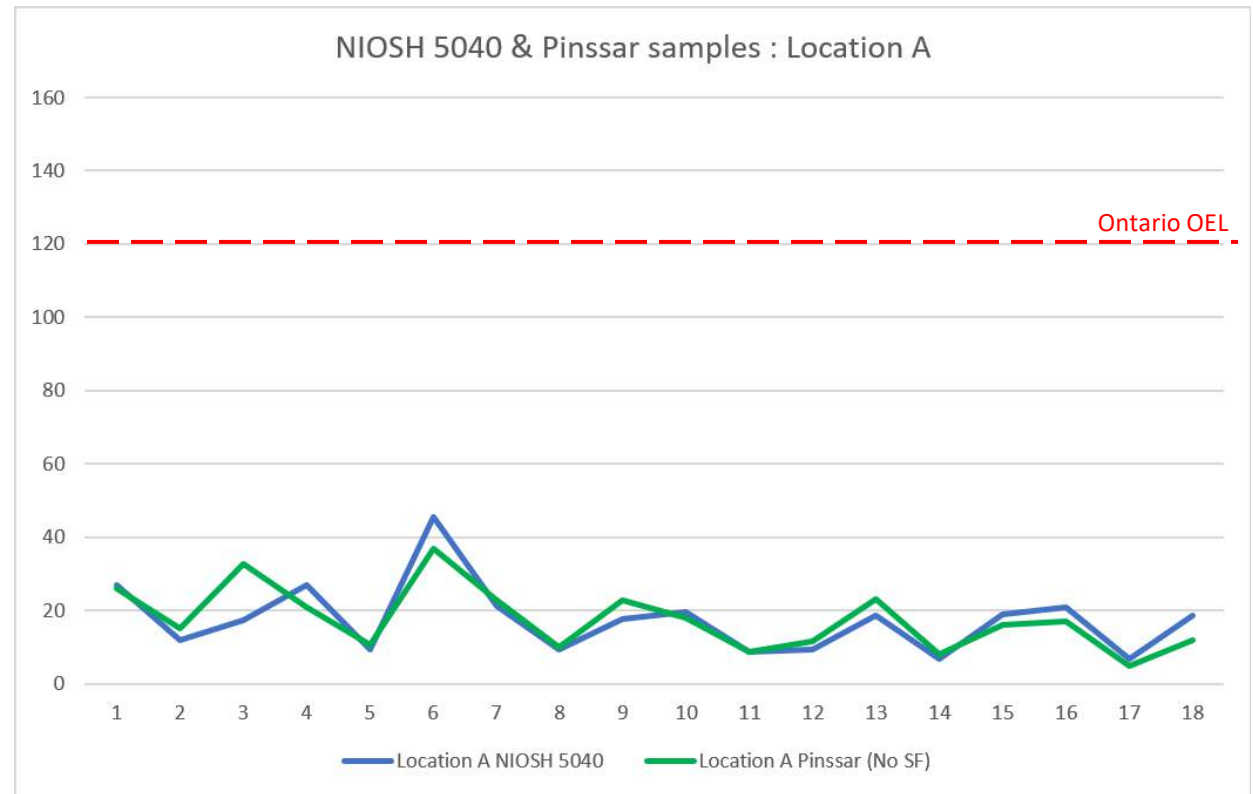
Suggested coefficients (no safety factor)

- North: Pinssar at 4082 Sth drift. = 0.25

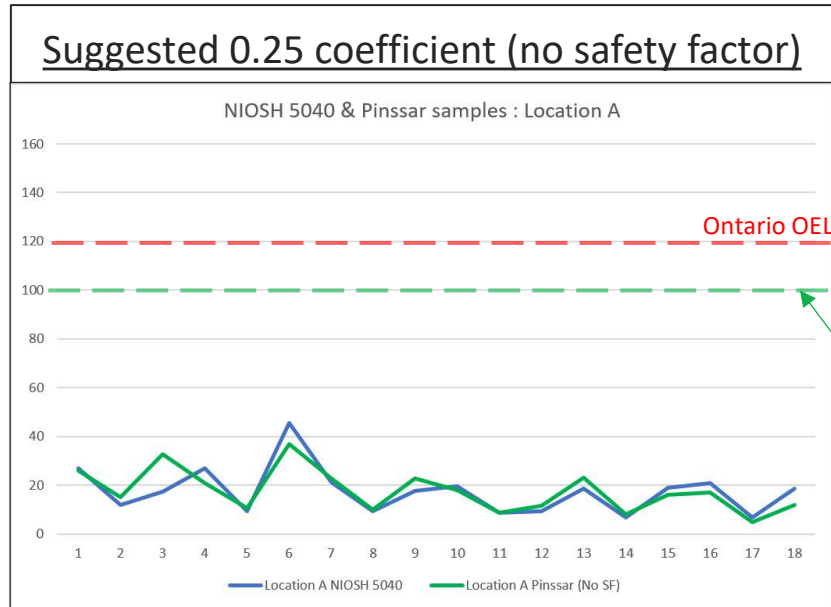
57 X valid samples



18 X shift averages of valid samples



Co-efficient with safety factor considerations (North)



Time and duration					Location A	
Shift #	Date	Monitoring start	Sample Duration (minutes)	Monitoring End	NIOSH 5040 Elemental Carbon µg/m³	Pinssar Real-time results EC Coefficient applied µg/m³ 0.25 (no SF)
1	27-Mar-2026	7:15	480	15:15	27	26
2	27-Mar-2026	15:20	480	23:20	12	15
3	27-Mar-2026	23:20	480	7:20	17	33
4	8-Apr-2026	5:45	480	13:45	27	21
5	8-Apr-2026	13:50	480	21:50	9	11
6	8-Apr-2026	21:50	480	5:50	46	37
7	29-Apr-2026	6:15	480	14:15	21	23
8	29-Apr-2026	14:15	480	22:15	9	10
9	29-Apr-2026	22:15	480	6:15	18	23
10	2-May-2026	6:30	480	14:30	20	18
11	2-May-2026	14:30	480	22:30	9	9
12	2-May-2026	22:30	480	6:30	9	12
13	5-May-2026	6:00	480	14:00	19	23
14	5-May-2026	14:00	480	22:00	7	8
15	5-May-2026	22:00	480	6:00	19	16
16	10-May-2026	6:00	480	14:00	21	17
17	10-May-2026	14:00	480	22:00	7	5
18	10-May-2026	22:00	480	6:00	19	12

invalid NIOSH 5040 samples removed from results

Questionable



Silica Sampling in Mining

NIOSH 7500 Method

SILICA, CRYSTALLINE, by XRD (filter redeposition)			7500
SiO ₂	MW: 60.08	CAS: 14808-60-7 (quartz) 14464-46-1 (cristobalite) 15468-32-3 (tridymite)	RTECS: VV7330000 (quartz) VV7325000 (cristobalite) VV7335000 (tridymite)
METHOD: 7500, Issue 4		EVALUATION: FULL Issue 1: 15 August 1990 Issue 4: 15 March 2003	
OSHA: quartz (respirable) 10 mg/m ³ (%SiO ₂ +2); cristobalite and tridymite (respirable) 1/5 the above		PROPERTIES: solid; d 2.65 g/cm ³ @ 0 °C; crystalline transformations: quartz to tridymite @ 867 °C; tridymite to cristobalite @ 1470 °C; cristobalite to quartz @ 573 °C	
NIOSH: 0.05 mg/m ³ ; carcinogen			
ACGIH: quartz (respirable) 0.1 mg/m ³ ; cristobalite (respirable) 0.05 mg/m ³ ; tridymite (respirable) 0.05 mg/m ³			
SYNONYMS: free crystalline silica; silicon dioxide			
SAMPLING		MEASUREMENT	
SAMPLER:	CYCLONE + FILTER (10-mm nylon cyclone, Higgins-Dewell (HD) cyclone, or aluminum cyclone + 5-µm PVC membrane) *see sampling section	TECHNIQUE:	X-RAY POWDER DIFFRACTION
FLOW RATE:	Nylon cyclone: 1.7 L/min; HD cyclone: 2.2 L/min; aluminum cyclone: 2.5 L/min	ANALYTE:	Crystalline SiO ₂
VOL-MIN:	400 L	ASH:	Muffle furnace or plasma asher or dissolve in tetrahydrofuran
-MAX:	1000 L	REDEPOSIT:	On 0.45-µm Ag membrane filter
SHIPMENT:	Routine	XRD:	2-θ target X-ray tube, graphite monochromator Optimize for intensity; 1° slit Slow step scan, 0.02°/10 sec Integrated intensity with background subtraction
SAMPLE STABILITY:	Stable	CALIBRATION:	NIST SRM 1878a quartz, NIST SRM 1878a cristobalite, USGS 210-75-0043 tridymite suspensions in 2-propanol
BLANKS:	2 to 10 per set (see step 12.3)	RANGE:	0.02 to 2 mg SiO ₂ per sample [2]
BULK SAMPLE:	High-volume or solid dust; to identify interferences	ESTIMATED LOD:	0.005 mg SiO ₂ per sample [2]
ACCURACY		PRECISION (S _p):	
RANGE STUDIED:	25 to 2500 µg/m ³ [1] (800-L sample)	0.08 @ 0.05 to 0.2 mg per sample [1]	
BIAS:	None known		
OVERALL PRECISION (S _{IT}):	0.09 (50 to 200 µg) [1]		
ACCURACY:	± 18%		
APPLICABILITY: The working range is 0.025 to 2.5 mg/m ³ for an 800-L air sample.			
INTERFERENCES: Micas, talc, feldspars, zircon, graphite, and aluminosilicates. See APPENDIX.			
OTHER METHODS: This is similar to the method in the Criteria Document [3] and PACAM 259 [4] which has been collaboratively tested [1]. This method is similar, except for sample collection, to S315 [5,6]. Method PACAM 109 [7,8,9], which incorporates an internal standard, has been dropped. XRD can distinguish the three silica polymorphs and silica interferences can be eliminated by phosphoric acid treatment. IR methods 7802 and 7803 can also quantify quartz, cristobalite and tridymite if amorphous silica and silicates are not present in large amounts. However sensitivity is reduced if multiple polymorphs are present and secondary peaks must be used. Crystalline silica can also be determined by visible absorption spectrophotometry (e.g., Method 7501) but polymorphs can not be distinguished. Visible absorption methods also have larger laboratory-to-laboratory variability than XRD and IR methods and therefore are recommended for research use only [10].			

NIOSH Manual of Analytical Methods (NMAM), Fourth Edition

ACCURACY		ESTIMATED LOD:
		PRECISION (S _p):
RANGE STUDIED:	25 to 2500 µg/m ³ [1] (800-L sample)	
BIAS:	None known	
OVERALL PRECISION (S _{IT}):	0.09 (50 to 200 µg) [1]	
ACCURACY:	± 18%	
APPLICABILITY: The working range is 0.025 to 2.5 mg/m ³ for an 800-L air sample.		

- Samples are very sensitive and care needed during handling & transport.
- Usually 2 weeks to get a result back from the laboratory. (sometimes longer, sometimes shorter).
- This is the method recognized and used by Regulators world-wide, to measure the respirable fraction of Silica.
- Typically sampling occurs for **less than 1% of operating time** per year. (yet the mine is dynamic)

Results – North Mine

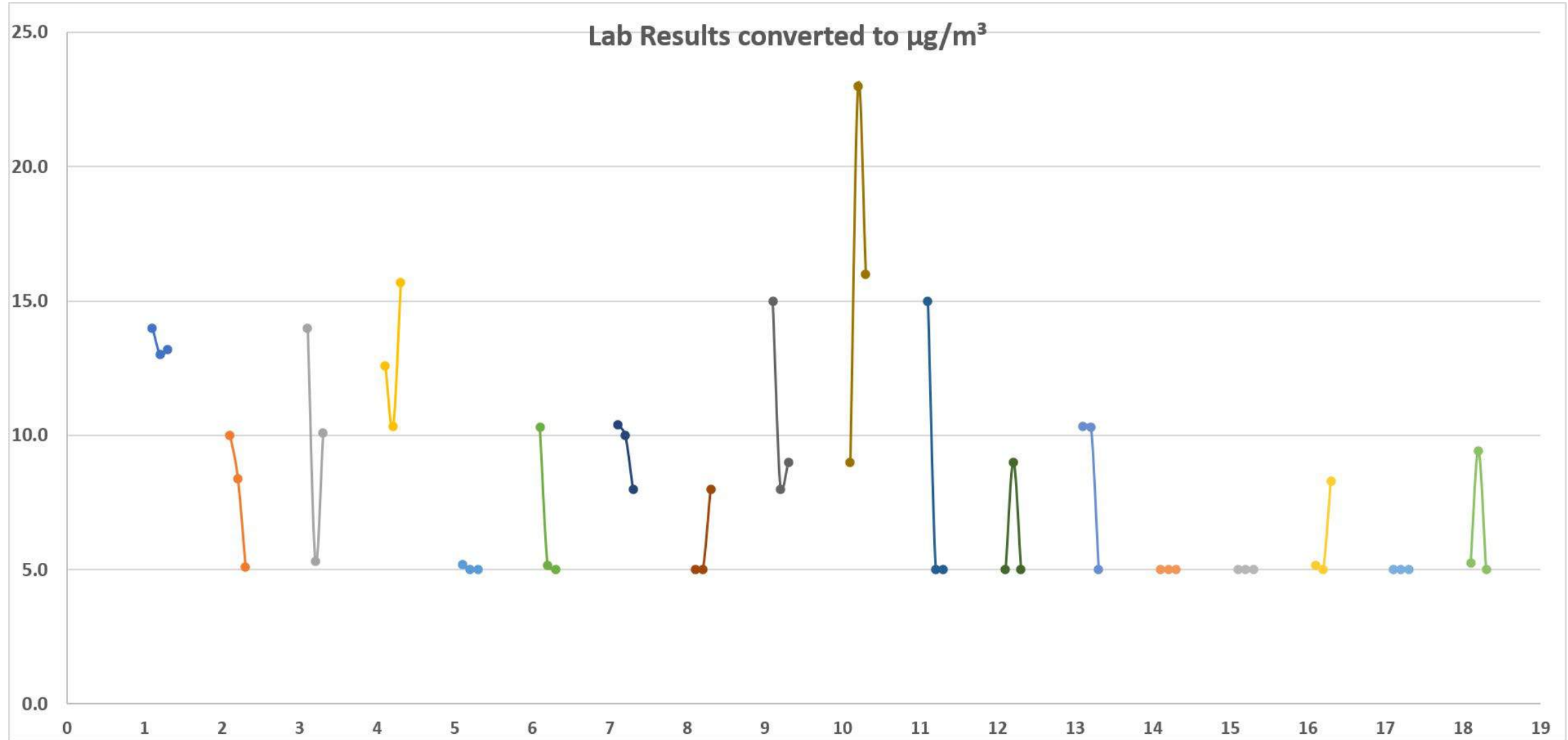
NIOSH 7500 Silica Results – Station A

- The Occupational Exposure Limit in Ontario for Respirable Crystalline Silica is 0.1 mg/m³ or 100 ug/m³ over an 8-hour shift.
- All 54 samples across 18 shifts were well below this OEL with the highest result being 23ug/m³ or 23% of the OEL.
- The average across all the shifts was 8.3ug/m³ and individually ranged from 5 to 16ug/m³.
- A Relative Percentage Difference analysis was done on the laboratory results from each of the shifts to determine how they differ between one another.
 - Results ranged from 0-120%
 - What does this mean?

Shift #	Test #	Sample Cassette #	Date	Monitoring start	Sample Duration	Monitoring End	Lab Results converted to µg/m³	Live TWA µg/m³	Lab/Live ratio	Test #	Shift #	Average	Max	Min	RPD
1	1.1	250334875	27-Mar-2026	7:15	480	15:15	14.0	110.14	0.13	1.1	1	13.4	14.0	13.0	7%
	1.2	250334850	27-Mar-2026	7:15	480	15:15	13.0		0.12	1.2					
	1.3	27546	27-Mar-2026	7:15	480	15:15	13.2		0.12	1.3					
2	2.1	250334860	27-Mar-2026	15:20	480	23:20	10.0	45.91	0.22	2.1	2	7.8	10.0	5.1	63%
	2.2	250334878	27-Mar-2026	15:20	480	23:20	8.4		0.18	2.2					
	2.3	27544	27-Mar-2026	15:20	480	23:20	5.1		0.11	2.3					
3	3.1	250334866	27-Mar-2026	23:20	480	7:20	14.0	106.65	0.13	3.1	3	9.8	14.0	5.3	89%
	3.2	250334868	27-Mar-2026	23:20	480	7:20	5.3		0.05	3.2					
	3.3	27551	27-Mar-2026	23:20	480	7:20	10.1		0.09	3.3					
4	4.1	28214	8-Apr-2026	5:45	480	13:45	12.6	128.47	0.10	4.1	4	12.9	15.7	10.3	42%
	4.2	28211	8-Apr-2026	5:45	480	13:45	10.3		0.08	4.2					
	4.3	28221	8-Apr-2026	5:45	480	13:45	15.7		0.12	4.3					
5	5.1	28227	8-Apr-2026	13:50	480	21:50	5.2	70.44	0.07	5.1	5	5.1	5.2	5.0	4%
	5.2	28213	8-Apr-2026	13:50	480	21:50	5.0		0.07	5.2					
	5.3	28226	8-Apr-2026	13:50	480	21:50	5.0		0.07	5.3					
6	6.1	28225	8-Apr-2026	21:50	480	5:50	10.3	65.28	0.16	6.1	6	6.8	10.3	5.0	78%
	6.2	28219	8-Apr-2026	21:50	480	5:50	5.2		0.08	6.2					
	6.3	28209	8-Apr-2026	21:50	480	5:50	5.0		0.08	6.3					
7	7.1	28149	29-Apr-2026	6:15	480	14:15	10.4	104.02	0.10	7.1	7	9.5	10.4	8.0	25%
	7.2	28138	29-Apr-2026	6:15	480	14:15	10.0		0.10	7.2					
	7.3	28141	29-Apr-2026	6:15	480	14:15	8.0		0.08	7.3					
8	8.1	28207	29-Apr-2026	14:15	480	22:15	5.0	82.05	0.06	8.1	8	6.0	8.0	5.0	50%
	8.2	28208	29-Apr-2026	14:15	480	22:15	5.0		0.06	8.2					
	8.3	28204	29-Apr-2026	14:15	480	22:15	8.0		0.10	8.3					
9	9.1	28144	29-Apr-2026	22:15	480	6:15	15.0	134.01	0.11	9.1	9	10.7	15.0	8.0	66%
	9.2	28132	29-Apr-2026	22:15	480	6:15	8.0		0.06	9.2					
	9.3	28136	29-Apr-2026	22:15	480	6:15	9.0		0.07	9.3					
10	10.1	28139	2-May-2026	6:30	480	14:30	9.0	160.88	0.06	10.1	10	16.0	23.0	9.0	88%
	10.2	28128	2-May-2026	6:30	480	14:30	23.0		0.14	10.2					
	10.3	28130	2-May-2026	6:30	480	14:30	16.0		0.10	10.3					
11	11.1	28129	2-May-2026	14:30	480	22:30	15.0	68.34	0.22	11.1	11	8.3	15.0	5.0	120%
	11.2	28168	2-May-2026	14:30	480	22:30	5.0		0.07	11.2					
	11.3	27179	2-May-2026	14:30	480	22:30	5.0		0.07	11.3					
12	12.1	28198	2-May-2026	22:30	480	6:30	5.0	105.21	0.05	12.1	12	6.3	9.0	5.0	63%
	12.2	28194	2-May-2026	22:30	480	6:30	9.0		0.09	12.2					
	12.3	28200	2-May-2026	22:30	480	6:30	5.0		0.05	12.3					
13	13.1	28169	5-May-2026	6:00	480	14:00	10.3	108.39	0.10	13.1	13	8.6	10.3	5.0	63%
	13.2	28184	5-May-2026	6:00	480	14:00	10.3		0.10	13.2					
	13.3	28181	5-May-2026	6:00	480	14:00	5.0		0.05	13.3					
14	14.1	28165	5-May-2026	14:00	480	22:00	5.0	27.85	0.18	14.1	14	5.0	5.0	5.0	0%
	14.2	28157	5-May-2026	14:00	480	22:00	5.0		0.18	14.2					
	14.3	26650	5-May-2026	14:00	480	22:00	5.0		0.18	14.3					
15	15.1	27177	5-May-2026	22:00	480	6:00	5.0	49.41	0.10	15.1	15	5.0	5.0	5.0	0%
	15.2	28163	5-May-2026	22:00	480	6:00	5.0		0.10	15.2					
	15.3	26651	5-May-2026	22:00	480	6:00	5.0		0.10	15.3					
16	16.1	28182	10-May-2026	6:00	480	14:00	5.2	66.79	0.08	16.1	16	6.2	8.3	5.0	54%
	16.2	28166	10-May-2026	6:00	480	14:00	5.0		0.07	16.2					
	16.3	28185	10-May-2026	6:00	480	14:00	8.3		0.12	16.3					
17	17.1	28189	10-May-2026	14:00	480	22:00	5.0	17.41	0.29	17.1	17	5.0	5.0	5.0	0%
	17.2	28193	10-May-2026	14:00	480	22:00	5.0		0.29	17.2					
	17.3	26654	10-May-2026	14:00	480	22:00	5.0		0.29	17.3					
18	18.1	28183	10-May-2026	22:00	480	6:00	5.2	78.52	0.07	18.1	18	6.6	9.4	5.0	67%
	18.2	28180	10-May-2026	22:00	480	6:00	9.4		0.12	18.2					
	18.3	26638	10-May-2026	22:00	480	6:00	5.0		0.06	18.3					

Results – North Mine

NIOSH 7500 Silica Results – Station A



Silica Sampling in Mining

NIOSH 7500 Method

SILICA, CRYSTALLINE, by XRD (filter redeposition)			7500
SiO ₂	MW: 60.08	CAS: 14808-60-7 (quartz) 14464-46-1 (cristobalite) 15468-32-3 (tridymite)	RTCS: VV7330000 (quartz) VV7325000 (cristobalite) VV7335000 (tridymite)
METHOD: 7500, Issue 4		EVALUATION: FULL Issue 1: 15 August 1990 Issue 4: 15 March 2003	
OSHA: quartz (respirable) 10 mg/m ³ (%SiO ₂ +2); cristobalite and tridymite (respirable) 1/5 the above NIOSH: 0.05 mg/m ³ ; carcinogen ACGIH: quartz (respirable) 0.1 mg/m ³ cristobalite (respirable) 0.05 mg/m ³ tridymite (respirable) 0.05 mg/m ³		PROPERTIES: solid; d 2.65 g/cm ³ @ 0 °C; crystalline transformations: quartz to tridymite @ 867 °C; tridymite to cristobalite @ 1470 °C; cristobalite to quartz @ 573 °C	
SYNONYMS: free crystalline silica; silicon dioxide			
SAMPLING		MEASUREMENT	
SAMPLER:	CYCLONE + FILTER (10-mm nylon cyclone, Higgins- Dewell (HD) cyclone, or aluminum cyclone + 5-µm PVC membrane) *see sampling section	TECHNIQUE:	X-RAY POWDER DIFFRACTION
FLOW RATE:	Nylon cyclone: 1.7 L/min; HD cyclone: 2.2 L/min; aluminum cyclone: 2.5 L/min	ANALYTE:	Crystalline SiO ₂
VOL-MIN:	400 L	ASH:	Muffle furnace or plasma asher or dissolve in tetrahydrofuran
-MAX:	1000 L	REDEPOSIT:	On 0.45-µm Ag membrane filter
SHIPMENT:	Routine	XRD:	2-θ target X-ray tube, graphite monochromator Optimize for intensity; 1° slit Slow step scan, 0.02°/10 sec Integrated intensity with background subtraction
SAMPLE STABILITY:	Stable	CALIBRATION:	NIST SRM 1878a quartz, NIST SRM 1878a cristobalite, USGS 210-75-0043 tridymite suspensions in 2-propanol
BLANKS:	2 to 10 per set (see step 1.2.1)	RANGE:	0.02 to 2 mg SiO ₂ per sample [2]
BULK SAMPLE:	High-volume or solid dust; to identify interferences	ESTIMATED LOD:	0.005 mg SiO ₂ per sample [2]
ACCURACY		PRECISION (S _J):	0.08 @ 0.05 to 0.2 mg per sample [1]
RANGE STUDIED:	25 to 2500 µg/m ³ [1] (800-L sample)		
BIAS:	None known		
OVERALL PRECISION (S _{IT}):	0.09 (50 to 200 µg) [1]		
ACCURACY:	± 18%		
APPLICABILITY: The working range is 0.025 to 2.5 mg/m ³ for an 800-L air sample.			
INTERFERENCES: Micas, potash, feldspars, zircon, graphite, and aluminosilicates. See APPENDIX.			
OTHER METHODS: This is similar to the method in the Criteria Document [3] and PACAM 259 [4] which has been collaboratively tested [1]. This method is similar, except for sample collection, to S315 [5,6]. Method PACAM 109 [7,8,9], which incorporates an internal standard, has been dropped. XRD can distinguish the three silica polymorphs and silica interferences can be eliminated by phosphoric acid treatment. IR methods 7802 and 7803 cannot quantify quartz, cristobalite and tridymite if amorphous silica and silicates are not present in large amounts. However sensitivity is reduced if multiple polymorphs are present and secondary peaks must be used. Crystalline silica can also be determined by visible absorption spectrophotometry (e.g., Method 7501) but polymorphs can not be distinguished. Visible absorption methods also have larger laboratory-to-laboratory variability than XRD and IR methods and therefore are recommended for research use only [10].			

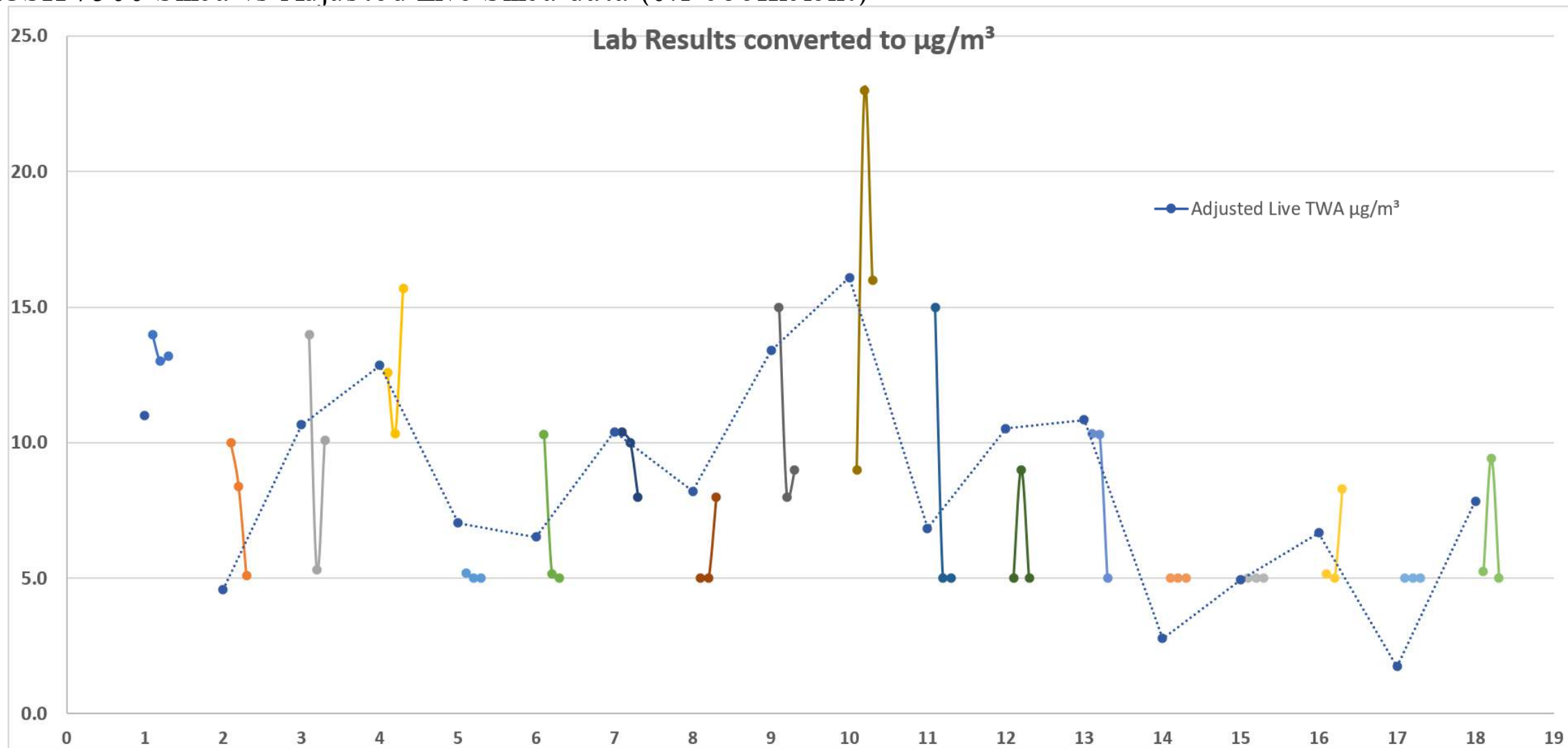
NIOSH Manual of Analytical Methods (NMAM), Fourth Edition

	Analyte Level (µg)	Measurement Precision (S _r)	Overall Precision (S _{IT})
Intralaboratory	50-200	0.08 [1]	
	20	0.20 [5]	
	10	0.28 [9]	
Total (intra- and interlaboratory)	50-200	0.17 [1]	0.29 [1]

- Page 7 of the NIOSH 7500 Methodology from the NIOSH Manual of Analytical Methods (NMAM), Fourth Edition states the accuracy at different concentrations.
- Estimated Limit of Detection (LOD) is 5ug of SiO₂ per sample filter.
- The majority of the results would fall under the limit of quantification (LOQ) of 25ug/m³.

Results – North Mine

NIOSH 7500 Silica vs Adjusted Live Silica data (0.1 coefficient)



Results – North Mine

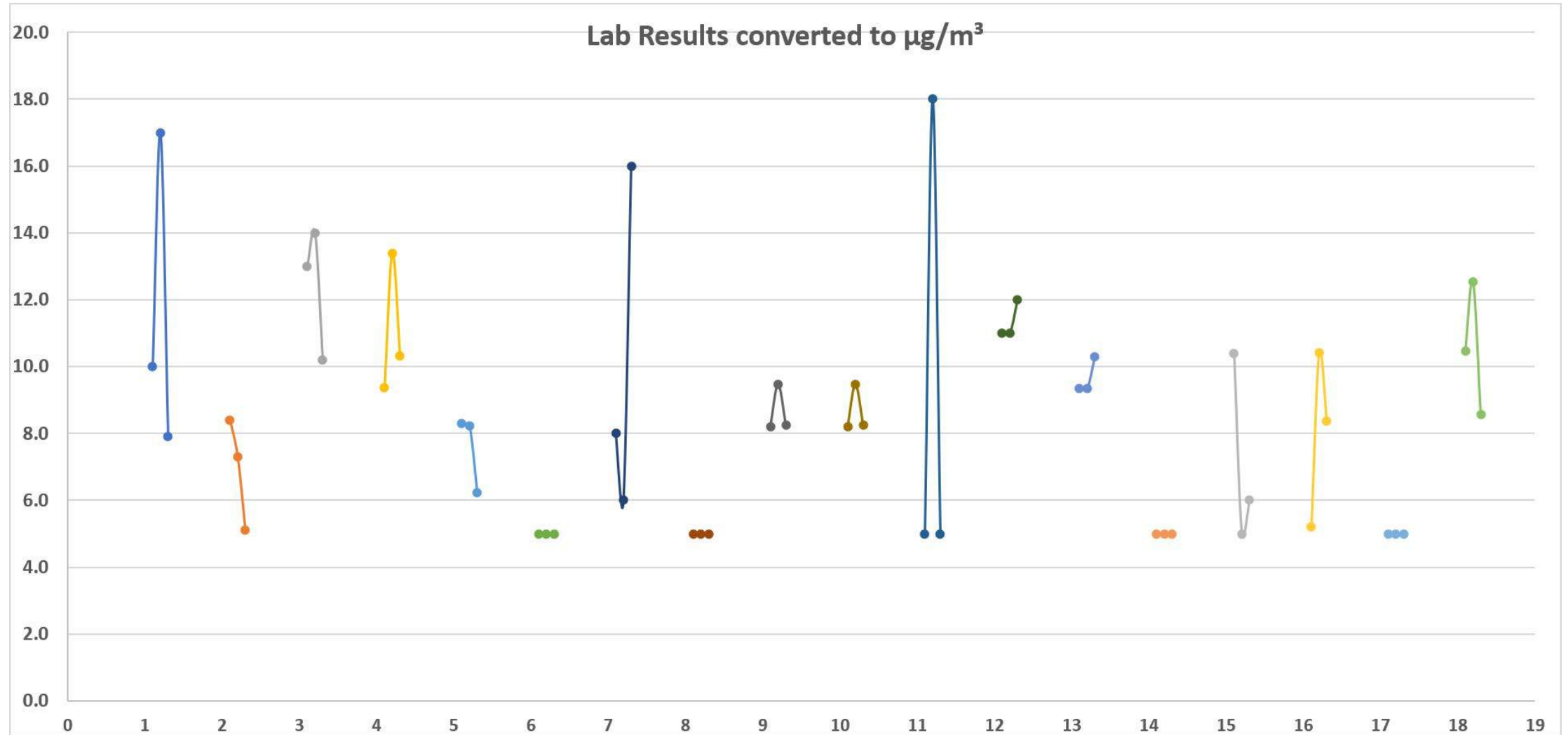
NIOSH 7500 Silica Results – Station B

- The Occupational Exposure Limit in Ontario for Respirable Crystalline Silica is 0.1 mg/m³ or 100 ug/m³ over an 8-hour shift.
- All 54 samples across 18 shifts were well below this OEL with the highest result being 19ug/m³ or 19% of the OEL.
- The average across all the shifts was 8.9ug/m³ and individually ranged from 5 to 16ug/m³.
- A Relative Percentage Difference analysis was done on the laboratory results from each of the shifts to determine how they differ between one another.
 - Results ranged from 0-139%

Shift #	Test #	Sample Cassette #	Date	Monitoring start	Sample Duration	Monitoring End	Lab Results converted to µg/m³	Live TWA µg/m³	Lab/Live ratio	Test #	Shift #	Average	Max	Min	RPD
1	1.1	250334863	27-Mar-2026	7:15	480	15:15	10.0	110.1396	0.09	1.1	1	11.6	17.0	7.9	78%
	1.2	250334859	27-Mar-2026	7:15	480	15:15	17.0	110.1396	0.15	1.2					
	1.3	27553	27-Mar-2026	7:15	480	15:15	7.9	110.1396	0.07	1.3					
2	2.1	250334867	27-Mar-2026	15:20	480	23:20	8.4	45.9125	0.18	2.1	2	6.9	8.4	5.1	48%
	2.2	250334870	27-Mar-2026	15:20	480	23:20	7.3	45.9125	0.16	2.2					
	2.3	27548	27-Mar-2026	15:20	480	23:20	5.1	45.9125	0.11	2.3					
3	3.1	250334879	27-Mar-2026	23:20	480	7:20	13.0	106.65	0.12	3.1	3	12.4	14.0	10.2	31%
	3.2	250334847	27-Mar-2026	23:20	480	7:20	14.0	106.65	0.13	3.2					
	3.3	27550	27-Mar-2026	23:20	480	7:20	10.2	106.65	0.10	3.3					
4	4.1	28215	8-Apr-2026	5:45	480	13:45	9.4	128.4673	0.07	4.1	4	11.0	13.4	9.4	37%
	4.2	28217	8-Apr-2026	5:45	480	13:45	13.4	128.4673	0.10	4.2					
	4.3	28206	8-Apr-2026	5:45	480	13:45	10.3	128.4673	0.08	4.3					
5	5.1	28224	8-Apr-2026	13:50	480	21:50	8.3	70.44097	0.12	5.1	5	7.6	8.3	6.2	27%
	5.2	28223	8-Apr-2026	13:50	480	21:50	8.2	70.44097	0.12	5.2					
	5.3	28220	8-Apr-2026	13:50	480	21:50	6.2	70.44097	0.09	5.3					
6	6.1	28222	8-Apr-2026	21:50	480	5:50	5.0	65.2826	0.08	6.1	6	5.0	5.0	5.0	0%
	6.2	28218	8-Apr-2026	21:50	480	5:50	5.0	65.2826	0.08	6.2					
	6.3	28216	8-Apr-2026	21:50	480	5:50	5.0	65.2826	0.08	6.3					
7	7.1	28147	29-Apr-2026	6:15	480	14:15	8.0	104.0181	0.08	7.1	7	10.0	16.0	6.0	100%
	7.2	28151	29-Apr-2026	6:15	480	14:15	6.0	104.0181	0.06	7.2					
	7.3	28140	29-Apr-2026	6:15	480	14:15	16.0	104.0181	0.15	7.3					
8	8.1	28212	29-Apr-2026	14:15	480	22:15	5.0	82.04757	0.06	8.1	8	5.0	5.0	5.0	0%
	8.2	28150	29-Apr-2026	14:15	480	22:15	5.0	82.04757	0.06	8.2					
	8.3	28152	29-Apr-2026	14:15	480	22:15	5.0	82.04757	0.06	8.3					
9	9.1	28146	29-Apr-2026	22:15	480	6:15	8.2	134.0125	0.06	9.1	9	8.6	9.5	8.2	15%
	9.2	28145	29-Apr-2026	22:15	480	6:15	9.5	134.0125	0.07	9.2					
	9.3	28148	29-Apr-2026	22:15	480	6:15	8.3	134.0125	0.06	9.3					
10	10.1	28142	2-May-2026	6:30	480	14:30	12.0	160.8799	0.07	10.1	10	16.0	19.0	12.0	44%
	10.2	28143	2-May-2026	6:30	480	14:30	17.0	160.8799	0.11	10.2					
	10.3	28135	2-May-2026	6:30	480	14:30	19.0	160.8799	0.12	10.3					
11	11.1	28191	2-May-2026	14:30	480	22:30	5.0	68.33993	0.07	11.1	11	9.3	18.0	5.0	139%
	11.2	28137	2-May-2026	14:30	480	22:30	18.0	68.33993	0.26	11.2					
	11.3	28131	2-May-2026	14:30	480	22:30	5.0	68.33993	0.07	11.3					
12	12.1	28202	2-May-2026	22:30	480	6:30	11.0	105.2097	0.10	12.1	12	11.3	12.0	11.0	9%
	12.2	28199	2-May-2026	22:30	480	6:30	11.0	105.2097	0.10	12.2					
	12.3	28197	2-May-2026	22:30	480	6:30	12.0	105.2097	0.11	12.3					
13	13.1	28195	5-May-2026	6:00	480	14:00	9.4	108.3868	0.09	13.1	13	9.7	10.3	9.4	10%
	13.2	28196	5-May-2026	6:00	480	14:00	9.4	108.3868	0.09	13.2					
	13.3	28175	5-May-2026	6:00	480	14:00	10.3	108.3868	0.10	13.3					
14	14.1	28172	5-May-2026	14:00	480	22:00	5.0	27.84514	0.18	14.1	14	5.0	5.0	5.0	0%
	14.2	28173	5-May-2026	14:00	480	22:00	5.0	27.84514	0.18	14.2					
	14.3	26652	5-May-2026	14:00	480	22:00	5.0	27.84514	0.18	14.3					
15	15.1	28167	5-May-2026	22:00	480	6:00	10.4	49.41458	0.21	15.1	15	7.1	10.4	5.0	76%
	15.2	28160	5-May-2026	22:00	480	6:00	5.0	49.41458	0.10	15.2					
	15.3	26641	5-May-2026	22:00	480	6:00	6.0	49.41458	0.12	15.3					
16	16.1	28156	10-May-2026	6:00	480	14:00	5.2	66.79444	0.08	16.1	16	8.0	10.4	5.2	65%
	16.2	28188	10-May-2026	6:00	480	14:00	10.4	66.79444	0.16	16.2					
	16.3	28179	10-May-2026	6:00	480	14:00	8.4	66.79444	0.13	16.3					
17	17.1	28178	10-May-2026	14:00	480	22:00	5.0	17.41458	0.29	17.1	17	5.0	5.0	5.0	0%
	17.2	28190	10-May-2026	14:00	480	22:00	5.0	17.41458	0.29	17.2					
	17.3	26657	10-May-2026	14:00	480	22:00	5.0	17.41458	0.29	17.3					
18	18.1	28154	10-May-2026	22:00	480	6:00	10.5	78.51736	0.13	18.1	18	10.5	12.5	8.6	43%
	18.2	28187	10-May-2026	22:00	480	6:00	12.5	78.51736	0.16	18.2					
	18.3	26656	10-May-2026	22:00	480	6:00	8.6	78.51736	0.11	18.3					

Results – North Mine

NIOSH 7500 Silica Results – Station B



Summary on Silica

NIOSH 7500 Silica Results

- All 108 samples across 18 shifts were well below this OEL with the highest result being 23ug/m³ or 23% of the OEL.
- The average across all the shifts was 8.3ug/m³ and individually ranged from 5 to 16ug/m³.
- A Relative Percentage Difference analysis was done on the laboratory results from each of the shifts to determine how they differ between one another.
 - Results ranged from 0-139%
 - 0% - Estimated Limit of Detection (LOD) is 5ug of SiO₂ per sample filter.
 - All results fell under the limit of quantification (LOQ) of 25ug/m³.
- Real-time Respirable Silica vs Laboratory NIOSH 7500 results
 - The real-time silica monitor has a very tight trend with the laboratory results from the NIOSH testing methods.
 - Across all 18 shifts the real time data ranged from -3.26 to 4.19ug/m³ (+/- 4.2ug/m³; +/- 4.2% of OEL) from lab results.

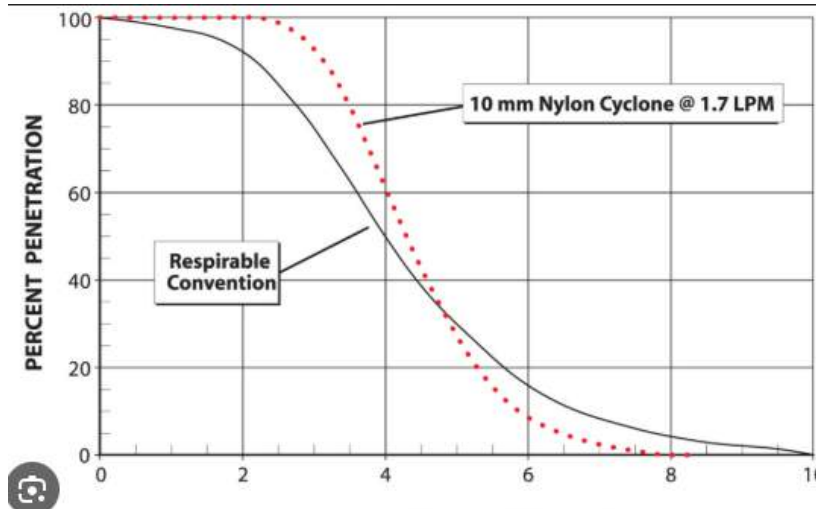
Dust Sampling in Mining

NIOSH 0600 Method

PARTICULATES NOT OTHERWISE REGULATED, RESPIRABLE 0600		
DEFINITION: aerosol collected by sampler with 4- μ m median cut point		CAS: None RTECS: None
METHOD: 0600, Issue 3	EVALUATION: FULL	Issue 1: 15 February 1984 Issue 3: 15 January 1998
OSHA: 5 mg/m ³ NIOSH: no REL ACGIH: 3 mg/m ³	PROPERTIES: contains no asbestos and quartz less than 1%; penetrates non-elated portions of respiratory system	
SYNONYMS: nuisance dusts; particulates not otherwise classified		
SAMPLING		MEASUREMENT
SAMPLER: CYCLONE + FILTER (10-mm nylon cyclone, Higgins-Dewell (HD) cyclone, or aluminum cyclone + tared 5- μ m PVC membrane)		TECHNIQUE: GRAVIMETRIC (FILTER WEIGHT)
FLOW RATE: nylon cyclone: 1.7 L/min HD cyclone: 2.2 L/min Al cyclone: 2.5 L/min		ANALYTE: mass of respirable dust fraction
VOL. MIN: 20 L @ 5 mg/m ³ MAX: 400 L		BALANCE: 0.001 mg sensitivity; use same balance before and after sample collection
SHIPMENT: routine		CALIBRATION: National Institute of Standards and Technology Class S-1.1 or ASTM Class 1 weights
SAMPLE STABILITY: stable		RANGE: 0.1 to 2 mg per sample
BLANKS: 2 to 10 field blanks per set		ESTIMATED LOD: 0.03 mg per sample
		PRECISION: <10 μ g with 0.001 mg sensitivity balance; <70 μ g with 0.01 mg sensitivity balance [3]
ACCURACY		
RANGE STUDIED: 0.5 to 10 mg/m ³ (lab and field)		
BIAS: dependent on dust size distribution [1]		
OVERALL PRECISION ($\sigma_{p,s}$): dependent on size distribution [1, 2]		
ACCURACY: dependent on size distribution [1]		
APPLICABILITY: The working range is 0.5 to 10 mg/m ³ for a 200-L air sample. The method measures the mass concentration of any non-volatile respirable dust, in addition to inert dusts [4]; the method has been recommended for respirable coal dust. The method is based in light of the recently adopted international definition of respirable dust, e.g., > 4.7% bias for non-diesel, coal mine dust [5].		
INTERFERENCES: Larger than respirable particles (over 10 μ m) have been found in some cases by microscopic analysis of cyclone filters. Over-sized particles in samples are known to be caused by inserting the cyclone assembly, heavy dust loadings, fibers, and water saturated dusts also interfere with the cyclones size selective properties. The use of conductive samplers is recommended to minimize particle charge effects.		
OTHER METHODS: This method is based on and replaces Sampling Data Sheet #29.0.2 [5].		

NIOSH Manual of Analytical Methods (NMAM), Fourth Edition

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- Samples are very sensitive and care needed during handling & transport.
- Usually 2 weeks to get a result back from the laboratory. (sometimes longer, sometimes shorter).
- This is the method recognized and used by Regulators world-wide, to measure.
- Typically sampling occurs for **less than 1% of operating time** per year. (yet the mine is dynamic)

Results – North Mine

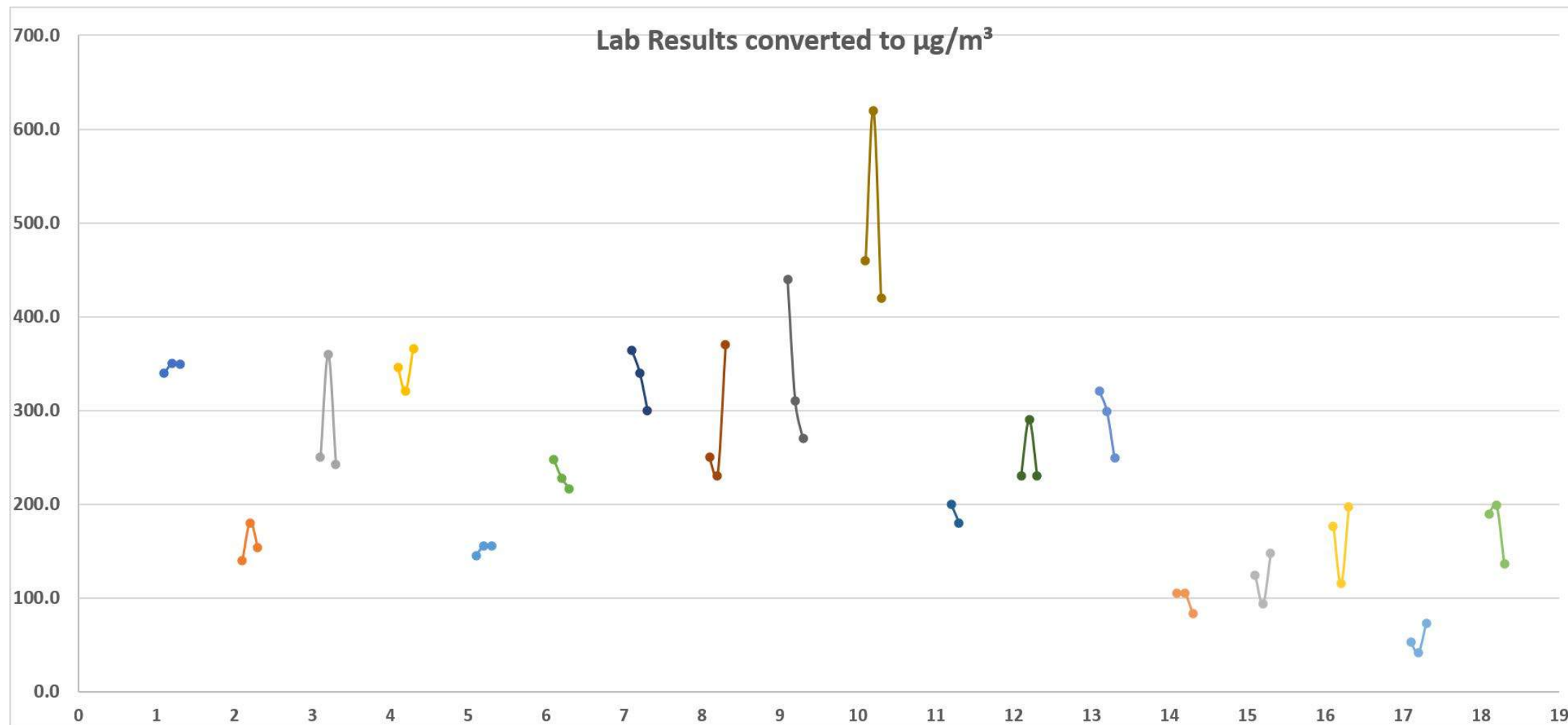
NIOSH 0600 Dust Results – Station A

- The Occupational Exposure Limit in Ontario for Respirable Particulate (Dust) is 3.0 mg/m³ or 3000 ug/m³ over an 8-hour shift.
- All 54 samples across 18 shifts were well below this OEL with the highest result being 620.0ug/m³ or 20.7% of the OEL.
- The average across all the shifts was 239.7ug/m³ and individually ranged from 55.5to 500.0ug/m³.
- A Relative Percentage Difference analysis was done on the laboratory results from each of the shifts to determine how they differ between one another.
 - Results ranged from 3-56%
 - What does this mean?

Shift #	Test #	Sample Cassette #	Date	Monitoring start	Sample Duration	Monitoring End	Lab Results converted to µg/m³	Live TWA µg/m³	Lab/Live ratio	Test #	Shift #	Average	Max	Min	RPD	Adjusted Live TWA µg/m³
1	1.1	250334875	27-Mar-2026	7:15	480	15:15	340.0	314.9	1.08	1.1	1	346.3	350.0	340.0	3%	377.92
	1.2	250334850	27-Mar-2026	7:15	480	15:15	350.0		1.11	1.2						
	1.3	27546	27-Mar-2026	7:15	480	15:15	348.9		1.11	1.3						
2	2.1	250334860	27-Mar-2026	15:20	480	23:20	140.0	128.9	1.09	2.1	2	157.9	180.0	140.0	25%	154.62
	2.2	250334878	27-Mar-2026	15:20	480	23:20	180.0		1.40	2.2						
	2.3	27544	27-Mar-2026	15:20	480	23:20	153.6		1.19	2.3						
3	3.1	250334866	27-Mar-2026	23:20	480	7:20	250.0	330.3	0.76	3.1	3	284.0	360.0	242.1	42%	396.42
	3.2	250334868	27-Mar-2026	23:20	480	7:20	360.0		1.09	3.2						
	3.3	27551	27-Mar-2026	23:20	480	7:20	242.1		0.73	3.3						
4	4.1	28214	8-Apr-2026	5:45	480	13:45	345.8	343.9	1.01	4.1	4	344.0	365.9	320.4	13%	412.63
	4.2	28211	8-Apr-2026	5:45	480	13:45	320.4		0.93	4.2						
	4.3	28221	8-Apr-2026	5:45	480	13:45	365.9		1.06	4.3						
5	5.1	28227	8-Apr-2026	13:50	480	21:50	145.3	192.6	0.75	5.1	5	151.7	155.0	145.3	6%	231.17
	5.2	28213	8-Apr-2026	13:50	480	21:50	155.0		0.80	5.2						
	5.3	28226	8-Apr-2026	13:50	480	21:50	155.0		0.80	5.3						
6	6.1	28225	8-Apr-2026	21:50	480	5:50	247.4	189.2	1.31	6.1	6	230.3	247.4	216.3	14%	227.07
	6.2	28219	8-Apr-2026	21:50	480	5:50	227.3		1.20	6.2						
	6.3	28209	8-Apr-2026	21:50	480	5:50	216.3		1.14	6.3						
7	7.1	28149	29-Apr-2026	6:15	480	14:15	363.9	215.4	1.69	7.1	7	334.6	363.9	300.0	19%	258.52
	7.2	28138	29-Apr-2026	6:15	480	14:15	340.0		1.58	7.2						
	7.3	28141	29-Apr-2026	6:15	480	14:15	300.0		1.39	7.3						
8	8.1	28207	29-Apr-2026	14:15	480	22:15	250.0	173.8	1.44	8.1	8	283.3	370.0	230.0	49%	208.58
	8.2	28208	29-Apr-2026	14:15	480	22:15	230.0		1.32	8.2						
	8.3	28204	29-Apr-2026	14:15	480	22:15	370.0		2.13	8.3						
9	9.1	28144	29-Apr-2026	22:15	480	6:15	440.0	278.6	1.58	9.1	9	340.0	440.0	270.0	50%	334.34
	9.2	28132	29-Apr-2026	22:15	480	6:15	310.0		1.11	9.2						
	9.3	28136	29-Apr-2026	22:15	480	6:15	270.0		0.97	9.3						
10	10.1	28139	2-May-2026	6:30	480	14:30	460.0	409.8	1.12	10.1	10	500.0	620.0	420.0	40%	491.70
	10.2	28128	2-May-2026	6:30	480	14:30	620.0		1.51	10.2						
	10.3	28130	2-May-2026	6:30	480	14:30	420.0		1.03	10.3						
11	11.2	28168	2-May-2026	14:30	480	22:30	200.0	140.4	1.42	11.2	11	190.0	200.0	180.0	11%	168.53
	11.3	27179	2-May-2026	14:30	480	22:30	180.0		1.28	11.3						
	12.1	28198	2-May-2026	22:30	480	6:30	230.0	210.2	1.09	12.1	12	250.0	290.0	230.0	24%	252.26
12	12.2	28194	2-May-2026	22:30	480	6:30	290.0		1.38	12.2						
	12.3	28200	2-May-2026	22:30	480	6:30	230.0		1.09	12.3						
13	13.1	28169	5-May-2026	6:00	480	14:00	320.8	224.0	1.43	13.1	13	289.7	320.8	249.1	25%	268.76
	13.2	28184	5-May-2026	6:00	480	14:00	299.2		1.34	13.2						
	13.3	28181	5-May-2026	6:00	480	14:00	249.1		1.11	13.3						
14	14.1	28165	5-May-2026	14:00	480	22:00	104.5	63.8	1.64	14.1	14	97.4	104.5	83.2	22%	76.56
	14.2	28157	5-May-2026	14:00	480	22:00	104.5		1.64	14.2						
	14.3	26650	5-May-2026	14:00	480	22:00	83.2		1.30	14.3						
15	15.1	27177	5-May-2026	22:00	480	6:00	123.6	96.0	1.29	15.1	15	121.6	147.3	93.8	44%	115.16
	15.2	28163	5-May-2026	22:00	480	6:00	93.8		0.98	15.2						
	15.3	26651	5-May-2026	22:00	480	6:00	147.3		1.53	15.3						
16	16.1	28182	10-May-2026	6:00	480	14:00	175.8	128.7	1.37	16.1	16	162.6	197.1	115.0	51%	154.44
	16.2	28166	10-May-2026	6:00	480	14:00	115.0		0.89	16.2						
	16.3	28185	10-May-2026	6:00	480	14:00	197.1		1.53	16.3						
17	17.1	28189	10-May-2026	14:00	480	22:00	52.5	51.6	1.02	17.1	17	55.5	72.5	41.6	56%	61.91
	17.2	28193	10-May-2026	14:00	480	22:00	41.6		0.81	17.2						
	17.3	26654	10-May-2026	14:00	480	22:00	72.5		1.40	17.3						
18	18.1	28183	10-May-2026	22:00	480	6:00	188.9	183.5	1.03	18.1	18	174.8	198.9	136.5	36%	220.18
	18.2	28180	10-May-2026	22:00	480	6:00	198.9		1.08	18.2						
	18.3	26638	10-May-2026	22:00	480	6:00	136.5		0.74	18.3						

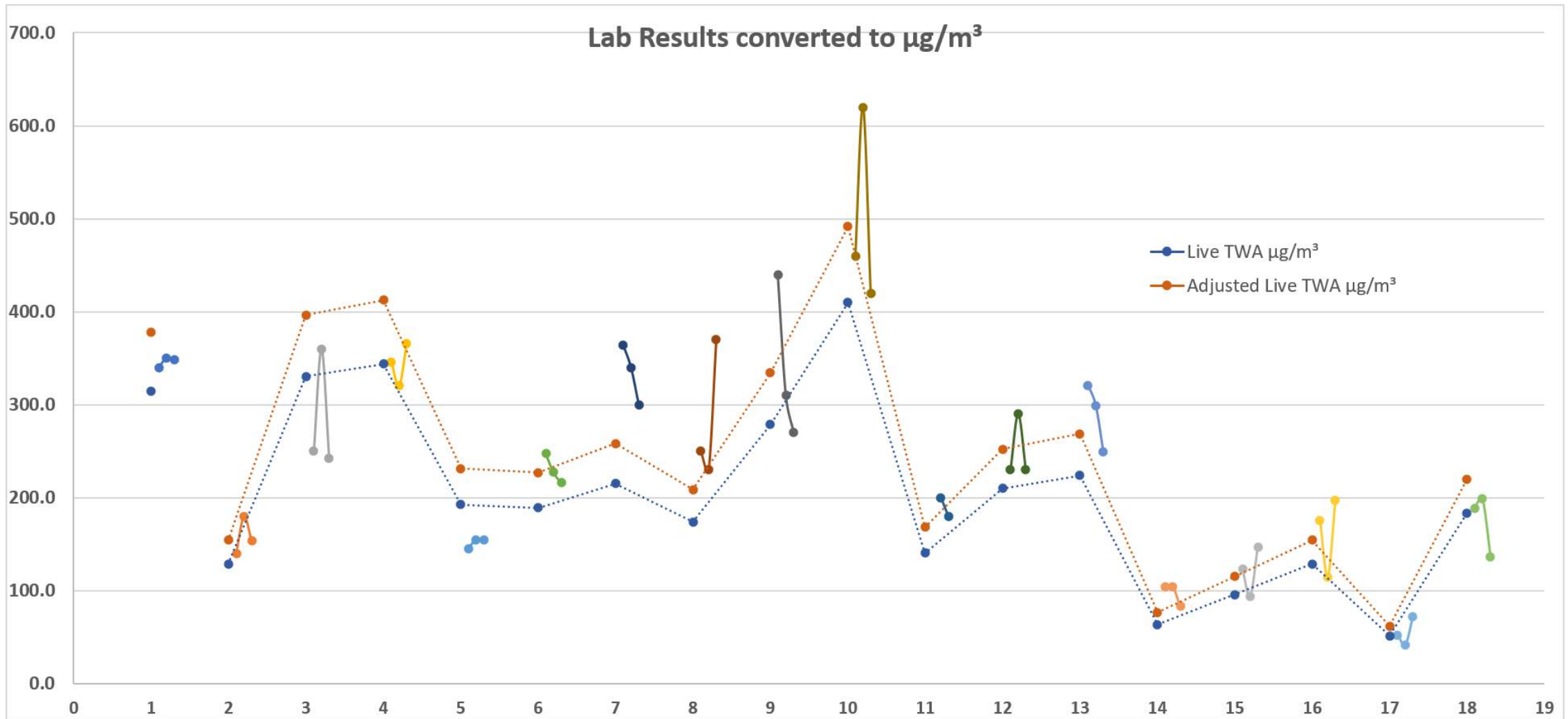
Results – North Mine

NIOSH 0600 Dust Results – Station A



Results – North Mine

NIOSH 0600 Dust vs Adjusted Live Dust data (1.0 & 1.2 coefficient)



Results – North Mine

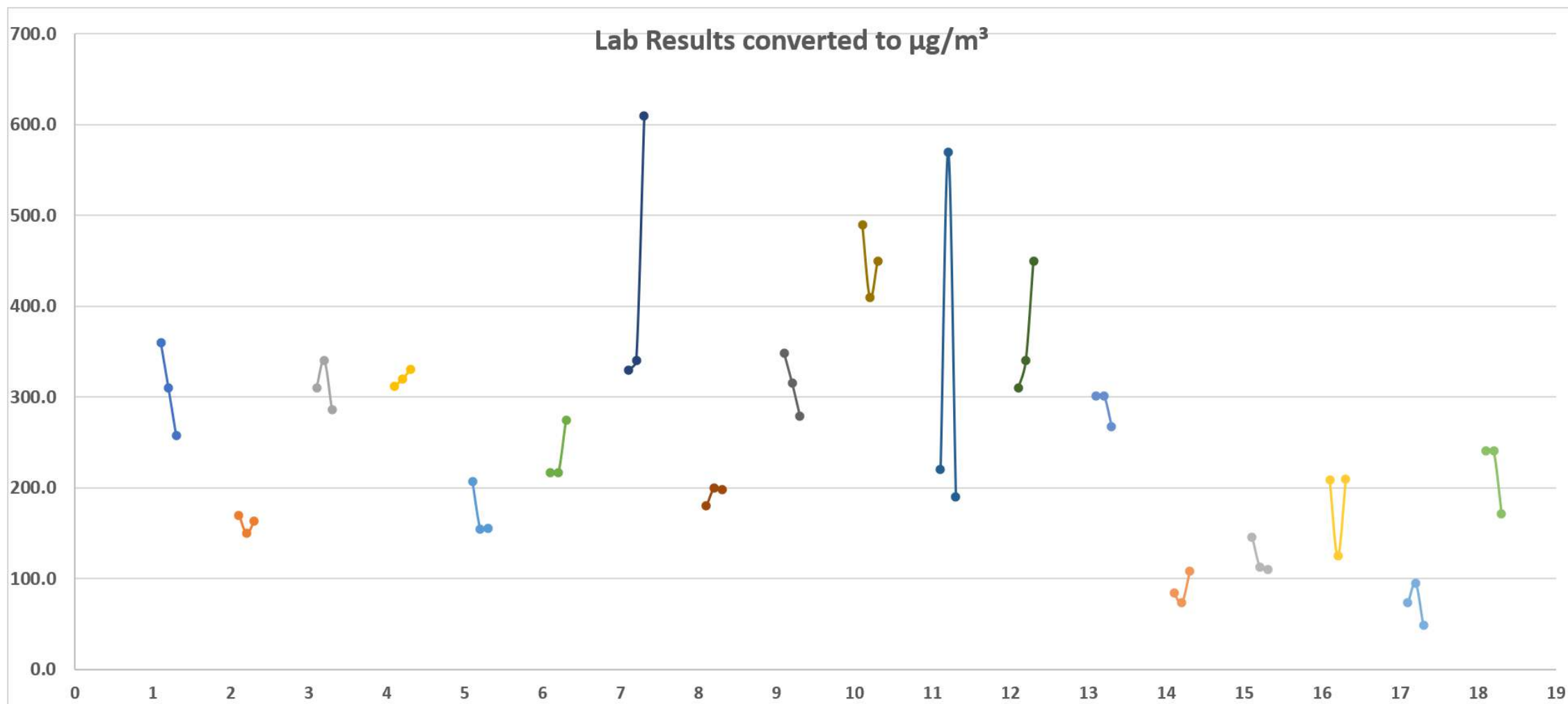
NIOSH 0600 Dust Results – Station B

- The Occupational Exposure Limit in Ontario for Respirable Particulate (Dust) is 3.0 mg/m³ or 3000 ug/m³ over an 8-hour shift.
- All 54 samples across 18 shifts were well below this OEL with the highest result being 610.0ug/m³ or 20.3% of the OEL.
- The average across all the shifts was 253.4ug/m³ and individually ranged from 72.3 to 450.0ug/m³.
- A Relative Percentage Difference analysis was done on the laboratory results from each of the shifts to determine how they differ between one another.
 - Results ranged from 6-116%
 - What does this mean?

Shift #	Test #	Sample Cassette #	Date	Monitoring start	Sample Duration	Monitoring End	Lab Results converted to µg/m³	Live TWA µg/m³	UNCLASSIFIED - NON CLASSIFIED	Test #	Shift #	Average	Max	Min	RPD
1	1.1	250334863	27-Mar-2026	7:15	480	15:15	360.0	314.93		1.1	1	309.3	360.0	257.8	33%
	1.2	250334859	27-Mar-2026	7:15	480	15:15	310.0			1.2					
	1.3	27553	27-Mar-2026	7:15	480	15:15	257.8			1.3					
2	2.1	250334867	27-Mar-2026	15:20	480	23:20	170.0	128.85		2.1	2	161.3	170.0	150.0	12%
	2.2	250334870	27-Mar-2026	15:20	480	23:20	150.0			2.2					
	2.3	27548	27-Mar-2026	15:20	480	23:20	163.8			2.3					
3	3.1	250334879	27-Mar-2026	23:20	480	7:20	310.0	330.35		3.1	3	312.1	340.0	286.4	17%
	3.2	250334847	27-Mar-2026	23:20	480	7:20	340.0			3.2					
	3.3	27550	27-Mar-2026	23:20	480	7:20	286.4			3.3					
4	4.1	28215	8-Apr-2026	5:45	480	13:45	312.0	343.86		4.1	4	320.5	330.1	312.0	6%
	4.2	28217	8-Apr-2026	5:45	480	13:45	319.5			4.2					
	4.3	28206	8-Apr-2026	5:45	480	13:45	330.1			4.3					
5	5.1	28224	8-Apr-2026	13:50	480	21:50	207.3	192.65		5.1	5	172.4	207.3	154.2	31%
	5.2	28223	8-Apr-2026	13:50	480	21:50	154.2			5.2					
	5.3	28220	8-Apr-2026	13:50	480	21:50	155.6			5.3					
6	6.1	28222	8-Apr-2026	21:50	480	5:50	216.5	189.23		6.1	6	236.0	274.8	216.5	25%
	6.2	28218	8-Apr-2026	21:50	480	5:50	216.7			6.2					
	6.3	28216	8-Apr-2026	21:50	480	5:50	274.8			6.3					
7	7.1	28147	29-Apr-2026	6:15	480	14:15	330.0	215.44		7.1	7	426.7	610.0	330.0	66%
	7.2	28151	29-Apr-2026	6:15	480	14:15	340.0			7.2					
	7.3	28140	29-Apr-2026	6:15	480	14:15	610.0			7.3					
8	8.1	28212	29-Apr-2026	14:15	480	22:15	180.0	173.82		8.1	8	192.8	200.0	180.0	10%
	8.2	28150	29-Apr-2026	14:15	480	22:15	200.0			8.2					
	8.3	28152	29-Apr-2026	14:15	480	22:15	198.4			8.3					
9	9.1	28146	29-Apr-2026	22:15	480	6:15	348.7	278.62		9.1	9	314.4	348.7	278.8	22%
	9.2	28145	29-Apr-2026	22:15	480	6:15	315.8			9.2					
	9.3	28148	29-Apr-2026	22:15	480	6:15	278.8			9.3					
10	10.1	28142	2-May-2026	6:30	480	14:30	490.0	409.75		10.1	10	450.0	490.0	410.0	18%
	10.2	28143	2-May-2026	6:30	480	14:30	410.0			10.2					
	10.3	28135	2-May-2026	6:30	480	14:30	450.0			10.3					
11	11.1	28191	2-May-2026	14:30	480	22:30	220.0	140.44		11.1	11	326.7	570.0	190.0	116%
	11.2	28137	2-May-2026	14:30	480	22:30	570.0			11.2					
	11.3	28131	2-May-2026	14:30	480	22:30	190.0			11.3					
12	12.1	28202	2-May-2026	22:30	480	6:30	310.0	210.22		12.1	12	366.7	450.0	310.0	38%
	12.2	28199	2-May-2026	22:30	480	6:30	340.0			12.2					
	12.3	28197	2-May-2026	22:30	480	6:30	450.0			12.3					
13	13.1	28195	5-May-2026	6:00	480	14:00	301.3	223.97		13.1	13	290.2	301.3	267.8	12%
	13.2	28196	5-May-2026	6:00	480	14:00	301.3			13.2					
	13.3	28175	5-May-2026	6:00	480	14:00	267.8			13.3					
14	14.1	28172	5-May-2026	14:00	480	22:00	83.8	63.80		14.1	14	88.5	108.3	73.5	39%
	14.2	28173	5-May-2026	14:00	480	22:00	73.5			14.2					
	14.3	26652	5-May-2026	14:00	480	22:00	108.3			14.3					
15	15.1	28167	5-May-2026	22:00	480	6:00	145.6	95.97		15.1	15	122.7	145.6	109.6	29%
	15.2	28160	5-May-2026	22:00	480	6:00	112.8			15.2					
	15.3	26641	5-May-2026	22:00	480	6:00	109.6			15.3					
16	16.1	28156	10-May-2026	6:00	480	14:00	208.8	128.70		16.1	16	180.9	209.2	124.9	47%
	16.2	28188	10-May-2026	6:00	480	14:00	124.9			16.2					
	16.3	28179	10-May-2026	6:00	480	14:00	209.2			16.3					
17	17.1	28178	10-May-2026	14:00	480	22:00	73.6	51.60		17.1	17	72.3	95.0	48.4	64%
	17.2	28190	10-May-2026	14:00	480	22:00	95.0			17.2					
	17.3	26657	10-May-2026	14:00	480	22:00	48.4			17.3					
18	18.1	28154	10-May-2026	22:00	480	6:00	240.5	183.48		18.1	18	217.4	240.5	171.4	32%
	18.2	28187	10-May-2026	22:00	480	6:00	240.4			18.2					
	18.3	26656	10-May-2026	22:00	480	6:00	171.4			18.3					

Results – North Mine

NIOSH 0600 Dust Results – Station B



Summary on Dust

NIOSH 0600 Dust Results

- All 108 samples across 18 shifts were well below this OEL with the highest result being 620.0ug/m³ or 20.7% of the OEL.
- The average across all the shifts was 247.0ug/m³ and individually ranged from 55.5 to 500.0ug/m³.
- A Relative Percentage Difference analysis was done on the laboratory results from each of the shifts to determine how they differ between one another.
 - Results ranged from 3-116%
- Real-time Respirable Dust vs Laboratory NIOSH 7500 results
 - The real-time Dust monitor has a very tight trend with the laboratory results from the NIOSH testing methods
 - Across all 18 shifts the real time data ranged from -76.12 to 112.38ug/m³ (+/-112.4ug/m³ or +/-3.75% of OEL) from lab results.

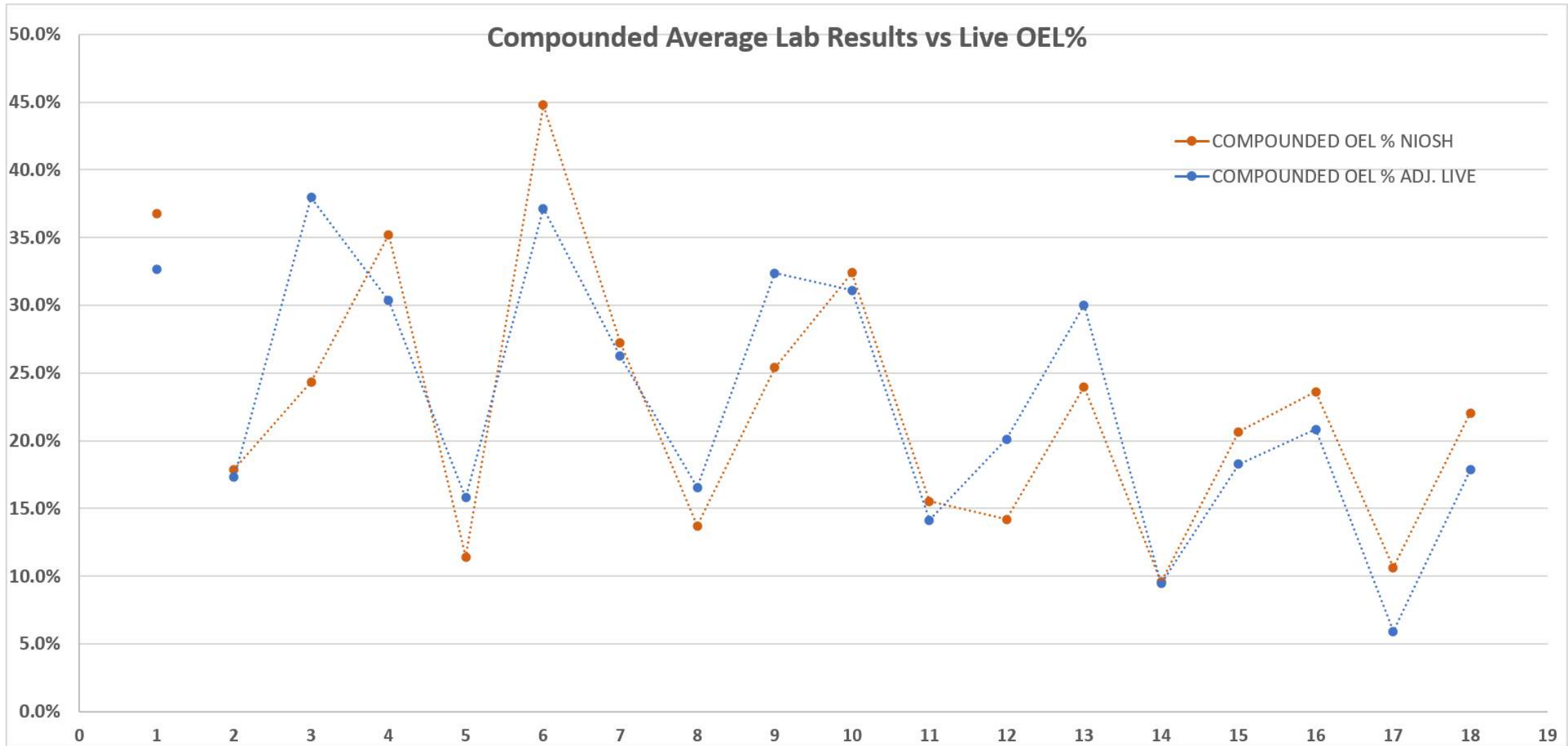
Compounding Results

Lab vs Real-time Monitoring Results – Station A – Silica + Elemental Carbon

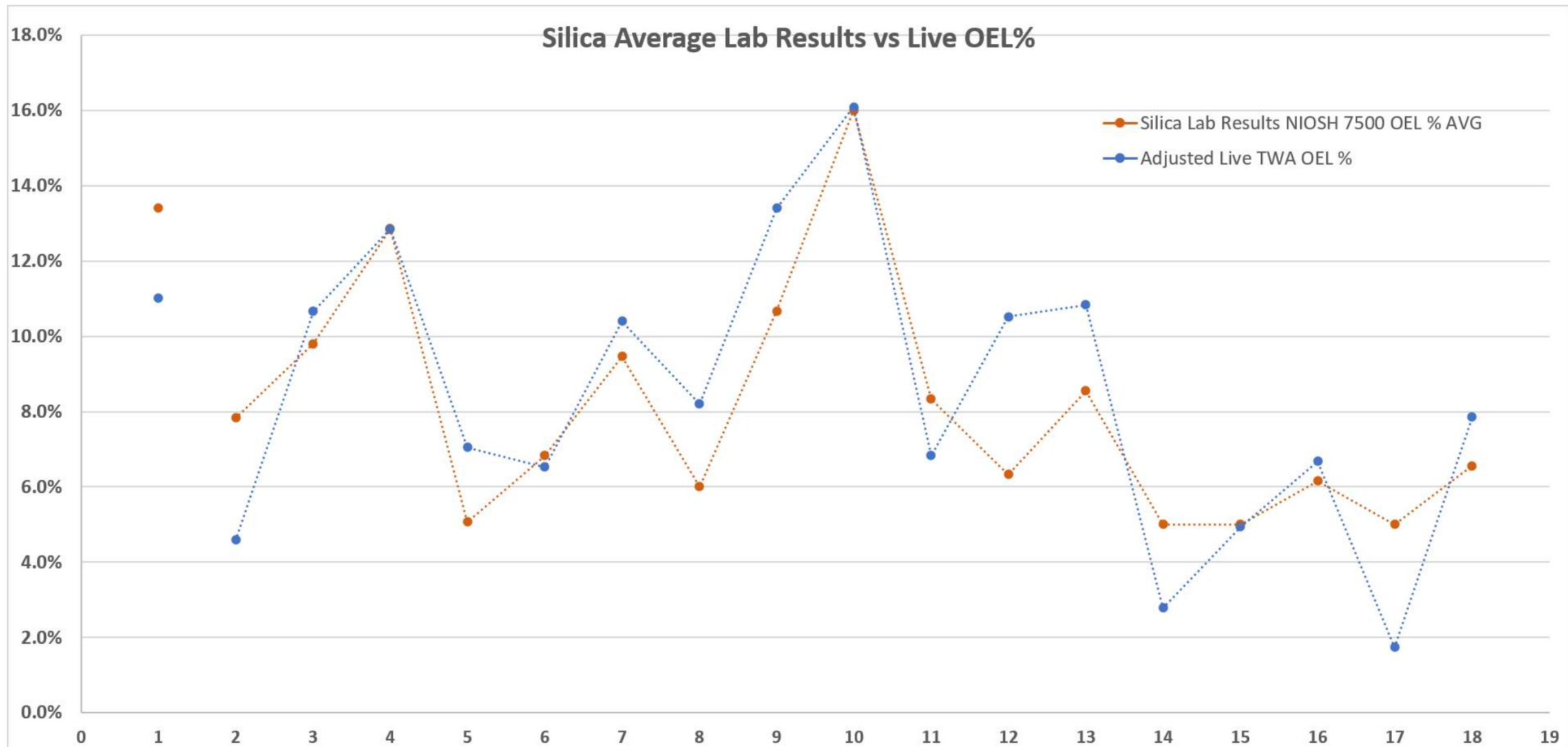
Shift #	Test #	Date	Monitoring start	Sample Duration	Monitoring End	Sample Cassette #	Silica Lab Results NIOSH 7500	Silica Lab Results NIOSH 7500 OEL %	Silica Lab Results NIOSH 7500 AVG	Silica Lab Results NIOSH 7500 OEL % AVG	Silica Live TWA µg/m³	Adjusted Live TWA µg/m³	SF 0.05 Adjusted Live TWA µg/m³	Adjusted Live TWA OEL %	SF 0.05 Adjusted Live TWA µg/m³	Sample Cassette #	EC Lab Results NIOSH 7500	EC Lab Results NIOSH 7500 OEL %	EC Lab Results NIOSH 5040 AVG	EC Lab Results NIOSH 5040 OEL % AVG	DPM Live TWA µg/m³	Adjusted EC/DPM Live TWA µg/m³	SF 0.05 Adjusted EC/DPM Live TWA µg/m³	Adjusted Live TWA OEL %	SF 0.05 Adjusted Live TWA µg/m³	COMPOUNDED OEL % NIOSH	COMPOUNDED OEL % ADJ. LIVE	Difference between Lab vs Live
1	1.1	27-Mar-2026	7:15	480	15:15	250334875	14.0	14%	13.4	13.4%	110.14	11.01	16.52	11.0%	16.5%	274091	28.0	23.4%	26.8	23.4%	104.0	26.0	36.4	21.7%	36.4%	36.8%	32.7%	-4.1%
	1.2	27-Mar-2026	7:15	480	15:15	250334850	13.0	13%								274122	27.4	22.8%										
	1.3	27-Mar-2026	7:15	480	15:15	27546	13.2	13%								20080	25.7	21.4%										
	1.4	27-Mar-2026	7:15	480	15:15											250244730	30.0	25.0%										
	1.5	27-Mar-2026	7:15	420	14:15											240134784	25.4	24.2%										
	1.6	27-Mar-2026	7:15	420	14:15											250244724	24.5	23.3%										
2	2.1	27-Mar-2026	15:20	480	23:20	250334860	10.0	10%	7.8	8%	45.91	4.59	6.89	4.6%	6.9%	274038	13.3	11.1%	12.0	10%	61.0	15.3	21.4	12.7%	21.4%	18%	17%	-0.6%
	2.2	27-Mar-2026	15:20	480	23:20	250334878	8.4	8%								277130	12.5	10.4%										
	2.3	27-Mar-2026	15:20	480	23:20	27544	5.1	5%								20089	10.3	8.6%										
3	3.1	27-Mar-2026	23:20	480	7:20	250334866	14.0	14%	9.8	10%	106.65	10.67	16.00	10.7%	16.0%	274115	17.7	14.8%	17.4	15%	131.0	32.8	45.9	27.3%	45.9%	24%	38%	13.6%
	3.2	27-Mar-2026	23:20	480	7:20	250334868	5.3	5%								274151	17.9	15.0%										
	3.3	27-Mar-2026	23:20	480	7:20	27551	10.1	10%								20084	16.6	13.8%										
4	4.1	8-Apr-2026	5:45	480	13:45	28214	12.6	13%	12.9	12.9%	128.47	12.85	19.27	12.8%	19.3%	277556	28.0	23.4%	26.8	22.3%	84.0	21.0	29.4	17.5%	29.4%	35.2%	30.3%	-4.9%
	4.2	8-Apr-2026	5:45	480	13:45	28211	10.3	10%								273781	20.9	17.5%										
	4.3	8-Apr-2026	5:45	480	13:45	28221	15.7	16%								277681	28.9	24.1%										
	4.4	8-Apr-2026	5:45	480	13:45											24-0134787	27.0	22.5%										
	4.5	8-Apr-2026	5:45	480	13:45											24-0134780	28.0	23.3%										
	4.6	8-Apr-2026	5:45	480	13:45											24-0134788	28.0	23.3%										
5	5.1	8-Apr-2026	13:50	480	21:50	28227	5.2	5%	5.1	5%	70.44	7.04	10.57	7.0%	10.6%	274157	9.3	7.8%	7.6	6%	42.0	10.5	14.7	8.8%	14.7%	11%	16%	4.4%
	5.2	8-Apr-2026	13:50	480	21:50	28213	5.0	5%								277529	9.3	7.8%										
	5.3	8-Apr-2026	13:50	480	21:50	28226	5.0	5%								277533	4.1	3.4%										
6	6.1	8-Apr-2026	21:50	480	5:50	28225	10.3	10%	6.8	7%	65.28	6.53	9.79	6.5%	9.8%	277582	46.6	38.8%	45.5	38%	147.0	36.8	51.5	30.6%	51.5%	45%	37%	-7.6%
	6.2	8-Apr-2026	21:50	480	5:50	28219	5.2	5%								274090	45.6	38.0%										
	6.3	8-Apr-2026	21:50	480	5:50	28209	5.0	5%								27774	44.5	37.1%										
7	7.1	29-Apr-2026	6:15	480	14:15	28149	10.4	10%	9.5	9%	104.02	10.40	15.60	10.4%	15.6%	277735	20.0	16.7%	21.3	18%	76.0	19.0	26.6	15.8%	26.6%	27%	26%	-1.0%
	7.2	29-Apr-2026	6:15	480	14:15	28138	10.0	10%								277587	22.0	18.3%										
	7.3	29-Apr-2026	6:15	480	14:15	28141	8.0	8%								260103825	22.0	18.3%										
8	8.1	29-Apr-2026	14:15	480	22:15	28207	5.0	5%	6.0	6%	82.05	8.20	12.31	8.2%	12.3%	260103820	8.6	7.2%	9.3	8%	40.0	10.0	14.0	8.3%	14.0%	14%	17%	2.8%
	8.2	29-Apr-2026	14:15	480	22:15	28208	5.0	5%								277522	9.6	8.0%										
	8.3	29-Apr-2026	14:15	480	22:15	28204	8.0	8%								277535	9.6	8.0%										
9	9.1	29-Apr-2026	22:15	480	6:15	28144	15.0	15%	10.7	11%	134.01	13.40	20.10	13.4%	20.1%	260103818	20.0	16.7%	17.7	15%	91.0	22.8	31.9	19.0%	31.9%	25%	32%	7.0%
	9.2	29-Apr-2026	22:15	480	6:15	28132	8.0	8%								277457	16.0	13.3%										
	9.3	29-Apr-2026	22:15	480	6:15	28136	9.0	9%								277625	17.0	14.2%										
10	10.1	2-May-2026	6:30	480	14:30	28139	9.0	9%	16.0	16.0%	160.88	16.09	24.13	16.1%	24.1%	277699	18.0	15.0%	17.3	16.4%	72.0	18.0	25.2	15.0%	25.2%	32.4%	31.1%	-1.3%
	10.2	2-May-2026	6:30	480	14:30	28128	23.0	23%								277824	21.0	17.5%										
	10.3	2-May-2026	6:30	480	14:30	28130	16.0	16%								260103814	19.0	15.8%										
	10.4	2-May-2026	6:30	480	14:30											260103815	19.0	15.8%										
	10.5	2-May-2026	6:30	480	14:30											260103812	21.0	17.5%										
	10.6	2-May-2026	6:30	135	8:45											260103813	5.6	16.7%										
11	11.1	2-May-2026	14:30	480	22:30	28129	15.0	15%	8.3	8%	68.34	6.83	10.25	6.8%	10.3%	277489	8.3	6.9%	8.6	7%	35.0	8.8	12.3	7.3%	12.3%	16%	14%	-1.4%
	11.2	2-May-2026	14:30	480	22:30	28168	5.0	5%								277424	8.5	7.1%										
	11.3	2-May-2026	14:30	480	22:30	27179	5.0	5%								260103821	9.1	7.6%										
12	12.1	2-May-2026	22:30	480	6:30	28198	5.0	5%	6.3	6%	105.21	10.52	15.78	10.5%	15.8%	277632	9.2	7.7%	9.4	8%	46.0	11.5	16.1	9.6%	16.1%	14%	20%	5.9%
	12.2	2-May-2026	22:30	480	6:30	28194	9.0	9%								277718	9.5	7.9%										
	12.3	2-May-2026	22:30	480	6:30	28200	5.0	5%								260103822	9.6	8.0%										
13	13.1	5-May-2026	6:00	480	14:00	28169	10.3	10%	8.6	9%	108.39	10.84	16.26	10.8%	16.3%	20490	19.9	15.8%	18.5	15%	92.0	23.0	32.2	19.2%	32.2%	24%	30%	6.0%
	13.2	5-May-2026	6:00	480	14:00	28184	10.3	10%								273572	19.8	16.5%										
	13.3	5-May-2026	6:00	480	14:00	28181	5.0	5%								277479	16.8	14.0%										
14	14.1	5-May-2026	14:00	480	22:00	28165	5.0	5%	5.0	5%	27.85	2.78	4.18	2.8%	4.2%	20487	6.2	5.2%	5.5	5%	32.0	8.0	11.2	6.7%	11.2%	10%	9%	-0.1%
	14.2	5-May-2026	14:00	480	22:00	28157	5.0	5%								273653	7.3	6.1%										
	14.3	5-May-2026	14:00	480	22:00	26650	5.0	5%								273698	3.0	2.5%										
15	15.1	5-May-2026	22:00	480	6:00	27177	5.0	5%	5.0	5%	49.41	4.94	7.41	4.9%	7.4%	20491	18.9	15.8%	18.8	16%	64.0	16.0	22.4	13.3%	22.4%	21%	18%	-2.4%
	15.2	5-May-2026	22:00	480	6:00	28163	5.0	5%								277333	18.8	15.7%										
	15.3	5-May-2026	22:00	480	6:00	26651	5.0	5%								277680	18.7	15.6%										
16	16.1	10-May-2026	6:00	480	14:00	28182	5.2	5%	6.2	6%	66.79	6.68	10.02	6.7%	10.0%	20475	20.9	17.4%	21.0	17%	68.0	17.0	23.8	14.2%	23.8%	24%	21%	-2.8%
	16.2	10-May-2026	6:00	480	14:00	28166	5.0	5%								277468	21.0	17.5%										
	16.3	10-May-2026	6:00	480	14:00	28185	8.3	8%								273710	21.0	17.5%										
17	17.1	10-May-2026	14:00	480	22:00	28189	5.0	5%	5.0	5%	17.41	1.74	2.61	1.7%	2.6%	20492	7.3	6.1%	6.8	6%	20.0	5.0	7.0	4.2%	7.0%	11%	6%	-4.7%
	17.2	10-May-2026	14:00	480	22:00	28193	5.0	5%								273549	7.0	5.8%										
	17.3	10-May-2026	14:00	480	22:00	26654	5.0	5%								277782	6.0	5.0%										
18	18.1	10-May-2026	22:00	480	6:00	28183	5.2	5%	6.6	7%	78.52	7.85	11.78	7.9%	11.8%	20494	17.7	14.8%	18.6	15%	48.0	12.0	16.8	10.0%	16.8%	22%	18%	-4.2%
	18.2	10-May-2026	22:00	480	6:00	28180	9.4	9%								273526	19.0	15.8%										
	18.3	10-May-2026	22:00	480	6:00	26638	5.0	5%								277620	19.0	15.8%										

UNCLASSIFIED - NON CLASSIFIÉ																										
Shift #	Test #	Date	Monitoring start	Sample Duration	Monitoring End	Silica Lab Results NIOSH 7500	Silica Lab Results NIOSH 7500 OEL %	Silica Lab Results NIOSH 7500 AVG ug/m3	Silica Lab Results NIOSH 7500 OEL % AVG	Silica Live TWA µg/m³	Adjusted Live TWA µg/m³	Lab Average vs Adjusted Live difference µg/m³	SF 0.05 Adjusted Live TWA µg/m³	Adjusted Live TWA OEL %	EC Lab Results NIOSH 7500	EC Lab Results NIOSH 7500 OEL %	EC Lab Results NIOSH 5040 AVG ug/m3	EC Lab Results NIOSH 5040 OEL % AVG	DPM Live TWA µg/m³	Adjusted EC/DPM Live TWA µg/m³	Lab Average vs Adjusted Live difference µg/m³	SF 0.05 Adjusted EC/DPM Live TWA µg/m³	Adjusted Live TWA OEL %	COMPOUNDED OEL % NIOSH	COMPOUNDED OEL % ADJ. LIVE	Difference between Lab vs Live
1	1.1	27-Mar-2026	7:15	480	15:15	14.0	14%	13.4	13.4%	110.14	11.01	-2.39	16.52	11.0%	28.0	23.4%	26.8	23.4%	104.0	26.0	-0.84	36.4	21.7%	36.8%	32.7%	-4.1%
	1.2	27-Mar-2026	7:15	480	15:15	13.0	13%								27.4	22.8%										
	1.3	27-Mar-2026	7:15	480	15:15	13.2	13%								25.7	21.4%										
	1.4	27-Mar-2026	7:15	480	15:15										30.0	25.0%										
	1.5	27-Mar-2026	7:15	420	14:15										25.4	24.2%										
	1.6	27-Mar-2026	7:15	420	14:15										24.5	23.3%										
2	2.1	27-Mar-2026	15:20	480	23:20	10.0	10%	7.8	8%	45.91	4.59	-3.24	6.89	4.6%	13.3	11.1%	12.0	10%	61.0	15.3	3.21	21.4	12.7%	18%	17%	-0.6%
	2.2	27-Mar-2026	15:20	480	23:20	8.4	8%								12.5	10.4%										
	2.3	27-Mar-2026	15:20	480	23:20	5.1	5%								10.3	8.6%										
3	3.1	27-Mar-2026	23:20	480	7:20	14.0	14%	9.8	10%	106.65	10.67	0.87	16.00	10.7%	17.7	14.8%	17.4	15%	131.0	32.8	15.32	45.9	27.3%	24%	38%	13.6%
	3.2	27-Mar-2026	23:20	480	7:20	5.3	5%								17.9	15.0%										
	3.3	27-Mar-2026	23:20	480	7:20	10.1	10%								16.6	13.8%										
4	4.1	8-Apr-2026	5:45	480	13:45	12.6	13%	12.9	12.9%	128.47	12.85	-0.02	19.27	12.8%	28.0	23.4%	26.8	22.3%	84.0	21.0	-5.81	29.4	17.5%	35.2%	30.3%	-4.9%
	4.2	8-Apr-2026	5:45	480	13:45	10.3	10%								20.9	17.5%										
	4.3	8-Apr-2026	5:45	480	13:45	15.7	16%								28.9	24.1%										
	4.4	8-Apr-2026	5:45	480	13:45										27.0	22.5%										
	4.5	8-Apr-2026	5:45	480	13:45										28.0	23.3%										
	4.6	8-Apr-2026	5:45	480	13:45										28.0	23.3%										
5	5.1	8-Apr-2026	13:50	480	21:50	5.2	5%	5.1	5%	70.44	7.04	1.98	10.57	7.0%	9.3	7.8%	7.6	6%	42.0	10.5	2.89	14.7	8.8%	11%	16%	4.4%
	5.2	8-Apr-2026	13:50	480	21:50	5.0	5%								9.3	7.8%										
	5.3	8-Apr-2026	13:50	480	21:50	5.0	5%								4.1	3.4%										
6	6.1	8-Apr-2026	21:50	480	5:50	10.3	10%	6.8	7%	65.28	6.53	-0.30	9.79	6.5%	46.6	38.8%	45.5	38%	147.0	36.8	-8.79	51.5	30.6%	45%	37%	-7.6%
	6.2	8-Apr-2026	21:50	480	5:50	5.2	5%								45.6	38.0%										
	6.3	8-Apr-2026	21:50	480	5:50	5.0	5%								44.5	37.1%										
7	7.1	29-Apr-2026	6:15	480	14:15	10.4	10%	9.5	9%	104.02	10.40	0.94	15.60	10.4%	20.0	16.7%	21.3	18%	76.0	19.0	-2.33	26.6	15.8%	27%	26%	-1.0%
	7.2	29-Apr-2026	6:15	480	14:15	10.0	10%								22.0	18.3%										
	7.3	29-Apr-2026	6:15	480	14:15	8.0	8%								22.0	18.3%										
8	8.1	29-Apr-2026	14:15	480	22:15	5.0	5%	6.0	6%	82.05	8.20	2.20	12.31	8.2%	8.6	7.2%	9.3	8%	40.0	10.0	0.73	14.0	8.3%	14%	17%	2.8%
	8.2	29-Apr-2026	14:15	480	22:15	5.0	5%								9.6	8.0%										
	8.3	29-Apr-2026	14:15	480	22:15	8.0	8%								9.6	8.0%										
9	9.1	29-Apr-2026	22:15	480	6:15	15.0	15%	10.7	11%	134.01	13.40	2.73	20.10	13.4%	20.0	16.7%	17.7	15%	91.0	22.8	5.08	31.9	19.0%	25%	32%	7.0%
	9.2	29-Apr-2026	22:15	480	6:15	8.0	8%								16.0	13.3%										
	9.3	29-Apr-2026	22:15	480	6:15	9.0	9%								17.0	14.2%										
10	10.1	2-May-2026	6:30	480	14:30	9.0	9%	16.0	16.0%	160.88	16.09	0.09	24.13	16.1%	18.0	15.0%	17.3	16.4%	72.0	18.0	0.73	25.2	15.0%	32.4%	31.1%	-1.3%
	10.2	2-May-2026	6:30	480	14:30	23.0	23%								21.0	17.5%										
	10.3	2-May-2026	6:30	480	14:30	16.0	16%								19.0	15.8%										
	10.4	2-May-2026	6:30	480	14:30										19.0	15.8%										
	10.5	2-May-2026	6:30	480	14:30										21.0	17.5%										
	10.6	2-May-2026	6:30	135	8:45										5.6	16.7%										
11	11.1	2-May-2026	14:30	480	22:30	15.0	15%	8.3	8%	68.34	6.83	-1.50	10.25	6.8%	8.3	6.9%	8.6	7%	35.0	8.8	0.12	12.3	7.3%	16%	14%	-1.4%
	11.2	2-May-2026	14:30	480	22:30	5.0	5%								8.5	7.1%										
	11.3	2-May-2026	14:30	480	22:30	5.0	5%								9.1	7.6%										
12	12.1	2-May-2026	22:30	480	6:30	5.0	5%	6.3	6%	105.21	10.52	4.19	15.78	10.5%	9.2	7.7%	9.4	8%	46.0	11.5	2.07	16.1	9.6%	14%	20%	5.9%
	12.2	2-May-2026	22:30	480	6:30	9.0	9%								9.5	7.9%										
	12.3	2-May-2026	22:30	480	6:30	5.0	5%								9.6	8.0%										
13	13.1	5-May-2026	6:00	480	14:00	10.3	10%	8.6	9%	108.39	10.84	2.28	16.26	10.8%	18.9	15.8%	18.5	15%	92.0	23.0	4.48	32.2	19.2%	24%	30%	6.0%
	13.2	5-May-2026	6:00	480	14:00	10.3	10%								19.8	16.5%										
	13.3	5-May-2026	6:00	480	14:00	5.0	5%								16.8	14.0%										
14	14.1	5-May-2026	14:00	480	22:00	5.0	5%	5.0	5%	27.85	2.78	-2.22	4.18	2.8%	6.2	5.2%	5.5	5%	32.0	8.0	2.50	11.2	6.7%	10%	9%	-0.1%
	14.2	5-May-2026	14:00	480	22:00	5.0	5%								7.3	6.1%										
	14.3	5-May-2026	14:00	480	22:00	5.0	5%								3.0	2.5%										
15	15.1	5-May-2026	22:00	480	6:00	5.0	5%	5.0	5%	49.41	4.94	-0.06	7.41	4.9%	18.9	15.8%	18.8	16%	64.0	16.0	-2.80	22.4	13.3%	21%	18%	-2.4%
	15.2	5-May-2026	22:00	480	6:00	5.0	5%								18.8	15.7%										
	15.3	5-May-2026	22:00	480	6:00	5.0	5%								18.7	15.6%										
16	16.1	10-May-2026	6:00	480	14:00	5.2	5%	6.2	6%	66.79	6.68	0.52	10.02	6.7%	20.9	17.4%	21.0	17%	68.0	17.0	-3.96	23.8	14.2%	24%	21%	-2.8%
	16.2	10-May-2026	6:00	480	14:00	5.0	5%								21.0	17.5%										
	16.3	10-May-2026	6:00	480	14:00	8.3	8%								21.0	17.5%										
17	17.1	10-May-2026	14:00	480	22:00	5.0	5%	5.0	5%	17.41	1.74	-3.26	2.61	1.7%	7.3	6.1%	6.8	6%	20.0	5.0	-1.77	7.0	4.2%	11%	6%	-4.7%
	17.2	10-May-2026	14:00	480	22:00	5.0	5%								7.0	5.8%										
	17.3	10-May-2026	14:00	480	22:00	5.0	5%								6.0	5.0%										
18	18.1	10-May-2026	22:00	480	6:00	5.2	5%	6.6	7%	78.52	7.85	1.30	11.78	7.9%	17.7	14.8%	18.6	15%	48.0	12.0	-6.58	16.8	10.0%	22%	18%	-4.2%
	18.2	10-May-2026	22:00	480	6:00	9.4	9%								19.0	15.8%										
	18.3	10-May-2026	22:00	480	6:00	5.0	5%								19.0	15.8%										

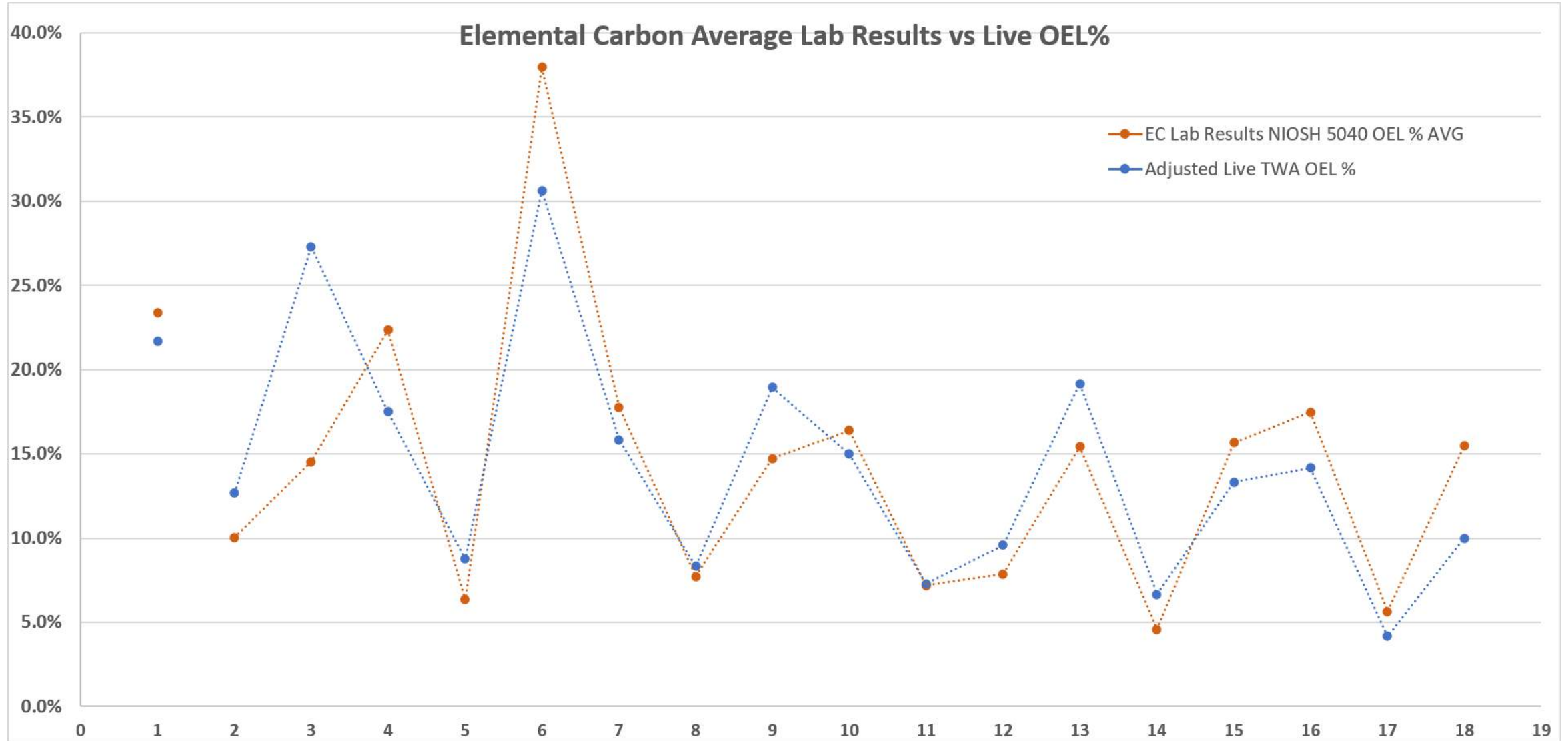
Compounding Results – DPM (EC) + SILICA



OEL Percentage Results – Silica



OEL Percentage Results – DPM (Elemental Carbon)



Summary

- Looking at the Compounding OEL, the real time monitors have a very tight trend with the laboratory results from the NIOSH testing methods. (-7.6 to 7.0%; one outlier on the safe side on shift #3 previously identified as an outlier at 13.6%)
 - 17/18 shifts (94.4%) the real time monitors were +/-7.6% OEL from the average of the NIOSH laboratory data compounding results.
 - 1/18 shifts the real time monitors were +13.6% OEL from the average of the NIOSH laboratory data compounding results.
- Real time monitors are not a compliance tool, but they do enable resolution into their operations to manage the working environment dynamically as increasing levels are occurring not only through investigation after laboratory results are returned long after the exposure.

Ni Results

Ni Laboratory Results – Station A&B

Date	Substance	Pre Flow	Post Flow	Cal. Avg.	% Dif. Avg.	Samp. Time	Volume (L)	Cassette #	Location	Monitoring start	TWA (8)	Value (ug)	Adjust. Con.(C ₁ +T ₁)/8	Units	OEL %	Lab Results converted to µg/m³
2-May-2026	Ni	2.016	2.016	2.016	0	480	967.68	250125208	North Mine 4082 South Drift station A	22:30	0.2	7.7	0.008	mg/m3	4.0	8.0
2-May-2026	Ni	1.96	1.984	1.972	1.21704	480	946.56	250125214	North Mine 4082 South Drift station B	22:30	0.2	22	0.023	mg/m3	11.5	23.0
5-May-2026	Ni	2.016	2.034	2.025	0.88889	480	972	250125209	North Mine 4082 South Drift station A	22:00	0.2	11	0.012	mg/m3	6.0	12.0
5-May-2026	Ni	2.003	2.013	2.008	0.49801	480	963.84	250125207	North Mine 4082 South Drift station B	22:00	0.2	5.8	0.006	mg/m3	3.0	6.0
10-May-2026	Ni	2.005	1.974	1.9895	1.55818	480	954.96	250125218	North Mine 4082 South Drift station A	22:00	0.2	11	0.012	mg/m3	6.0	12.0
10-May-2026	Ni	2.013	1.977	1.995	1.80451	480	957.6	250125216	North Mine 4082 South Drift station B	22:00	0.2	18	0.019	mg/m3	9.5	19.0

NO2 Results

NO2 Laboratory Results – Station A

Date	Substance	Samp. Time	Volume (L)	Location	Monitoring start	TWA (8)	Conc. (mg/m3)	Units	OEL %
27-Mar-2026	NO2	480	0	North Mine 4082 South Drift station A	7:15	3	0.110	ppm	3.7
27-Mar-2026	NO2	480	0	North Mine 4082 South Drift station A	15:20	3	0.020	ppm	0.7
27-Mar-2026	NO2	480	0	North Mine 4082 South Drift station A	23:20	3	0.070	ppm	2.3
8-Apr-2026	NO2	480	0	North Mine 4082 South Drift station A	5:45	3	0.030	ppm	1.0
8-Apr-2026	NO2	480	0	North Mine 4082 South Drift station A	13:50	3	0.000	ppm	0.0
8-Apr-2026	NO2	480	0	North Mine 4082 South Drift station A	21:50	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station A	6:30	3	0.030	ppm	1.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station A	6:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station A	6:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station A	14:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station A	22:30	3	0.010	ppm	0.3
2-May-2026	NO2	480	0	North Mine 4082 South Drift station A	22:30	3	0.000	ppm	0.0
5-May-2026	NO2	480	0	North Mine 4082 South Drift station A	6:00	3	0.000	ppm	0.0
5-May-2026	NO2	480	0	North Mine 4082 South Drift station A	14:00	3	0.000	ppm	0.0
5-May-2026	NO2	480	0	North Mine 4082 South Drift station A	22:00	3	0.000	ppm	0.0
10-May-2026	NO2	480	0	North Mine 4082 South Drift station A	6:00	3	0.060	ppm	2.0
10-May-2026	NO2	480	0	North Mine 4082 South Drift station A	14:00	3	0.020	ppm	0.7
10-May-2026	NO2	480	0	North Mine 4082 South Drift station A	22:00	3	0.020	ppm	0.7

NO2 Results

NO2 Laboratory Results – Station B

Date	Substance	Samp. Time	Volume (L)	Location	Monitoring start	TWA (8)	Conc. (mg/m3)	Units	OEL %
27-Mar-2026	NO2	480	930.72	North Mine 4082 South Drift station B	7:15	3	0.180	ppm	6.0
27-Mar-2026	NO2	480	930.72	North Mine 4082 South Drift station B	15:20	3	0.020	ppm	0.7
27-Mar-2026	NO2	480	930.72	North Mine 4082 South Drift station B	23:20	3	0.010	ppm	0.3
8-Apr-2026	NO2	480	930.72	North Mine 4082 South Drift station B	5:45	3	0.050	ppm	1.7
8-Apr-2026	NO2	480	930.72	North Mine 4082 South Drift station B	13:50	3	0.050	ppm	1.7
8-Apr-2026	NO2	480	930.72	North Mine 4082 South Drift station B	21:50	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station B	6:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station B	6:30	3	0.120	ppm	4.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station B	14:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station B	14:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station B	22:30	3	0.000	ppm	0.0
2-May-2026	NO2	480	0	North Mine 4082 South Drift station B	22:30	3	0.080	ppm	2.7
5-May-2026	NO2	480	0	North Mine 4082 South Drift station B	6:00	3	0.030	ppm	1.0
5-May-2026	NO2	480	0	North Mine 4082 South Drift station B	14:00	3	0.000	ppm	0.0
5-May-2026	NO2	480	0	North Mine 4082 South Drift station B	22:00	3	0.140	ppm	4.7
10-May-2026	NO2	480	0	North Mine 4082 South Drift station B	6:00	3	0.000	ppm	0.0
10-May-2026	NO2	480	0	North Mine 4082 South Drift station B	14:00	3	0.000	ppm	0.0
10-May-2026	NO2	480	0	North Mine 4082 South Drift station B	22:00	3	0.000	ppm	0.0

CO Results

CO Laboratory Results – Station A

Date	Substance	Samp. Time	Volume (L)	Location	Monitoring start	TWA (8)	Conc. (mg/m3)	Units	OEL %
27-Mar-2026	CO	480	930.72	North Mine 4082 South Drift station A	7:15	25	1.860	ppm	7.4
27-Mar-2026	CO	480	930.72	North Mine 4082 South Drift station A	15:20	25	3.360	ppm	13.4
27-Mar-2026	CO	480	930.72	North Mine 4082 South Drift station A	23:20	25	5.500	ppm	22.0
8-Apr-2026	CO	480	930.72	North Mine 4082 South Drift station A	5:45	25	6.820	ppm	27.3
8-Apr-2026	CO	480	930.72	North Mine 4082 South Drift station A	13:50	25	4.000	ppm	16.0
8-Apr-2026	CO	480	930.72	North Mine 4082 South Drift station A	21:50	25	4.160	ppm	16.6
2-May-2026	CO	480	0`	North Mine 4082 South Drift station A	6:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station A	6:30	25	0.010	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station A	14:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station A	14:30	25	0	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station A	22:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station A	22:30	25	0.140	ppm	0.6
5-May-2026	CO	480	0	North Mine 4082 South Drift station A	6:00	25	0.000	ppm	0.0
5-May-2026	CO	480	0	North Mine 4082 South Drift station A	14:00	25	0.000	ppm	0.0
5-May-2026	CO	480	0	North Mine 4082 South Drift station A	22:00	25	0.000	ppm	0.0
10-May-2026	CO	480	0	North Mine 4082 South Drift station A	6:00	25	0.000	ppm	0.0
10-May-2026	CO	480	0	North Mine 4082 South Drift station A	14:00	25	0.000	ppm	0.0
10-May-2026	CO	480	0	North Mine 4082 South Drift station A	22:00	25	0.000	ppm	0.0

CO Results

CO Laboratory Results – Station B

Date	Substance	Samp. Time	Volume (L)	Location	Monitoring start	TWA (8)	Conc. (mg/m3)	Units	OEL %
27-Mar-2026	CO	480	0	North Mine 4082 South Drift station B	7:15	25	0.000	ppm	0.0
27-Mar-2026	CO	480	0	North Mine 4082 South Drift station B	15:20	25	0.830	ppm	3.3
27-Mar-2026	CO	480	0	North Mine 4082 South Drift station B	23:20	25	1.930	ppm	7.7
8-Apr-2026	CO	480	0	North Mine 4082 South Drift station B	5:45	25	8.720	ppm	34.9
8-Apr-2026	CO	480	0	North Mine 4082 South Drift station B	13:50	25	5.720	ppm	22.9
8-Apr-2026	CO	480	0	North Mine 4082 South Drift station B	21:50	25	6.140	ppm	24.6
2-May-2026	CO	480	0	North Mine 4082 South Drift station B	6:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station B	6:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station B	14:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station B	14:30	25	0.000	ppm	0.0
2-May-2026	CO	480	0	North Mine 4082 South Drift station B	22:30	25	0.210	ppm	0.8
2-May-2026	CO	480	0	North Mine 4082 South Drift station B	22:30	25	0.000	ppm	0.0
5-May-2026	CO	480	0	North Mine 4082 South Drift station B	6:00	25	0.000	ppm	0.0
5-May-2026	CO	480	0	North Mine 4082 South Drift station B	14:00	25	0.000	ppm	0.0
5-May-2026	CO	480	0	North Mine 4082 South Drift station B	22:00	25	0.000	ppm	0.0
10-May-2026	CO	480	0	North Mine 4082 South Drift station B	6:00	25	0.060	ppm	0.2
10-May-2026	CO	480	0	North Mine 4082 South Drift station B	14:00	25	0.010	ppm	0.0
10-May-2026	CO	480	0	North Mine 4082 South Drift station B	22:00	25	0.010	ppm	0.0

Ongoing initiatives

- Continue maintenance frequency of real-time monitoring equipment per manufacturers instructions.
- Site has created an air quality gauge for dispatch for real time alerts. Done a bowtie risk assessment and MOC.
- Introduce TARPs with alerts as trigger points.
 - Air quality gauge for dispatch for maintaining air quality (50% compounding OEL action point and gas levels)
- Continue ongoing testing/review data of sample pumps, exhaust and real time monitors.
- Review opportunities for potential increase of equipment safely.
 - Theoretical application of the CANMET certification to existing fleet.
 - Determining new Ventilation Requirements on a by equipment basis.
 - Consider ventilation quality of all locations through compliance testing and monitoring.
- Note that they are still undergoing their process of moving towards these changes safely and that they still have a long journey ahead with sampling campaigns of workers in all areas, tuning their protocols and slowly moving to CANMET airflow rates.



Questions and Discussions

Building a better world starts by building healthier workplaces.

Take care of your team with continuous monitoring of particulates and diesel engine exhaust emissions and make every breath positive progress.

What we can measure, we can manage!

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