



# Memorandum

**To:** Alexco Keno Hill Mining Corp.

**From:** Catherine Henry, Alexco Environmental Group Inc.

**CC:** Kai Woloshyn, Alexco Resource Corp.

**Date:** March 26, 2017

**Re:** Air Quality Data Summary, Keno, YT

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## 1. INTRODUCTION

In accordance with Clause 69 of the Decision Document for the assessment of the Bellekeno Mine Project (YESAB File Number 2009-0030), dustfall monitoring was installed at two initial locations near the Keno District Mill site in March 2011 and two additional sampling locations were established in August 2011. Bergerhoff dust monitoring gauges were initially selected as the appropriate instrumentation to carry out this program. In accordance with clauses 36 and 37 of the Decision Document for the assessment of the Onek and Lucky Queen Deposit production (YESAB File Number 2011-0315), total suspended particulates (TSP) monitoring was subsequently initiated in August 2012 and dustfall monitoring was discontinued in January 2013. Additional sampling for coarse and fine fractions of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub> respectively) was instigated in August 2015, in accordance with the revised Dust Abatement and Monitoring Plan required in the Decision Document (clause 19) for the assessment of the Flame & Moth Development and Production Program (YESAB file Number 2013-0161). This memorandum presents the results of the ambient air quality monitoring to date.

## 2. INSTRUMENTATION AND METHODOLOGY

Two BGI Omni Ambient Air Quality Samplers (see Figure 1) were commissioned in August 2012, one to the East of the mill and crusher (TSP-1) and one at the toe of the dry stack tailings facility (TSP-2). A third sampler (TSP-3), located in Keno City, was commissioned in December 2014, in accordance with the revised Dust Abatement and Monitoring Plan required in the Decision Document for the assessment of the Flame & Moth Development and Production Program (YESAB file Number 2013-0161). The sampling locations are shown on Figure 2. The BGI Omni samplers are set up with TSP, PM<sub>10</sub> or PM<sub>2.5</sub> inlets, and use the filter reference method. Samples are collected over 24-hour periods and sent to Maxxam Analytics laboratory for gravimetric analysis and ICP

metals mass spectrometry (from TSP samples only). The sampling program aims to collect three samples per location every month, in order to capture the different weather conditions that may affect dust sources and transport. The BGI Omni Ambient Air Quality Samplers cannot collect samples below -20°C and therefore some winter months will have reduced data.



**Figure 1 BGI Omni Ambient Air Quality Sampler**



Satellite imagery obtained from Yukon Geomatics map service <http://mapservices.gov.yk.ca/ArcGIS/services> on November 2017  
 Data obtained from EBA: "As built" spatial data: Mill pond (Y.E.S.), Mill structure, and current DSTF footprints, Roads (In House survey December 11th 2011).  
 Design spatial data: Conveyance and water collection, diversion ditches and berm.

Datum: NAD 83; Projection: UTM Zone 8N

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1:5,500 (when printed on 11 x17 inch paper)

0 50 100 150 200 Meters

- Y MineFeaturePoint Weather Stns
- ▲ Dust Monitoring Station
- Existing Building
- DSTF 322k Tonnes Design
- Current DSTF
- DSTF Phase II Expansion
- Silver Trail Highway
- Secondary Road



ALEXCO KENO HILL MINING CORP.

**FIGURE 2**  
**DUST MONITORING AND WEATHER STATIONS**

NOVEMBER 2017

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 (Last edited by: amatshevska,09/11/2017 13:10 PM)

### 3. RESULTS

#### 3.1. AMBIENT TSP, PM<sub>10</sub> AND PM<sub>2.5</sub> CONCENTRATIONS

Results of the gravimetric analyses can be converted into 24-hour average ambient concentrations based on the flow rate of the instruments. These can then be compared with the Yukon Ambient Air Quality Standard (YAAQS) of 120 µg/m<sup>3</sup> for TSP, 50 µg/m<sup>3</sup> for PM<sub>10</sub> and 28 µg/m<sup>3</sup> for PM<sub>2.5</sub> (24-hour average). Table 1 below presents summary statistics for the three sampling locations (TSP-1, TSP-2 and TSP-3), while the complete result tables are presented in Appendix A. When results were below the detection limit a value of half the detection limit was used to calculate the summary statistics. Table 1 shows that all results are well below the Yukon ambient standards, most results being between 5 and 20 times inferior. Note that over half of the results for each of the three parameters are below the detection limit at all three stations.

The air quality monitors located on site are 160 (TSP-1) and 46 (TSP-2) meters away from the dry stack tailings facility (DSTF) and 163 (TSP-1) and 240 (TSP-2) meters away from the crusher, two of the main potential dust sources. The nearest residence is at a distance of 710 meters from the DSTF and 860 meters from the crusher. TSP levels experienced at the nearest residence are better approximated by levels observed at air quality monitor TSP-3, located in Keno City (950 m from the DSTF and 1240 m from the crusher). Note that the mine announced a temporary closure as of September 4<sup>th</sup> 2013 and operation continues to be suspended at this time. Therefore, the crusher would not have contributed to fugitive dust emissions during that period.

**Table 1 24-hour TSP, PM<sub>10</sub> and PM<sub>2.5</sub> Summary Statistics, August 2012 – December 2016**

Yukon Ambient Air Quality Standards	TSP (µg/m <sup>3</sup> )			PM <sub>10</sub> (µg/m <sup>3</sup> )			PM <sub>2.5</sub> (µg/m <sup>3</sup> )		
	120			50			28		
Sampling Location	TSP-1*	TSP-2	TSP-3	TSP-1	TSP-2	TSP-3	TSP-1	TSP-2	TSP-3
Average	6.0	6.8	6.1	3.2	3.3	3.1	4.1	4.2	4.0
Count	168	155	78	43	35	43	41	35	40
Minimum	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Maximum	53.2	62.2	68.1	14.6	8.6	8.2	17.4	23.1	13.6
Geometric Mean	4.5	4.9	4.2	3.0	3.1	3.0	3.5	3.3	3.5
Count <DL	105	90	53	41	32	40	33	31	33
Standard Deviation	6.6	7.3	9.1	1.9	1.6	1.1	3.2	4.6	3.0
1st Quartile	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Median	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
3rd Quartile	7.1	8.1	6.3	2.8	2.8	2.8	2.8	2.8	2.8
Count Over Standard	0	0	0	0	0	0	0	0	0
% Over Standard	0	0	0	0	0	0	0	0	0

\* One outlier result was removed (976.4 µg/m<sup>3</sup> on July 1, 2015)



### 3.2. METAL SPECIATION

There are no ambient air quality standards for metals in Yukon, however the Ontario Ministry of Environment has developed a comprehensive list of Ambient Air Quality Criteria (AAQC) that includes 24-hour average concentrations for a number of metals. Table 2 below presents the summary statistics for metal concentrations from TSP samples at TSP-1, TSP-2 and TSP-3, while the complete result tables are presented in Appendix A. For reference, the Ontario AAQCs are indicated in the first row where available. When results were below the detection limit a value of half the detection limit was used to calculate the statistics.

Very few exceedences of the Ontario AAQCs are observed overall, and none were observed in 2016; samples are generally below the detection limit for most parameters. Parameters for which exceedences have occurred include lead (1.2 % of samples) at TSP-1 and cadmium (1.3 % of samples), lead (0.6 % of samples) and manganese (1.9 % of samples) at TSP-2. No exceedences were observed at TSP-3 to date. Note that the detection limit for beryllium and cadmium is greater than the Ontario AAQC and in many cases, it cannot be determined if exceedences of these parameters have occurred. Also, the chromium and manganese criteria did not come into effect until July 1, 2016, but were still used as reference for the entire sampling period.



**Table 2 24-hour Metal Concentrations Summary Statistics ( $\mu\text{g}/\text{m}^3$ ) August 2012 – December 2016**

Ontario Air Quality Criteria	Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Sn	Ti	V	Zn	Zr	
		25	0.3	10	0.01	120	0.025		0.5	0.1	50	4	0.5		0.4	120	2			10		1		120		10	120	2	120		
<b>TSP-1*</b>																															
Average	0.226	0.137	0.055	0.003	0.006	0.024	0.014	0.351	0.077	0.034	0.034	0.262	0.068	0.040	0.013	0.034	0.034	0.205	0.682	0.034	0.529	0.021	0.261	0.003	0.169	0.057	0.014	0.021	0.028	0.034	
Count	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	167	103	167	167	167	164	167	167	167	167	167	
Minimum	0.029	0.000	0.000	0.001	0.000	0.021	0.000	0.139	0.021	0.000	0.001	0.021	0.001	0.021	0.001	0.000	0.001	0.056	0.035	0.000	0.139	0.000	0.069	0.002	0.139	0.000	0.014	0.014	0.003	0.003	
Maximum	5.292	0.139	0.056	0.022	0.006	0.264	0.014	8.722	0.139	0.035	0.035	2.528	1.083	0.429	0.301	0.035	0.035	0.208	0.694	0.035	3.875	0.021	2.444	0.041	0.708	0.193	0.042	0.021	0.558	0.035	
Geometric Mean	0.155	0.144	0.059	0.002	0.007	0.022	0.015	0.186	0.070	0.037	0.033	0.157	0.055	0.029	0.008	0.037	0.033	0.203	0.658	0.037	0.325	0.023	0.230	0.003	0.156	0.060	0.014	0.021	0.018	0.033	
Count <DL	151	167	167	149	167	163	167	140	15	167	164	24	159	128	135	167	164	167	167	167	74	167	150	138	146	165	166	167	132	167	
Standard Deviation	0.569	0.019	0.007	0.003	0.001	0.027	0.002	0.979	0.028	0.005	0.004	0.298	0.099	0.054	0.032	0.005	0.004	0.020	0.088	0.005	0.753	0.003	0.230	0.004	0.096	0.016	0.002	0.001	0.055	0.004	
1st Quartile	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.060	0.035	0.035	0.059	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
Median	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.076	0.035	0.035	0.239	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
3rd Quartile	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.097	0.035	0.035	0.345	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.451	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
Count Over Standard	n/a	0	0	0	0	0	0	n/a	0	0	0	0	2	n/a	0	0	0	n/a	n/a	0	n/a	0	n/a	0	n/a	0	0	0	0	0	n/a
% Over Standard	n/a	0	0	0	0	0	0	n/a	0	0	0	0	1.2	n/a	0	0	0	n/a	n/a	0	n/a	0	n/a	0	n/a	0	0	0	0	0	n/a
<b>TSP-2</b>																															
Average	0.161	0.136	0.055	0.003	0.006	0.022	0.014	0.230	0.079	0.034	0.034	0.298	0.070	0.036	0.029	0.034	0.034	0.205	0.681	0.034	0.586	0.021	0.226	0.003	0.173	0.055	0.014	0.021	0.031	0.034	
Count	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	154	94	154	154	154	151	154	154	154	154	154	
Minimum	0.014	0.000	0.000	0.001	0.000	0.021	0.000	0.139	0.021	0.000	0.001	0.021	0.001	0.021	0.001	0.000	0.001	0.056	0.035	0.000	0.139	0.000	0.069	0.002	0.139	0.000	0.014	0.014	0.003	0.003	
Maximum	1.625	0.139	0.056	0.048	0.006	0.099	0.040	3.472	0.132	0.035	0.035	1.431	0.736	0.193	0.651	0.035	0.035	0.208	0.694	0.035	5.028	0.021	1.111	0.032	0.736	0.056	0.014	0.021	0.294	0.035	
Geometric Mean	0.142	0.144	0.057	0.002	0.007	0.022	0.015	0.173	0.072	0.037	0.033	0.195	0.057	0.029	0.010	0.037	0.033	0.203	0.655	0.037	0.357	0.023	0.214	0.002	0.160	0.059	0.014	0.021	0.020	0.033	
Count <DL	146	154	153	141	154	151	151	130	14	154	151	17	142	114	108	154	151	154	154	154	63	154	146	131	130	154	154	154	113	154	
Standard Deviation	0.171	0.019	0.008	0.004	0.001	0.009	0.003	0.359	0.029	0.005	0.005	0.251	0.076	0.031	0.083	0.005	0.005	0.021	0.091	0.005	0.792	0.003	0.107	0.003	0.095	0.008	0.000	0.001	0.047	0.004	
1st Quartile	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.059	0.035	0.035	0.099	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
Median	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.080	0.035	0.035	0.305	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
3rd Quartile	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.099	0.035	0.035	0.378	0.056	0.043	0.013	0.035	0.035	0.208	0.694	0.035	0.708	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.029	0.035	
Count Over Standard	n/a	0	0	0	0	0	2	n/a	0	0	0	0	1	n/a	3	0	0	n/a	n/a	0	n/a	0	n/a	0	n/a	0	0	0	0	0	n/a
% Over Standard	n/a	0	0	0	0	0	1.3	n/a	0	0	0	0	0.6	n/a	1.9	0	0	n/a	n/a	0	n/a	0	n/a	0	n/a	0	0	0	0	0	n/a
<b>TSP-3</b>																															
Average	0.243	0.134	0.054	0.003	0.006	0.029	0.013	0.456	0.075	0.034	0.034	0.127	0.054	0.051	0.008	0.034	0.034	0.202	0.672	0.034	0.311	0.020	0.209	0.009	0.150	0.054	0.014	0.021	0.019	0.034	
Count	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	69	81	81	81	78	81	81	81	81	81	
Minimum	0.014	0.000	0.000	0.001	0.000	0.021	0.000	0.139	0.021	0.000	0.001	0.021	0.001	0.021	0.001	0.000	0.001	0.056	0.035	0.000	0.139	0.000	0.069	0.002	0.139	0.000	0.014	0.014	0.003	0.003	
Maximum	2.778	0.139	0.056	0.024	0.006	0.218	0.014	6.417	0.131	0.035	0.035	0.514	0.056	0.553	0.070	0.035	0.035	0.208	0.694	0.035	1.569	0.021	0.458	0.175	0.431	0.056	0.014	0.021	0.144	0.035	
Geometric Mean	0.150	0.150	0.062	0.002	0.007	0.024	0.016	0.204	0.070	0.040	0.032	0.076	0.049	0.030	0.007	0.036	0.031	0.198	0.635	0.040	0.253	0.024	0.205	0.003	0.146	0.058	0.014	0.021	0.016	0.032	
Count <DL	76	81	81	73	81	76	78	61	3	81	78	23	78	62	71	80	78	81	80	81	58	81	79	60	74	80	81	81	68	81	



	Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	P	K	Se	Si	Ag	Na	Sr	S	Sn	Ti	V	Zn	Zr	
<b>Ontario Air Quality Criteria</b>		<b>25</b>	<b>0.3</b>	<b>10</b>	<b>0.01</b>	<b>120</b>	<b>0.025</b>		<b>0.5</b>	<b>0.1</b>	<b>50</b>	<b>4</b>	<b>0.5</b>		<b>0.4</b>	<b>120</b>	<b>2</b>			<b>10</b>		<b>1</b>		<b>120</b>		<b>10</b>	<b>120</b>	<b>2</b>	<b>120</b>		
Standard Deviation	0.485	0.026	0.011	0.004	0.001	0.034	0.003	1.178	0.024	0.007	0.005	0.124	0.010	0.097	0.008	0.007	0.006	0.029	0.116	0.007	0.288	0.004	0.038	0.031	0.047	0.011	0.000	0.001	0.017	0.006	
1st Quartile	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.056	0.035	0.035	0.021	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
Median	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.074	0.035	0.035	0.065	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
3rd Quartile	0.139	0.139	0.056	0.002	0.006	0.021	0.014	0.139	0.093	0.035	0.035	0.228	0.056	0.021	0.006	0.035	0.035	0.208	0.694	0.035	0.208	0.021	0.208	0.002	0.139	0.056	0.014	0.021	0.014	0.035	
Count Over Standard	n/a	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	0	0	0	n/a	n/a	0	n/a	0	n/a	0	n/a	0	0	0	0	0	n/a
% Over Standard	n/a	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	0	0	0	n/a	n/a	0	n/a	0	n/a	0	n/a	0	0	0	0	0	n/a

\* One outlier result was removed (976.4 µg/m³ on July 1, 2015)

### 3.3. WIND ANALYSIS

An analysis of the hourly wind speed and direction collected between June 2011 and December 2016 at the Keno District Mill weather station (shown on Figure 2), at a height of 10 meters, indicates that dominant winds are blowing from the North and from the Southeast. The wind rose in Figure 3, which has data availability of 92.1% for that period, depicts this information based on 16 wind direction categories. The average wind speed is 1.29 m/s and winds are calm 16.61% of the time. Note that the wind sensor experienced occasional icing during the winter months and extended periods of zero wind speed were excluded from this analysis. Also, winter wind speeds may occasionally be underestimated due to the presence of ice on the sensor, but these occurrences cannot be detected in the data record.

Table 3 below compiles the wind speed and direction frequency distribution based on 8 wind direction categories, and 6 wind speed categories.

**Table 3 Wind Frequency Distribution (%), Keno District Mill, June 2011 - December 2016**

Directions / Wind Classes (m/s)	0.5 - 1.0	1.0 - 2.0	2.0 - 3.0	3.0 - 4.0	4.0 - 5.0	>= 5.0	Total (%)
N	5.17	8.36	3.23	0.58	0.09	0.03	16.08
NE	5.60	5.10	1.29	0.15	0.01	0.00	11.19
E	3.59	7.75	2.48	0.39	0.07	0.01	13.17
SE	3.67	5.79	3.21	1.42	0.55	0.32	13.77
S	3.21	5.78	2.44	0.46	0.10	0.05	11.09
SW	0.77	1.77	1.48	0.35	0.04	0.02	4.08
W	0.37	0.56	0.43	0.29	0.11	0.09	1.70
NW	0.90	1.54	1.33	0.63	0.32	0.11	4.45
Sub-Total	21.44	33.76	14.64	3.92	1.20	0.57	75.52
Calms							16.61
Missing/Incomplete							7.87
Total							100

The dominant wind direction is from the north (16.08% of the time), followed by southeast (13.77%) and east (13.17%). As can be seen on the wind rose, the strongest winds tend to originate from the southeast. Referring to Figure 2, we can see that air quality station TSP-1 is located downwind from the DSTF when the wind blows from the north, but generally upwind from the DSTF and crusher when the wind blows from the SE. Station TSP-2 is generally downwind from the DSTF and may capture the influence of the crusher when the wind is from the SE but not when it is from the north. TSP-3, located in Keno City and further away from the DSTF and crusher, is generally east (ENE) of these potential dust sources. Based on Table 3 above, westerly winds only occur 1.70% of the time (or 10.22% of the time when combining NW, W and SW), so the DSTF and crusher are expected to have very limited influence on air quality in Keno City (TSP-3).



WIND ROSE PLOT:

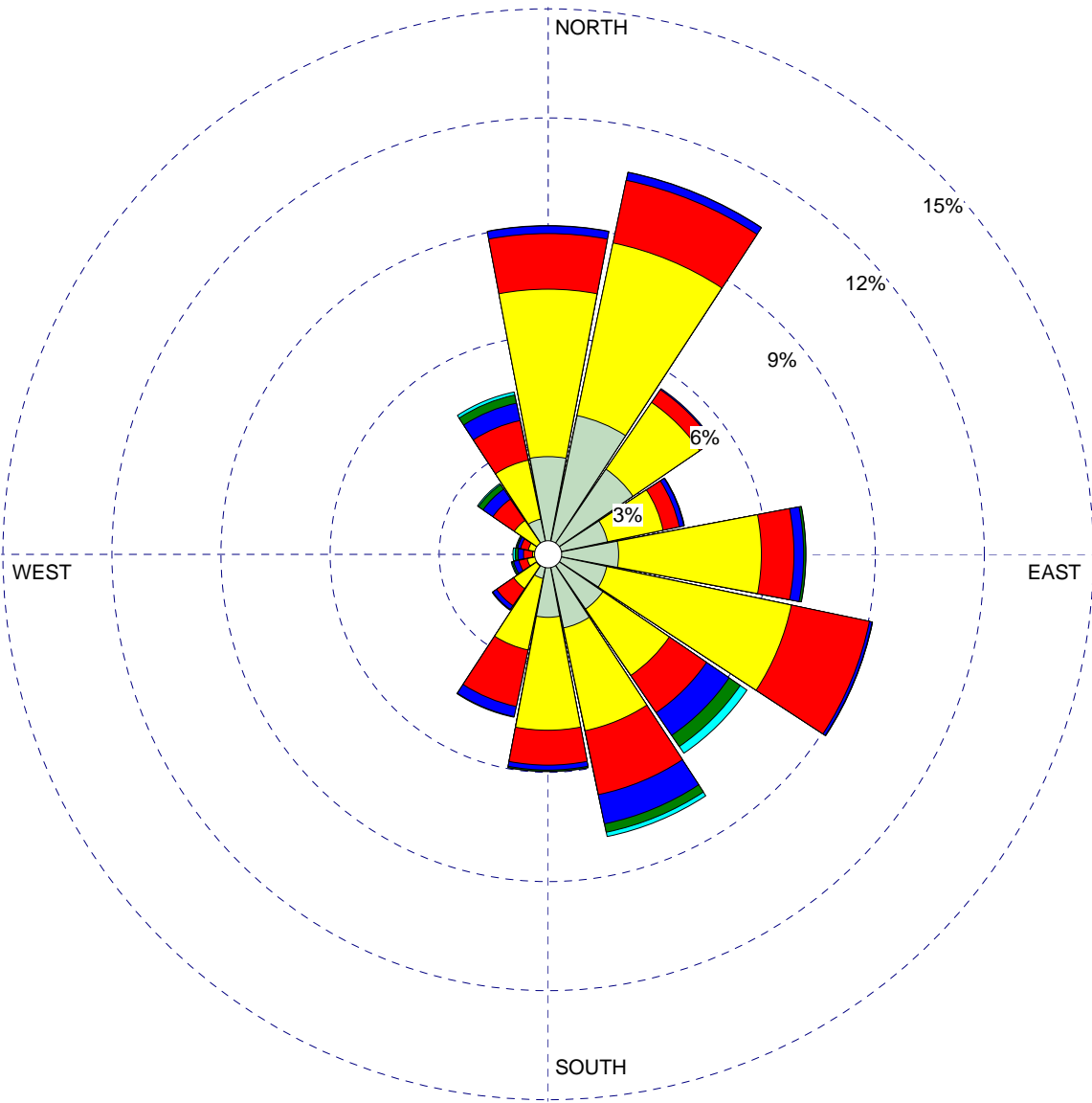
**Figure 3 - Keno District Mill Wind Rose  
June 2011 - Dec 2016**

DISPLAY:

**Wind Speed  
Direction (blowing from)**

COMMENTS:

Excludes periods of ice affected or missing data.  
Anemometer height: 10m



**WIND SPEED (m/s)**

- >= 5.0
- 4.0 - 5.0
- 3.0 - 4.0
- 2.0 - 3.0
- 1.0 - 2.0
- 0.5 - 1.0

Calms: 16.61%

DATA PERIOD:

**Start Date: 02/06/2011 - 00:00  
End Date: 29/12/2016 - 16:00**

TOTAL COUNT:

**45100 hrs.**

CALM WINDS:

**16.61%**

AVG. WIND SPEED:

**1.29 m/s**

COMPANY NAME:

MODELER:

DATE:

**27/01/2017**

PROJECT NO.:

The average TSP concentration is slightly higher at TSP-2 than at TSP-1 and TSP-3 (6.8  $\mu\text{g}/\text{m}^3$  versus 6.0  $\mu\text{g}/\text{m}^3$  and 6.1  $\mu\text{g}/\text{m}^3$  respectively), however the differences are not statistically significant and all results are well below the YAAQS. Similarly, although the average  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  concentrations are slightly higher at TSP-2 than at the other two stations (see Table 1), no statistically significant differences exist and all results are well below the YAAQS.

Figure 4 presents comparisons of average metals concentrations between the three sampling stations for all parameters that were above detection limit for at least one sample. Half the detection limit (RDL) was used to calculate averages for samples that were below RDL. Although some differences in average concentrations of certain metals can be observed between the three stations, results of statistical tests indicate that only iron is significantly lower at TSP-3 than at TSP-1 and TSP-2. Because the samples are not normally distributed and variances are not equal, non-parametric test were used for statistical comparisons of the sample medians at a significance level of 0.05. Detailed results can be found in Appendix B.

Dust originating from the DSTF would be expected to contain high concentrations of iron, manganese, calcium, zinc, lead, magnesium, arsenic and aluminum, based on metal characterization analyses of the tailings conducted monthly in 2012 and 2013. From the wind direction distribution, TSP-2 is more frequently located downwind of the DSTF than TSP-1, and would therefore be expected to record higher concentrations of the above metals. However, no significant differences were found between TSP-1 and TSP-2, suggesting that the DSTF is likely not the predominant source of ambient dust.

On days where TSP levels were higher than average and where exceedences of the Ontario AAQCs were observed for lead at TSP-1, winds were generally blowing from the northeast and from the east (on October 23, 2012 and June 18, 2013 respectively). Site activities occurring in October 2012 and June 2013 included mining at Bellekeno, development at Lucky Queen (LQ) and Onek and milling at the Keno District Mill. Explorations activities at Flame & Moth also took place in June 2013. A source of ambient dust on these two occasions could have been the unpaved roads. Roads within the vicinity of the TSP stations include mine access roads as well as public roads including Duncan Creek Road.

On days where TSP levels were higher than average and/or where exceedences of the Ontario AAQCs were observed for lead at TSP-2, winds were generally blowing from the NNE (on August 23, 2012). A source of ambient dust in this case could have been the unpaved roads. On days where TSP levels were higher than average and/or where exceedences of the Ontario AAQCs were observed for manganese at TSP-2, winds were generally blowing from the NE (March 23-24, 2013) and from the east (April 7, 2013). On these three occasions, the DSTF could have been a source of TSP at TSP-2. Similarly, on days where exceedences of the Ontario AAQCs were observed for cadmium at TSP-2, winds were generally from the NE or NNE (on September 28, 2013 and October 21, 2015 respectively) suggesting a possible influence of the DSTF but also eventually of the unpaved roads. Site activities occurring in August 2012, March 2013 and April 2013 included mining at Bellekeno, development at LQ and Onek, and milling at the Keno District Mill. Between September 2013 and October 2016, only care and maintenance activities were taking place as the mine was under a temporary suspension of operations. Detailed meteorological conditions and site activities associated with each ambient air quality sampling event are provided with the complete tabular data in Appendix A-1.

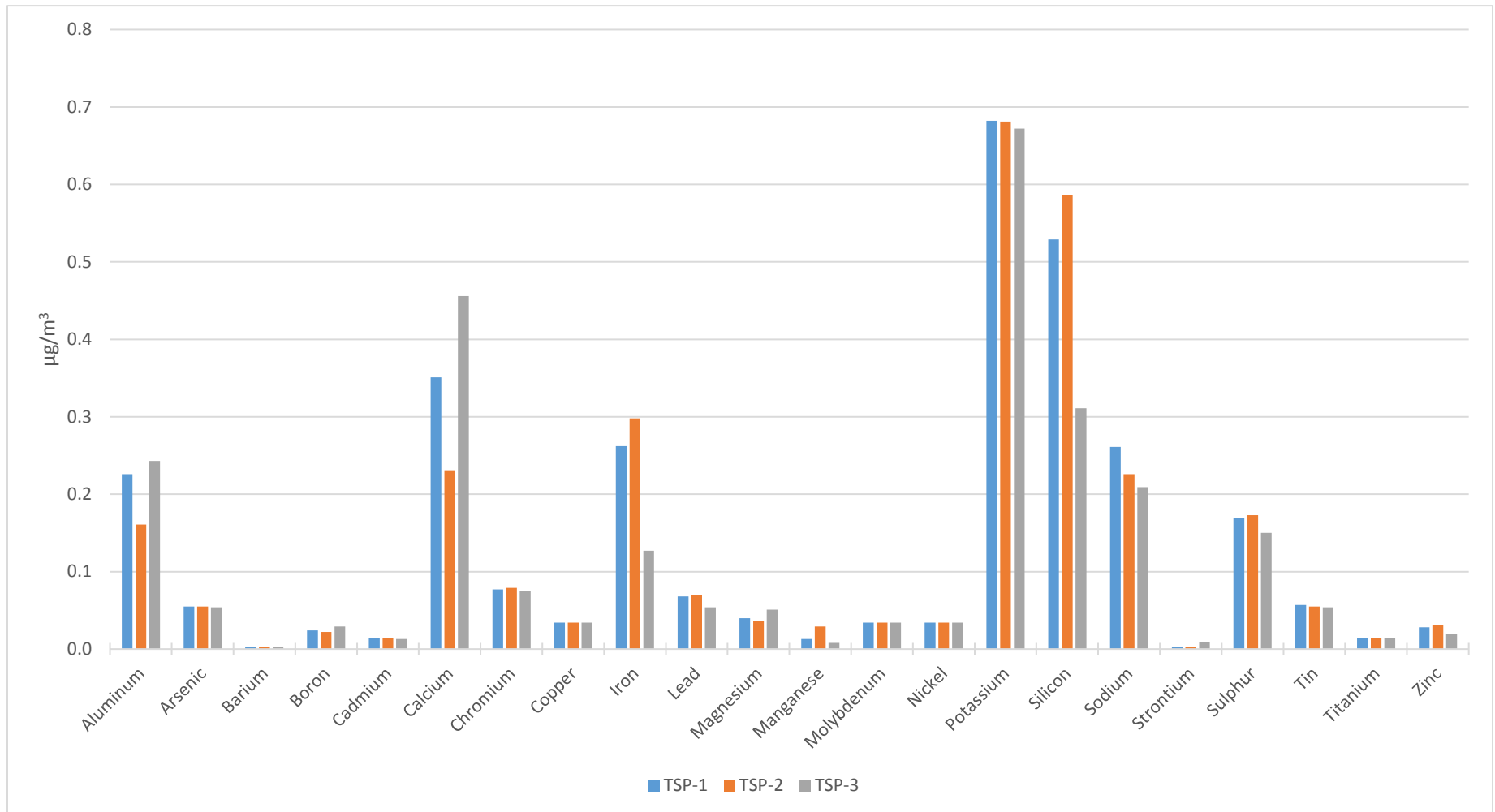


Figure 4 24-hour Average Ambient Metal Concentrations

## 4. QA/QC

As a quality assurance and quality control measure, blanks were collected along with regular samples starting in December 2015 and analyzed for either TSP and metals, PM<sub>10</sub> or PM<sub>2.5</sub>. A total of 11 blanks were collected during that period and all results were found to be below the detection limit, with the exception of one calcium, two chromium, two iron and two strontium results. Of those, only the September 29, 2016 sample had results greater than two times the detection limit for iron and strontium and the December 29, 2016 sample for chromium.

## 5. PM<sub>10</sub> SAMPLING BY YUKON GOVERNMENT

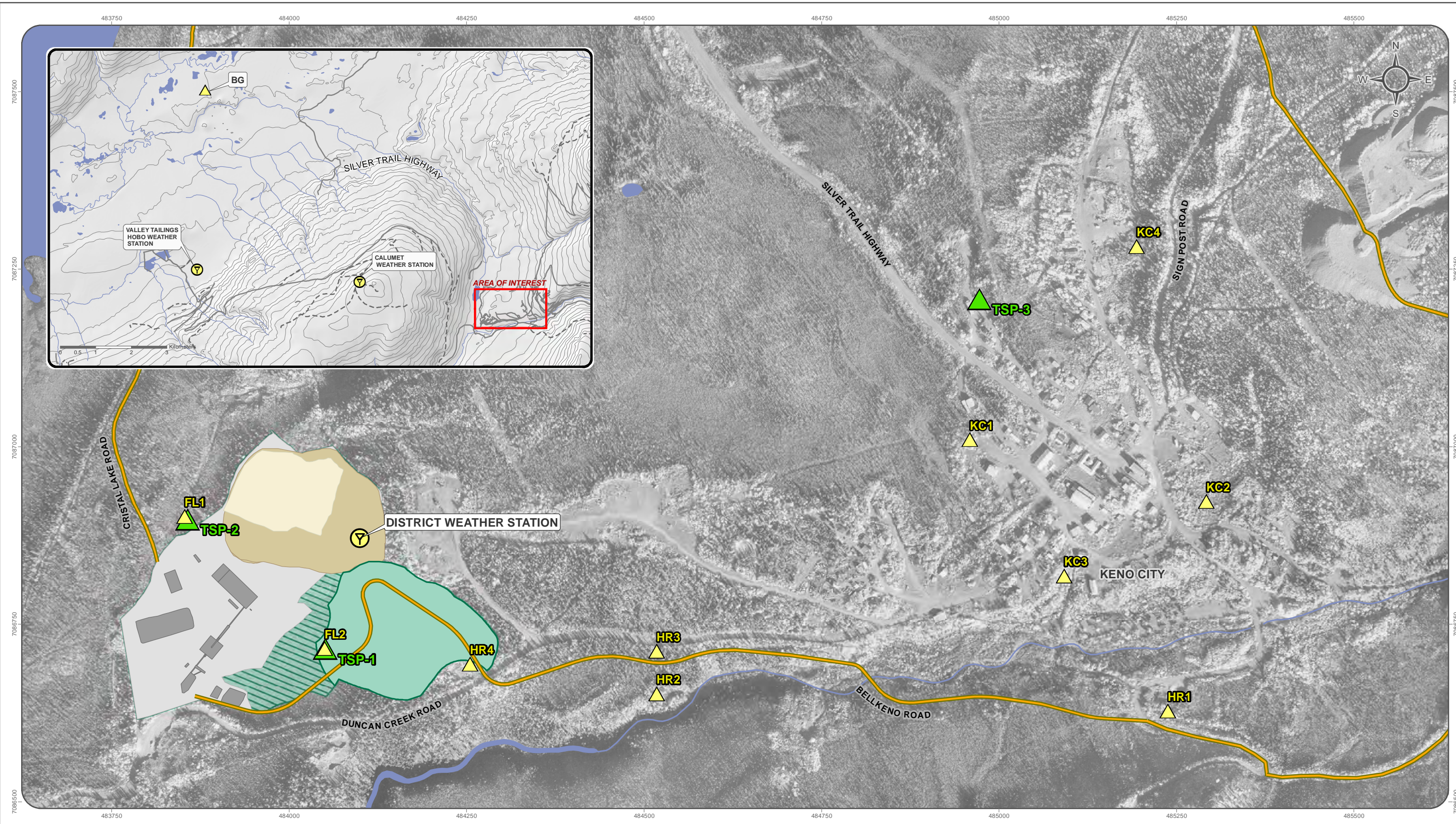
Independent PM<sub>10</sub> sampling was conducted by Yukon Government in 2013 at the locations shown in Figure 5. The station labelled BG represents background (8 km outside of Keno), stations labelled KC are located in Keno City, stations labelled HR are along the Bellekeno Haul Road and stations labelled FL are fence line stations and correspond to TSP-1 and TSP-2 locations. 5-minute data averaged over the different sampling periods are presented in Table 4 below. The sampling period varies between sites (ranges from about 14 to 53 hours) but for comparison purposes, the average results are all below the 24-hour YAAQS of 50 µg/m<sup>3</sup>. Note that in some cases the measured background PM<sub>10</sub> concentration is higher than that measured at some of the receptors, suggesting that there is some variability in the data and that the difference between background and receptors sites may not be significant. Results are generally comparable to the PM<sub>10</sub> concentrations measured by AKHM at stations TSP-1, TSP-2 and TSP-3 between August 2015 and December 2016.

**Table 4 Average PM<sub>10</sub> concentrations (µg/m<sup>3</sup>)**

	June 11-13, 2013	July 15-17, 2013	August 21-22, 2013
BG	2.8	10.2	3.8
KC1	6.2		
KC2	3.8		
KC3	8.3		
KC4	2.1		
HR1		5.2	
HR2		2.1	
HR3		13.8	
HR4		16.4	
FL1			0.8
FL2			39.3

Source: Yukon Government, 2014

The data presented in Table 4 was obtained from Yukon Government and not collected by Alexco, therefore details of the collection have not been presented within this report. The data is assumed to be accurate and valid, but potentially not representative of all conditions observed over a year due to the limited dataset.












National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.

Quartz claim boundaries current as of October<sup>th</sup>, 2013. Data source: <http://geomatics.yukon.ca>.

Datum: NAD 83; Map Projection: UTM Zone 8N

1:5,000 (when printed on 11 x17 inch paper)

0 50 100 200 300 400 Meters

-  Weather Stations
-  Alexco TSP Monitoring Stations
-  YG PM10 Monitoring Sites 2013
-  Haul Road
-  Building/Infrastructure
-  Current DSTF
-  DSTF 322k Tonnes Design
-  Proposed DSTF Expansion
-  Proposed Mill Site Footprint Expansion



**KENO HILL SILVER DISTRICT MINING OPERATIONS**

**FIGURE 5**

**METEOROLOGICAL AND AIR QUALITY MONITORING STATIONS LOCATION**

MARCH 2017

D:\Project\AT\Projects\Keno\_Area\_Mines\FMMap\01-Overview\Specific\Air\_Dispersal\_Model\03\_01\_Meteorological\_and\_air\_quality\_monitoring\_stations\_20170326.mxd  
(Last edited by: mduchamir: 3/29/2017 10:44AM)



## 6. CONCLUSION

- All TSP samples collected to date near the District Mill, DSTF and Keno City are on average at least an order of magnitude below the Yukon air quality standard for TSP;
- PM<sub>10</sub> and PM<sub>2.5</sub> samples collected at the same three locations are all well below their respective YAAQS. Most results were in fact found to be below the lab detection limit;
- Two metal concentrations (lead) exceeded the Ontario ambient air quality criteria at TSP-1 out of 167 samples collected to date and 6 exceedances (3 manganese, 1 lead and 2 cadmium) were measured at TSP-2 from 154 samples collected to date. No exceedances of the Ontario AAQCs were observed at TSP-3 in 81 samples. Air quality samples will continue to be collected 3 times per month to identify if these infrequent events are associated with any trends or patterns;
- Blanks will continue to be collected along with regular samples to ensure that no sample contamination is occurring during handling, transport or lab analysis; and
- A few samples were damaged during transport to the lab and could not be analyzed. Precautions have been taken to prevent this from happening again in the future.

## 7. REFERENCES

Ontario Ministry of Environment. 2012. Ontario's Ambient Air Quality Criteria. Standards Development Branch. PIBS#6570e01. April 2012.

Yukon Environment. 2014. Yukon Ambient Air Quality Standards. April 2010, updated September 2014.

# **APPENDIX A**

## **TABULAR DATA**



**Table A-1 24-Hour Average Total Suspended Particulate Results and Associated Meteorological Condition and Site Activities, August 2012 – December 2016**

Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
23/08/2012	10.1	12.8		13.11	10.25	6.84	75.31	0	0.68	29.5	3.42	6.6	n/a	n/a	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
27/09/2012	<5.6	<5.6		8.18	5.23	2.42	62.53	4.5	4.28	124.7	14.27	145.1	n/a	n/a	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
29/09/2012	<5.6	<5.6		5.69	4.28	2.27	60.46	0	2.33	129.7	8.48	155.9	n/a	n/a	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
16/10/2012	5.8	-		1.65	0.24	-2.12	89.17	0.8	0.9	32.6	6.26	75.9	n/a	n/a	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
17/10/2012	<5.6	-		-0.04	-2.84	-8.45	76.89	0.1	1.26	58.8	7.19	159.2	n/a	n/a	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
23/10/2012	53.2	-		-9.97	-14.04	-17.54	78.41	0	0.66	43.2	3.28	17.0	n/a	n/a	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
15/12/2012	<5.6	13.6		-13.59	-15.89	-19.29	88.8	0	0.2	357.4	1.85	5.7	1.71	0.01	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
14/01/2013	<5.6	-		-3.02	-8.34	-11.78	95.04	0	0.28	284.8	1.43	189.9	0.29	0	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
16/01/2013	<5.6	<5.6		-15.96	-18.61	-20.79	84.83	0	1.26	70.2	4.52	36.1	1.08	0.039	Mining at Bellekeno and development at LQ and Onek, Milling at the Keno District Mill
23/03/2013	<5.6	18.2		-3.01	-10.79	-18.99	51.87	0	1.65	28.3	7.48	148.5	117.58	0.359	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
24/03/2013	<5.6	23.2		0.17	-4.17	-9.93	57.7	0.2	2.61	78.3	11.11	131.7	113.46	0.521	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
25/03/2013	<5.6	13.5		3.26	-0.18	-1.98	60.02	0.2	3.57	83.1	12.47	135.8	89.92	0.692	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
26/03/2013	9.6	11.1		-1.96	-7.27	-17.97	64.66	0.1	3.53	29	10.49	152.2	107.38	0.518	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
07/04/2013	-	17.1		3.46	-3.18	-12.29	65.38	2.2	2.96	94.8	10.32	145.0	113.25	0.71	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
10/04/2013	5.7	7.2		-2.04	-6.54	-11.32	67.42	2.6	2.51	256.1	8.09	199.2	59.54	0.374	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
13/04/2013	<5.6	6.9		-5.93	-12.43	-19.03	45.43	0	1.96	10.6	6.29	26.6	219	0.395	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
15/04/2013	6.5	6.5		-1.9	-7.18	-13.58	53.95	0	2.18	42.3	7.95	103.5	141.21	0.401	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
16/04/2013	7.2	6.4		0.44	-3.52	-8.62	69.65	0.1	2.14	64.3	7.03	73.8	197.88	0.38	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill
28/05/2013	6.8	-		19.47	14.39	9.06	49.38	1.6	1.74	23.9	6.95	353.5	221.13	1.048	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
16/06/2013	8.2	-		23.38	17.3	11.35	47.8	3.4	1.94	7.2	12.71	357.9	187.21	1.3	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
17/06/2013	-	<5.6		14.07	10.7	7.39	50.03	0	3.05	16.8	10.87	344.0	234.08	1.435	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth





Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
18/06/2013	47.2	6.3		21.94	15.07	7.66	47.63	0	1.65	97.3	6.13	136.7	277.13	1.082	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
21/06/2013	7.2	<5.6		17.66	13.9	10.38	79.66	6.6	1.42	344.9	6.83	177.0	124.17	0.363	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
23/06/2013	-	<5.6		18.44	12.68	7.82	76.09	9.4	1.65	23.7	9.54	306.5	149.04	0.509	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
24/06/2013	<5.6	-		23.85	15.91	6.54	59.11	0	1.72	15.1	5.33	336.8	337.54	1.183	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
28/06/2013	-	62.2		23.98	18.36	12.73	65.86	10.5	1.67	51.2	10.37	140.4	182.54	0.783	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
19/07/2013	5.6	<5.6		20.14	14.74	9.64	65.78	0.1	1.42	2.3	6.15	196.5	184.71	0.647	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
20/07/2013	12.2	<5.6		17.94	12.89	7.1	72.14	0.8	1.66	27.6	6.36	304.1	179.46	0.652	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
21/07/2013	<5.6	<5.6		15.94	13.17	11.18	70.77	0.6	1.57	41.9	5.25	11.6	117.25	0.557	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
22/07/2013	<5.6	10.1		20.87	15.55	11.04	56.74	0	1.57	18.9	5.79	209.9	240.08	0.877	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
22/08/2013	<5.6	<5.6		14.14	7.63	1.62	69.1	0	1.76	7.6	6.41	245.3	150.75	0.66	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
23/08/2013	<5.6	-		8.68	6.55	4.21	91.68	6.6	0.85	17.8	3.18	108.3	56.21	0.074	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
24/08/2013	<5.6	-		8.03	5.92	3.43	75.82	0.3	2.61	60.9	8.73	87.5	134.21	0.571	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
25/08/2013	<5.6	<5.6		8.4	5.09	1.8	75.02	0	1.29	16.8	4.03	17.2	96.25	0.274	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
26/08/2013	-	<5.6		10.85	6.73	3.85	82.06	1	1.36	41.4	5.22	324.4	125.54	0.321	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
28/08/2013	-	7.2		17.01	8.66	1.14	61.42	0	1.38	73.5	6.5	145.7	181.92	0.639	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
31/08/2013	-	<5.6		9.51	7.68	5.12	91.35	4.7	1.01	22.5	4.9	191.4	53.42	0.094	Mining at Bellekeno and development at Onek, Milling at the Keno District Mill, Exploration activities at Flame & Moth
21/09/2013	-	<5.6		2.64	0.6	-0.96	96.45	6.6	0.92	356.8	3.41	27.7	48.71	0.036	No mining operations, Exploration activities at Flame & Moth
24/09/2013	<5.6	<5.6		1.7	0.38	-2.3	89.58	0	1.68	17.2	6.2	220.9	55.67	0.138	No mining operations, Care and Maintenance
27/09/2013	<5.6	<5.6		6.66	3.26	1.15	84.55	2.8	1.25	50.8	7.66	137.4	49.38	0.183	No mining operations, Care and Maintenance
28/09/2013	<5.6	<5.6		7.32	3.73	0.07	69.19	0	1.14	55.2	5.51	78.8	78.04	0.346	No mining operations, Care and Maintenance
29/09/2013	<5.6	-		6.77	3.58	1.28	60.97	0	2.18	63.6	7.7	92.1	81.08	0.636	No mining operations, Care and Maintenance
30/09/2013	-	6		6.19	3.22	1	63.34	0	1.64	49.8	5.32	84.6	49.79	0.447	No mining operations, Care and Maintenance
24/10/2013	-	<5.6		-4.58	-6.99	-10.1	95.67	0	0.77	48.1	3.78	238.2	22.92	0.022	No mining operations, Care and Maintenance
25/10/2013	7.6	<5.6		-3.58	-5.09	-7.52	96.9	0	0.47	43.3	2.99	31.6	8.96	0.015	No mining operations, Care and Maintenance
26/10/2013	<5.6	<5.6		-0.68	-4.9	-8.64	95.13	1.2	1.19	79.3	4.02	152.5	41.21	0.036	No mining operations, Care and Maintenance
27/10/2013	6.8	<5.6		-5.73	-7.6	-9.98	95.57	0	0.71	44.1	2.77	15.1	7.17	0.024	No mining operations, Care and Maintenance



Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
28/10/2013	<5.6	-		0.21	-3.79	-5.96	97.83	0	0.97	19.7	5.27	25.8	4.92	0.016	No mining operations, Care and Maintenance
28/11/2013	7.8	8.8		-5.9	-10.14	-15.55	91.67	2.3	1.53	22.8	8.22	202.6	1.04	0.051	No mining operations, Care and Maintenance
29/11/2013	7.6	7.5		-16.84	-22.52	-27.23	81.85	0.1	1.04	111.6	3.7	159.4	1.13	0.031	No mining operations, Care and Maintenance
30/11/2013	8.9	8.5		-25.99	-27.76	-29.67	77.52	0	0.37	75.8	1.95	97.3	1.08	0.012	No mining operations, Care and Maintenance
01/12/2013	6.7	7.2		-29.46	-30.57	-32.06	74.69	0	0.54	103.8	3.58	114.7	0.79	0.016	No mining operations, Care and Maintenance
03/01/2014	13.2	11.8		-20.82	-24.67	-28.26	80.16	0	n/a	n/a	n/a	n/a	0.5	n/a	No mining operations, Care and Maintenance
04/01/2014	12.6	9.3		-23.86	-27.58	-29.03	77.62	0	n/a	n/a	n/a	n/a	0.38	n/a	No mining operations, Care and Maintenance
05/01/2014	18.6	11.4		-11.47	-15.47	-22.96	88.97	0	n/a	n/a	n/a	n/a	0.25	n/a	No mining operations, Care and Maintenance
06/01/2014	11.9	11		-10.08	-10.91	-11.81	92.77	2.3	0	239.5	0.17	239.5	0.63	0	No mining operations, Care and Maintenance
01/02/2014	9.7	11.9		-13.87	-15.42	-16.72	89.15	0	0.17	68.5	1.26	41.1	16.67	0.006	No mining operations, Care and Maintenance
02/02/2014	<5.6	<5.6		-10.84	-13.88	-16.51	90.43	0	0.7	54.6	2.99	45.8	18.17	0.028	No mining operations, Care and Maintenance
03/02/2014	<5.6	<5.6		-13.05	-16.23	-18.55	88.38	0	0.71	8.2	4.06	12.8	20.17	0.027	No mining operations, Care and Maintenance
04/02/2014	<5.6	6.4		-16.81	-19.32	-20.81	85.64	0	0.31	66.7	2.22	19.1	20.38	0.013	No mining operations, Care and Maintenance
05/03/2014	<5.6	<5.6		-13.83	-18.81	-21.99	54.48	0	1.1	59.6	3.62	124.0	82.79	0.12	No mining operations, Care and Maintenance
06/03/2014	<5.6	<5.6		-14.55	-20.5	-26.02	61.57	0	1.24	36.8	4.91	117.7	89.46	0.119	No mining operations, Care and Maintenance
07/03/2014	<5.6	<5.6		-15.31	-21.47	-26.79	62.8	0	0.84	38.6	3.17	5.5	92.17	0.084	No mining operations, Care and Maintenance
25/03/2014	<5.6	<5.6		-1.15	-9.04	-16.37	41.09	0	2.09	39.8	5.68	79.2	151.67	0.533	No mining operations, Care and Maintenance
12/04/2014	<5.6	<5.6		1.63	-6.67	-14.67	40.6	0	1.38	23.9	4.11	241.4	189.08	0.444	Exploration activities at Flame & Moth
13/04/2014	6.8	8.1		5.29	-0.4	-6.75	39.56	0.4	1.16	34.5	4.06	355.5	176.96	0.585	Exploration activities at Flame & Moth
14/04/2014	18.8	20.3		8.44	3.51	-0.45	45.57	0.1	1.43	56.6	5.66	15.6	167.38	0.69	Exploration activities at Flame & Moth
15/04/2014	15.7	14.4		8.6	3.21	-1.58	56.03	0	1.46	31.1	6.69	133.6	164.21	0.606	Exploration activities at Flame & Moth
11/05/2014	21.9	23.2		13.32	7.67	2.564	40.33	0.4	1.81	3.5	6.44	302.1	0.3	1.048	Exploration activities at Flame & Moth
12/05/2014	14.4	10		15.92	9.23	1.645	40.14	0.2	1.55	10.5	6.13	209.7	0.28	0.985	Exploration activities at Flame & Moth
13/05/2014	<5.6	18.6		17.93	11.47	4.408	47.25	0.2	2.2	335.7	8.58	194.2	0.27	1.367	Exploration activities at Flame & Moth
29/05/2014	17.1	<5.6		17.05	10.5	2.236	58.36	1.2	1.64	3.6	7.38	314.9	0.29	0.877	Exploration activities at Flame & Moth
26/06/2014	<5.6			15.56	11.04	5.062	48.68	0.4	2.02	79.7	7.96	150.5	0.26	1.047	Exploration activities at Flame & Moth
27/06/2014	<5.6	5.6		18.11	12.96	8.05	48.56	0	1.42	34.9	5.67	322.6	0.18	0.916	Exploration activities at Flame & Moth
28/06/2014		<5.6		23.06	16.15	6.332	38.97	0.4	2.11	328.2	7.94	285.6	0.35	1.641	Exploration activities at Flame & Moth
29/06/2014	<5.6	<5.6		24.93	17.07	7.576	40.23	0.2	1.9	35	6.44	336.1	0.29	1.48	Exploration activities at Flame & Moth
30/06/2014	<5.6	<5.6		17.12	14.37	12.5	67.69	0	1.12	47.7	6.95	92.8	0.09	0.454	Exploration activities at Flame & Moth
08/07/2014	<5.6	<5.6		16.39	12.98	8.98	63.26	0	1.57	326.4	6.45	223.7	0.16	0.65	Exploration activities at Flame & Moth
27/07/2014	<5.6	<5.6		16.61	11.39	8.41	83.5	2.8	1.11	228.9	5.3	334.3	0.14	0.266	Exploration activities at Flame & Moth
28/07/2014	<5.6	<5.6		18.93	12.56	7.43	68.18	0.6	1.36	220.2	6.31	151.2	0.19	0.599	Exploration activities at Flame & Moth



Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
29/07/2014	<5.6	<5.6		15.18	12.05	9.11	79.4	3.4	1.69	211.1	6.9	320.3	0.13	0.354	Exploration activities at Flame & Moth
22/08/2014	<5.6	<5.6		14.95	10.31	6.149	76.43	0	1.35	44.2	5.99	16.6	0.13	0.337	Exploration activities at Flame & Moth
23/08/2014	6.9	16.7		16.65	10.05	4.659	78.54	1.5	1.37	59.5	4.99	143.5	0.18	0.354	Exploration activities at Flame & Moth
24/08/2014	<5.6	5.6		14.83	9.69	5.429	74.6	0	1.6	55.6	5.76	354.8	0.12	0.447	Exploration activities at Flame & Moth
25/08/2014	<5.6			12.09	9.4	7.071	86.62	1.1	0.73	18.6	3.96	354	0.09	0.156	Exploration activities at Flame & Moth
26/08/2014		<5.6		11.48	8.22	5.645	91.57	16	0.65	51.2	4.1	193.2	0.07	0.059	Exploration activities at Flame & Moth
20/09/2014	<5.6	<5.6		8.42	6.1	4.174	77.89	0	1	58.8	5.53	94.3	0.05	0.223	Exploration activities at Flame & Moth
23/09/2014	5.6	6.9		4.986	0.95	-1.977	88.36	0.7	1.51	271.1	7.22	194.9	0.06	0.134	Exploration activities at Flame & Moth
24/09/2014	5.6	6.9		4.955	-0.44	-3.427	76.34	0.4	1.28	22.7	4.81	221.0	0.1	0.221	Exploration activities at Flame & Moth
27/09/2014	5.6	<5.6		4.42	0.96	-1.406	89.84	3.5	1.42	32.8	8.05	166.0	0.02	0.109	Exploration activities at Flame & Moth
15/10/2014	9.7	18.1		-0.86	-3.51	-5.65	87.21	0.1	0.88	25.4	3.51	30.7	0.03	0.063	Exploration activities at Flame & Moth
16/10/2014	<5.6	<5.6		-0.581	-1.62	-3.093	89.96	0	1.1	28.4	4.97	25.6	0.01	0.068	Exploration activities at Flame & Moth
23/10/2014	<5.6	<5.6		-3.667	-4.97	-5.752	89.54	0	0.93	30.2	4.95	34.6	0.02	0.063	Exploration activities at Flame & Moth
24/10/2014	<5.6	<5.6		-2.715	-4.57	-5.456	95.21	0	0.79	39.2	3.81	171.6	0.01	0.031	Exploration activities at Flame & Moth
19/11/2014	10			-2.206	-3.73	-5.562	97.74	0	0.45	50.3	2.98	187.5	0	0.012	No mining operations, Care and Maintenance
20/11/2014	<5.6			-4.7	-10	-15.01	93.46	0	0.49	124.5	2.75	117.0	0	0.016	No mining operations, Care and Maintenance
22/11/2014		<5.6		-18.86	-19.79	-21.6	85.38	0.2	0.22	12.2	1.61	29.1	0	0.008	No mining operations, Care and Maintenance
23/11/2014		5.8		-17.53	-19.71	-22.09	85.39	0.1	0.15	14.1	2.55	17.0	0	0.003	No mining operations, Care and Maintenance
24/11/2014	<5.6			-14.55	-16.44	-18.21	88.27	0.1	0.18	45	1.58	28.1	0	0.007	No mining operations, Care and Maintenance
25/11/2014	10.4	8.1		-11.02	-12.48	-13.85	91.5	0	0.18	30.3	1.31	40.8	0	0.002	No mining operations, Care and Maintenance
12/12/2014	10.3	7.8		-11.81	-14.01	-16.65	90.33	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
13/12/2014	5.8	11.7	16	-11.22	-14.47	-17.02	89.88	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
14/12/2014		5.6	<5.6	-2.637	-10.17	-15.75	93.13	0.1	n/a	n/a	0.04	46.8	0	0	No mining operations, Care and Maintenance
15/12/2014	<5.6	<5.6	<5.6	-0.904	-1.88	-4.157	85.83	0	0.78	48.5	8.87	155.1	0	0.081	No mining operations, Care and Maintenance
17/12/2014	<5.6			-5.392	-6.76	-8.51	94.93	0	0.55	69.5	3.02	38.6	0	0.024	No mining operations, Care and Maintenance
10/01/2015	5.6	<5.6		-9.46	-10.34	-10.97	93.47	0	0.09	251.9	1.42	10.3	0	0.003	No mining operations, Care and Maintenance
11/01/2015	<5.6	<5.6		-9.37	-10.03	-10.63	93.32	0	0.11	65.4	1.26	33.4	0	0.001	No mining operations, Care and Maintenance
12/01/2015			<5.6	-9.68	-10.29	-11.46	93.2	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
13/01/2015	<5.6	<5.6		-6.068	-8.44	-11.23	94.59	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
15/01/2015	6.1	<5.6	<5.6	-0.888	-5.06	-9.68	96.82	0	0.22	356.6	3.7	38.4	0	0.005	No mining operations, Care and Maintenance
16/01/2015			<5.6	-0.335	-2.85	-7.954	98.1	0	1.14	346.9	4.48	188.0	0	0.018	No mining operations, Care and Maintenance
18/01/2015			<5.6	-3.823	-6.18	-8.51	96	0.2	0.69	60.2	4.21	170.8	0	0.023	No mining operations, Care and Maintenance
12/02/2015		6.3	8.6	-11.62	-13.95	-15.81	89.23	0	0.37	19.4	3.26	272.0	0.01	0.023	No mining operations, Care and Maintenance



Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
13/02/2015	<5.6	<5.6		-6.289	-8.23	-11.42	93.9	0	0.52	24.5	4.93	37.9	0	0.024	No mining operations, Care and Maintenance
15/02/2015	7.1	<5.6	8.8	-3.145	-6.33	-9.71	92.52	7.3	0.73	98.5	3.04	97.7	0.01	0.038	No mining operations, Care and Maintenance
16/02/2015	<5.6	<5.6	7.9	-2.157	-7.74	-11.49	93.95	0.7	0.85	15.9	4.61	30.5	0	0.029	No mining operations, Care and Maintenance
18/02/2015	<5.6		11.5	-0.889	-2.64	-4.515	96.48	0	0.42	29.1	3.69	7.9	0	0.016	No mining operations, Care and Maintenance
06/03/2015	7.1	7.8	<5.6	-0.298	-3.66	-5.577	86.59	0.1	1.37	322.7	6.53	188.2	0.03	0.148	No mining operations, Care and Maintenance
07/03/2015	<5.6	<5.6	<5.6	0.932	-2.44	-4.272	78.47	0.2	1.42	30.5	6.22	180.2	0.02	0.2	No mining operations, Care and Maintenance
16/03/2015	6.7	<5.6	9	-12.89	-19.53	-26.15	73.31	0	0.89	14.5	3.84	17.0	0.06	0.07	No mining operations, Care and Maintenance
17/03/2015	<5.6	<5.6	16.5	-1.807	-9.23	-13.81	72.37	0.3	0.93	28.9	4.24	24.0	0.07	0.158	No mining operations, Care and Maintenance
02/04/2015	<5.6	<5.6	<5.6	4.032	-1.57	-5.899	66.26	0	1.7	27.7	4.94	71.0	0.17	0.415	No mining operations, Care and Maintenance
03/04/2015	<5.6	<5.6	<5.6	2.002	-2.72	-7.184	58.66	0	2.35	16.5	7.17	88.7	0.17	0.575	No mining operations, Care and Maintenance
04/04/2015	<5.6	<5.6	5.7	3.513	-3.7	-10.48	61.55	0	1.53	71	6.57	152.2	0.16	0.414	No mining operations, Care and Maintenance
05/04/2015	<5.6	<5.6	5.8	3.213	-2.1	-5.496	84.15	0	1.2	345.9	7.63	247.7	0.13	0.174	No mining operations, Care and Maintenance
21/05/2015			<5.6	23.83	16.28	7.585	34.05	0	1.73	13	5.17	238.3	0.31	1.389	No mining operations, Care and Maintenance
22/05/2015			<5.6	25.09	17.82	10.28	29.16	0	1.71	25.5	6.02	300.9	0.29	1.554	No mining operations, Care and Maintenance
23/05/2015			8.8	26.43	19.79	12.86	26.79	0	1.36	18.1	9.86	184.2	0.25	1.466	No mining operations, Care and Maintenance
24/05/2015			9.9	26.51	19.2	11.59	32.85	0	1.79	91.6	7.59	167.6	0.27	1.648	No mining operations, Care and Maintenance
25/05/2015	15.8	18.9		25.12	17.97	10.28	38.93	0	2.05	1.8	8.18	180.7	0.28	1.556	No mining operations, Care and Maintenance
26/05/2015	22.2	26.4		21.73	15.55	9.78	53.49	0	1.79	32.8	9.22	90.9	0.16	0.986	No mining operations, Care and Maintenance
27/05/2015	15.8	15		22.99	16.43	11.38	52.67	0	2.18	351.8	8.63	24.0	0.29	1.243	No mining operations, Care and Maintenance
28/05/2015	6.3	5.8		20.98	14.38	8.42	62.4	0	1.94	333.9	10.63	269.0	0.25	0.924	No mining operations, Care and Maintenance
16/06/2015	<5.6	<5.6	<5.6	19.74	13.76	6.668	51.79	0.9	1.75	21.2	10.14	354.4	0.27	1.096	No mining operations, Care and Maintenance
17/06/2015	<5.6	9.3	<5.6	15.41	11.36	6.976	63.5	0	2.66	357.7	9.73	337.9	0.22	1.071	No mining operations, Care and Maintenance
18/06/2015	<5.6	<5.6	<5.6	18.34	11.65	4.589	42.59	0	2.27	349.6	7.18	316.9	0.35	1.479	No mining operations, Care and Maintenance
01/07/2015		<5.6	68.1	15.59	11.07	7.143	76.46	1.4	1.58	304.9	7.87	205.5	0.18	0.466	No mining operations, Care and Maintenance
08/07/2015	15.4	32.1	43.8	17.01	12.85	10.73	80.11	3.2	1.68	276.1	11.49	257.1	0.08	0.453	No mining operations, Care and Maintenance
11/07/2015	<5.6	7.6	<5.6	14.04	12.35	10.35	75.27	9.5	1.01	39	5.52	152.4	0.11	0.281	No mining operations, Care and Maintenance
20/07/2015	9.6	5.7	13.1	17.42	11.86	4.725	62.55	0	2.03	2	9.09	318.7	0.26	1.007	No mining operations, Care and Maintenance
13/08/2015	6.8	10.4		14.48	7.56	0.308	64.18	0	1.56	4.2	6.06	322.4	0.21	0.644	No mining operations, Care and Maintenance
14/08/2015	11.4	<5.6	9.7	16.49	9.14	3.399	70.07	0	1.67	34.3	6.71	224.5	0.17	0.55	No mining operations, Care and Maintenance
15/08/2015	7.4	9	6.4	18.97	11.31	4.551	63.45	0	1.67	1.3	5.93	215.3	0.21	0.728	No mining operations, Care and Maintenance
16/08/2015	11	8.6	6.5	16.31	11.81	8.21	64.84	0	1.52	298.6	6.48	207.9	0.14	0.687	No mining operations, Care and Maintenance
17/09/2015	5.7	<5.6		8.56	5.26	3.57	83.42	4.4	1.69	121.4	6.94	142.7	0.08	0.26	No mining operations, Care and Maintenance
20/10/2015	6	<5.6	5.6	3.167	1.32	-1.097	89.12	0	0.99	90.8	5.45	120.4	0.04	0.11	No mining operations, Care and Maintenance



Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
21/10/2015	<5.6	8.2	<5.6	2.824	0.27	-1.349	89.93	0	0.7	23.8	5.71	140.6	0.01	0.065	No mining operations, Care and Maintenance
13/11/2015	21.4	14	16	-11.46	-12.67	-14.95	91.27	2.4	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
15/11/2015	10.3	10	8.5	-14.97	-16.71	-19.11	88	1	n/a	n/a	0.09	205.8	0	0	No mining operations, Care and Maintenance
16/11/2015	10.8	12.2	6.9	-14.95	-16.51	-18.04	88.14	0.2	0.36	19.4	2.93	26.0	0	0.005	No mining operations, Care and Maintenance
17/11/2015	17.8	20.8		-17.84	-18.96	-22.21	85.9	0.3	0.69	20.9	2.99	20.7	0	0.02	No mining operations, Care and Maintenance
18/11/2015	9.7	17.4		-22.09	-25.52	-29.1	79.53	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
16/12/2015	<5.6		<5.6	-15.9	-17.77	-21.21	87.08	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
17/12/2015	<5.6		<5.6	-12.54	-17.25	-19.91	87.61	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
18/12/2015	<5.6		<5.6	-10.93	-11.8	-12.91	91.85	0.1	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
19/12/2015	<5.6		<5.6	-11.73	-12.75	-14.99	90.93	0	n/a	n/a	n/a	n/a	0	n/a	No mining operations, Care and Maintenance
05/01/2016	<5.6		<5.6	-12.1	-14.93	-16.42	89.23	0	0.41	49.4	2.10	76.3	0.00	0.023	No mining operations, Care and Maintenance
06/01/2016	<5.6		<5.6	-14.12	-15.06	-15.93	85.37	0	0.21	47.1	1.59	30.3	0.00	0.014	No mining operations, Care and Maintenance
07/01/2016			<5.6	-14.34	-15.65	-16.56	79.81	4	0.33	64.8	2.20	36.4	0.00	0.028	No mining operations, Care and Maintenance
08/01/2016	<5.6			-15.34	-16.32	-17.01	79.46	0	0.51	88.9	2.41	140.3	0.00	0.036	No mining operations, Care and Maintenance
26/02/2016	<5.6		<5.6	-2.88	-6.39	-9.04	89.98	0	0.83	44.7	3.82	14.3	0.01	0.045	No mining operations, Care and Maintenance
27/02/2016	<5.6		<5.6	-0.499	-3.86	-5.51	89.43	0.2	0.90	18.1	5.08	341.7	0.09	0.105	No mining operations, Care and Maintenance
28/02/2016	<5.6		<5.6	-0.842	-2.71	-5.93	76.81	0	1.14	30.8	6.79	139.1	0.03	0.173	No mining operations, Care and Maintenance
12/03/2016	<5.6	<5.6	<5.6	3.148	-2.98	-7.60	62.41	0.2	1.07	68.3	4.02	90.3	0.10	0.286	No mining operations, Care and Maintenance
14/03/2016	<5.6	<5.6	<5.6	-4.622	-6.39	-9.43	83.42	0	1.14	17.3	3.71	21.7	0.06	0.101	No mining operations, Care and Maintenance
15/03/2016	<5.6	<5.6	<5.6	-3.963	-6.65	-9.78	91.08	0.1	0.77	25.8	3.96	45.1	0.04	0.052	No mining operations, Care and Maintenance
19/04/2016	<5.6	<5.6	<5.6	4.494	0.18	-5.34	60.59	0	1.58	13.4	6.15	318.7	0.22	0.48	No mining operations, Care and Maintenance
23/04/2016	<5.6	<5.6	<5.6	12.14	5.94	0.67	67.36	0.5	1.25	74.3	5.66	111.3	0.23	0.538	No mining operations, Care and Maintenance
24/04/2016	<5.6	<5.6	<5.6	13.5	7.50	2.87	59.67	0	1.27	32.3	5.58	64.8	0.18	0.538	No mining operations, Care and Maintenance
23/05/2016	<5.6	<5.6	<5.6	15.41	10.35	2.50	55.84	0	1.95	10.5	6.47	319.6	0.22	1.007	No mining operations, Care and Maintenance
25/05/2016	10.6	<5.6	<5.6	9.99	7.54	5.79	64.33	0.2	2.36	359.9	8.15	339.7	0.15	0.723	No mining operations, Care and Maintenance
13/06/2016	<5.6	<5.6	<5.6	14.65	10.54	6.45	73.67	1.1	1.33	26.6	4.77	339.0	0.11	0.353	No mining operations, Care and Maintenance
17/06/2016	<5.6	<5.6	<5.6	21.96	15.16	8.18	37.44	0	1.90	8.8	7.63	317.6	0.35	1.509	No mining operations, Care and Maintenance
19/06/2016	9.7	22.6	6.1	25.98	18.97	9.57	35.04	0	2.41	292.5	9.21	198.7	0.35	2.176	No mining operations, Care and Maintenance
28/07/2016	<5.6	<5.6	<5.6	18.66	14.78	10.16	67.43	1.7	1.57	61.8	7.73	236.2	0.14	0.675	No mining operations, Care and Maintenance
29/07/2016	<5.6	<5.6	<5.6	15.55	11.73	7.72	88.27	2.7	0.95	61.3	4.20	238.4	0.12	0.141	No mining operations, Care and Maintenance
30/07/2016	<5.6	<5.6	<5.6	15.5	12.59	9.46	78.82	0.6	1.44	285.4	6.19	233.8	0.13	0.364	No mining operations, Care and Maintenance
09/08/2016	<5.6	<5.6	<5.6	12.96	11.51	9.52	93.48	8.5	1.17	302.7	5.50	194.6	0.08	0.096	No mining operations, Care and Maintenance
10/08/2016	<5.6	<5.6	<5.6	11.59	9.94	8.94	91.50	2.9	1.31	355.7	7.75	255.8	0.06	0.147	No mining operations, Care and Maintenance



Sample Date	TSP-1 (µg/m³)	TSP-2 (µg/m³)	TSP-3 (µg/m³)	Maximum Air Temperature (°C)	Mean Air Temperature (°C)	Minimum Air Temperature (°C)	Average Relative Humidity (%)	Total Rain* (mm)	Average Wind Speed (m/s)	Average Wind Direction (°)	Maximum Wind Speed (m/s)	Direction of Maximum Wind Speed (°)	Average Solar Radiation (W/m²)	Total Evapo-transpiration (mm)	Activities at site
11/08/2016	<5.6	<5.6	<5.6	16.77	11.59	7.05	75.82	0.1	0.87	337.9	5.60	228.3	0.16	0.321	No mining operations, Care and Maintenance
28/09/2016	<5.6	<5.6	<5.6	5.192	0.46	-2.50	67.44	0	1.38	79.8	5.88	178.1	0.09	0.373	No mining operations, Care and Maintenance
29/09/2016	<5.6	<5.6	<5.6	3.332	0.51	-3.57	67.16	0.2	2.12	349.2	8.03	309.6	0.05	0.544	No mining operations, Care and Maintenance
30/09/2016	<5.6	<5.6	<5.6	3.833	-1.67	-6.18	65.93	0	1.35	48.9	4.13	209.7	0.09	0.295	No mining operations, Care and Maintenance
05/10/2016	8.8	6.7	5.7	1.857	-4.62	-8.16	70.26	0	1.36	59.1	3.94	111.7	0.09	0.252	No mining operations, Care and Maintenance
07/10/2016	<5.6		<5.6	1.909	-4.42	-8.66	67.82	0	1.41	74.1	3.65	126.2	0.09	0.253	No mining operations, Care and Maintenance
10/10/2016	<5.6		13.5	0.07	-5.24	-9.03	75.16	0	1.27	74.9	3.26	102.4	0.07	0.168	No mining operations, Care and Maintenance
27/10/2016		<5.6		-5.793	-8.05	-10.39	89.97	0.3	0.96	39.1	3.35	16.5	0.04	0.048	No mining operations, Care and Maintenance
26/11/2016	<5.6	<5.6	<5.6	-8.12	-13.62	-17.72	89.97	0	0.45	20.1	3.97	23.1	0.00	0.014	No mining operations, Care and Maintenance
27/11/2016	<5.6	6.1	7.6	-6.422	-6.91	-8.06	95.25	0	0.45	39.6	3.59	37.4	0.00	0.017	No mining operations, Care and Maintenance
28/11/2016	<5.6	<5.6	<5.6	-6.707	-8.32	-13.37	94.16	1.3	0.34	119.1	4.63	179.3	0.00	0.013	No mining operations, Care and Maintenance
27/12/2016	<5.6	<5.6	<5.6	-11.02	-11.92	-14.10	91.65	0	0.05	51.0	1.20	63.8	0.00	0.002	No mining operations, Care and Maintenance
29/12/2016	<5.6	<5.6	<5.6	-14.61	-16.92	-19.94	87.48	0	0.12	147.9	1.53	184.4	0.00	0.002	No mining operations, Care and Maintenance
30/12/2016	<5.6	<5.6	<5.6	-14.31	-16.67	-18.52	87.67	0	n/a	n/a	n/a	n/a	0.00	n/a	No mining operations, Care and Maintenance

\* Starting October 15, 2013, total precipitation is reported rather than total rain



**Table A-2 24-Hour Average PM<sub>10</sub> and PM<sub>2.5</sub> Results, August 2015 – December 2016**

Sample Date	TSP-1		TSP-2		TSP-3		Sample Date	TSP-1		TSP-2		TSP-3		Sample Date	TSP-1		TSP-2		TSP-3	
	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )		PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )
17/08/2015		<5.6		<5.6		<5.6	18/03/2016	<5.6		<5.6		<5.6		15/08/2016	<5.6		<5.6		<5.6	
18/08/2015		6.5		<5.6		<5.6	19/03/2016	<5.6		<5.6		<5.6		30/08/2016		<5.6		<5.6		9
20/08/2015		6.5		<5.6		<5.6	21/03/2016		<5.6		<5.6		<5.6	31/08/2016		<5.6		<5.6		<5.6
22/08/2015	<5.6		8.6		<5.6		23/03/2016		<5.6		<5.6		<5.6	12/09/2016		<5.6		<5.6		<5.6
23/08/2015	7.8		8.6		<5.6		28/03/2016		<5.6		<5.6		<5.6	14/09/2016		<5.6		<5.6		<5.6
24/08/2015	14.6		8.5		5.8		15/04/2016		<5.6		<5.6		<5.6	21/09/2016		<5.6		<5.6		<5.6
05/09/2015	<5.6		<5.6		<5.6		16/04/2016		<5.6		<5.6		<5.6	23/09/2016	<5.6				<5.6	
06/09/2015	<5.6		<5.6		<5.6		18/04/2016		<5.6		<5.6		<5.6	24/09/2016	<5.6		<5.6		<5.6	
09/09/2015	<5.6		<5.6		<5.6		25/04/2016	<5.6		<5.6		<5.6		25/09/2016	<5.6		<5.6		<5.6	
11/09/2015		<5.6		<5.6		<5.6	26/04/2016	<5.6		<5.6		<5.6		03/10/2016					<5.6	
12/09/2015				<5.6		<5.6	29/04/2016	<5.6		<5.6		8.2		23/10/2016		<5.6				<5.6
14/09/2015				<5.6		<5.6	15/05/2016	<5.6		<5.6		<5.6		27/10/2016		<5.6				<5.6
20/11/2015		<5.6		<5.6			16/05/2016	<5.6		<5.6		<5.6		28/10/2016		<5.6		<5.6		<5.6
21/11/2015		<5.6		<5.6			18/05/2016	<5.6		<5.6		<5.6		29/10/2016	<5.6			<5.6		<5.6
24/11/2015		<5.6	<5.6				19/05/2016		<5.6		<5.6		<5.6	30/10/2016	<5.6		<5.6			
25/11/2015	<5.6				<5.6		21/05/2016		<5.6		<5.6		<5.6	31/10/2016	<5.6		<5.6		<5.6	
09/01/2016		<5.6				<5.6	22/05/2016		<5.6		<5.6		<5.6	04/11/2016	<5.6		<5.6		<5.6	
10/01/2016		<5.6				6.3	20/06/2016	<5.6		<5.6		<5.6		05/11/2016	<5.6		<5.6		<5.6	
16/01/2016		<5.6				<5.6	22/06/2016	<5.6		<5.6		<5.6		25/11/2016	<5.6		<5.6		<5.6	
17/01/2016	<5.6				<5.6		26/06/2016	<5.6		<5.6		<5.6		30/11/2016		6		<5.6		<5.6
18/01/2016	<5.6				<5.6		27/06/2016		5.6		7.4		<5.6	01/12/2016		<5.6		<5.6		<5.6
19/01/2016	<5.6				<5.6		29/06/2016		13.8		20.8		13.6	02/12/2016		<5.6		<5.6		<5.6
13/02/2016	<5.6				6.4		15/07/2016		17.4		8.9		12.1	18/12/2016		<5.6		<5.6		10
14/02/2016	<5.6				<5.6		17/07/2016		10.1		23.1		12.2	20/12/2016		8.3		<5.6		6.3
15/02/2016	<5.6				<5.6		18/07/2016		<5.6		<5.6		<5.6	21/12/2016		<5.6		<5.6		<5.6
22/02/2016		<5.6				<5.6	25/07/2016	<5.6		<5.6		<5.6		31/12/2016	<5.6		<5.6		<5.6	
23/02/2016		<5.6				<5.6	26/07/2016	<5.6		<5.6		<5.6		01/01/2017	<5.6		<5.6		<5.6	
25/02/2016		<5.6				<5.6	27/07/2016	<5.6		<5.6		<5.6		02/01/2017	<5.6		<5.6		<5.6	
12/03/2016							13/08/2016	<5.6		<5.6		<5.6								
17/03/2016	<5.6		<5.6		<5.6		14/08/2016	<5.6		<5.6		<5.6								













Sample Date	Aluminum (Al), total µg/m³	Antimony (Sb), total µg/m³	Arsenic (As), total µg/m³	Barium (Ba), total µg/m³	Beryllium (Be), total µg/m³	Boron (B), total µg/m³	Cadmium (Cd), total µg/m³	Calcium (Ca), total µg/m³	Chromium (Cr), total µg/m³ *	Cobalt (Co), total µg/m³	Copper (Cu), total µg/m³	Iron (Fe), total µg/m³	Lead (Pb), total µg/m³	Magnesium (Mg), total µg/m³	Manganese (Mn), total µg/m³ *	Molybdenum (Mo), total µg/m³	Nickel (Ni), total µg/m³	Phosphorus (P), total µg/m³	Potassium (K), total µg/m³	Selenium (Se), total µg/m³	Silicon (Si), total µg/m³	Silver (Ag), total µg/m³	Sodium (Na), total µg/m³	Strontium (Sr), total µg/m³	Sulphur (S), total µg/m³	Tin (Sn), total µg/m³	Titanium (Ti), total µg/m³	Vanadium (V), total µg/m³	Zinc (Zn), total µg/m³	Zirconium (Zr), total µg/m³
13/06/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.096	<0.069	<0.069	0.072	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.006	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
17/06/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.068	<0.069	<0.069	0.176	<0.111	<0.042	0.026	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
19/06/16	0.306	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	0.694	0.065	<0.069	<0.069	0.224	<0.111	0.082	0.013	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.006	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
28/07/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.126	<0.069	<0.069	0.072	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.009	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
29/07/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.117	<0.069	<0.069	0.069	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
30/07/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.110	<0.069	<0.069	0.050	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
09/08/16	0.036	<0.001	<0.001	0.001	<0.001	<0.042	0.000	0.542	0.125	<0.001	0.006	0.078	0.003	0.043	0.007	0.000	0.002	<0.111	<0.069	<0.001	<0.278	0.000	<0.139	0.002	-	<0.001	<0.028	<0.028	0.008	<0.006
10/08/16	0.029	<0.001	<0.001	0.001	<0.001	<0.042	0.000	0.444	0.109	<0.001	0.001	<0.042	0.001	<0.042	0.002	0.000	0.001	<0.111	<0.069	<0.001	<0.278	0.000	<0.139	0.004	-	<0.001	<0.028	<0.028	<0.006	<0.006
11/08/16	0.047	<0.001	<0.001	0.001	<0.001	<0.042	0.000	0.528	0.133	<0.001	0.001	0.047	0.001	0.042	0.001	0.000	0.001	<0.111	<0.069	<0.001	<0.278	0.000	0.250	0.005	-	<0.001	<0.028	<0.028	<0.006	<0.006
28/09/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	0.389	0.076	<0.069	<0.069	0.056	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.012	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
29/09/16	0.653	<0.278	<0.111	0.006	<0.011	0.042	<0.028	1.681	0.100	<0.069	<0.069	0.086	<0.111	0.126	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.041	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
30/09/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.068	<0.069	<0.069	0.051	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
05/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.087	<0.069	<0.069	0.147	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
07/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.094	<0.069	<0.069	0.301	<0.111	0.064	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.009	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
10/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.107	<0.069	<0.069	0.214	<0.111	0.046	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.016	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
26/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.085	<0.069	<0.069	<0.042	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
27/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.089	<0.069	<0.069	<0.042	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.006	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
28/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.074	<0.069	<0.069	<0.042	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
27/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.097	<0.069	<0.069	0.062	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.013	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
29/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.110	<0.069	<0.069	0.053	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
30/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.126	<0.069	<0.069	0.058	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.006	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069

\* Criteria effective on July 1, 2016













Sample Date	Aluminum (Al), total µg/m³	Antimony (Sb), total µg/m³	Arsenic (As), total µg/m³	Barium (Ba), total µg/m³	Beryllium (Be), total µg/m³	Boron (B), total µg/m³	Cadmium (Cd), total µg/m³	Calcium (Ca), total µg/m³	Chromium (Cr), total µg/m³ *	Cobalt (Co), total µg/m³	Copper (Cu), total µg/m³	Iron (Fe), total µg/m³	Lead (Pb), total µg/m³	Magnesium (Mg), total µg/m³	Manganese (Mn), total µg/m³ *	Molybdenum (Mo), total µg/m³	Nickel (Ni), total µg/m³	Phosphorus (P), total µg/m³	Potassium (K), total µg/m³	Selenium (Se), total µg/m³	Silicon (Si), total µg/m³	Silver (Ag), total µg/m³	Sodium (Na), total µg/m³	Strontium (Sr), total µg/m³	Sulphur (S), total µg/m³	Tin (Sn), total µg/m³	Titanium (Ti), total µg/m³	Vanadium (V), total µg/m³	Zinc (Zn), total µg/m³	Zirconium (Zr), total µg/m³
09/08/16	0.031	<0.001	<0.001	0.001	<0.001	<0.042	0.000	0.500	0.131	<0.001	0.002	<0.042	0.002	<0.042	0.004	0.000	0.001	<0.111	<0.069	<0.001	<0.278	0.000	<0.139	0.003	-	<0.001	<0.028	<0.028	<0.006	<0.006
10/08/16	0.014	<0.001	<0.001	0.001	<0.001	<0.042	0.000	0.444	0.122	<0.001	0.001	<0.042	0.001	<0.042	0.001	0.000	0.001	<0.111	<0.069	<0.001	<0.278	0.000	<0.139	0.002	-	<0.001	<0.028	<0.028	<0.006	<0.006
11/08/16	0.032	<0.001	0.001	0.001	<0.001	<0.042	0.000	0.528	0.117	<0.001	0.002	0.078	0.003	<0.042	0.002	0.000	0.001	<0.111	<0.069	<0.001	<0.278	0.000	<0.139	0.009	-	<0.001	<0.028	<0.028	<0.006	<0.006
28/09/16	<0.278	<0.278	<0.111	0.006	<0.011	<0.042	<0.028	<0.278	0.099	<0.069	<0.069	0.108	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.007	<0.278	<0.111	<0.028	<0.042	0.029	<0.069
29/09/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.093	<0.069	<0.069	0.114	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
30/09/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	0.333	0.099	<0.069	<0.069	0.097	<0.111	0.051	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
05/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.099	<0.069	<0.069	0.386	<0.111	0.065	0.058	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	0.040	<0.069
27/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.114	<0.069	<0.069	0.044	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
26/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	0.486	0.128	<0.069	<0.069	0.061	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
27/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	0.278	0.090	<0.069	<0.069	<0.042	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
28/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.072	<0.069	<0.069	0.050	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
27/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.093	<0.069	<0.069	0.047	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
29/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.108	<0.069	<0.069	0.062	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.006	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
30/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.096	<0.069	<0.069	0.082	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069

\* Criteria effective on July 1, 2016







Sample Date	Aluminum (Al), total µg/m³	Antimony (Sb), total µg/m³	Arsenic (As), total µg/m³	Barium (Ba), total µg/m³	Beryllium (Be), total µg/m³	Boron (B), total µg/m³	Cadmium (Cd), total µg/m³	Calcium (Ca), total µg/m³	Chromium (Cr), total µg/m³ *	Cobalt (Co), total µg/m³	Copper (Cu), total µg/m³	Iron (Fe), total µg/m³	Lead (Pb), total µg/m³	Magnesium (Mg), total µg/m³	Manganese (Mn), total µg/m³ *	Molybdenum (Mo), total µg/m³	Nickel (Ni), total µg/m³	Phosphorus (P), total µg/m³	Potassium (K), total µg/m³	Selenium (Se), total µg/m³	Silicon (Si), total µg/m³	Silver (Ag), total µg/m³	Sodium (Na), total µg/m³	Strontium (Sr), total µg/m³	Sulphur (S), total µg/m³	Tin (Sn), total µg/m³	Titanium (Ti), total µg/m³	Vanadium (V), total µg/m³	Zinc (Zn), total µg/m³	Zirconium (Zr), total µg/m³
28/09/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.078	<0.069	<0.069	<0.042	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
29/09/16	1.833	<0.278	<0.111	0.015	<0.011	0.124	<0.028	4.333	0.086	<0.069	<0.069	0.071	<0.111	0.353	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.116	<0.278	<0.111	<0.028	<0.042	0.039	<0.069
30/09/16	2.778	<0.278	<0.111	0.024	<0.011	0.189	<0.028	6.181	0.096	<0.069	<0.069	0.249	<0.111	0.553	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.175	<0.278	<0.111	<0.028	<0.042	0.054	<0.069
05/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.111	<0.069	<0.069	0.272	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	0.040	<0.069
07/10/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.108	<0.069	<0.069	0.167	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.007	<0.278	<0.111	<0.028	<0.042	0.031	<0.069
10/10/16	<0.278	<0.278	<0.111	0.006	<0.011	<0.042	<0.028	0.319	0.107	<0.069	<0.069	0.514	<0.111	0.115	0.026	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	0.144	<0.069
26/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.117	<0.069	<0.069	0.044	<0.111	<0.042	0.024	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
27/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.087	<0.069	<0.069	0.051	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.006	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
28/11/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.078	<0.069	<0.069	0.104	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.010	<0.278	<0.111	<0.028	<0.042	0.050	<0.069
27/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.093	<0.069	<0.069	0.071	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	<0.004	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
29/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.111	<0.069	<0.069	0.068	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069
30/12/16	<0.278	<0.278	<0.111	<0.004	<0.011	<0.042	<0.028	<0.278	0.118	<0.069	<0.069	0.089	<0.111	<0.042	<0.011	<0.069	<0.069	<0.417	<1.389	<0.069	<0.417	<0.042	<0.417	0.005	<0.278	<0.111	<0.028	<0.042	<0.028	<0.069

\* Criteria effective on July 1, 2016

# **APPENDIX B**

## **STATISTICAL TESTS RESULTS**



Parameter	Non-parametric	Pairwise comparisons (Wilcoxon test) p-values**		
	Kruskal-Wallis p-value*	TSP-1/TSP-2	TSP-1/TSP-3	TSP-2/TSP-3
TSP	0.2705	-	-	-
PM <sub>10</sub>	0.7747	-	-	-
PM <sub>2.5</sub>	0.7054	-	-	-
Al	0.3207	-	-	-
As	0.5948	-	-	-
Ba	0.6325	-	-	-
B	0.1538	-	-	-
Cd	0.3977	-	-	-
Ca	0.2204	-	-	-
Cr	0.3819	-	-	-
Cu	0.6072	-	-	-
Fe	2.92E-09	0.1187	0.00543	6.20E-05
Pb	0.06835	-	-	-
Mg	0.8646	-	-	-
Mn	0.003412	0.1686	0.4963	0.04666
Mo	0.6058	-	-	-
Ni	0.6105	-	-	-
K	0.6058	-	-	-
Si	0.03674	0.5401	0.3193	0.06621
Na	0.01771	0.8283	0.2352	0.7685
Sr	0.1358	-	-	-
S	0.1316	-	-	-
Sn	0.3764	-	-	-
Ti	0.4942	-	-	-
Zn	0.06725	-	-	-

\* Compared to  $\alpha=0.05$

\*\* Compared to  $\alpha=0.017$  (using Bonferroni adjustment  $\alpha/x$  where  $\alpha$  is the overall significance level and  $x=3$  for 3 pairwise comparisons)