

Presentation to the Joint Review Panel for the Marathon Palladium Project

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Topic: Air Quality

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Presentation Outline

- MECP's Role in the Environmental Assessment (EA)
- Technical Review and Analysis
 - Baseline air quality
 - Sources of air emissions and emission estimates
 - Impact prediction
 - Mitigation measures
 - Follow-up monitoring
- MECP's Recommendations

MECP's Role in the Environmental Assessment

- MECP has the mandate to regulate/consider potential air quality impacts of a project under
 - *Environmental Protection Act (EPA)*
 - *Environmental Assessment Act (EAA)*
- MECP participated in and undertook a technical review of the potential air quality impacts from the Project.

MECP's Role in the Environmental Assessment – cont'd

Ambient air quality criteria, standards, guidelines and screen levels developed and published by MECP:

- Ontario's Ambient Air Quality Criteria (AAQC)
- Standards published in Ontario Regulation 419/05 (O. Reg. 419/05) Air Pollution – Local Air Quality
- Jurisdictional Screening Limits (JSLs)
- Upper Risk Thresholds (URTs)

MECP's Review and Analysis

MECP is of the view that:

- The established background air quality concentrations can be considered conservative and may overestimate the actual background concentrations for the local study area.
- The description of the air emission sources and the estimation of emissions of contaminants from these sources were carried out in accordance with established industry norms and published MECP guidance documents, except a low silt content assumption of 5.8% was used to estimate particulate matter (PM) emissions from unpaved roads.

MECP's Review and Analysis – cont'd

- MECP approved air dispersion model, AERMOD was used to predict the potential air quality effects of the Project.
- The Proponent provided conservative, worst-case scenario air quality predictions for comparison to applicable criteria except for particulate matter due to:
 - The omission of fugitive particulate matter emissions from haul roads and stockpiles in the modelling.
 - A low silt content assumption used in the emissions calculations without site-specific silt content.

MECP's Review and Analysis – cont'd

Impact prediction (construction)

Contaminants	Averaging Period	Background Concentration (µg/m³)	Predicted Concentration (µg/m³)		Criteria	Percentage of Criteria (%)		% of Time Above Criteria	
			Max Concentration on Modelled Property Boundary	Max Special Receptor Concentration		Max Concentration on Modelled Property Boundary	Max Special Receptor Concentration	Property Boundary	Special Receptor
Benzene	24-hour	1.44E+00	1.38E-01	6.7E-02	2.3	6.0 (68.6)	2.9 (65.6)		
	annual	9.02E-01	4.05E-02	2.33E-02	0.45	9.0 (209.4)	5.2 (205.6)		
Benzo(a)pyrene	24-hour	2.06E-04	7.21E-06	5.23E-05	0.00005	14.4 (426.4)	104.6 (516.6)		0.05
	annual	1.03E-04	1.83E-06	1.66E-05	0.00001	18.3 (1048.3)	165.8 (1195.8)		100
NO ₂	1-hour	6.34E+01	3.97E+02	2.53E+02	400	99.2 (115.0)	63.1 (79.0)		
	24-hour	3.17E+01	1.12E+02	6.61E+01	200	56.6 (72.4)	33.1 (48.9)		
TSP*	24-hour	4.41E+01	2.44E+02	6.91E+01	120	203.3 (240.1)	57.6 (94.3)		
	annual	2.44E+01	7.69E+01	1.87E+01	60	128.2 (168.8)	31.2 (71.8)		
PM ₁₀ *	24-hour	2.28E+01	7.51E+01	2.32E+01	50	150.2 (195.8)	46.4 (92.0)		
PM _{2.5} *	24-hour	1.23E+01	1.42E+01	3.54E+00	27	52.6 (98.1)	8.6 (58.7)		
	annual	6.80E+00	2.00E+00	9.13E-01	8.8	22.7 (100)	10.4 (96.4)		
Silica	24-hour		3.51E+01	1.10E+01	5	702.5 (702.5)	220.7 (220.7)	83.79	0.05-4.38
Dustfall (g/m²/30 days)	30-day	1.44E+00	6.24E+00	1.21E+00	7	89.1 (109.7)	17.3 (37.9)		
	annual		4.86E+00	1.03E+00	4.6	105.6 (105.6)	22.3 (22.3)	100	

*Particulate matter emissions from haul roads and stockpiles were included in the modelling. Numbers in brackets are comparison between cumulative concentrations and criteria, and numbers in red indicate greater than 100% of criteria.

MECP's Review and Analysis – cont'd

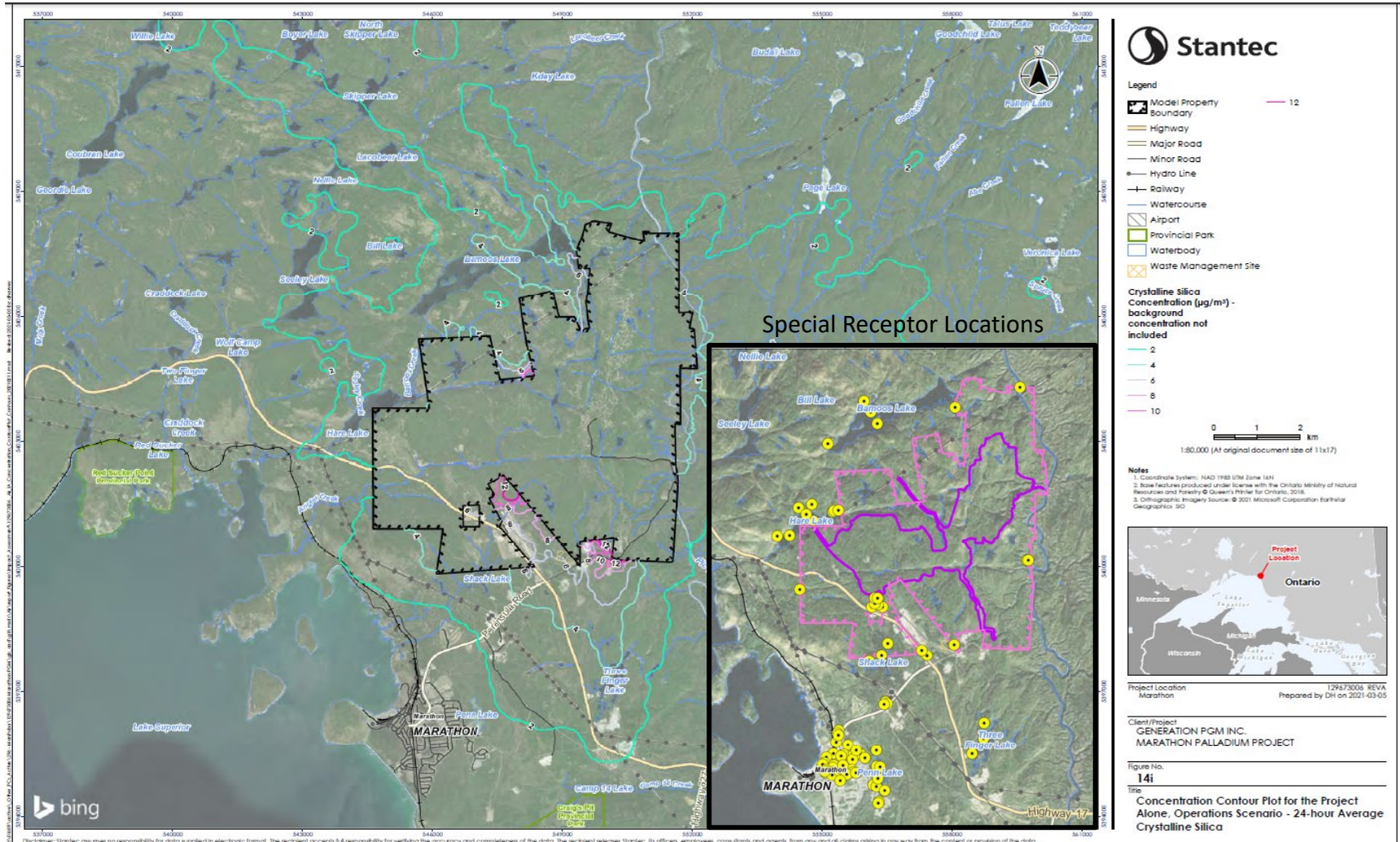
Impact prediction (operation)

Contaminants	Averaging Period	Background Concentration (µg/m³)	Predicted Concentration (µg/m³)		Criteria	Percentage of Criteria (%)		% of Time Above Criteria	
			Max Concentration on Modelled Property Boundary	Max Special Receptor Concentration		Max Concentration on Modelled Property Boundary	Max Special Receptor Concentration	Property Boundary	Special Receptor
Benzene	24-hour	1.44E+00	6.94E-02	2.64E-01	2.3	3.0 (65.6)	11.5 (74.1)		
	annual	9.02E-01	1.71E-02	7.28E-02	0.45	3.8 (204.2)	16.2 (216.6)		
Benzo(a)pyrene	24-hour	2.06E-04	2.62E-06	8.57E-05	0.00005	5.2 (417.2)	171.4 (583.4)		7.8
	annual	1.03E-04	7.52E-07	3.23E-05	0.00001	7.5 (1037.5)	323.5 (1353.5)		100
NO ₂	1-hour	6.34E+01	1.11E+02	1.05E+02	400	27.8 (43.6)	26.3 (42.1)		
	24-hour	3.17E+01	4.69E+01	3.87E+01	200	23.5 (39.3)	19.4 (35.2)		
TSP*	24-hour	4.41E+01	2.75E+02	1.54E+02	120	229.2 (265.9)	128.3 (165.1)		
	annual	2.44E+01	8.03E+01	5.24E+01	60	133.8 (174.5)	87.3 (128.0)		
Nickel	24-hour	2.60E-03	2.82E-01	4.20E-02	0.2	141.0 (142.3)	21.0 (22.3)	5.2	
	annual	1.00E-03	1.14E-01	1.16E-02	0.04	285.0 (287.5)	29.1 (31.6)	100	
PM ₁₀ *	24-hour	2.28E+01	7.43E+01	4.08E+01	50	148.6 (194.2)	81.6 (127.2)		
PM _{2.5} *	24-hour	1.23E+01	8.42E+00	4.54E+00	27	31.2 (76.7)	16.8 (62.4)		
	annual	6.80E+00	2.34E+00	1.56E+00	8.8	26.6 (103.9)	17.7 (95.0)		
Silica	24-hour		3.52E+01	1.94E+01	5	704.9	388.1	89	0.05-66
Dustfall (g/m ² /30 days)	30-day	1.44E+00	8.76E+00	3.68E+00	7	125.1 (145.7)	52.5 (73.1)	13	
	annual		6.80E+00	3.02E+00	4.6	147.8	65.8	100	

*Particulate matter emissions from haul roads and stockpiles were included in the modelling. Numbers in brackets are comparison between cumulative concentrations and criteria, and numbers in red indicate greater than 100% of criteria.

MECP's Review and Analysis – cont'd

Impact prediction for crystalline silica (operation)



MECP's Review and Analysis – cont'd

- The Proponent has proposed mitigation measures to reduce the emissions of fugitive dust and criteria air contaminants from various Project activities.
- The Proponent has proposed air quality monitoring based on the information from follow-up and monitoring programs:
 - Particulate matter using high volume samplers
 - Fugitive dust using dustfall jars

MECP's Recommendations

- Conduct polycyclic aromatic hydrocarbons (PAHs) monitoring before construction for one year to establish background concentrations.
- TSP including metals, PM₁₀, PM_{2.5}, crystalline silica, NO₂, and dustfall should be included in the monitoring program during construction and operation phases. PAHs may also need to be measured during construction and operation phases depending on the measurements of background benzo(a)pyrene concentrations. Continuous PM₁₀ or PM_{2.5} monitoring is recommended to facilitate the implementation of adaptive dust management.
- Conduct road dust sampling to verify the silt content used in modelling for unpaved roads.
- Develop an air quality management program with details to manage and mitigate the effects of the Project on air quality.

Thank you!