

Appendix B

Air Toxics and GHG analysis

Appendix B BAAQMD Rule 11-17 Health Risk Analysis

CARB HARP Model Results⁽¹⁾

Engine Type	100 hp		175 hp		500 hp	
	Risk (per million)	PM2.5 GLC (mg/m ³)	Risk (per million)	PM2.5 GLC (mg/m ³)	Risk (per million)	PM2.5 GLC (mg/m ³)
Baseline (Current Emissions) - Tier 0 Engines	0.502	1.58E-03	0.73	2.29E-03	1.32	4.14E-03
Proposed Project (Full Implementation) - Tier 4 Engines	0.0050	1.58E-05	0.0073	2.29E-05	0.0132	4.14E-05
ACTM - Tier 3 Engines	0.11	3.47E-04	0.109	3.44E-04	0.198	6.21E-04
Proposed Project (Delayed Implementation) ⁽²⁾	0.0689		0.1002		0.1812	

(1) Using Screen 3 met data file available in the HARP model.

(2) Assumes exposure to emissions from Tier 0 for 9 years and exposure to emission from Tier 4 for 61 years.

Significance Evaluation	100 hp		175 hp		500 hp	
	Cancer Risk (per million)	PM2.5 GLC (mg/m ³)	Cancer Risk (per million)	PM2.5 GLC (mg/m ³)	Cancer Risk (per million)	PM2.5 GLC (mg/m ³)
Baseline (Current Emissions) - Tier 0 Engines	0.5020	0.0016	0.7300	0.0023	1.3200	0.0041
Proposed Project (Full Implementation) - Tier 4 Engines	0.0050	0.0000	0.0073	0.0000	0.0132	0.0000
Change ⁽¹⁾	-0.4970	-0.0016	-0.7227	-0.0023	-1.3068	-0.0041
ACTM - Tier 3 Engines	0.11	3.47E-04	0.109	3.44E-04	0.198	6.21E-04
Proposed Project (Delayed Implementation)	0.0689		0.1002		0.1812	
Risk Increase During Delay ⁽²⁾	-0.0411		-0.0088		-0.0168	0.0035
PM2.5 GLC During Delay ⁽³⁾		0.0012		0.0019		0.0035
Significance Threshold	10	0.3	10	0.3	10	0.3
Significant?	No	No	No	No	No	No

(1) Baseline compared to full implementation of proposed rule emissions.

(2) ACTM compared to delayed implementation of proposed rule emissions (2011-2020)

(3) Comparison of PM2.5 GLC during delay from 2011-2020.

Appendix B BAAQMD Rule 11-17 GHG Analysis

GHG Analysis for Low Use Agricultural Engines

GHG	EF (kg/mmbtu)	Global Warming Potential	CO2eq (kg/yr)	Baseline CO2eq (tonnes/yr)	Proposed Rule CO2eq (tonnes/yr)	Increase of CO2eq (tonnes/yr)
CO2	73.1	1	72,628,243.14	72,628.24	73,354.53	726.28
CH4	0.003	21	62,593.42	62.59	63.22	0.63
N2O	0.0006	310	184,799.63	184.80	186.65	1.85
CO2eq - Registered Low Use Engines				72,875.64	73,604.39	728.76
CO2eq - Unregistered Low Use Engines				145,751.27	147,208.79	1,457.51
CO2eq - Registered and Unregistered Low Use Engines				218,626.91	220,813.18	2,186.27

Parameters and Assumptions

Baseline values are based on registered 2010 agricultural engine data.

Low use assumes 100 or fewer hours of operation.

Total Baseline Low Use Agricultural Engines Power in Horsepower

27537.90 HP

Total Baseline Low Use Agricultural Engines Power in BTU/hr

70130769.93 BTU/hr

Total Baseline Low Use Agricultural Engines Power in mmBTU/hr

70.13 mmBTU/hr

Total Baseline Operating Time for Low Use Agricultural Engines

5751.82 hours

Total Baseline Power Output of Low Use Agricultural Engines

403379.85 mmBTU

Typical Diesel Engine Efficiency (http://en.wikipedia.org/wiki/Brake_specific_fuel_consumption)

40.6% of Fuel Input

Total Heating Value of Fuel Consumed

993546.42 mmBTU

Fuel Efficiency Loss of Tier 4 Engines

1% of baseline

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Diesel PM Cancer Risk Value vs Distance Baseline

Distance (ft)	100HP	175HP	250HP	500HP
100	1.83E-06	9.91E-07	7.41E-07	1.49E-07
200	2.58E-06	2.54E-06	2.68E-06	1.52E-06
300	2.08E-06	2.37E-06	2.69E-06	2.38E-06
400	1.6E-06	1.98E-06	2.35E-06	2.4E-06
500	1.25E-06	1.63E-06	1.99E-06	2.24E-06
600	9.94E-07	1.35E-06	1.68E-06	2.03E-06
700	8.14E-07	1.13E-06	1.43E-06	1.82E-06
800	6.81E-07	9.67E-07	1.23E-06	1.63E-06
900	5.8E-07	8.35E-07	1.07E-06	1.46E-06
1000	5.02E-07	7.3E-07	9.44E-07	1.32E-06

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Diesel PM Cancer Risk Value vs Distance ACTM

Distance (ft)	100HP	175HP	250HP	500HP
100	4.03E-07	1.49E-07	1.11E-07	2.24E-08
200	5.67E-07	3.8E-07	4.02E-07	2.27E-07
300	4.57E-07	3.55E-07	4.04E-07	3.57E-07
400	3.52E-07	2.97E-07	3.52E-07	3.6E-07
500	2.74E-07	2.44E-07	2.98E-07	3.36E-07
600	2.19E-07	2.03E-07	2.52E-07	3.04E-07
700	1.79E-07	1.7E-07	2.15E-07	2.73E-07
800	1.5E-07	1.45E-07	1.85E-07	2.44E-07
900	1.28E-07	1.25E-07	1.61E-07	2.19E-07
1000	1.1E-07	1.09E-07	1.42E-07	1.98E-07

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Diesel PM Cancer Risk Value vs Distance Proposed Project

Distance (ft)	100HP	175HP	250HP	500HP
100	1.83E-08	9.91E-09	7.41E-09	1.49E-09
200	2.58E-08	2.54E-08	2.68E-08	1.52E-08
300	2.08E-08	2.37E-08	2.69E-08	2.38E-08
400	1.6E-08	1.98E-08	2.35E-08	2.4E-08
500	1.25E-08	1.63E-08	1.99E-08	2.24E-08
600	9.94E-09	1.35E-08	1.68E-08	2.03E-08
700	8.14E-09	1.13E-08	1.43E-08	1.82E-08
800	6.81E-09	9.67E-09	1.23E-08	1.63E-08
900	5.8E-09	8.35E-09	1.07E-08	1.46E-08
1000	5.02E-09	7.3E-09	9.44E-09	1.32E-08