APPENDIX B

EMISSIONS REDUCTION ANALYSIS FOR PROPOSED AMENDMENTS TO RULE 4306 AND RULE 4320

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APPENDIX B
EMISSIONS REDUCTION CALCULATIONS FOR RULES 4306 AND 4320

I. Summary

As shown in this analysis, the proposed amendments will result in total emission reductions of 0.99 tons NOx/Day in 2024 and 0.16 tons NOx/Day in 2030.

Table B-1 Emission Summaries

Rule	NOx Baseline (tons/day)	NOx Reductions (tons/day)
4306 (2024)	6.02	0.99
4306 (2030)	6.02	0.16

II. Emissions Reductions for NOx – Rule 4306

District staff used the Permit Database to identify the number of boilers, steam generators, and process heaters as well as the rated heat input of each unit so they could be appropriately distributed in the range of rated heat inputs for which different emission limits are established. There are 1,175 permitted boilers, steam generators, and process heaters subject to amendments of Rule 4306.

The oilfield steam generators and refinery units were assumed to be operated at 80% of their maximum rated heat input capacity while all other units were assumed to operate at 50% capacity. Based on the calculations shown in Table B-2, the proposed controls would result in emission reductions of 0.99 tons of NOx/day in 2024 and 0.16 tons of NOx per day in 2030. This is a reduction of 16.4% in 2024 and 2.6% in 2030 from the calculated baseline of 6.02 tons of NOx/day.

The emission inventory used in the 2018 PM2.5 Plan had a 2024 baseline of 1.18 tons of NOx per day and a baseline of 1.00 tons of NOx per day in 2030. To effectively compare the baselines, the calculated percent reduction is multiplied by the Plan baseline.

Normalized emission reduction (2024) = 1.18 tons per day NOx x 16.4%
= 0.19 tons per day NOx

Normalized emission reduction (2030) = 1.00 tons per day NOx x 2.6%
= 0.03 tons per day NOx

Table B-2 NOx Emissions Reduction Calculation for Rule 4306 Limits

Category	Permitted Level	# Units	Total MMBtu/hr	Operating Capacity	Current ppmv	Current lb/MMBtu	Current Emission (tpd)	New ppmv	New lb/MMBtu	New Emission (tpd)	Reduction in 2023 (tpd)	Reduction in 2029 (tpd)
A. 5 to 20.0 MMBtu/hr	**Fire Tube Boilers 15 ppm**	19	258	0.50	15	0.0182	0.028	7	0.0085	0.013	0.015	
	Fire Tube Boilers 9 ppm	143	2,073	0.50	9	0.0109	0.136	7	0.0085	0.106	N/A	0.030
	Fire Tube Boiler 8 ppm	1	11	0.50	7	0.0097	0.001	7	0.0085	0.001	N/A	0.000
	Fire Tube Boilers 7 ppm	9	170	0.50	7	0.0085	0.009	7	0.0085	0.009	0.000	
	Fire Tube Boilers 6 ppm	3	35	0.50	6	0.0073	0.002	6	0.0073	0.002	0.000	
	Fire Tube Boilers 5 ppm	3	45	0.50	5	0.0061	0.002	5	0.0061	0.002	0.000	
	Units at Schools	9	112.60	0.50	9	0.0109	0.007	9	0.0109	0.007	0.000	
	Units Fired on Digester Gas	2	33.50	0.50	9	0.0109	0.002	9	0.0109	0.002	0.000	
	Thermal Fluid Heaters	3	31.30	0.50	9	0.0109	0.002	9	0.0109	0.002	0.000	
	Other Units 15 ppm	17	228	0.50	15	0.0182	0.025	9	0.0109	0.015	0.010	
	Other Units 12 ppm	2	17	0.50	12	0.0146	0.001	9	0.0109	0.001	N/A	0.000
	Other Unit 9 ppm	83	869	0.50	9	0.0109	0.057	9	0.0109	0.057	0.000	
	Other Unit 7 ppm	3	48	0.50	7	0.0085	0.002	7	0.0085	0.002	0.000	
	Other Unit 6 ppm	4	65	0.50	6	0.0073	0.003	6	0.0073	0.003	0.000	
	Other Unit 5 ppm	1	20	0.50	5	0.0061	0.001	5	0.0061	0.001	0.000	
B. 20-75 MMBtu/hr	**Fire Tube Boilers 9 ppm**	25	732	0.50	9	0.0109	0.048	7	0.0085	0.037	N/A	0.011
	Fire Tube Boilers 7 ppm	48	1,421	0.50	7	0.0085	0.072	7	0.0085	0.072	0.000	
	Fire Tube Boilers 6 ppm	2	67	0.50	6	0.0073	0.003	6	0.0073	0.003	0.000	
	Fire Tube Boilers 5 ppm	12	355	0.50	5	0.0061	0.013	5	0.0061	0.013	0.000	
	Fire Tube Boilers 2.5 ppm	1	29	0.50	2.5	0.003	0.001	2.5	0.003	0.001	0.000	
	Other Units 9 ppm	9	413	0.50	9	0.0109	0.027	7	0.0085	0.021	N/A	0.006
	Other Units 7 ppm	33	1,682	0.50	7	0.0085	0.086	7	0.0085	0.086	0.000	
	Other Units 6 ppm	2	70	0.50	6	0.0073	0.003	6	0.0073	0.003	0.000	
	Other Units 5 ppm	12	587	0.50	5	0.0061	0.021	5	0.0061	0.021	0.000	

Category	Permitted Level	# Units	Total MMBtu/hr	Operating Capacity	Current ppmv	Current lb/MMBtu	Current Emission (tpd)	New ppmv	New lb/MMBtu	New Emission (tpd)	Reduction in 2023 (tpd)	Reduction in 2029 (tpd)
B. >75 MMBtu/hr	**9 ppm**	2	300	0.50	9	0.0109	0.020	5	0.0061	0.011	0.009	
	7 ppm	54	7,071	0.50	7	0.0085	0.361	5	0.0061	0.259	N/A	0.102
	6 ppm	7	942	0.50	6	0.0073	0.041	5	0.0061	0.034	N/A	0.007
	5 ppm	23	3,161	0.50	5	0.0061	0.116	5	0.0061	0.116	0.000	
C.1 OFSG 5-20 MMBtu/hr	**15 ppm**	1	15	0.80	15	0.0182	0.003	9	0.0109	0.002	0.001	
	9 ppm	5	99	0.80	9	0.0109	0.010	9	0.0109	0.010	0.000	
	7 ppm	1	20	0.80	7	0.0085	0.002	7	0.0085	0.002	0.000	
	6 ppm	1	18	0.80	6	0.0073	0.001	6	0.0073	0.001	0.000	
C.2 OFSG 20-75 MMBtu/hr	**15 ppm**	180	11,226	0.80	15	0.0182	1.961	9	0.0109	1.175	0.787	
	14 ppm	15	938	0.80	14	0.017	0.153	9	0.0109	0.098	0.055	
	12 ppm	1	63	0.80	12	0.0146	0.009	9	0.0109	0.007	0.002	
	10.5 ppm	10	690	0.80	10.5	0.0128	0.085	9	0.0109	0.072	0.013	
	9 ppm	4	140	0.80	9	0.0109	0.015	9	0.0109	0.015	0.000	
	7 ppm	60	3,338	0.80	7	0.0085	0.272	7	0.0085	0.272	0.000	
	5 ppm	6	375	0.80	5	0.0061	0.022	5	0.0061	0.022	0.000	
C.3 OF SG <75 MMBtu/hr	**7 ppm**	100	8,507	0.80	7	0.0085	0.694	7	0.0085	0.694	0.000	
	6 ppm	6	510	0.80	6	0.0073	0.036	6	0.0073	0.036	0.000	
	5 ppm	28	2,380	0.80	5	0.0061	0.139	5	0.0061	0.139	0.000	
C.4 OFSG <50% PUC	**15 ppm**	45	2,813	0.80	15	0.0182	0.491	15	0.0182	0.491	0.000	
	14 ppm	12	750	0.80	14	0.017	0.122	14	0.017	0.122	0.000	
	9 ppm	51	3,088	0.80	9	0.0109	0.323	9	0.0109	0.323	0.000	
	7 ppm	30	2,401	0.80	7	0.0085	0.196	7	0.0085	0.196	0.000	
	5 ppm	4	250	0.80	5	0.0061	0.015	5	0.0061	0.015	0.000	
D.1 Refinery Boilers <40 MMBtu/hr	**30 ppm**	1	31	0.50	30	0.0364	0.007	30	0.0364	0.007	0.000	
	5 ppm	1	27	0.50	5	0.0061	0.001	5	0.0061	0.001	0.000	

Category	Permitted Level	# Units	Total MMBtu/hr	Operating Capacity	Current ppmv	Current lb/MMBtu	Current Emission (tpd)	New ppmv	New lb/MMBtu	New Emission (tpd)	Reduction in 2023 (tpd)	Reduction in 2029 (tpd)
D.2 Refinery Boilers >40 MMBtu/hr to <110 MMBtu/hr	**25 ppm**	3	292	0.50	25	0.0304	0.053	9	0.0109	0.019	0.034	
D.3 Refinery Boilers >110 MMBtu/hr	**5 ppm**	1	200	0.50	5	0.0061	0.007	5	0.0061	0.007	0.000	
D.4 Refinery Heaters <40 MMBtu/hr	**30 ppm**	27	571	0.50	30	0.0364	0.125	30	0.0364	0.125	0.000	
	25 ppm	13	214	0.50	25	0.0304	0.039	25	0.0304	0.039	0.000	
	9 ppm	1	8	0.50	9	0.0109	0.001	9	0.0109	0.001	0.000	
	6 ppm	1	15	0.50	6	0.0073	0.001	6	0.0073	0.001	0.000	
D.5 Refinery Heaters >40 MMBtu/hr to <110 MMBtu/hr	**30 ppm**	7	424	0.50	30	0.0364	0.093	15	0.0182	0.046	0.046	
	25 ppm	2	185	0.50	25	0.0304	0.034	15	0.0182	0.020	0.014	
D.6 Refinery Heaters <110 MMBtu/hr	**5 ppm**	1	233	0.50	5	0.0061	0.009	5	0.0061	0.009	0.000	
E. Units limited by a Permit to Operate to an annual heat input > 9 billion Btu/year but < 30 billion Btu/year.	**30 ppm**	12	282.02	0.10	30	0.0364	0.012	30	0.0364	0.012	0.000	
	20 ppm	1	12.75	0.10	20	0.0243	0.000	20	0.0243	0.000	0.000	
	15 ppm	1	7.00	0.10	15	0.0182	0.000	15	0.0182	0.000	0.000	
	9 ppm	11	123.16	0.10	9	0.0109	0.002	9	0.0109	0.002	0.000	
	TOTAL	1,175	61,089				6.02			4.88	0.99	0.16
									Percent Reduction		**16.4%**	**2.6%**