

Appendix 9-B
Emissions Tables

**Appendix B: Table B-1
CPV Valley Energy Center
Combined Cycle Turbine Emissions
Natural Gas Firing**

SWPC 5000F Combustion Turbine in Combined Cycle Mode

GT Operating Mode																	Startup Emissions		
		-5	-5	-5	-5	51	51	51	51	51	90	90	90	90	90	90	51	51	51
		98%	98%	80%	60%	BASE	BASE	BASE	80%	60%	BASE	BASE	BASE	BASE	80%	60%	Cold Start	Warm Start	Hot Start
		Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane
Ambient Temp, °F																			
% Load																			
Fuel Type																			
Evaporative Cooler Operation (85% effectiveness)		Off	Off	Off	Off	Off	Off	Off	Off	Off	On	On	Off	Off	Off	Off	Off	Off	Off
Combustion Turbine (CTG) Heat Input, mmBtu/hr (HHV)		2,234	2,234	2,083	1,551	1,998	1,998	1,998	1,861	1,364	1,855	1,855	1,855	1,855	1,689	1,243	1,364	1,364	1,364
Duct Burner Operation		Off	On	Off	Off	On	On	Off	Off	Off	On	Off	On	Off	Off	Off	Off	Off	Off
Duct Burner Heat Input, mmBtu/hr (HHV)		--	500.0	--	--	185.4	500.0	--	--	--	500.0	--	500.0	--	--	--	--	--	--
Combined Power Output of 2 CTG's & STG, MW		669.6	669.6	458.8	349.5	649.3	649.3	604.9	401.8	88.2	653.2	549.7	653.2	549.7	352.8	270.8	-	-	-
Controlled CTG and DB Pollutant Concentrations																			
NO _x ppmvd @ 15% O ₂		2.0	2.0	2.0	2.0	2.00	2.00	2.0	2.0	2.0	2.00	2.0	2.00	2.0	2.0	2.0	-	-	-
CO ppmvd @ 15% O ₂		2.0	3.3	2.0	2.0	2.66	3.44	2.0	2.0	2.0	3.50	2.0	3.55	2.0	2.0	2.0	-	-	-
VOC ppmvd @ 15% O ₂		0.7	1.6	0.7	0.7	1.12	1.67	0.7	0.7	0.7	1.72	0.7	1.77	0.7	0.7	0.7	-	-	-
NH ₃ ppmvd @ 15% O ₂		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	-	-	-
Controlled CTG and DB Emission Factors, lb/mmBtu (HHV)																			
NO _x		0.0075	0.0093	0.0068	0.0074	0.0076	0.0076	0.0075	0.0067	0.0075	0.0076	0.0075	0.0074	0.0073	0.0068	0.0075	-	-	-
CO		0.0046	0.0090	0.0041	0.0179	0.0059	0.0077	0.0046	0.0041	0.0183	0.0078	0.0045	0.0077	0.0044	0.0041	0.0183	-	-	-
VOC		0.0009	0.0025	0.0008	0.0027	0.0014	0.0021	0.0009	0.0008	0.0028	0.0022	0.0009	0.0022	0.0009	0.0008	0.0028	-	-	-
SO ₂		0.0022	0.0027	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	-	-	-
Sulfuric Acid Mist (H ₂ SO ₄)		0.0007	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	-	-	-
PM/PM-10/PM-2.5 (filterables, condensibles and sulfates)		0.0050	0.0074	0.0047	0.0061	0.0055	0.0062	0.0051	0.0052	0.0068	0.0064	0.0052	0.0064	0.0052	0.0056	0.0073	-	-	-
Controlled CTG and DB Stack Emissions, lb/hr																			
NO _x		16.80	20.80	14.08	11.44	16.52	19.04	15.04	12.56	10.24	17.92	13.92	17.52	13.52	11.44	9.36	35.44	40.95	38.02
CO		10.20	20.20	8.60	27.80	12.91	19.20	9.20	7.60	25.00	18.40	8.40	18.20	8.20	7.00	22.80	269.05	333.56	329.71
VOC		2.03	5.53	1.75	4.20	3.12	5.32	1.82	1.54	3.78	5.18	1.68	5.18	1.68	1.40	3.43	53.07	57.56	51.83
SO ₂		4.87	5.96	4.54	3.38	4.76	5.45	4.36	4.06	2.97	5.13	4.04	5.13	4.04	3.68	2.71	-	-	-
SO ₃		1.22	1.49	1.14	0.85	1.19	1.36	1.09	1.01	0.74	1.28	1.01	1.28	1.01	0.92	0.68	-	-	-
NH ₃		4.77	4.77	4.08	3.48	4.36	4.36	4.36	3.75	3.21	3.96	3.96	3.88	3.88	3.38	2.91	-	-	-
Sulfuric Acid Mist (H ₂ SO ₄)		1.49	1.83	1.39	1.04	1.46	1.67	1.33	1.24	0.91	1.57	1.24	1.57	1.24	1.13	0.83	-	-	-
Ammonia Sulfates ((NH ₄) ₂ SO ₄)		2.01	2.46	1.87	1.40	1.96	2.25	1.80	1.67	1.23	2.12	1.67	2.12	1.67	1.52	1.12	-	-	-
PM-10 (filterables and condensables)		9.10	14.10	8.00	8.00	10.15	13.30	8.30	8.00	8.00	13.00	8.00	13.00	8.00	8.00	8.00	-	-	-
PM-10 (filterables, condensables and sulfates)		11.11	16.56	9.87	9.40	12.12	15.55	10.10	9.67	9.23	15.12	9.67	15.12	9.67	9.52	9.12	9.66	9.65	9.40
Stack Parameters																			
Stack Diameter, m		5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
Stack Diameter, ft		19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Exhaust Flow per Stack, lb/hr		4,332	4,353	3,700	3,143	3,974	3,988	3,966	3,407	2,909	3,688	3,667	3,598	3,577	3,116	2,670	1,454	1,454	1,454
Exhaust Volume, acfm		1,231,680	1,237,785	1,043,520	870,780	1,122,688	1,126,505	1,120,440	950,460	802,740	1,061,761	1,055,580	1,061,916	1,055,580	867,720	740,100	401,370	401,370	401,370
Stack Exit Velocity, ft/s		72.4	72.8	61.3	51.2	66.0	66.2	65.9	55.9	47.2	62.4	62.1	62.4	62.1	51.0	43.5	23.6	23.6	23.6
Stack Exit Velocity, m/s		22.1	22.2	18.7	15.6	20.1	20.2	20.1	17.0	14.4	19.0	18.9	19.0	18.9	15.5	13.3	7.2	7.2	7.2
Stack Exit Temperature, °F		195	195	182	179	182	182	189	178	176	183	183	196	196	175	173	113.5	113.5	113.5
Stack Exit Temperature, deg K				356.5	354.8	356.5	356.5	360.4	354.3	353.2	357.0	357.0	364.3	364.3	352.6	351.5	318.4	318.4	318.4
Emission Rates, g/s																			
NO _x		2.117	2.621	1.774	1.441	2.082	2.399	1.895	1.583	1.290	2.258	1.754	2.208	1.704	1.441	1.179	4.466	5.160	4.791
CO		1.285	2.545	1.084	3.503	1.626	2.419	1.159	0.958	3.150	2.318	1.058	2.293	1.033	0.882	2.873	33.900	42.028	41.544
VOC		0.256	0.697	0.221	0.529	0.393	0.670	0.229	0.194	0.476	0.653	0.212	0.653	0.212	0.176	0.432	6.687	7.252	6.531
SO ₂		0.614	0.751	0.572	0.426	0.600	0.686	0.549	0.511	0.375	0.647	0.510	0.647	0.510	0.464	0.341	-	-	-
Sulfuric Acid Mist (H ₂ SO ₄)		0.188	0.230	0.175	0.131	0.184	0.210	0.168	0.157	0.115	0.198	0.156	0.198	0.156	0.142	0.105	-	-	-
PM-10 (filterables and condensables)		1.147	1.777	1.008	1.008	1.279	1.676	1.046	1.008	1.008	1.638	1.008	1.638	1.008	1.008	1.008	-	-	-
PM-10 (filterables, condensables and sulfates)		1.400	2.086	1.244	1.184	1.527	1.959	1.272	1.219	1.163	1.905	1.218	1.905	1.218	1.199	1.149	1.217	1.216	1.184

Notes:

1) Proposed method of emission control for NO_x is Dry Low-NO_x Burners and SCR when firing natural gas.

2) Sulfur Trioxide, Sulfuric Acid Mist and Ammonia Sulfates emissions are calculated by the following methodology:

$$SO_2 \text{ ----> } SO_3 \text{ conversion} = \boxed{20\%}$$

$$SO_3 \text{ lb/hr} = SO_2 \text{ lb/hr} * (80 \text{ MW}_{SO_3} / 64 \text{ MW}_{SO_2}) * 20\%$$

$$H_2SO_4 \text{ lb/hr} = SO_3 \text{ lb/hr} * (98 \text{ MW}_{H_2SO_4} / 80 \text{ MW}_{SO_3})$$

$$(NH_4)_2SO_4 \text{ lb/hr} = H_2SO_4 \text{ lb/hr} * (132 \text{ MW}_{(NH_4)_2SO_4} / 98 \text{ MW}_{H_2SO_4})$$

Appendix B: Table B-2
CPV Valley Energy Center
Combined Cycle Turbine Emissions
Distillate Oil Firing

SWPC 5000F Combustion Turbine in Combined Cycle Mode

GT Operating Mode												Startup Emissions		
Ambient Temp (°F)	-5	-5	-5	51	51	51	90	90	90	90	51	51	51	
% Load	100%	85%	70%	BASE	85%	70%	BASE	BASE	85%	70%	Cold Start	Warm Start	Hot Start	
Fuel Type	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	Distillate	
Evaporative Cooler Operation (85% effectiveness)	Off	Off	Off	Off	Off	Off	On	Off	Off	Off	Off	Off	On	
Combustion Turbine (CTG) Heat Input, mmBtu/hr (HHV)	2,145	1,867	1,606	1,894	1,662	1,436	1,757	1,698	1,504	1,303	1,435.9	1435.9	1435.9	
Combined Power Output of 2 CTG's & STG (MW)	635.6	456.8	380.0	566.3	400.1	332.7	516.9	501.5	351.3	293.3	-	-	-	
Controlled CTG Pollutant Concentrations														
NO _x	ppmvd @ 15% O ₂	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	-	-	-	
CO	ppmvd @ 15% O ₂	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	-	-	-	
VOC	ppmvd @ 15% O ₂	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	-	-	-	
NH ₃	ppmvd @ 15% O ₂	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	-	-	-	
Controlled CTG Emission Factors, lb/mmBtu (HHV)														
NO _x		0.0240	0.0239	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	0.0240	-	-	-	
CO		0.0035	0.0073	0.0146	0.0049	0.0073	0.0146	0.0049	0.0048	0.0073	-	-	-	
VOC		0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	-	-	-	
SO ₂		0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	-	-	-	
Sulfuric Acid Mist (H ₂ SO ₄)		0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	-	-	-	
PM/PM-10/PM-2.5 (filterables, condensibles and sulfates)		0.0239	0.0242	0.0361	0.0244	0.0247	0.0368	0.0240	0.0242	0.0246	0.0367	-	-	
Controlled CTG Stack Emissions, lb/hr														
NO _x		51.43	44.71	38.57	45.43	39.86	34.43	42.14	40.71	36.14	31.29	81.48	91.74	87.19
CO		7.43	13.60	23.40	9.20	12.20	21.00	8.60	8.20	11.00	19.00	323.48	375.76	369.52
VOC		2.10	1.82	1.54	1.82	1.61	1.40	1.68	1.68	1.47	1.26	187.12	198.28	173.61
SO ₂		3.27	2.85	2.45	2.89	2.53	2.19	2.68	2.59	2.29	1.99	-	-	-
SO ₃		0.82	0.71	0.61	0.72	0.63	0.55	0.67	0.65	0.57	0.50	-	-	-
Sulfuric Acid Mist (H ₂ SO ₄)		1.00	0.87	0.75	0.88	0.78	0.67	0.82	0.79	0.70	0.61	-	-	-
Ammonia Sulfates ((NH ₄) ₂ SO ₄)		1.35	1.17	1.01	1.19	1.04	0.90	1.10	1.07	0.95	0.82	-	-	-
PM-10 (filterables and condensables)		50.00	44.00	57.00	45.00	40.00	52.00	41.00	40.00	36.00	47.00	-	-	-
PM-10 (filterables, condensables and sulfates)		51.35	45.17	58.01	46.19	41.04	52.90	42.10	41.07	36.95	47.82	53.05	52.40	52.16
Stack Parameters														
Stack Diameter, m		5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79
Stack Diameter, ft		19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Exhaust Flow per Stack (lb/hr)		4,442	3,906	3,500	4,015	3,587	3,231	3,712	3,621	3,277	2,955	1,615	1,615	1,615
Exhaust Volume, acfm		1,274,010	1,111,200	976,380	1,147,230	1,005,240	894,180	1,069,140	1,069,140	895,050	824,100	447,090	447,090	447,090
Stack Exit Velocity, ft/s		74.9	65.3	57.4	67.4	59.1	52.6	62.8	62.8	52.6	48.4	26.3	26.3	26.3
Stack Exit Velocity, m/s		22.8	19.9	17.5	20.6	18.0	16.0	19.2	19.2	16.0	14.8	8.0	8.0	8.0
Stack Exit Temperature, °F		209	192	192	204	185	185	203	203	185	185	118	118	118
Stack Exit Temperature, deg K		371.5	362.0	362.0	368.7	358.2	358.2	368.2	368.2	358.2	358.2	320.9	320.9	320.9
Emission Rates, g/s														
NO _x		6.480	5.634	4.860	5.724	5.022	4.338	5.310	5.130	4.554	3.942	10.267	11.559	10.986
CO		0.936	1.714	2.948	1.159	1.537	2.646	1.084	1.033	1.386	2.394	40.759	47.345	46.559
VOC		0.265	0.229	0.194	0.229	0.203	0.176	0.212	0.212	0.185	0.159	23.577	24.983	21.875
SO ₂		0.412	0.359	0.308	0.364	0.319	0.276	0.337	0.326	0.289	0.250	-	-	-
Sulfuric Acid Mist (H ₂ SO ₄)		0.126	0.110	0.094	0.111	0.098	0.084	0.103	0.100	0.088	0.077	-	-	-
PM-10 (filterables and condensables)		6.300	5.544	7.182	5.670	5.040	6.552	5.166	5.040	4.536	5.922	-	-	-
PM-10 (filterables, condensables and sulfates)		6.470	5.692	7.309	5.820	5.172	6.666	5.305	5.175	4.655	6.025	6.685	6.603	6.572

Notes:

- Proposed method of emission control for NO_x is water injection and SCR when firing fuel oil.
- Sulfur Trioxide, Sulfuric Acid Mist and Ammonia Sulfates emissions are calculated by the following methodology:
 - SO₂ ----> SO₃ conversion = 20%
 - SO₃ lb/hr = SO₂ lb/hr * (80 MW_{SO3}/64 MW_{SO2}) * 20%
 - H₂SO₄ lb/hr = SO₃ lb/hr * (98 MW_{H2SO4}/80 MW_{SO3})
 - (NH₄)₂SO₄ lb/hr = H₂SO₄ lb/hr * (132 MW_{(NH4)2SO4}/98 MW_{H2SO4})

Appendix B: Table B-3 CPV Valley Energy Center Combustion Turbine Natural Gas Startup and Shutdown Emissions

Estimated Siemens SGT6-5000F Startup and Shutdown emissions-Natural Gas.

Event	Elapsed Time(hr)	Turbine NO _x ⁽¹⁾ (lb/event)	Stack NO _x ⁽¹⁾ (lb/event)	Turbine CO (lb/event)	Stack CO (lb/event)	VOC ⁽²⁾ (lb/event)	Particulates (lb/event)
<i>Cold Start</i> ⁽³⁾ , 1st CTG	2.87	337	95	4,012	630	150	28
2nd CTG	1.45	157	58	2,386	532	79	14
<i>Warm Start</i> ⁽⁴⁾	1.95	234	77	3,123	569	112	19
	1.28	131	56	2,141	510	74	12
<i>Hot Start</i> ⁽⁵⁾	1.80	177	62	2,320	479	91	17
	0.97	87	44	1,524	433	53	9
<i>Shut Down</i>	1.00	60	43	842	127	22	8

1 As NO₂

2 As CH₄

3 Startup after 72 hour shutdown

4 Startup after 48 hour shutdown

5 Startup after 8 hour shutdown

The above data has been determined based on the following assumptions:

1. Auxiliary Boiler in operation to pre-heat HRSG during start-up.
2. Emissions are estimated based upon data provided by Siemens on 10-29-2007.
3. NO_x Catalyst sized to produce 2 ppmvd at GT full load with duct firing.
4. CO and VOC reductions based upon Catalyst performance provided by VOGT dated on 11-05-07.
5. Stack damper installed to maintain HRSG hot during shut down.

	Type of Start-up or Shut-down Event			
	Cold Startup	Warm Startup	Hot Startup	Shutdown
Duration of Turbine at 0% load prior to Start-up (hr)	>48	8.1 to 48	0 to 8	--
Maximum Duration of Start-up or Shut-down Event (hr)	2.9	2.1	1.8	1
Nox (Lb/hr)	33.00	39.28	34.22	42.50
VOC (Lb/hr)	52.43	57.49	50.44	21.60
CO (Lb/hr)	219.59	291.64	266.17	127.20

Appendix B: Table B-4 CPV Valley Energy Center Combustion Turbine Fuel Oil Startup and Shutdown Emissions

Estimated Siemens SGT6-5000F Startup and Shutdown emissions-Fuel Oil.

Event	Elapsed Time(hr)	Turbine NOx ⁽¹⁾ (lb/event)	Stack NOx ⁽¹⁾ (lb/event)	Turbine CO (lb/event)	Stack CO (lb/event)	VOC ⁽²⁾ (lb/event)	Particulates (lb/event)
<i>Cold Start</i> ⁽³⁾ , 1st CTG	3.03	839	233	6,885	847	574	162
2nd CTG	1.62	406	146	3,727	657	296	84
<i>Warm Start</i> ⁽⁴⁾	2.12	580	187	4,997	721	430	112
	1.45	348	140	3,303	619	277	75
<i>Hot Start</i> ⁽⁵⁾	1.97	480	158	4,109	623	341	104
	1.13	251	112	2,186	523	197	58
<i>Shut Down</i>	1.00	195	111	1,200	169	87	42

1 As NO₂

2 As CH₄

3 Startup after 72 hour shutdown

4 Startup after 48 hour shutdown

5 Startup after 8 hour shutdown

The above data has been determined based on the following assumptions:

1. Auxiliary Boiler in operation to pre-heat HRSG during start-up.
2. Emissions are estimated based upon data provided by Siemens on 10-29-2007.
3. NOx Catalyst sized to produce 5.9 ppmvd at GT full load w/ duct firing.
4. CO and VOC reductions based upon Catalyst performance provided by VOGT dated on 11-05-07.
5. Stack damper installed to maintain HRSG hot during shut down.

	Type of Start-up or Shut-down Event			
	Cold Startup	Warm Startup	Hot Startup	Shutdown
Duration of Turbine at 0% load prior to Start-up (hr)	>48	8.1 to 48	0 to 8	--
Maximum Duration of Start-up or Shut-down Event (hr)	3	2.1	2	1
Nox (Lb/hr)	76.71	88.25	80.39	110.80
VOC (Lb/hr)	189.20	203.24	173.34	86.90
CO (Lb/hr)	279.16	340.58	316.78	168.50

**Appendix B: Table B-5
CPV Valley Energy Center
Combustion Turbine Startup and Shutdown Emissions Summary**

Event	Fuel	Duration of Shutdown Prior to Startup (hours)	Duration (hours)	NO _x			CO			VOC			PM10		
				total (lb)	rate (lb/hr)	rate (gram/sec)	total (lb)	rate (lb/hr)	rate (gram/sec)	total (lb)	rate (lb/hr)	rate (gram/sec)	total (lb)	rate (lb/hr)	rate (gram/sec)
Cold Startup	Natural Gas	>48	2.2	76.5	35.4	4.5	580.7	269.1	33.9	114.6	53.1	6.7	20.9	9.7	1.2
Cold Startup	Distillate Oil	>48	2.3	189.5	81.5	10.3	752.1	323.5	40.8	435.1	187.1	23.6	123.4	53.1	6.7
Warm Startup	Natural Gas	8.1 to 48	1.6	66.2	40.9	5.2	539.3	333.6	42.0	93.1	57.6	7.3	15.6	9.6	1.2
Warm Startup	Distillate Oil	8.1 to 48	1.8	163.6	91.7	11.6	670.1	375.8	47.3	353.6	198.3	25.0	93.5	52.4	6.6
Hot Startup	Natural Gas	0 to 8	1.4	52.6	38.0	4.8	456.1	329.7	41.5	71.7	51.8	6.5	13.0	9.4	1.2
Hot Startup	Distillate Oil	0 to 8	1.6	135.2	87.2	11.0	572.8	369.5	46.6	269.1	173.6	21.9	80.9	52.2	6.6
Shutdown	Natural Gas		1.0	42.5	42.5	5.4	127.2	127.2	16.0	21.6	21.6	2.7	8.0	8.0	1.0
Shutdown	Distillate Oil		1.0	110.8	110.8	14.0	168.5	168.5	21.2	86.9	86.9	10.9	42.4	42.4	5.3

(1) Emissions are for a single unit

**Appendix B: Table B-6
CPV Valley Energy Center
Potential Emissions Summary
Maximum Combined Cycle PTE for any Annual Operating Scenario**

Annual Operating Scenario		Natural Gas Only Operation				Gas/Oil Operation			
Maximum Annual Operation With No Startups				Per Unit	2-Unit Total			Per Unit	2-Unit Total
Annual Turbine Operation, hr/yr				8,760	17,520			8,760	17,520
Annual Turbine Operation on Natural Gas, hr/yr				8,760	17,520			8,040	16,080
Annual Turbine Operation on Fuel Oil, hr/yr				0	0			720	1,440
DB Capacity Factor of Annual Turbine Operation				30%				30%	
Annual DB Operation on Natural Gas, hr/yr				2,628	5,256			2,628	5,256
Annual Generation, MWhr/yr					5,415,245				5,437,381
Annual Emissions, tons/yr				Per Unit	2-Unit Total			Per Unit	2-Unit Total
NO _x				71.13	142.3			84.23	168.5
CO				101.88	203.8			101.30	202.6
VOC				18.58	37.2			17.98	36.0
SO ₂				20.51	41.0			20.12	40.2
H ₂ SO ₄				6.28	12.6			6.16	12.3
PM/PM-10/PM-2.5				51.4	102.8			68.6	137.3
Annual Operation With Cold & Warm Startups				Per Unit	2-Unit Total			Per Unit	2-Unit Total
Number of Start-Ups on Natural Gas	Cold			40	80			36	72
	Warm			235	470			219	438
	Hot			0	0			0	0
Number of Shut Downs on Natural Gas				275	550			255	510
Operating Time Attributed to Gas SUSD, hr/yr				741	1,483			687	1,374
Downtime Prior to Natural Gas Startups, hr/yr				3,800	7,600			3,480	6,960
Number of Start-Ups on Fuel Oil	Cold			0	0			4	8
	Warm			0	0			16	32
	Hot			0	0			0	0
Number of Shut Downs on Fuel Oil				0	0			20	40
Operating Time Attributed to Oil SUSD, hr/yr				0	0			58	116
Downtime Prior to Fuel Oil Startups, hr/yr				0	0			320	640
Annual Turbine Operation on Natural Gas, hr/yr				4,219	8,438			3,553	7,107
Annual Turbine Operation on Fuel Oil, hr/yr				0	0			662	1,324
DB Capacity Factor of Annual Turbine Operation				30%				30%	
Annual DB Operation on Natural Gas, hr/yr				2,628	5,256			2,628	5,256
Annual Generation, MWhr/yr					2,668,470				2,686,812
Annual Emissions, tons/yr		Per Unit		Per Unit	2-Unit Total	Per Unit		Per Unit	2-Unit Total
		Operation	Start-Ups	Total	Total	Operation	Start-Ups	Total	Total
NO _x		36.98	15.15	52.1	104.3	49.00	16.84	65.8	131.7
CO		45.11	92.47	137.6	275.2	44.54	94.27	138.8	277.6
VOC		10.00	16.19	26.2	52.4	9.43	19.57	29.0	58.0
SO ₂		10.62	0	10.6	21.2	10.26	0.00	10.3	20.5
H ₂ SO ₄		3.25	0	3.3	6.5	3.14	0.00	3.1	6.3
Annual Operation With Cold & Hot Startups				Per Unit	2-Unit Total			Per Unit	2-Unit Total
Number of Start-Ups on Natural Gas	Cold			40	80			36	72
	Warm			0	0			0	0
	Hot			235	470			219	438
Number of Shut Downs on Natural Gas				275	550			255	510
Operating Time Attributed to Gas SUSD, hr/yr				686	1,373			636	1,271
Downtime Prior to Natural Gas Startups, hr/yr				2,390	4,780			2,166	4,332
Number of Start-Ups on Fuel Oil	Cold			0	0			4	8
	Warm			0	0			0	0
	Hot			0	0			16	32
Number of Shut Downs on Fuel Oil				0	0			20	40
Operating Time Attributed to Oil SUSD, hr/yr				0	0			54	108
Downtime Prior to Fuel Oil Startups, hr/yr				0	0			224	448
Annual Turbine Operation on Natural Gas, hr/yr				5,684	11,367			5,014	10,029
Annual Turbine Operation on Fuel Oil, hr/yr				0	0			666	1,332
DB Capacity Factor of Annual Turbine Operation				30%				30%	
Annual DB Operation on Natural Gas, hr/yr				2,628	5,256			2,628	5,256
Annual Generation, MWhr/yr					3,554,475				3,170,161
Annual Emissions, tons/yr		Per Unit		Per Unit	2-Unit Total	Per Unit		Per Unit	2-Unit Total
		Operation	Start-Ups	Total	Total	Operation	Start-Ups	Total	Total
NO _x		48.00	13.55	61.6	123.1	60.09	15.12	75.2	150.4
CO		63.42	82.70	146.1	292.2	62.85	84.38	147.2	294.5
VOC		12.77	13.69	26.5	52.9	12.20	16.56	28.8	57.5
SO ₂		13.81	0	13.8	27.6	13.44	0	13.4	26.9
H ₂ SO ₄		4.23	0	4.2	8.5	4.12	0	4.1	8.2
Annual Operation With All Warm Startups				Per Unit	2-Unit Total			Per Unit	2-Unit Total
Number of Start-Ups on Natural Gas	Cold			0	0			0	0
	Warm			275	550			255	510
	Hot			0	0			0	0
Number of Shut Downs on Natural Gas				275	550			255	510
Operating Time Attributed to Gas SUSD, hr/yr				720	1,439			667	1,335
Downtime Prior to Natural Gas Startups, hr/yr				2,200	4,400			2,040	4,080
Number of Start-Ups on Fuel Oil	Cold			0	0			4	8
	Warm			0	0			16	32
	Hot			0	0			0	0
Number of Shut Downs on Fuel Oil				0	0			20	40
Operating Time Attributed to Oil SUSD, hr/yr				0	0			58	116
Downtime Prior to Fuel Oil Startups, hr/yr				0	0			320	640
Annual Turbine Operation on Natural Gas, hr/yr				5,840	11,681			5,013	10,026
Annual Turbine Operation on Fuel Oil, hr/yr				0	0			662	1,324
DB Capacity Factor of Annual Turbine Operation				30%				30%	
Annual DB Operation on Natural Gas, hr/yr				2,628	5,256			2,628	5,256
Annual Generation, MWhr/yr					3,649,335				3,569,590
Annual Emissions, tons/yr		Per Unit		Per Unit	2-Unit Total	Per Unit		Per Unit	2-Unit Total
		Operation	Start-Ups	Total	Total	Operation	Start-Ups	Total	Total
NO _x		49.18	14.95	64.1	128.2	59.98	16.65	76.6	153.3
CO		65.38	91.64	157.0	314.0	62.79	93.52	156.3	312.6
VOC		13.06	15.76	28.8	57.7	12.19	19.19	31.4	62.8
SO ₂		14.15	0	14.2	28.3	13.43	0	13.4	26.9
H ₂ SO ₄		4.33	0	4.3	8.7	4.11	0	4.1	8.2
Annual Operation With All Hot Startups				Per Unit	2-Unit Total			Per Unit	2-Unit Total
Number of Start-Ups on Natural Gas	Cold			0	0			0	0
	Warm			0	0			0	0
	Hot			275	550			255	510
Number of Shut Downs on Natural Gas				275	550			255	510
Operating Time Attributed to Gas SUSD, hr/yr				655	1,311			608	1,216
Downtime Prior to Natural Gas Startups, hr/yr				550	1,100			510	1,020
Number of Start-Ups on Fuel Oil	Cold			0	0			4	8
	Warm			0	0			0	0
	Hot			0	0			16	32
Number of Shut Downs on Fuel Oil				0	0			20	40
Operating Time Attributed to Oil SUSD, hr/yr				0	0			54	108
Downtime Prior to Fuel Oil Startups, hr/yr				0	0			224	448
Annual Turbine Operation on Natural Gas, hr/yr				7,555	15,109			6,698	13,397
Annual Turbine Operation on Fuel Oil, hr/yr				0	0			666	1,332
DB Capacity Factor of Annual Turbine Operation				30%				30%	
Annual DB Operation on Natural Gas, hr/yr				2,628	5,256			2,628	5,256
Annual Generation, MWhr/yr					4,686,149				4,188,668
Annual Emissions, tons/yr		Per Unit		Per Unit	2-Unit Total	Per Unit		Per Unit	2-Unit Total
		Operation	Start-Ups	Total	Total	Operation	Start-Ups	Total	Total
NO _x		62.07	13.08	75.1	150.3	72.75	14.69	87.4	174.9
CO		86.81	80.20	167.0	334.0	83.90	82.14	166.0	332.1
VOC		16.30	12.83	29.1	58.3	15.38	15.79	31.2	62.3
SO ₂		17.89	0	17.9	35.8	17.11	0	17.1	34.2
H ₂ SO ₄		5.48	0	5.5	11.0	5.24	0	5.2	10.5

Appendix B: Table B-7
CPV Valley Energy Center
Proposed Potential Emissions for the Auxiliary Boiler

<u>Operating Hours</u>	2000	<u>Stack Parameters</u>	
Fuel Type	Nat Gas	Stack ID (ft.)	19.0
Fuel Heating Value, HHV (Btu/scf)	1,048	Exhaust Flow (acfm)	19,301
Standard Cubic Feet per Hour	70,116	Stack Velocity (ft/min)	68
Fuel Input in MMBtu per Hour (HHV)	73.5	Stack Velocity (m/sec)	0.3
Annual Fuel Usage (scf/year)	1.40E+08	Stack Temperature (°F)	300

Pollutant	Emission Factor		Source	Short Term	Long Term
	(lb/MMBtu)	(lb/scf)		Emissions (lb/hr)	Emissions (ton/yr)
Criteria Air Pollutants					
NOx	4.50E-02		1	3.31	3.31
CO	7.21E-02		1	5.30	5.30
SOx	2.18E-03		1	0.16	0.16
VOC	3.78E-03		1	0.28	0.28
PM ₁₀ /PM _{2.5}	6.31E-03		1	0.46	0.46
PM	6.31E-03		1	0.46	0.46
Sulfuric Acid	1.67E-04		2	1.23E-02	1.23E-02

1. PB Power, Inc.
2. Assume that 5% of SO₂ is converted to H₂SO₄

Appendix B: Table B-8 CPV Valley Energy Center Proposed Potential Emissions for the Gas Heater

Operating Parameters:

Operating Hours	8760
Fuel Type	Nat Gas
Fuel Heating Value, HHV (Btu/scf)	1,048
Fuel Input, HHV (MMBtu/hr)	5.02
Number of heaters	2

Stack Parameters:

Stack Height (ft.)	26
Stack Height (m.)	7.92
Stack Temperature (°F)	850
Stack Temperature (°K)	727.6
Stack Velocity (ft/s)	16.07
Stack Velocity (m/s)	4.9
Stack ID (ft.)	2.0
Stack ID (m.)	0.61

Pollutant	Emission Factor (lb/mmBtu)	Short-Term Emissions (per heater)		Total Annual Emissions (ton/yr)
		(lb/hr)	(g/s)	
<u>Criteria Air Pollutants</u>				
CO	0.0840	0.4219	0.0532	3.70
NO _x	0.0575	0.289	0.0364	2.53
SO ₂	0.0022	0.011	0.0014	0.10
VOC	0.0110	0.055	0.0070	0.48
PM10/PM2.5	0.0076	0.038	0.0048	0.33
PM	0.0076	0.038	0.0048	0.33
Sulfuric Acid	0.00017	0.001	0.0001	0.01

Appendix B: Table B-9
CPV Valley Energy Center
Proposed Potential Emissions for the Emergency Generator

Operating Hours	500	Generator Efficiency	95%
Fuel Type	ULSD	Engine Horsepower	2,117
Fuel Heating Value, HHV (Btu/gal)	139,728	Stack Parameters	
Gallon per Hour	110.4	Stack ID (ft.)	1.5
Assumed Heat Rate (Btu/kW-hr)	10,287	Exhaust Flow (acfm)	11,061
Fuel Input in MMBtu per Hour	15.43	Stack Velocity (ft/min)	6,259
Output in kW	1,500	Stack Velocity (m/sec)	31.8
Annual Fuel Usage (gallon/year)	55,216	Stack Temperature (°F)	764
Sulfur Content of Fuel	0.0015%		

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (g/hp-hr)	Source	Short Term Emissions (lb/hr)	Long Term Emissions (ton/yr)
<u>Criteria Air Pollutants</u>					
NOx		4.97	2	23.20	5.80
CO		0.45	2	2.10	0.53
SOx	1.38E-03		4	0.0213	5.33E-03
VOC		0.11	2	0.51	0.13
PM ₁₀ /PM _{2.5}		0.03	2	0.14	0.04
PM		0.03	2	0.14	0.04
Sulfuric Acid	3.10E-05		3,4	4.79E-04	1.20E-04

- Stack exhaust temperature and flow from Caterpillar data sheet (CAT3512C Diesel Engine)
- Emission factors based on Caterpillar data sheet (CAT3512C Diesel Engine) and are NSPS Subpart IIII compliant. Emissions calculated assuming 95% efficiency.
- Emissions based on Toxic Air Pollutant Emission Factors - A Compilation for Selected Air Toxics Compounds and Sources: October, 1990, EPA-450/2-90-011.
- Mass balance

Appendix B: Table B-10
CPV Valley Energy Center
Proposed Potential Emissions for the Fire Water Pump Engine

Operating Hours	500	Stack Parameters ⁵	
Fuel Type	ULSD	Stack ID (ft.)	0.50
Fuel Heating Value, HHV (Btu/gal)	139,728	Exhaust Flow (acfm)	1,605
Gallons per Hour	16.3	Stack Velocity (ft/min)	8,174
Assumed Efficiency	36%	Stack Velocity (m/sec)	41.5
Fuel Input (MMBtu/hr)	2.27	Stack Temperature (°F)	952
BHP Rating	325		
Assumed Heat Rate (Btu/kW-hr)	10,287		
Annual Fuel Usage (gal/year)	8,140		
Sulfur Content in Fuel	0.0015%		

Pollutant	Emission Factor (lbs/MMBtu)	Emission Factor (g/kW-hr)	Source	Short Term Emissions (lb/hr)	Long Term Emissions (ton/yr)
<u>Criteria Air Pollutants</u>					
NOx	8.57E-01	4.00	1	1.95	0.488
CO	7.50E-01	3.50	1	1.71	0.427
SOx	1.43E-03		6	3.25E-03	8.13E-04
VOC	0.36		2	0.82	0.205
PM ₁₀ /PM _{2.5}	4.29E-02	0.20	1	0.10	0.024
PM	4.29E-02	0.20	1	0.10	0.024
Sulfuric Acid	3.10E-05		3/4	7.06E-05	1.77E-05

1. Caterpillar 3406C data sheet states emission are Tier 1 compliant. For emission estimation purposes, assumed regulatory limit for NMHC+NOx as max emission rate for NOx and AP-42 for VOC emission rate. In no way will total NMHC+Nox emissions be greater than the standards specified in NSPS Subpart IIII.
2. AP-42, 5th Edition Tables 3.3-1 and 3.3-2, November 1996
3. Emissions based on Toxic Air Pollutant Emission Factors - A Compilation for Selected Air Toxics Compounds and Sources: October, 1990, EPA-450/2-90-011.
4. Emission factor for sulfuric acid is 8.9(%S) ng/J.
5. Assumed same exhaust parameters as 317 bhp Cummins diesel engine which has stack exhaust gas flowrate of 1605 acfm at 952 °F.
6. Mass balance

Appendix B: Table B-12
CPV Valley Energy Center
Combined Cycle Unit Non-Criteria Pollutant Emissions
(Page 1 of 6)

Fuel		°F	Methane 90	Methane 90	Methane 90	Methane 90	Methane 90	Methane 90	Methane 51	Methane 51	Methane 51	Methane 51	Methane 51	Methane -5	Methane -5	Methane -5	Methane -5
Ambient Temp.			BASE	BASE	BASE	BASE	80%	60%	BASE	BASE	BASE	80%	60%	98%	98%	80%	60%
Turbine Load			On	On	On	On	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Inlet Air Cooling			mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr
CTG Heat Input-HHV			1,855	1,855	1,855	1,855	1,689	1,243	1,998	1,998	1,998	1,861	1,364	2,234	2,234	2,083	1,551
Duct Burner Status			On	Off	On	Off	Off	Off	On	On	Off	Off	Off	On	Off	Off	Off
Duct Burner Firing Rate			mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr	mmBtu/hr
1,3-Butadiene	a	(lb/hr)	7.98E-04	7.98E-04	7.98E-04	7.98E-04	7.26E-04	5.35E-04	8.59E-04	8.59E-04	8.59E-04	8.00E-04	5.87E-04	9.60E-04	9.60E-04	8.96E-04	6.67E-04
1,1,1-Trichloroethane		(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichlorobenzene	a	(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene		(lb/hr)	1.18E-05	0.00E+00	1.18E-05	0.00E+00	0.00E+00	0.00E+00	4.36E-06	1.18E-05	0.00E+00	0.00E+00	0.00E+00	1.18E-05	0.00E+00	0.00E+00	0.00E+00
3-Methylchloranthrene	a,b	(lb/hr)	8.82E-07	0.00E+00	8.82E-07	0.00E+00	0.00E+00	0.00E+00	3.27E-07	8.82E-07	0.00E+00	0.00E+00	0.00E+00	8.82E-07	0.00E+00	0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	a,b	(lb/hr)	7.84E-06	0.00E+00	7.84E-06	0.00E+00	0.00E+00	0.00E+00	2.91E-06	7.84E-06	0.00E+00	0.00E+00	0.00E+00	7.84E-06	0.00E+00	0.00E+00	0.00E+00
Acenaphthene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Acenaphthylene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Acetaldehyde	a	(lb/hr)	7.42E-02	7.42E-02	7.42E-02	7.42E-02	6.76E-02	5.53E-02	7.99E-02	7.99E-02	7.99E-02	7.44E-02	6.07E-02	8.93E-02	8.93E-02	8.33E-02	6.90E-02
Acrolein	a	(lb/hr)	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.08E-02	1.03E-02	1.28E-02	1.28E-02	1.28E-02	1.19E-02	1.13E-02	1.43E-02	1.43E-02	1.33E-02	1.29E-02
Ammonia		(lb/hr)	3.96E+00	3.96E+00	3.88E+00	3.88E+00	3.88E+00	2.91E+00	4.36E+00	4.36E+00	4.36E+00	3.75E+00	3.21E+00	4.77E+00	4.77E+00	4.08E+00	3.48E+00
Anthracene	a,b	(lb/hr)	2.12E-04	2.11E-04	2.12E-04	2.11E-04	1.92E-04	1.29E-04	2.28E-04	2.29E-04	2.27E-04	2.12E-04	1.55E-04	2.55E-04	2.54E-04	2.37E-04	1.77E-04
Arsenic	a	(lb/hr)	9.80E-05	0.00E+00	9.80E-05	0.00E+00	0.00E+00	0.00E+00	3.63E-05	9.80E-05	0.00E+00	0.00E+00	0.00E+00	9.80E-05	0.00E+00	0.00E+00	0.00E+00
Barium		(lb/hr)	2.16E-03	0.00E+00	2.16E-03	0.00E+00	0.00E+00	0.00E+00	8.00E-04	2.16E-03	0.00E+00	0.00E+00	0.00E+00	2.16E-03	0.00E+00	0.00E+00	0.00E+00
Benz(a)anthracene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Benzene	a	(lb/hr)	2.33E-02	2.23E-02	2.33E-02	2.23E-02	2.03E-02	1.28E-01	2.44E-02	2.50E-02	2.40E-02	2.23E-02	1.40E-01	2.78E-02	2.68E-02	2.50E-02	1.60E-01
Benzo(a)pyrene	a,b	(lb/hr)	1.06E-04	1.06E-04	1.06E-04	1.06E-04	9.61E-05	7.07E-05	1.14E-04	1.14E-04	1.14E-04	1.06E-04	7.76E-05	1.28E-04	1.27E-04	1.18E-04	8.83E-05
Benzo(b)fluoranthene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Benzo(b,k)fluoranthene		(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	a,b	(lb/hr)	1.06E-04	1.06E-04	1.06E-04	1.06E-04	9.61E-05	7.07E-05	1.14E-04	1.14E-04	1.14E-04	1.06E-04	7.76E-05	1.28E-04	1.27E-04	1.18E-04	8.83E-05
Benzo(k)fluoranthene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Beryllium	a	(lb/hr)	5.88E-06	0.00E+00	5.88E-06	0.00E+00	0.00E+00	0.00E+00	2.18E-06	5.88E-06	0.00E+00	0.00E+00	0.00E+00	5.88E-06	0.00E+00	0.00E+00	0.00E+00
Butane		(lb/hr)	1.03E+00	0.00E+00	1.03E+00	0.00E+00	0.00E+00	0.00E+00	3.82E-01	1.03E+00	0.00E+00	0.00E+00	0.00E+00	1.03E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	a	(lb/hr)	5.39E-04	0.00E+00	5.39E-04	0.00E+00	0.00E+00	0.00E+00	2.00E-04	5.39E-04	0.00E+00	0.00E+00	0.00E+00	5.39E-04	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	a	(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene	a	(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chloroform	a	(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	a	(lb/hr)	6.86E-04	0.00E+00	6.86E-04	0.00E+00	0.00E+00	0.00E+00	2.54E-04	6.86E-04	0.00E+00	0.00E+00	0.00E+00	6.86E-04	0.00E+00	0.00E+00	0.00E+00
Chrysene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Cobalt	a	(lb/hr)	4.12E-05	0.00E+00	4.12E-05	0.00E+00	0.00E+00	0.00E+00	1.53E-05	4.12E-05	0.00E+00	0.00E+00	0.00E+00	4.12E-05	0.00E+00	0.00E+00	0.00E+00
Copper		(lb/hr)	4.17E-04	0.00E+00	4.17E-04	0.00E+00	0.00E+00	0.00E+00	1.54E-04	4.17E-04	0.00E+00	0.00E+00	0.00E+00	4.17E-04	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)anthracene	a,b	(lb/hr)	1.06E-04	1.06E-04	1.06E-04	1.06E-04	9.61E-05	7.07E-05	1.14E-04	1.14E-04	1.14E-04	1.06E-04	7.76E-05	1.28E-04	1.27E-04	1.18E-04	8.83E-05
Dichlorobenzene	a	(lb/hr)	5.88E-04	0.00E+00	5.88E-04	0.00E+00	0.00E+00	0.00E+00	2.18E-04	5.88E-04	0.00E+00	0.00E+00	0.00E+00	5.88E-04	0.00E+00	0.00E+00	0.00E+00
Ethane		(lb/hr)	1.52E+00	0.00E+00	1.52E+00	0.00E+00	0.00E+00	0.00E+00	5.63E-01	1.52E+00	0.00E+00	0.00E+00	0.00E+00	1.52E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	a	(lb/hr)	5.94E-02	5.94E-02	5.94E-02	5.94E-02	5.40E-02	3.98E-02	6.39E-02	6.39E-02	6.39E-02	5.95E-02	4.37E-02	7.15E-02	7.15E-02	6.66E-02	4.96E-02
Ethylene Dichloride	a	(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	a,b	(lb/hr)	2.65E-04	2.64E-04	2.65E-04	2.64E-04	2.40E-04	1.77E-04	2.85E-04	2.86E-04	2.84E-04	2.65E-04	1.94E-04	3.19E-04	3.18E-04	2.96E-04	2.21E-04
Fluorene	a,b	(lb/hr)	2.48E-04	2.46E-04	2.48E-04	2.46E-04	2.24E-04	1.65E-04	2.66E-04	2.67E-04	2.65E-04	2.47E-04	1.81E-04	2.98E-04	2.97E-04	2.76E-04	2.06E-04
Formaldehyde	a	(lb/hr)	2.41E-01	2.04E-01	2.41E-01	2.04E-01	1.86E-01	1.37E-01	2.33E-01	2.57E-01	2.20E-01	2.05E-01	1.50E-01	2.82E-01	2.46E-01	2.29E-01	1.71E-01
Hexane	a	(lb/hr)	8.82E-01	0.00E+00	8.82E-01	0.00E+00	0.00E+00	0.00E+00	3.27E-01	8.82E-01	0.00E+00	0.00E+00	0.00E+00	8.82E-01	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	a,b	(lb/hr)	1.59E-04	1.58E-04	1.59E-04	1.58E-04	1.44E-04	1.06E-04	1.71E-04	1.71E-04	1.71E-04	1.59E-04	1.16E-04	1.92E-04	1.91E-04	1.78E-04	1.32E-04
Lead	a	(lb/hr)	2.45E-04	0.00E+00	2.45E-04	0.00E+00	0.00E+00	0.00E+00	9.09E-05	2.45E-04	0.00E+00	0.00E+00	0.00E+00	2.45E-04	0.00E+00	0.00E+00	0.00E+00
Manganese	a	(lb/hr)	1.86E-04	0.00E+00	1.86E-04	0.00E+00	0.00E+00	0.00E+00	6.91E-05	1.86E-04	0.00E+00	0.00E+00	0.00E+00	1.86E-04	0.00E+00	0.00E+00	0.00E+00
Mercury	a	(lb/hr)	1.27E-04	0.00E+00	1.27E-04	0.00E+00	0.00E+00	0.00E+00	4.73E-05	1.27E-04	0.00E+00	0.00E+00	0.00E+00	1.27E-04	0.00E+00	0.00E+00	0.00E+00
Methylene Chloride	a	(lb/hr)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum		(lb/hr)	5.39E-04	0.00E+00	5.39E-04	0.00E+00	0.00E+00	0.00E+00	2.00E-04	5.39E-04	0.00E+00	0.00E+00	0.00E+00	5.39E-04	0.00E+00	0.00E+00	0.00E+00
Napthalene	a,c	(lb/hr)	2.71E-03	2.41E-03	2.71E-03	2.41E-03	2.20E-03	1.70E-03	2.71E-03	2.90E-03	2.60E-03	2.42E-03	1.87E-03	3.20E-03	2.90E-03	2.71E-03	2.13E-03
Nickel	a	(lb/hr)	1.03E-03	0.00E+00	1.03E-03	0.00E+00	0.00E+00	0.00E+00	3.82E-04	1.03E-03	0.00E+00	0.00E+00	0.00E+00	1.03E-03	0.00E+00	0.00E+00	0.00E+00
PAH	a,b	(lb/hr)	4.08E-03	4.08E-03	4.08E-03	4.08E-03	3.72E-03	2.80E-03	4.40E-03	4.40E-03	4.40E-03	4.09E-03	3.07E-03	4.91E-03	4.91E-03	4.58E-03	3.49E-03
Pentane		(lb/hr)	1.27E+00	0.00E+00	1.27E+00	0.00E+00	0.00E+00	0.00E+00	4.73E-01	1.27E+00	0.00E+00	0.00E+00	0.00E+00	1.27E+00	0.00E+00	0.00E+00	0.00E+00

Appendix B: Table B-12
CPV Valley Energy Center
Combined Cycle Unit Non-Criteria Pollutant Emissions
(Page 3 of 6)

Fuel		°F	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane	Methane
Ambient Temp.		90	90	90	90	90	90	90	90	51	51	51	51	51	-5	-5	-5
Turbine Load		BASE	BASE	BASE	BASE	80%	60%	BASE	BASE	BASE	BASE	80%	60%	1	1	80%	60%
Inlet Air Cooling		On	On	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
CTG Heat Input-HHV		mmBtu/hr	1855	1855	1855	1855	1689	1243	1998	1998	1998	1861	1364	2234	2234	2083	1551
Duct Burner Operation		On	Off	On	Off	Off	Off	Off	On	On	Off	Off	Off	On	Off	Off	Off
Duct Burner Rate (HHV)	Note	mmBtu/hr	500	0	500	0	0	0	185	500	0	0	0	500	0	0	0
1,3-Butadiene	a	(g/s)	1.01E-04	1.01E-04	1.01E-04	1.01E-04	9.15E-05	6.74E-05	1.08E-04	1.08E-04	1.08E-04	1.01E-04	7.39E-05	1.21E-04	1.21E-04	1.13E-04	8.41E-05
1,1,1-Trichloroethane		(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,4-Dichlorobenzene	a	(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2-Methylnaphthalene		(g/s)	1.48E-06	0.00E+00	1.48E-06	0.00E+00	0.00E+00	0.00E+00	5.50E-07	1.48E-06	0.00E+00	0.00E+00	0.00E+00	1.48E-06	0.00E+00	0.00E+00	0.00E+00
3-Methylchloranthrene	a,b	(g/s)	1.11E-07	0.00E+00	1.11E-07	0.00E+00	0.00E+00	0.00E+00	4.12E-08	1.11E-07	0.00E+00	0.00E+00	0.00E+00	1.11E-07	0.00E+00	0.00E+00	0.00E+00
7,12-Dimethylbenz(a)anthracene	a,b	(g/s)	9.88E-07	0.00E+00	9.88E-07	0.00E+00	0.00E+00	0.00E+00	3.66E-07	9.88E-07	0.00E+00	0.00E+00	0.00E+00	9.88E-07	0.00E+00	0.00E+00	0.00E+00
Acenaphthene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Acenaphthylene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Acetaldehyde	a	(g/s)	9.35E-03	9.35E-03	9.35E-03	9.35E-03	8.51E-03	6.97E-03	1.01E-02	1.01E-02	1.01E-02	9.38E-03	7.65E-03	1.13E-02	1.13E-02	1.05E-02	8.70E-03
Acrolein	a	(g/s)	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.36E-03	1.00E-03	1.61E-03	1.61E-03	1.61E-03	1.50E-03	1.43E-03	1.80E-03	1.80E-03	1.68E-03	1.62E-03
Ammonia		(g/s)	4.99E-01	4.99E-01	4.88E-01	4.88E-01	4.26E-01	3.66E-01	5.49E-01	5.49E-01	5.49E-01	5.49E-01	4.72E-01	6.01E-01	6.01E-01	5.14E-01	4.38E-01
Anthracene	a,b	(g/s)	2.67E-05	2.66E-05	2.67E-05	2.66E-05	2.42E-05	1.78E-05	2.87E-05	2.88E-05	2.87E-05	2.67E-05	1.96E-05	3.22E-05	3.20E-05	2.99E-05	2.22E-05
Arsenic	a	(g/s)	1.24E-05	0.00E+00	1.24E-05	0.00E+00	0.00E+00	0.00E+00	4.58E-06	1.24E-05	0.00E+00	0.00E+00	0.00E+00	1.24E-05	0.00E+00	0.00E+00	0.00E+00
Barium		(g/s)	2.72E-04	0.00E+00	2.72E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-04	2.72E-04	0.00E+00	0.00E+00	0.00E+00	2.72E-04	0.00E+00	0.00E+00	0.00E+00
Benz(a)anthracene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Benzene	a	(g/s)	2.93E-03	2.81E-03	2.93E-03	2.81E-03	2.55E-03	1.61E-02	3.07E-03	3.07E-03	3.07E-03	2.81E-03	1.77E-02	3.51E-03	3.38E-03	3.15E-03	2.01E-02
Benzo(a)pyrene	a,b	(g/s)	1.34E-05	1.33E-05	1.34E-05	1.33E-05	1.21E-05	8.91E-06	1.44E-05	1.44E-05	1.43E-05	1.33E-05	9.78E-06	1.61E-05	1.60E-05	1.49E-05	1.11E-05
Benzo(b)fluoranthene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Benzo(b,k)fluoranthene		(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	a,b	(g/s)	1.34E-05	1.33E-05	1.34E-05	1.33E-05	1.21E-05	8.91E-06	1.44E-05	1.44E-05	1.43E-05	1.33E-05	9.78E-06	1.61E-05	1.60E-05	1.49E-05	1.11E-05
Benzo(k)fluoranthene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Beryllium	a	(g/s)	7.41E-07	0.00E+00	7.41E-07	0.00E+00	0.00E+00	0.00E+00	2.75E-07	7.41E-07	0.00E+00	0.00E+00	0.00E+00	7.41E-07	0.00E+00	0.00E+00	0.00E+00
Butane		(g/s)	1.30E-01	0.00E+00	1.30E-01	0.00E+00	0.00E+00	0.00E+00	4.81E-02	1.30E-01	0.00E+00	0.00E+00	0.00E+00	1.30E-01	0.00E+00	0.00E+00	0.00E+00
Cadmium	a	(g/s)	6.79E-05	0.00E+00	6.79E-05	0.00E+00	0.00E+00	0.00E+00	2.52E-05	6.79E-05	0.00E+00	0.00E+00	0.00E+00	6.79E-05	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	a	(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene	a	(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chloroform	a	(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	a	(g/s)	8.65E-05	0.00E+00	8.65E-05	0.00E+00	0.00E+00	0.00E+00	3.21E-05	8.65E-05	0.00E+00	0.00E+00	0.00E+00	8.65E-05	0.00E+00	0.00E+00	0.00E+00
Chrysene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Cobalt	a	(g/s)	5.19E-06	0.00E+00	5.19E-06	0.00E+00	0.00E+00	0.00E+00	1.92E-06	5.19E-06	0.00E+00	0.00E+00	0.00E+00	5.19E-06	0.00E+00	0.00E+00	0.00E+00
Copper		(g/s)	5.25E-05	0.00E+00	5.25E-05	0.00E+00	0.00E+00	0.00E+00	1.95E-05	5.25E-05	0.00E+00	0.00E+00	0.00E+00	5.25E-05	0.00E+00	0.00E+00	0.00E+00
Dibenzo(a,h)anthracene	a,b	(g/s)	1.34E-05	1.33E-05	1.34E-05	1.33E-05	1.21E-05	8.91E-06	1.44E-05	1.44E-05	1.43E-05	1.33E-05	9.78E-06	1.61E-05	1.60E-05	1.49E-05	1.11E-05
Dichlorobenzene	a	(g/s)	7.41E-05	0.00E+00	7.41E-05	0.00E+00	0.00E+00	0.00E+00	2.75E-05	7.41E-05	0.00E+00	0.00E+00	0.00E+00	7.41E-05	0.00E+00	0.00E+00	0.00E+00
Ethane		(g/s)	1.91E-01	0.00E+00	1.91E-01	0.00E+00	0.00E+00	0.00E+00	7.10E-02	1.91E-01	0.00E+00	0.00E+00	0.00E+00	1.91E-01	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	a	(g/s)	7.48E-03	7.48E-03	7.48E-03	7.48E-03	6.81E-03	5.01E-03	8.06E-03	8.06E-03	8.06E-03	7.50E-03	5.50E-03	9.01E-03	9.01E-03	8.40E-03	6.26E-03
Ethylene Dichloride	a	(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	a,b	(g/s)	3.34E-05	3.33E-05	3.34E-05	3.33E-05	3.03E-05	2.23E-05	3.59E-05	3.60E-05	3.58E-05	3.34E-05	2.44E-05	4.02E-05	4.00E-05	3.73E-05	2.78E-05
Fluorene	a,b	(g/s)	3.12E-05	3.10E-05	3.12E-05	3.10E-05	2.83E-05	2.08E-05	3.35E-05	3.36E-05	3.34E-05	3.12E-05	2.28E-05	3.75E-05	3.74E-05	3.48E-05	2.60E-05
Formaldehyde	a	(g/s)	3.03E-02	2.57E-02	3.03E-02	2.57E-02	2.34E-02	1.72E-02	2.94E-02	3.23E-02	2.77E-02	2.58E-02	1.89E-02	3.56E-02	3.10E-02	2.89E-02	2.15E-02
Hexane	a	(g/s)	1.11E-01	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00	4.12E-02	1.11E-01	0.00E+00	0.00E+00	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	a,b	(g/s)	2.01E-05	2.00E-05	2.01E-05	2.00E-05	1.82E-05	1.34E-05	2.15E-05	2.16E-05	2.15E-05	2.00E-05	1.47E-05	2.41E-05	2.40E-05	2.24E-05	1.67E-05
Lead	a	(g/s)	3.09E-05	0.00E+00	3.09E-05	0.00E+00	0.00E+00	0.00E+00	1.14E-05	3.09E-05	0.00E+00	0.00E+00	0.00E+00	3.09E-05	0.00E+00	0.00E+00	0.00E+00
Manganese	a	(g/s)	2.35E-05	0.00E+00	2.35E-05	0.00E+00	0.00E+00	0.00E+00	8.70E-06	2.35E-05	0.00E+00	0.00E+00	0.00E+00	2.35E-05	0.00E+00	0.00E+00	0.00E+00
Mercury	a	(g/s)	1.61E-05	0.00E+00	1.61E-05	0.00E+00	0.00E+00	0.00E+00	5.95E-06	1.61E-05	0.00E+00	0.00E+00	0.00E+00	1.61E-05	0.00E+00	0.00E+00	0.00E+00
Methylene Chloride	a	(g/s)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum		(g/s)	6.79E-05	0.00E+00	6.79E-05	0.00E+00	0.00E+00	0.00E+00	2.52E-05	6.79E-05	0.00E+00	0.00E+00	0.00E+00	6.79E-05	0.00E+00	0.00E+00	0.00E+00
Napthalene	a,c	(g/s)	3.42E-04	3.04E-04	3.42E-04	3.04E-04	2.77E-04	2.15E-04	3.41E-04	3.65E-04	3.27E-04	3.05E-04	2.35E-04	4.04E-04	3.66E-04	3.41E-04	2.68E-04
Nickel	a	(g/s)	1.30E-04	0.00E+00	1.30E-04	0.00E+00	0.00E+00	0.00E+00	4.81E-05	1.30E-04	0.00E+00	0.00E+00	0.00E+00	1.30E-04	0.00E+00	0.00E+00	0.00E+00
PAH	a,b	(g/s)	5.14E-04	5.14E-04	5.14E-04	5.14E-04	4.68E-04	3.52E-04	5.54E-04	5.54E-04	5.54E-04	5.14E-04	3.87E-04	6.19E-04	6.19E-04	5.77E-04	4.40E-04
Pentane		(g/s)	1.61E-01	0.00E+00	1.61E-01	0.00E+00	0.00E+00	0.00E+00	5.95E-02	1.61E-01	0.00E+00	0.00E+00	0.00E+00	1.61E-01	0.00E+00	0.00E+00	0.00E+00
Phenanthrene	a,b	(g/s)	1.89E-04	1.88E-04	1.89E-04	1.88E-04	1.72E-04	1.26E-04	2.03E-04	1.8							

Appendix B: Table B-12
CPV Valley Energy Center
Combined Cycle Unit Non-Criteria Pollutant Emissions
(Page 5 of 6)

Combined Cycle Unit Potential HAP Emissions

Annual Operating Scenario		Gas Only	Gas/Oil	Single CTG/DB		2 x CTG/DB		Facility-Wide 2CTG/DB and Aux. Equip.
Gas Fired Operation	hr/yr	8,760	8,040	Worst Case Annual Emissions (scientific)	Worst Case Annual Emissions (decimal)	Worst Case Annual Emissions (scientific)	Worst Case Annual Emissions (decimal)	
Oil-Fired Operation (w/o duct burner)	hr/yr	0	720					
Gas-Fired Operation (w/ duct burner)	hr/yr	2,628	2,628					
Gas-Fired Operation (w/o duct burner)	Note hr/yr	6,132	5,412					
1,3-Butadiene	a (tons/yr)	4.21E-03	1.62E-02	1.62E-02	0.016216	3.24E-02	0.032432	3.26E-02
1,1,1-Trichloroethane	(tons/yr)	0.00E+00	0.00E+00	0.00E+00	0.000000	0.00E+00	0.000000	0.00E+00
1,4-Dichlorobenzene	a (tons/yr)	0.00E+00	1.72E-02	1.72E-02	0.017171	3.43E-02	0.034343	3.43E-02
2-Methylnaphthalene	(tons/yr)	1.55E-05	1.55E-05	1.55E-05	0.000015	3.09E-05	0.000031	3.31E-05
3-Methylchloranthrene	a,b (tons/yr)	1.16E-06	1.16E-06	1.16E-06	0.000001	2.32E-06	0.000002	2.48E-06
7,12-Dimethylbenz(a)anthracene	a,b (tons/yr)	1.03E-05	1.03E-05	1.03E-05	0.000010	2.06E-05	0.000021	2.21E-05
Acenaphthene	a,b (tons/yr)	8.36E-04	1.13E-02	1.13E-02	0.011270	2.25E-02	0.022541	2.25E-02
Acenaphthylene	a,b (tons/yr)	8.36E-04	8.93E-04	8.93E-04	0.000893	1.79E-03	0.001787	1.81E-03
Acetaldehyde	a (tons/yr)	3.91E-01	3.77E-01	3.91E-01	0.391314	7.83E-01	0.782628	7.86E-01
Acrolein	a (tons/yr)	6.26E-02	5.75E-02	6.26E-02	0.062610	1.25E-01	0.125220	1.26E-01
Ammonia	(tons/yr)	2.09E+01	2.36E+01	2.36E+01	23.609397	4.72E+01	47.218794	4.72E+01
Anthracene	a,b (tons/yr)	1.11E-03	1.63E-03	1.63E-03	0.001631	3.26E-03	0.003261	3.27E-03
Arsenic	a (tons/yr)	1.29E-04	8.62E-03	8.62E-03	0.008623	1.72E-02	0.017246	1.73E-02
Barium	(tons/yr)	2.83E-03	2.83E-03	2.83E-03	0.002834	5.67E-03	0.005668	6.07E-03
Benz(a)anthracene	a,b (tons/yr)	8.36E-04	2.76E-03	2.76E-03	0.002764	5.53E-03	0.005527	5.53E-03
Benzene	a (tons/yr)	5.27E-01	5.11E-01	5.27E-01	0.526529	1.05E+00	1.053057	1.06E+00
Benzo(a)pyrene	a,b (tons/yr)	5.57E-04	5.12E-04	5.12E-04	0.000557	1.11E-03	0.001115	1.12E-03
Benzo(b)fluoranthene	a,b (tons/yr)	8.36E-04	1.50E-03	1.50E-03	0.001504	3.01E-03	0.003008	3.01E-03
Benzo(b,k)fluoranthene	(tons/yr)	0.00E+00	0.00E+00	0.00E+00	0.000000	0.00E+00	0.000000	0.00E+00
Benzo(g,h,i)perylene	a,b (tons/yr)	5.57E-04	1.64E-03	1.64E-03	0.001637	3.27E-03	0.003273	3.28E-03
Benzo(k)fluoranthene	a,b (tons/yr)	8.36E-04	1.50E-03	1.50E-03	0.001504	3.01E-03	0.003008	3.01E-03
Beryllium	a (tons/yr)	7.73E-06	2.47E-04	2.47E-04	0.000247	4.94E-04	0.000494	4.95E-04
Butane	(tons/yr)	1.35E+00	1.35E+00	1.35E+00	1.352647	2.71E+00	2.705294	2.90E+00
Cadmium	a (tons/yr)	7.09E-04	4.42E-03	4.42E-03	0.004415	8.83E-03	0.008830	8.93E-03
Carbon Tetrachloride	a (tons/yr)	0.00E+00	1.77E-02	1.77E-02	0.017692	3.54E-02	0.035383	3.54E-02
Chlorobenzene	a (tons/yr)	0.00E+00	1.44E-02	1.44E-02	0.014396	2.88E-02	0.028792	2.88E-02
Chloroform	a (tons/yr)	0.00E+00	1.47E-02	1.47E-02	0.014743	2.95E-02	0.029486	2.95E-02
Chromium	a (tons/yr)	9.02E-04	9.40E-03	9.40E-03	0.009396	1.88E-02	0.018792	1.89E-02
Chrysene	a,b (tons/yr)	8.36E-04	1.95E-03	1.95E-03	0.001952	3.90E-03	0.003904	3.91E-03
Cobalt	a (tons/yr)	5.41E-05	5.41E-05	5.41E-05	0.000054	1.08E-04	0.000108	1.16E-04
Copper	(tons/yr)	5.48E-04	5.48E-04	5.48E-04	0.000548	1.10E-03	0.001095	1.17E-03
Dibenzo(a,h)anthracene	a,b (tons/yr)	5.57E-04	1.34E-03	1.34E-03	0.001343	2.69E-03	0.002686	2.69E-03
Dichlorobenzene	a (tons/yr)	7.73E-04	7.73E-04	7.73E-04	0.000773	1.55E-03	0.001546	1.66E-03
Ethane	(tons/yr)	2.00E+00	2.00E+00	2.00E+00	1.996765	3.99E+00	3.993529	4.28E+00
Ethylbenzene	a (tons/yr)	3.13E-01	2.87E-01	3.13E-01	0.313051	6.26E-01	0.626102	6.26E-01
Ethylene Dichloride	a (tons/yr)	0.00E+00	1.17E-02	1.17E-02	0.011679	2.34E-02	0.023358	2.34E-02
Fluoranthene	a,b (tons/yr)	1.39E-03	3.69E-03	3.69E-03	0.003688	7.38E-03	0.007377	7.41E-03
Fluorene	a,b (tons/yr)	1.30E-03	3.42E-03	3.42E-03	0.003419	6.84E-03	0.006838	6.97E-03
Formaldehyde	a (tons/yr)	1.12E+00	1.25E+00	1.25E+00	1.252190	2.50E+00	2.504380	2.52E+00
Hexane	a (tons/yr)	1.16E+00	1.16E+00	1.16E+00	1.159412	2.32E+00	2.318824	2.48E+00
Indeno(1,2,3-cd)pyrene	a,b (tons/yr)	8.36E-04	1.83E-03	1.83E-03	0.001833	3.67E-03	0.003665	3.67E-03
Lead	a (tons/yr)	3.22E-04	1.11E-02	1.11E-02	0.011133	2.23E-02	0.022266	2.23E-02
Manganese	a (tons/yr)	2.45E-04	6.10E-01	6.10E-01	0.610283	1.22E+00	1.220566	1.22E+00
Mercury	a (tons/yr)	1.67E-04	1.09E-03	1.09E-03	0.001094	2.19E-03	0.002188	2.21E-03
Methylene Chloride	a (tons/yr)	0.00E+00	1.23E-02	1.23E-02	0.012315	2.46E-02	0.024630	2.46E-02
Molybdenum	(tons/yr)	7.09E-04	7.09E-04	7.09E-04	0.000709	1.42E-03	0.001417	1.52E-03
Napthalene	a,c (tons/yr)	1.31E-02	3.91E-02	3.91E-02	0.039092	7.82E-02	0.078185	7.86E-02
Nickel	a (tons/yr)	1.35E-03	1.07E-02	1.07E-02	0.010719	2.14E-02	0.021438	2.16E-02
PAH	a,b (tons/yr)	2.15E-02	5.06E-02	5.06E-02	0.050641	1.01E-01	0.101283	1.01E-01
Pentane	(tons/yr)	1.67E+00	1.67E+00	1.67E+00	1.674706	3.35E+00	3.349412	3.59E+00
Phenanathrene	a,b (tons/yr)	7.90E-03	1.25E-02	1.25E-02	0.012475	2.49E-02	0.024949	2.51E-02
POM	a (tons/yr)	0.00E+00	0.00E+00	0.00E+00	0.000000	0.00E+00	0.000000	0.00E+00
Propane	(tons/yr)	1.03E+00	1.03E+00	1.03E+00	1.030588	2.06E+00	2.061176	2.21E+00
Propylene	(tons/yr)	0.00E+00	0.00E+00	0.00E+00	0.000000	0.00E+00	0.000000	1.14E-02
Propylene Oxide	a (tons/yr)	2.84E-01	2.60E-01	2.84E-01	0.283702	5.67E-01	0.567405	5.67E-01
Pyrene	a,b (tons/yr)	2.32E-03	4.25E-03	4.25E-03	0.004247	8.49E-03	0.008495	8.52E-03
Selenium	a (tons/yr)	1.55E-05	1.93E-02	1.93E-02	0.019320	3.86E-02	0.038641	3.86E-02
Sulfuric Acid	(tons/yr)	6.53E+00	6.36E+00	6.53E+00	6.531507	1.31E+01	13.063013	1.31E+01
Tetrachloroethylene	a (tons/yr)	0.00E+00	1.87E-02	1.87E-02	0.018732	3.75E-02	0.037465	3.75E-02
Toluene	a (tons/yr)	1.27E+00	1.17E+00	1.27E+00	1.273960	2.55E+00	2.547919	2.55E+00
Trichloroethylene	a (tons/yr)	0.00E+00	1.59E-02	1.59E-02	0.015899	3.18E-02	0.031799	3.18E-02
Vanadium	(tons/yr)	1.48E-03	1.48E-03	1.48E-03	0.001481	2.96E-03	0.002963	3.17E-03
Vinyl Chloride	a (tons/yr)	0.00E+00	3.05E-02	3.05E-02	0.030469	6.09E-02	0.060938	6.09E-02
Vinylidene Chloride	a (tons/yr)	0.00E+00	1.17E-02	1.17E-02	0.011679	2.34E-02	0.023358	2.34E-02
Xylenes	a (tons/yr)	6.26E-01	5.75E-01	6.26E-01	0.626102	1.25E+00	1.252204	1.25E+00
Zinc	(tons/yr)	1.87E-02	1.87E-02	1.87E-02	0.018679	3.74E-02	0.037359	4.00E-02

	Facility	2xCTG/DB
Max Single HAP	2.55	2.55
Total HAPs	13.96	13.77

**Appendix B: Table B-12
CPV Valley Energy Center
Combined Cycle Unit Non-Criteria Pollutant Emissions
(Page 6 of 6)**

Notes

Combustion Turbine emissions based on USEPA's AP-42 emission factors except as noted in other footnotes

	Note	AP-42 5th Edition (4/2000)			
		Final Section	Background Document	Final Section	Background Document
		Table 3.1-3 Gas Fired Turbines CT Load (80%-100%) (lb/mmBtu)	Table 3.4-1 Gas Fired Turbines CT Load (<80%) (lb/mmBtu)	Table 3.1-4 and 3.1-5 Oil-Fired Turbines CT Load (80%-100%) (lb/mmBtu)	Table 3.4-2 Oil-Fired Turbines CT Load (<80%) (lb/mmBtu)
1,3-Butadiene	a	< 4.30E-07	< 4.29E-07	< 1.60E-05	< 1.65E-05
1,1,1-Trichloroethane					
1,4-Dichlorobenzene	a				< 2.97E-05
2-Methylnapthalene					
3-Methylchloranthrene	a,b				
7,12-Dimethylbenz(a)anthracene	a,b				
Acenaphthene	a,b	8.53E-08		1.36E-05	
Acenaphthylene	a,b	8.53E-08		1.63E-07	
Acetaldehyde	a	4.00E-05	4.45E-05		3.03E-05
Acrolein	a	6.40E-06	8.31E-06		
Ammonia					
Anthracene	a,b	1.14E-07		7.86E-07	
Arsenic	a			< 1.10E-05	< 1.10E-05
Barium					
Benz(a)anthracene	a,b	8.53E-08		2.58E-06	
Benzene	a	1.20E-05	1.03E-04	5.50E-05	5.48E-05
Benzo(a)pyrene	a,b	5.69E-08			
Benzo(b)fluoranthene	a,b	8.53E-08		9.54E-07	
Benzo(b,k)fluoranthene					
Benzo(g,h,i)perylene	a,b	5.69E-08		1.46E-06	
Benzo(k)fluoranthene	a,b	8.53E-08		9.54E-07	
Beryllium	a			< 3.10E-07	< 3.07E-07
Butane					
Cadmium	a			4.80E-06	3.75E-06
Carbon Tetrachloride	a				< 3.06E-05
Chlorobenzene	a				< 2.49E-05
Chloroform	a				< 2.55E-05
Chromium	a			1.10E-05	8.43E-06
Chrysene	a,b	8.53E-08		1.53E-06	
Cobalt	a				
Copper					
Dibenzo(a,h)anthracene	a,b	5.69E-08		1.08E-06	
Dichlorobenzene	a				
Ethane					
Ethylbenzene	a	3.20E-05	2.58E-05		
Ethylene Dichloride	a				2.02E-05
Fluoranthene	a,b	1.42E-07		3.12E-06	
Fluorene	a,b	1.33E-07		2.88E-06	
Formaldehyde	a	1.10E-04	1.10E-04	2.80E-04	2.80E-04
Hexane	a				
Indeno(1,2,3-cd)pyrene	a,b	8.53E-08		1.38E-06	
Lead	a			1.40E-05	1.34E-05
Manganese	a			7.90E-04	7.89E-04
Mercury	a			1.20E-06	1.20E-06
Methylene Chloride	a				< 2.13E-05
Molybdenum					
Napthalene	a,c	1.30E-06	1.37E-06	3.50E-05	3.52E-05
Nickel	a			< 4.60E-06	1.62E-05
PAH	a,b	< 2.20E-06	2.25E-06	< 4.00E-05	4.03E-05
Pentane					
Phenanthrene	a,b	8.06E-07		6.77E-06	
POM	a				
Propane					
Propylene					
Propylene Oxide	a	< 2.90E-05	< 2.86E-05		
Pyrene	a,b	2.37E-07		2.74E-06	
Selenium	a			< 2.50E-05	< 2.88E-05
Sulfuric Acid					
Tetrachloroethylene	a				< 3.24E-05
Toluene	a	1.30E-04	9.37E-05		
Trichloroethylene	a				< 2.75E-05
Vanadium					
Vinyl Chloride	a				< 5.27E-05
Vinylidene Chloride	a				< 2.02E-05
Xylenes	a	6.40E-05	5.48E-05		
Zinc					

Notes Key

a	indicates compound is one of U.S. EPA's list of 188 HAPs.
b	indicates compound is subset of POM or PAH (PAH is a subset of POM)
c	compound is listed on U.S. EPA's list of 188 HAPs and is a subset of POM or PAH.

PAHs are broken out for turbines using the same split for boilers:

Turbine PAH Emission Rate (Nat Gas):	2.20E-06	lb/MMBtu from AP-42 Table 3.1-3
Turbine PAH Emission Rate (Fuel Oil):	4.00E-05	lb/MMBtu from AP-42 Table 3.1-4

Pollutant	AP-42 Emission Factor		Percent of Total Natural Gas (%)	Percent of Total Fuel Oil (%)
	Natural Gas lb/mmCF	Fuel Oil lb/mgal		
Acenaphthene	< 1.80E-06	2.11E-05	3.88%	34.00%
Acenaphthylene	< 1.80E-06	2.53E-07	3.88%	0.41%
Anthracene	< 2.40E-06	1.22E-06	5.17%	1.97%
Benzo(a)Anthracene	< 1.80E-06	4.01E-06	3.88%	6.46%
Benzo(a)pyrene	< 1.20E-06		2.59%	0.00%
Benzo(b)fluoranthene	< 1.80E-06	1.48E-06	3.88%	2.39%
Benzo(g,h,i)perylene	< 1.20E-06	2.26E-06	2.59%	3.64%
Benzo(k)fluoranthene	< 1.80E-06	1.48E-06	3.88%	2.39%
Chrysene	< 1.80E-06	2.38E-06	3.88%	3.84%
Dibenzo(a,h)anthracene	< 1.20E-06	1.67E-06	2.59%	2.69%
Fluoranthene	3.00E-06	4.84E-06	6.47%	7.80%
Fluorene	2.80E-06	4.47E-06	6.03%	7.20%
Indeno(1,2,3-cd)pyrene	< 1.80E-06	2.14E-06	3.88%	3.45%
Phenanthrene	1.70E-05	1.05E-05	36.64%	16.92%
Pyrene	5.00E-06	4.25E-06	10.78%	6.85%
Totals	4.64E-05	6.21E-05	100%	100%

Emission factors came from AP-42 Table 1.3-9 and 1.4-3

Formaldehyde emission factor for gas firing (median value for >80% load) obtained from California Air Resource Board (CARB) emission inventory, which can be downloaded from CARB website (www.arb.ca.gov), "software" section, filename - "catef.exe"

Sulfuric acid mist (H₂SO₄) emissions based on mass balance of sulfur in fuel and SO₂->SO₃ Conversion.

Ammonia slip (NH₃) emissions provided by vendor (ppm) and calculated (lb/hr).

**Appendix B: Table B-14
CPV Valley Energy Center
Facility-Wide Potential CO2 Emissions**

Source(s)	Natural Gas Only					Natural Gas + Oil - With Duct Burning				
	Fuel	Hours/yr	MMBtu/hr	Factor (lb/MMBtu)	CO ₂ (tons)	Fuel	Hours	MMBtu/hr	Factor (lb/MMBtu)	CO ₂ (tons)
2 CTGs	Gas	17,520	1,998	110	1,925,676	Gas	16,080	1,998	110	1,767,401
2 CTGs	Oil	0	2,145	157	0	Oil	1,440	2,145	157	242,510
2 DBs	Gas	5,256	500	117.6	154,526	Gas	5,256	500	117.6	154,526
Total CCs					2,080,202					2,164,438

Source(s)		Natural Gas + Oil - No Duct Burning					Maximum Annual CO ₂ (tons)
		Fuel	Hours	MMBtu/hr	Factor (lb/MMBtu)	CO ₂ (tons)	
2 CTGs		Gas	16,080	1,998	110	1,767,401	
2 CTGs		Oil	1,440	2,145	157	242,510	
2 DBs		Gas	0	0	117.6	0	
Total CCs						2,009,911	2,164,438

Source	Fuel	Hours/yr	MMBtu/hr	Factor (lb/MMBtu)	CO ₂ (tons)	
Aux Boiler	Gas	2,000	73.5	117.6	8641	
2 Gas Heaters	Gas	17,520	5.02	117.6	5171	8,641
						5,171

Source	Fuel	Hours/yr	MMBtu/hr	Factor (lb/MMBtu)	CO ₂ (tons)	
EG	Oil	500.00	15.43	164	633	633
FWP	Oil	500.00	2.27	164	93	93

Total PTE	2,178,977
------------------	------------------