APPENDIX 3.1B

Operational Emission Estimates

TABLE 3.1B-1 (Replaces Table 8.1B-2R, Data Response Set 1B)

AES Highgrove Power Plant Emission Scenarios - Normal Operation

Daily Emissions Scenarios based on Maximum daily operation of 24 hours/day

Annual Emissions Scenarios based on Maximum annual operation of 5475 hours/year

Normal Operation Scenario					Fuel Input[1,3]			Emissions[1,3]															Exhaust Stack Conditions				
Ambient	GE	RH	Evap	Load	Per CT	Per CT		NOx			CO			VOC			Particulates			SO_2[2]			Stack Temp	Flow	Stack Height	Stack Diameter	Velocity
Temp F	Date	%	%	%	MMBtu/hr (HHV)	lb/hr	$MMFt^3/hr$	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	F	ACFM	Feet	Feet	ft/s
30	**12/19/2005**	30	Off	Base	881	38,594	0.87	8.0	192	43,707	11.7	280	63,986	2.2	53	11,977	6	144	32,850	0.62	14.8	3,376	743	883,683	90	13.50	102.89
30	**12/19/2005**	30	Off	75	694	30,383	0.68	6.3	151	34,388	9.2	220	50,246	1.8	43	9,855	6	144	32,850	0.49	11.7	2,658	737	743,130	90	13.50	86.53
30	**12/19/2005**	30	Off	50	510	22,339	0.50	4.6	111	25,273	6.7	162	36,844	1.3	31	6,961	6	144	32,850	0.36	8.6	1,954	755	595,326	90	13.50	69.32
80	**12/19/2005**	60	On	Base	852	37,337	0.84	7.7	185	42,316	11.3	272	62,048	2.2	53	12,198	6	144	32,850	0.60	14.3	3,266	784	861,409	90	13.50	100.30
80	**12/19/2005**	60	Off	Base	839	36,747	0.83	7.6	183	41,637	11.1	267	60,961	2.2	52	11,804	6	144	32,850	0.59	14.1	3,214	789	850,996	90	13.50	99.09
80	**12/19/2005**	60	On	75	668	29,281	0.66	6.1	145	33,162	8.9	212	48,454	1.6	37	8,541	6	144	32,850	0.47	11.2	2,561	763	723,990	90	13.50	84.30
80	**12/19/2005**	60	On	50	492	21,556	0.49	4.5	107	24,402	6.5	156	35,618	1.1	26	5,840	6	144	32,850	0.34	8.3	1,886	781	582,597	90	13.50	67.84
97	**12/19/2005**	20	On	Base	855	37,462	0.84	7.8	186	42,448	11.3	272	61,955	2.3	54	12,330	6	144	32,850	0.60	14.4	3,277	783	863,615	90	13.50	100.56
97	**12/19/2005**	20	Off	Base	817	35,803	0.81	7.4	178	40,564	10.9	261	59,471	2.0	49	11,169	6	144	32,850	0.57	13.7	3,132	796	833,580	90	13.50	97.06
97	**12/19/2005**	20	On	75	670	29,375	0.66	6.1	146	33,266	8.9	214	48,788	1.6	38	8,629	6	144	32,850	0.47	11.3	2,570	763	725,731	90	13.50	84.50
97	**12/19/2005**	20	On	50	494	21,637	0.49	4.5	107	24,495	6.5	156	35,676	1.3	30	6,862	6	144	32,850	0.35	8.3	1,893	779	584,169	90	13.50	68.02

(1) Source: GE Gas Turbine Performance Sheets for 30, 80, 97 F, all dated December 2005

(2) SO2 Emissions using the emission factor 0.0007 lb SO2 per mmBtu natural gas - Source: 0.25 gr sulfur/100 cf natural gas.

(3) Per CTG, assuming BACT levels of 2.5 ppm NOx, 6 ppm CO, and 2 ppm VOC. Daily emissions represent 24 hours per day per CTG. Annual emissions represent 5475 hours per CTG per year.

TABLE 3.1B-2A (Replaces Table 8.1B-3BR, Data Response Set 1B)
AES Highgrove Commissioning Emissions

Commissioning Phase	Pre- break-in Checkout	Controlled Break-in Operation	Water Injection Commissioning	Complete AVR Commissioning	SCR Commissioning	Full load testing & checkout	Totals[3]
Water Injection/% Effective	No	No	Yes/50	Yes	Yes	Yes	
SCR Installed/% Effective	No	No	No	No	Yes/50	Yes	
CO Catalyst Installed/% Effective	No	No	No	No	Yes/100	Yes/100	
Unit Operating Hours/CT	28	28	48	16	8	96	1,284
Units in Operation Simultaneously	1	1	1	1	1	1	
Average Load (Percent)	0	5	50	100	75	100	
NOx lb/hr[1]	91	99	175	81	35	8.0	
CO lb/hr	55	60	168	255	9	12	
VOC lb/hr	2	2	3	5	4	2	
CT Heat Input MMBtu/hr - HHV	150	180	500	881	700	881	
Emissions							
NOx lb/mmscf[2]	616	558	355	93	51	9	
CO lb/mmscf[2]	372	338	341	294	13	14	
VOC lb/mmscf[2]	14	11	6	6	6	2	

Source: General Electric

Notes: 1. Full load testing and checkout represents NOx emission rate (2.5 ppmv) at base load at 30 F ambient temperature.

2. Fuel heat content is 1015 MMBtu/MMSCF.

3. Includes 204 hours per CTG for completion of commissioning period.

Exhaust Stack Parameters for Commissioning Modeling by Load Rate for 80F Temperature Case

Load Rate Percent	Stack Temp F	Flow ACFM	Stack Height Feet	Stack Diameter Feet	Velocity ft/s
35	818	485185	90	13.50	56.49
50	781	582597	90	13.50	67.84
75	763	723990	90	13.50	84.30
100	789	850996	90	13.50	99.09

TABLE 3.1B-2B (Replaces Table 8.1B-3CR, Data Response Set 1B)
AES Highgrove Commissioning Emissions

Day	NOx Lb/Day	CO Lb/Day	VOC Lb/Day	SO2 Lb/Day	PM10 Lb/Day	NOx Lb/31 Days	CO Lb/31 Days	VOC Lb/31 Days	SO2 Lb/31 Days	PM10 Lb/31 Days	NOx Avg Lb/Day	CO Avg Lb/Day	VOC Avg Lb/Day	SO2 Avg Lb/Day	PM10 Avg Lb/Day
1	728	440	16	1	9	728	440	16	1	9	24	15	1	0	0
2	728	440	16	1	9	1,456	880	32	2	18	49	29	1	0	1
3	546	330	12	1	7	2,002	1,210	44	2	24	67	40	1	0	1
4	546	330	12	1	7	2,548	1,540	56	3	31	85	51	2	0	1
5	594	360	12	1	8	3,142	1,900	68	4	39	105	63	2	0	1
6	0	0	0	0	0	3,142	1,900	68	4	39	105	63	2	0	1
7	0	0	0	0	0	3,142	1,900	68	4	39	105	63	2	0	1
8	594	360	12	1	8	3,736	2,260	80	4	47	125	75	3	0	2
9	1,400	1,344	24	3	29	5,136	3,604	104	7	76	171	120	3	0	3
10	1,400	1,344	24	3	29	6,536	4,948	128	10	105	218	165	4	0	4
11	1,400	1,344	24	3	29	7,936	6,292	152	13	135	265	210	5	0	4
12	1,400	1,344	24	3	29	9,336	7,636	176	16	164	311	255	6	1	5
13	0	0	0	0	0	9,336	7,636	176	16	164	311	255	6	1	5
14	0	0	0	0	0	9,336	7,636	176	16	164	311	255	6	1	5
15	648	2,040	40	5	52	9,984	9,676	216	21	216	333	323	7	1	7
16	648	2,040	40	5	52	10,632	11,716	256	26	268	354	391	9	1	9
17	648	2,040	40	5	52	11,280	13,756	296	30	319	376	459	10	1	11
18	648	2,040	40	5	52	11,928	15,796	336	35	371	398	527	11	1	12
19	648	2,040	40	5	52	12,576	17,836	376	40	423	419	595	13	1	14
20	0	0	0	0	0	12,576	17,836	376	40	423	419	595	13	1	14
21	0	0	0	0	0	12,576	17,836	376	40	423	419	595	13	1	14
22	648	2,040	40	5	52	13,224	19,876	416	45	475	441	663	14	2	16
23	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
24	728	440	16	1	9	13,952	20,316	432	46	483	465	677	14	2	16
25	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
26	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
27	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
28	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
29	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
30	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
31	0	0	0	0	0	13,952	20,316	432	46	483	465	677	14	2	16
32	728	440	16	1	9	13,952	20,316	432	46	483	465	677	14	2	16
33	546	330	12	1	7	13,770	20,206	428	46	481	459	674	14	2	16
34	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
35	0	0	0	0	0	12,678	19,546	404	45	468	423	652	13	1	16
36	546	330	12	1	7	12,630	19,516	404	44	467	421	651	13	1	16
37	594	360	12	1	8	13,224	19,876	416	45	475	441	663	14	2	16
38	594	360	12	1	8	13,818	20,236	428	46	483	461	675	14	2	16
39	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
40	1,400	1,344	24	3	29	13,224	19,876	416	45	475	441	663	14	2	16

TABLE 3.1B-2B (Replaces Table 8.1B-3CR, Data Response Set 1B)
AES Highgrove Commissioning Emissions

Day	NOx Lb/Day	CO Lb/Day	VOC Lb/Day	SO2 Lb/Day	PM10 Lb/Day	NOx Lb/31 Days	CO Lb/31 Days	VOC Lb/31 Days	SO2 Lb/31 Days	PM10 Lb/31 Days	NOx Avg Lb/Day	CO Avg Lb/Day	VOC Avg Lb/Day	SO2 Avg Lb/Day	PM10 Avg Lb/Day
41	0	0	0	0	0	11,824	18,532	392	42	445	394	618	13	1	15
42	0	0	0	0	0	10,424	17,188	368	40	416	347	573	12	1	14
43	1,400	1,344	24	3	29	10,424	17,188	368	40	416	347	573	12	1	14
44	1,400	1,344	24	3	29	11,824	18,532	392	42	445	394	618	13	1	15
45	1,400	1,344	24	3	29	13,224	19,876	416	45	475	441	663	14	2	16
46	648	2,040	40	5	52	13,224	19,876	416	45	475	441	663	14	2	16
47	648	2,040	40	5	52	13,224	19,876	416	45	475	441	663	14	2	16
48	0	0	0	0	0	12,576	17,836	376	40	423	419	595	13	1	14
49	0	0	0	0	0	11,928	15,796	336	35	371	398	527	11	1	12
50	648	2,040	40	5	52	11,928	15,796	336	35	371	398	527	11	1	12
51	648	2,040	40	5	52	12,576	17,836	376	40	423	419	595	13	1	14
52	648	2,040	40	5	52	13,224	19,876	416	45	475	441	663	14	2	16
53	648	2,040	40	5	52	13,224	19,876	416	45	475	441	663	14	2	16
54	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
55	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
56	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
57	728	440	16	1	9	13,224	19,876	416	45	475	441	663	14	2	16
58	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
59	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
60	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
61	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
62	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
63	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
64	728	440	16	1	9	12,678	19,546	404	45	468	423	652	13	1	16
65	546	330	12	1	7	13,224	19,876	416	45	475	441	663	14	2	16
66	546	330	12	1	7	13,770	20,206	428	46	481	459	674	14	2	16
67	594	360	12	1	8	13,818	20,236	428	46	483	461	675	14	2	16
68	594	360	12	1	8	13,818	20,236	428	46	483	461	675	14	2	16
69	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
70	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
71	1,400	1,344	24	3	29	13,224	19,876	416	45	475	441	663	14	2	16
72	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
73	0	0	0	0	0	13,224	19,876	416	45	475	441	663	14	2	16
74	1,400	1,344	24	3	29	13,224	19,876	416	45	475	441	663	14	2	16
75	1,400	1,344	24	3	29	13,224	19,876	416	45	475	441	663	14	2	16
76	0	0	0	0	0	11,824	18,532	392	42	445	394	618	13	1	15
77	0	0	0	0	0	11,176	16,492	352	38	394	373	550	12	1	13
78	1,400	1,344	24	3	29	11,928	15,796	336	35	371	398	527	11	1	12
79	0	0	0	0	0	11,928	15,796	336	35	371	398	527	11	1	12
80	648	2,040	40	5	52	12,576	17,836	376	40	423	419	595	13	1	14

TABLE 3.1B-2B (Replaces Table 8.1B-3CR, Data Response Set 1B)
AES Highgrove Commissioning Emissions

Day	NOx Lb/Day	CO Lb/Day	VOC Lb/Day	SO2 Lb/Day	PM10 Lb/Day	NOx Lb/31 Days	CO Lb/31 Days	VOC Lb/31 Days	SO2 Lb/31 Days	PM10 Lb/31 Days	NOx Avg Lb/Day	CO Avg Lb/Day	VOC Avg Lb/Day	SO2 Avg Lb/Day	PM10 Avg Lb/Day
81	648	2,040	40	5	52	12,576	17,836	376	40	423	419	595	13	1	14
82	648	2,040	40	5	52	12,576	17,836	376	40	423	419	595	13	1	14
83	0	0	0	0	0	11,928	15,796	336	35	371	398	527	11	1	12
84	0	0	0	0	0	11,280	13,756	296	30	319	376	459	10	1	11
85	648	2,040	40	5	52	11,928	15,796	336	35	371	398	527	11	1	12
86	648	2,040	40	5	52	12,576	17,836	376	40	423	419	595	13	1	14
87	648	2,040	40	5	52	13,224	19,876	416	45	475	441	663	14	2	16
88	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
89	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
90	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
91	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
92	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
93	0	0	0	0	0	12,496	19,436	400	44	466	417	648	13	1	16
94	280	72	32	4	41	12,776	19,508	432	48	507	426	650	14	2	17
95	280	72	32	4	41	12,328	19,140	448	51	539	411	638	15	2	18
96	280	72	32	4	41	12,062	18,882	468	55	574	402	629	16	2	19
97	0	0	0	0	0	11,516	18,552	456	54	567	384	618	15	2	19
98	0	0	0	0	0	10,922	18,192	444	53	559	364	606	15	2	19
99	0	0	0	0	0	10,328	17,832	432	53	551	344	594	14	2	18
100	0	0	0	0	0	10,328	17,832	432	53	551	344	594	14	2	18
101	287	432	72	22	233	10,615	18,264	504	75	784	354	609	17	2	26
102	287	432	72	22	233	9,503	17,352	552	94	988	317	578	18	3	33
103	287	432	72	22	233	9,790	17,784	624	116	1,221	326	593	21	4	41
104	0	0	0	0	0	9,790	17,784	624	116	1,221	326	593	21	4	41
105	0	0	0	0	0	8,390	16,440	600	114	1,191	280	548	20	4	40
106	287	432	72	22	233	7,278	15,528	648	133	1,395	243	518	22	4	46
107	287	432	72	22	233	7,565	15,960	720	155	1,627	252	532	24	5	54
108	287	432	72	22	233	7,852	16,392	792	177	1,860	262	546	26	6	62
109	287	432	72	22	233	6,740	15,480	840	197	2,064	225	516	28	7	69
110	0	0	0	0	0	6,740	15,480	840	197	2,064	225	516	28	7	69
111	0	0	0	0	0	6,092	13,440	800	192	2,012	203	448	27	6	67
112	0	0	0	0	0	5,444	11,400	760	187	1,960	181	380	25	6	65
113	287	432	72	22	233	5,083	9,792	792	204	2,141	169	326	26	7	71
114	120	180	30	9	97	5,203	9,972	822	213	2,238	173	332	27	7	75
115	120	180	30	9	97	5,323	10,152	852	223	2,336	177	338	28	7	78
116	120	180	30	9	97	4,794	8,292	842	227	2,381	160	276	28	8	79
117	120	180	30	9	97	4,266	6,432	832	231	2,426	142	214	28	8	81
118	0	0	0	0	0	3,618	4,392	792	226	2,374	121	146	26	8	79
119	0	0	0	0	0	3,618	4,392	792	226	2,374	121	146	26	8	79
120	120	180	30	9	97	3,738	4,572	822	236	2,471	125	152	27	8	82

TABLE 3.1B-2B (Replaces Table 8.1B-3CR, Data Response Set 1B)
AES Highgrove Commissioning Emissions

Day	NOx Lb/Day	CO Lb/Day	VOC Lb/Day	SO2 Lb/Day	PM10 Lb/Day	NOx Lb/31 Days	CO Lb/31 Days	VOC Lb/31 Days	SO2 Lb/31 Days	PM10 Lb/31 Days	NOx Avg Lb/Day	CO Avg Lb/Day	VOC Avg Lb/Day	SO2 Avg Lb/Day	PM10 Avg Lb/Day
121	120	180	30	9	97	3,858	4,752	852	245	2,568	129	158	28	8	86
122	120	180	30	9	97	3,977	4,932	882	254	2,665	133	164	29	8	89
123	120	180	30	9	97	4,097	5,112	912	263	2,762	137	170	30	9	92
124	120	180	30	9	97	4,217	5,292	942	273	2,859	141	176	31	9	95
125	0	0	0	0	0	3,937	5,220	910	269	2,818	131	174	30	9	94
126	0	0	0	0	0	3,657	5,148	878	265	2,777	122	172	29	9	93
127	120	180	30	9	97	3,497	5,256	876	270	2,833	117	175	29	9	94
128	120	180	30	9	97	3,616	5,436	906	279	2,930	121	181	30	9	98
129	120	180	30	9	97	3,736	5,616	936	289	3,027	125	187	31	10	101
130	120	180	30	9	97	3,856	5,796	966	298	3,124	129	193	32	10	104
131	72	108	18	6	58	3,928	5,904	984	303	3,182	131	197	33	10	106

TABLE 3.1B-3 (Replaces Table 8.1B-4R, Data Response Set 1B)
AES Highgrove Modeling Emissions Summary

	Scenario	NOx[a] (lb/hr)	CO (lb/hr)	PM10[b] (lb/hr)	SO2[b,c] (lb/hr)	Velocity (m/s)	Velocity (ft/s)	Temperature F	Temperature K
Annual	30F Base Load	7.99	*	3.96	0.41	31.4	102.9	743	668
	30F 75% Load	6.66	*	3.96	0.33	26.4	86.5	737	665
	30F 50% Load	5.36	*	3.96	0.25	21.1	69.3	755	675
	80F Base Load + Evap	7.79	*	3.96	0.39	30.6	100.3	784	691
	80F Base Load	7.69	*	3.96	0.39	30.2	99.1	789	693
	80F 75% Load	6.48	*	3.96	0.32	25.7	84.3	763	679
	80F 50% Load	5.23	*	3.96	0.24	20.7	67.8	781	689
	97F Base Load + Evap	7.81	*	3.96	0.40	30.6	100.6	783	691
	97F Base Load	7.54	*	3.96	0.38	29.6	97.1	796	697
	97F 75% Load	6.50	*	3.96	0.32	25.8	84.5	763	679
	97F 50% Load	5.25	*	3.96	0.25	20.7	68.0	779	688
24-hour	30F Base Load	*	*	6.21	0.64	31.4	102.9	743	668
	30F 75% Load	*	*	6.21	0.51	26.4	86.5	737	665
	30F 50% Load	*	*	6.21	0.39	21.1	69.3	755	675
	80F Base Load + Evap	*	*	6.21	0.62	30.6	100.3	784	691
	80F Base Load	*	*	6.21	0.61	30.2	99.1	789	693
	80F 75% Load	*	*	6.21	0.49	25.7	84.3	763	679
	80F 50% Load	*	*	6.21	0.37	20.7	67.8	781	689
	97F Base Load + Evap	*	*	6.21	0.62	30.6	100.6	783	691
	97F Base Load	*	*	6.21	0.59	29.6	97.1	796	697
	97F 75% Load	*	*	6.21	0.49	25.8	84.5	763	679
	97F 50% Load	*	*	6.21	0.37	20.7	68.0	779	688
	Pre- break-in Checkout	*	*	*	*	17.2	56.5	818	710
	Controlled Break-in Operation	*	*	*	*	17.2	56.5	818	710
	Water Injection Commissioning	*	*	*	*	20.7	67.8	781	689
	Complete AVR Commissioning	*	*	*	*	30.2	99.1	789	694
	SCR Commissioning	*	*	*	*	25.7	84.3	763	679
	Full load testing & checkout	*	*	*	*	30.2	99.1	789	694
8-hour	30F Base Load	*	19.06	*	*	31.4	102.9	743	668
	30F 75% Load	*	16.77	*	*	26.4	86.5	737	665
	30F 50% Load	*	14.54	*	*	21.1	69.3	755	675
	80F Base Load + Evap	*	18.74	*	*	30.6	100.3	784	691
	80F Base Load	*	18.56	*	*	30.2	99.1	789	693
	80F 75% Load	*	16.48	*	*	25.7	84.3	763	679
	80F 50% Load	*	14.34	*	*	20.7	67.8	781	689
	97F Base Load + Evap	*	18.73	*	*	30.6	100.6	783	691
	97F Base Load	*	18.31	*	*	29.6	97.1	796	697
	97F 75% Load	*	16.53	*	*	25.8	84.5	763	679
	97F 50% Load	*	14.35	*	*	20.7	68.0	779	688
	Pre- break-in Checkout	*	55	*	*	17.2	56.5	818	710
	Controlled Break-in Operation	*	60	*	*	17.2	56.5	818	710
	Water Injection Commissioning	*	168	*	*	20.7	67.8	781	689
	Complete AVR Commissioning	*	255	*	*	30.2	99.1	789	694
	SCR Commissioning	*	9	*	*	25.7	84.3	763	679
	Full load testing & checkout	*	12	*	*	30.2	99.1	789	694
3-hour	30F Base Load	*	*	*	0.79	31.4	102.9	743	668
	30F 75% Load	*	*	*	0.69	26.4	86.5	737	665
	30F 50% Load	*	*	*	0.59	21.1	69.3	755	675
	80F Base Load + Evap	*	*	*	0.77	30.6	100.3	784	691
	80F Base Load	*	*	*	0.76	30.2	99.1	789	693
	80F 75% Load	*	*	*	0.67	25.7	84.3	763	679
	80F 50% Load	*	*	*	0.58	20.7	67.8	781	689
	97F Base Load + Evap	*	*	*	0.77	30.6	100.6	783	691
	97F Base Load	*	*	*	0.75	29.6	97.1	796	697
	97F 75% Load	*	*	*	0.67	25.8	84.5	763	679
	97F 50% Load	*	*	*	0.58	20.7	68.0	779	688
	Pre- break-in Checkout	*	*	*	*	17.2	56.5	818	710
	Controlled Break-in Operation	*	*	*	*	17.2	56.5	818	710
	Water Injection Commissioning	*	*	*	*	20.7	67.8	781	689
	Complete AVR Commissioning	*	*	*	*	30.2	99.1	789	694
	SCR Commissioning	*	*	*	*	25.7	84.3	763	679
	Full load testing & checkout	*	*	*	*	30.2	99.1	789	694
1-hour	30F Base Load	23.24	41.20	*	0.87	31.4	102.9	743	668
	30F 75% Load	22.76	39.57	*	0.79	26.4	86.5	737	665
	30F 50% Load	22.29	37.97	*	0.70	21.1	69.3	755	675
	80F Base Load + Evap	23.16	40.97	*	0.86	30.6	100.3	784	691
	80F Base Load	23.13	40.84	*	0.85	30.2	99.1	789	693
	80F 75% Load	22.70	39.35	*	0.77	25.7	84.3	763	679
	80F 50% Load	22.25	37.83	*	0.69	20.7	67.8	781	689
	97F Base Load + Evap	23.17	40.96	*	0.86	30.6	100.6	783	691
	97F Base Load	23.07	40.66	*	0.84	29.6	97.1	796	697
	97F 75% Load	22.70	39.39	*	0.78	25.8	84.5	763	679
	97F 50% Load	22.25	37.84	*	0.69	20.7	68.0	779	688
	Pre- break-in Checkout	91	55	*	*	17.2	56.5	818	710
	Controlled Break-in Operation	99	60	*	*	17.2	56.5	818	710
	Water Injection Commissioning	175	168	*	*	20.7	67.8	781	689
	Complete AVR Commissioning	81	255	*	*	30.2	99.1	789	694
	SCR Commissioning	35	9	*	*	25.7	84.3	763	679
	Full load testing & checkout	11	12	*	*	30.2	99.1	789	694

Note:

a. Nox emission rates for modeling were based on 3.5 ppm, a conservative overestimate of the actual NOx exhaust concentration of 2.5 ppm.

b. Changes in emission rates for PM10 and SO2 reflect corrections made to CTG startup times (See Table 3.1B-5 for correct startup times for all criteria pollutants).

c. Because modeled impacts from SO2 have a linear relationship to emission rates, the screening modeling was not repeated.

TABLE 3.1B-4 (Replaces Table 8.1B-5R, Data Response Set 1B)
AES Highgrove Startup and Shutdown Emissions

Pollutant	Startup lb/event	Shutdown lb/event	Startup lb/hour	Shutdown lb/hour
NOx[a]	16.7	4.3	19.8	10.8
CO[a]	15.4	18.2	25.1	27.7
VOC	2.1	1.6	4.0	3.4
PM10	3.5	1.1	8.5	6
SOx[a]	0.36	0.11	0.87	0.61
NH3	2.86	0.90	7.9	5.8

Source: GE Energy and engineering estimates.
Start is assumed to take 37 minutes for NOx and 10 minutes for CO, VOC, SO2, and PM10. Shutdown takes 11 minutes.
a. Corrected calculation for startup and shutdown hourly emission rates. Previous calculation (Data Response Set 1B calculated using the incorrect load scenario).

TABLE 3.1B-5A (Replaces Table 8.1B-6AR, Data Response Set 1B)

AES Highgrove HAP Emission Estimates

Assume:

Assume heat input at 30 F at base load

Operating Hours for each CTG: 5,475 Hours/Year[a]

Gas Heat Content (MMBtu/MMCF) =	1,015	MMBtu/MMSCF	1 CTG		3 CTGs	
Total Heat Input	881	MMBtu/Hr HHV	0.868	MMCF/Hr	14,257	MMCF/Yr

				Turbine Emissions					
Compound	Emission Factor (Lb/MMCF)[b]	Maximum CTG Heat Input (mmBtu/hr)	Gas Input (MMCF/hr)	lb/hr/CT	lb/hr/3-CT	lb/yr/CT	TPY/CT	lb/yr/3-CT	TPY/3-CT
Ammonia[c]	5 ppm	881	0.868	6.0	18.0	32,832	16.4	98,495	49.2
Acetaldehyde	0.040600	881	0.868	0.035	0.1	192.9	0.096	579	0.3
Acrolein	0.003690	881	0.868	0.00320	0.01	17.5	0.009	53	0.03
Benzene	0.003330	881	0.868	0.0029	0.01	15.8	0.008	47	0.02
1,3-Butadiene	0.000436	881	0.868	0.00038	0.001	2.1	0.001	6	0.003
Ethylbenzene	0.032480	881	0.868	0.0282	0.1	154.4	0.08	463	0.2
Formaldehyde	0.365400	881	0.868	0.317	1.0	1,736	0.9	5,209	2.6
Hexane	0.259000	881	0.868	0.225	0.7	1,231	0.6	3,692	1.8
Naphthalene	0.001320	881	0.868	0.0011	0.003	6.3	0.003	18.8	0.009
PAH[d]	0.000014	881	0.868	0.00001	0.00004	0.07	0.00003	0.2	0.0001
Propylene Oxide	0.029435	881	0.868	0.0255	0.1	139.9	0.070	420	0.21
Toluene	0.131950	881	0.868	0.115	0.3	627	0.3	1,881	0.9
Xylene	0.064960	881	0.868	0.056	0.2	309	0.2	926	0.5
TOTAL HAPs						4,432	2.2	13,296	6.6

Notes:

(1) Source - GE - Estimated Performance and Emissions at 30F, dated December 19, 2005

[a] HAP emission estimates were previously based upon a maximum operation of 8,760 hours per year (Data Reponse Set 1B).

[b] Obtained from AP-42 Table 3.1-3 revised 4/00 for natural gas-fired combustion turbines. Formaldehyde, Benzene, and Acrolein emission factors are from the Background document for AP-42 Section 3.1, Table 3.4-1 for a natural gas fired combustion turbine with an oxidation catalyst. PAH emission factor for uncontrolled natural gas fired turbine. Hexane emission factor from California Air Toxic Emission Factor database.

[c] Based on an exhaust NH_3 limit of 5 ppmv @ 15% O_2 and a F-factor of 8710. This value represents 15 hours per day and 365 days per year of operation.

[d] Carcinogenic PAHs only; naphthalene considered separately. Emission Factor based on two separate source tests (2002 and 2004) from the Delta Energy Center located in Pittsburg, CA.

TABLE 3.1B-5B (Replaces Table 8.1B-6BR, Data Response Set 1B)

AES Highgrove Cooling Tower Toxic Emissions Analysis

Cooling Tower Recirculation Rate per Cooling Tower Cell[a]	7,000 GPM	3,502,800 Pounds/Hr
Drift Eliminator Efficiency[b]	0.001 Percent	
Cooling Tower Cycles of Concentration[c]	8	
Cooling Tower Drift	35.028 Pounds/Hr	
Annual Operating Hours	5475 Hours/Year[d]	

Toxic Compounds[e] Chemical Name	CAS Number	Sampling Results - Well #2 mg/L	Sampling Results - Well #21 mg/L	Design Case Cooling Tower Influent[e] mg/L	Max. TDS for Cooling Tower Discharge mg/L	Cooling Tower Emissions Per CT lb/hr	Annual Cooling Tower Toxic Emissions per CT lb/yr
Arsenic	7440-38-2	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Copper	7440-50-8	0.01	0.01	0.0100	0.080	2.80E-06	1.53E-02
Nickel	7440-02-0	0.01	0.01	0.0100	0.080	2.80E-06	1.53E-02
Silver	7440-22-4	0.01	0.01	0.0100	0.080	2.80E-06	1.53E-02
Antimony [f]	7440-36-0	0.001	0.006	0.0035	0.028	9.81E-07	5.37E-03
Beryllium [f]	7440-41-7	0.001	0.001	0.0010	0.008	2.80E-07	1.53E-03
Cadmium	7440-43-9	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Chromium (total)	18540-29-9	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Lead	7439-92-1	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Manganese	7439-96-5	0.02	0.02	0.0200	0.160	5.60E-06	3.07E-02
Mercury	7439-97-6	0.0002	0.0002	0.0002	0.002	5.60E-08	3.07E-04
Selenium [f]	7782-49-2	0.001	0.005	0.0030	0.024	8.41E-07	4.60E-03
Zinc	7440-66-6	0.02	0.02	0.0200	0.160	5.60E-06	3.07E-02
Acrylonitrile [f]	107-13-1	0.002	Not Tested [g]	0.0020	0.016	5.60E-07	3.07E-03
Allyl chloride [f]	107-05-1	0.0005	Not Tested [g]	0.0005	0.004	1.40E-07	7.67E-04
Benzene	71-43-2	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Bromomethane	74-83-9	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
2-Butanone [f]	78-93-3	0.002	Not Tested [g]	0.0020	0.016	5.60E-07	3.07E-03
Carbon disulfide [f]	75-15-0	0.0005	Not Tested [g]	0.0005	0.004	1.40E-07	7.67E-04
Carbon tetrachloride	56-23-5	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Chlorobenzene	108-90-7	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Chloroethane	75-00-3	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Chloroform [h]	67-66-3	0.002	0.0024	0.0022	0.018	6.16E-07	3.38E-03
1,2-Dibromo-3-chloropropane	96-12-8	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
1,2-Dibromoethane	106-93-4	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,4-Dichlorobenzene	106-46-7	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,1-Dichloroethane	75-34-3	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,2-Dichloroethane	107-06-2	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,1-Dichloroethene	75-35-4	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Ethylbenzene	100-41-4	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Methylene chloride	75-09-2	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Methyl-t-butyl ether [f]	1634-04-4	0.0005	0.003	0.0018	0.014	4.90E-07	2.68E-03
Naphthalene	91-20-3	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
Styrene	100-42-5	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,1,2,2-Tetrachloroethane	79-34-5	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Tetrachloroethene	127-18-4	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Toluene	108-88-3	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,1,1-Trichloroethane	71-55-6	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
1,1,2-Trichloroethane	79-00-5	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Trichloroethene	79-01-6	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
Vinyl chloride	75-01-4	0.005	0.005	0.0050	0.040	1.40E-06	7.67E-03
o-Xylene	95-47-6	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
m-Xylene	108-38-3	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03
p-Xylene	106-42-3	0.002	0.002	0.0020	0.016	5.60E-07	3.07E-03

1. Influent concentration data were tested on July 2006 (Test America).
2. For chemicals that were not detected (ND) during the source test, the reporting limits were used to calculate the emissions.
3. It was assumed that the total chromium is hexavalent chromium

a. Marley NC Class model NC8312G3. Recirculation rate is calculated for each tower (3 cells), previous emission calculations incorrectly assumed recirculaton rate was 7,000 gpm per cooling tower cell.
b. Vendor drift rate.
c. Cycles of concentration were lowered from 10 (Date Response Set 1B) to 8 in order to prevent scaling and meet requirements for discharge to the SARI line.

d. HAP emission estimates were previously based upon a maximum operation of 8,760 hours per year (Data Reponse Set 1B).
e. Cooling tower influent assumed to be comprised of 50% water from Well #2 and 50% water from Well #21.
f. For chemicals not tested during the July 2006 sampling event, previous testing data was used when available. This data consists of the Calscience Environmental Laboritories, Inc. testing (November 2004) and the MWH Laboritories testing (March 2006) for Wells #2 and #21, respectively.
g. When Well #21 data was unavailable, influent chenical concentration was assumed to be the same as the concentration in Well #2.
h. The sample taken at Well #21 was a non detect for chloroform. However, the value used was detected at Well #22, which is in close proximity to Well #21.

TABLE 3.1B-6 (Replaces Table 8.1B-7R, Data Response Set 1B)

AES Highgrove Cooling Tower Criteria Emissions

Assumed

Cooling tower operates 15 hours/day, 365 days per year at the design recirculation rate with 8 cycles of concentration.
3 Cooling Tower Cells per CT.

Givens

Cooling Tower Recirculation Rate per Cooling Tower[a]	7,000	GPM	3,502,800 Pounds/Hr per Tower (3-cells)
Drift Eliminator Efficiency[b]	0.0010	Percent	
Cooling Tower Cycles of Concentration[c]	8		
Cooling Tower Drift	35.0	Pounds/Hr	

Component[d]	Design Case Cooling Tower Influent (mg/L)	Max. TDS for Cooling Tower Discharge (mg/L)	Cooling Tower $PM_{10/2.5}$ Emissions Per CT (Lb/Hr)	Annual Cooling Tower $PM_{10/2.5}$ Emissions per CT Tons/Year[d]	Annual Cooling Tower $PM_{10/2.5}$ Emissions for 3 CTs Tons/Year[d]
Total Dissolved Solids	565	**4,520**	0.1583	0.43	1.30

Notes:

a. Marley NC Class model NC8312G3. Recirculation rate is calculated for each tower (3 cells), previous emission calculations incorrectly assumed recirculaton rate was 7,000 gpm per cooling tower cell.

b. Vendor drift rate.

c. Cycles of concentration were lowered from 10 (Date Response Set 1B) to 8 in order to prevent scaling and meet requirements for discharge to the SARI line.

d. TDS is calculated from 50/50 blend of Well #21 and Well #2, sampled 7/06, resulting in an increase in TDS in cooling tower influent. TDS from Data Response Set 1B was calculated from Well #2 only.

e. Calculated assuming each tower operates 5,475 hours per year

TABLE 3.1B-7 (Replaces Table 8.1B-9R, Data Response Set 1B)
AES Highgrove Mitigation Liability for Ambient Air Temperature 30 F Case

Pollutant[1, 2]	Daily Emissions (Pounds)	Monthly Emissions (Pounds)	Average Daily (Pounds)	ERCs Liability (Pounds/Day)	1st Year RTCs Liability (Pounds)	RTCs Liability (Pounds)
NOx	446.9	13,854	461.8	-	207,564	163,125
CO	703.0	21,792	726.4	871.7	-	-
VOC	116.0	3,597	119.9	143.9	-	-
SO_2	29.3	908	30.3	36.3	-	-
PM_{10}[3]	285.0	8,835	294.5	353.4	-	-

Notes

1. Daily emissions based on 15 hours per day per CTG, plus 2 starts/stops for 3 CTG per day.
2. Hourly emissions used are based on 30 F, base load without evaporators operating.
3. PM_{10} emissions do not include the 3 cooling towers as they are exempt from SCAQMD ERC requirements.