APPENDIX 8.1B

Calculation of Maximum Hourly, Daily, and Annual Emissions

APPENDIX 8.1B

Calculation of Maximum Hourly, Daily, and Annual Emissions

Tables presented in this Appendix are as follows:

Table 8.1B-1A	Estimated GE Performance Data for 30 F Ambient Conditions
Table 8.1B-1B	Estimated GE Performance Data for 80 F Ambient Conditions
Table 8.1B-1C	Estimated GE Performance Data for 97 F Ambient Conditions
Table 8.1B-2	Turbine Scenarios and Emission Calculations – Normal Operation
Table 8.1B-3	Turbine Scenarios and Emission Calculations - Commissioning
Table 8.1B-4	Emission Summary – Operation and Commissioning
Table 8.1B-5	Turbine Startup and Shutdown Emission Estimates
Table 8.1B-6	Turbine HAP Emission Estimates
Table 8.1B-7	Cooling Tower Emission Estimates
Table 8.1B-8	Natural Gas Analysis and Facility Fuel Usage
Table 8.1B-9	Mitigation Liability Calculation

Table 8.1B-1A

AES Highgrove Power Plant Turbine Performance - 30 F Ambient Temperature

GE Energy

TABLE 8.1B-1A

Performance By: **JWAY**
Project Info:

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**
Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**
Time: **6:52:17 AM**
Version: **3.4.3**

30 F	Evaporative Cooler ON	Evaporative Cooler OFF			
Load (%)		**100**	**75**	**50**	**37**
Case #		**100**	**101**	**102**	**103**
Ambient Conditions					
Dry Bulb, °F		30.0	30.0	30.0	30.0
Wet Bulb, °F		23.2	23.2	23.2	23.2
RH, %		30.0	30.0	30.0	30.0
Altitude, ft		945.0	945.0	945.0	945.0
Ambient Pressure, psia		14.201	14.201	14.201	14.201
	Evap Cooler Can Not Be Operated At Ambient Temps Below 59 F				Unit not Operable
Engine Inlet					
Comp Inlet Temp, °F		30.0	30.0	30.0	30.0
RH, %		30.0	30.0	30.0	30.0
Conditioning		NONE	NONE	NONE	NONE
Tons or kBtu/hr		0	0	0	0
Pressure Losses					
Inlet Loss, inH20		4.50	4.50	4.50	4.50
Exhaust Loss, inH20		12.00	12.00	12.00	12.00
Partload %		**100**	**75**	**50**	**37**
kW, Gen Terms		**102589**	**76962**	**51325**	**37467**
Est. Btu/kW-hr, LHV		**7741**	**8123**	**8956**	**9825**
Fuel Flow					
MMBtu/hr, LHV		794.2	625.2	459.7	368.1
lb/hr		38594	30383	22339	17890
NOx Control		**Water**	**Water**	**Water**	**Water**
Water Injection					
lb/hr		35973	25473	16332	11740
Temperature, °F		100.0	100.0	100.0	100.0
Intercooler		**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**
Humidification		OFF	OFF	OFF	OFF
IC Heat Extraction, btu/s		22008	16531	10396	7117
KOD Water Extraction, lb/s		0.0	0.0	0.0	0.0
Control Parameters					
HP Speed, RPM		9271	9101	8931	8839
LP Speed, RPM		5142	4779	4560	4417
PT Speed, RPM		3600	3600	3600	3600
PS3 - CDP, psia		567.0	470.2	364.2	301.9
T23 - Intcrl Inlet Temp, °F		301.0	277.1	240.1	213.8
P23 - Intcrl Inlet Pressure, psia		56.6	50.7	42.8	37.6
W23 - Intcrl Inlet Flow, lb/s		453.5	395.8	347.4	315.9
T25 - HPC Inlet Temp, °F		100.0	100.0	100.0	100.0
T3CRF - CDT, °F		718	688	659	642
T48IN, °R		1996	1927	1861	1814
T48IN, °F		1536	1467	1401	1354
Exhaust Parameters					
Temperature, °F		753.2	746.7	765.1	785.4
lb/sec		471.8	400.3	316.9	266.5
lb/hr		1698336	1441079	1141003	959240
Energy, Btu/s- ref 0 °R		147288	123566	98896	84328
Cp, Btu/lb-R		0.2735	0.2715	0.2705	0.2702

Table 8.1B-1A

AES Highgrove Power Plant Turbine Performance - 30 F Ambient Temperature

GE Energy

TABLE 8.1B-1A

Performance By: **JWAY**
Project Info:

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**
Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**
Time: **6:52:17 AM**
Version: **3.4.3**

30 F	Evaporative Cooler ON	Evaporative Cooler OFF			
Load (%)		**100**	**75**	**50**	**37**
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
NOx ppmvd Ref 15% O2		25	25	25	25
NOx as NO2, lb/hr		80	63	46	37
CO ppmvd Ref 15% O2		157	162	145	124
CO, lb/hr		305.81	247.79	162.63	111.35
CO2, lb/hr		103398.00	81437.05	59949.70	48065.84
HC ppmvd Ref 15% O2		8	8	7	5
HC, lb/hr		8.75	7.20	4.45	2.75
SOX as SO2, lb/hr		0.00	0.00	0.00	0.00
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
AR		1.2301	1.2368	1.2430	1.2468
N2		72.1429	72.5301	72.8964	73.1224
O2		13.4548	14.1988	14.8827	15.3037
CO2		6.0882	5.6511	5.2541	5.0108
H20		7.0622	6.3625	5.7063	5.3017
SO2		0.0000	0.0000	0.0000	0.0000
CO		0.0180	0.0172	0.0143	0.0116
HC		0.0005	0.0005	0.0004	0.0003
NOX		0.0032	0.0030	0.0028	0.0026
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
AR		0.9727	0.9696	0.9668	0.9651
N2		81.3498	81.0879	80.8525	80.7098
O2		13.2829	13.8977	14.4518	14.7985
CO2		4.3700	4.0217	3.7096	3.5206
H20		0.0000	0.0000	0.0000	0.0000
SO2		0.0000	0.0000	0.0000	0.0000
CO		0.0203	0.0192	0.0158	0.0128
HC		0.0010	0.0010	0.0008	0.0006
NOX		0.0032	0.0030	0.0027	0.0026
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)					
AR		0.8655	0.8730	0.8802	0.8846
N2		72.3858	73.0118	73.6080	73.9760
O2		11.8193	12.5135	13.1569	13.5551
CO2		3.8885	3.6211	3.3772	3.2270
H20		11.0190	9.9596	8.9602	8.3408
SO2		0.0000	0.0000	0.0000	0.0000
CO		0.0181	0.0173	0.0144	0.0117
HC		0.0009	0.0009	0.0007	0.0005
NOX		0.0029	0.0027	0.0025	0.0024
Aero Energy Fuel Number	**900-774 (So Cal Gas Line 2001)**				
		Volume %	**Weight %**		
Hydrogen		0.0000	0.0000		
Methane		96.1878	91.6553		
Ethane		1.6674	2.9780		
Ethylene		0.0000	0.0000		
Propane		0.2679	0.7017		
Propylene		0.0000	0.0000		
Butane		0.0976	0.3369		
Butylene		0.0000	0.0000		
Butadiene		0.0000	0.0000		
Pentane		0.0072	0.0309		
Cyclopentane		0.0000	0.0000		
Hexane		0.0223	0.1141		
Heptane		0.0000	0.0000		
Carbon Monoxide		0.0000	0.0000		

Table 8.1B-1A

AES Highgrove Power Plant Turbine Performance - 30 F Ambient Temperature

GE Energy

TABLE 8.1B-1A

Performance By: **JWAY**
Project Info:

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**
Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**
Time: **6:52:17 AM**
Version: **3.4.3**

30 F	Evaporative Cooler ON	Evaporative Cooler OFF			
Load (%)		**100**	**75**	**50**	**37**
Carbon Dioxide		1.3404	3.5040		
Nitrogen		0.4081	0.6791		
Water Vapor		0.0000	0.0000		
Oxygen		0.0000	0.0000		
Hydrogen Sulfide		0.0000	0.0000		
Ammonia		0.0000	0.0000		
Btu/lb, LHV		20577			
Btu/scf, LHV		915			
Btu/scf, HHV		1015			
Btu/lb, HHV		22815			
Fuel Temp, °F		175.0			
NOx Scalar		1.016			
Specific Gravity		0.58			
Engine Exhaust					
Exhaust MW		28.1	28.2	28.3	28.3
Inlet Flow Wet, pps		453.8	396.0	347.6	320.0
Inlet Flow Dry, pps		453.3	395.6	347.2	319.7
Shaft HP		139744	105160	70622	51977
Generator Information					
Capacity kW		122564	122564	122564	122564
Efficiency		0.984	0.981	0.975	0.967
Inlet Temp, °F		30.0	30.0	30.0	30.0
Gear Box Loss		N/A	N/A	N/A	N/A
8th Stage Bleed					
Flow, pps		0.0	0.0	0.0	0.0
Pressure, psia		0.000	0.000	0.000	0.000
Temperature, °R		0	0	0	0
CDP Bleed					
Flow, pps		0.0	0.0	0.0	0.0
Pressure, psia		0.000	0.000	0.000	0.000
CardPack		**87o**	**87o**	**87o**	**87o**
Intercooler Cardpack		**87m**	**87m**	**87m**	**87m**
NSI		**332**	**0**	**0**	**326**
NSI		**0**	**0**	**0**	**0**
NSI		**0**	**0**	**0**	**0**

Table 8.1B-1B

AES Highgrove Power Plant Turbine Performance - 80 F Ambient Temperature

GE Energy

TABLE 8.1B-1B

Performance By: **JWAY**

Project Info:

Engine: **LMS100 PA**

Deck Info: **G0179C - 87o.scp**

Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**

Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**

Time: **9:18:35 AM**

Version: **3.4.3**

80 F	Evaporative Cooler ON				Evaporative Cooler OFF			
Load (%)	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**35**
Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**
Ambient Conditions								
Dry Bulb, °F	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Wet Bulb, °F	69.5	69.5	69.5	69.5	69.5	69.5	69.5	69.5
RH, %	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Altitude, ft	945.0	945.0	945.0	945.0	945.0	945.0	945.0	945.0
Ambient Pressure, psia	14.201	14.201	14.201	14.201	14.201	14.201	14.201	14.201
Engine Inlet								
Comp Inlet Temp, °F	71.1	71.1	71.1	71.1	80.0	80.0	80.0	80.0
RH, %	92.7	92.7	92.7	92.7	60.0	60.0	60.0	60.0
Conditioning	EVAP	EVAP	EVAP	EVAP	NONE	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0	0	0	0
Pressure Losses								
Inlet Loss, inH20	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**35**
kW, Gen Terms	**97178**	**72904**	**48621**	**34513**	**95118**	**71360**	**47592**	**33058**
Est. Btu/kW-hr, LHV	**7906**	**8264**	**9123**	**10131**	**7950**	**8317**	**9196**	**10306**
Fuel Flow								
MMBtu/hr, LHV	768.3	602.5	443.6	349.7	756.1	593.5	437.7	340.7
lb/hr	37337	29281	21556	16993	36747	28841	21270	16557
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Water Injection								
lb/hr	30168	20184	11898	7929	29478	19698	12102	8038
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intercooler	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**
Humidification	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
IC Heat Extraction, btu/s	27287	21289	13539	9428	26813	20954	13965	9667
KOD Water Extraction, lb/s	1.5	1.0	0.1	0.0	0.6	0.1	0.0	0.0
Control Parameters								
HP Speed, RPM	9359	9153	8980	8875	9359	9151	8973	8863
LP Speed, RPM	5282	4942	4718	4567	5281	4963	4739	4578
PT Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	539.4	450.0	349.2	285.6	531.1	443.4	344.7	278.8
T23 - Intcrl Inlet Temp, °F	345.0	324.6	287.3	257.7	354.7	334.5	297.2	265.7
P23 - Intcrl Inlet Pressure, psia	52.7	48.3	40.9	35.6	51.9	47.6	40.4	34.9
W23 - Intcrl Inlet Flow, lb/s	428.2	369.4	323.7	297.6	420.8	363.2	318.5	291.9
T25 - HPC Inlet Temp, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
T3CRF - CDT, °F	722	686	657	639	721	685	657	638
T48IN, °R	2031	1943	1878	1827	2031	1942	1877	1824
T48IN, °F	1572	1483	1418	1368	1572	1483	1417	1364
Exhaust Parameters								
Temperature, °F	794.3	773.4	790.6	812.9	798.5	777.5	793.6	817.6
lb/sec	443.1	380.1	301.6	250.4	436.3	374.6	297.9	244.8
lb/hr	1595134	1368444	1085920	901374	1570549	1348463	1072402	881279
Energy, Btu/s- ref 0 °R	144445	121005	97078	81848	142731	119655	96004	80219
Cp, Btu/lb-R	0.2774	0.2747	0.2740	0.2739	0.2775	0.2748	0.2738	0.2736

Table 8.1B-1B

AES Highgrove Power Plant Turbine Performance - 80 F Ambient Temperature

GE Energy

TABLE 8.1B-1B

Performance By: **JWAY**

Project Info:

Engine: **LMS100 PA**

Deck Info: **G0179C - 87o.scp**

Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**

Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**

Time: **9:18:35 AM**

Version: **3.4.3**

80 F	Evaporative Cooler ON				Evaporative Cooler OFF			
Load (%)	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**35**
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	77	61	45	35	76	60	44	34
CO ppmvd Ref 15% O2	121	114	87	68	120	112	91	72
CO, lb/hr	228.55	168.15	94.33	58.33	222.69	163.38	97.73	60.31
CO2, lb/hr	100113.80	78587.72	57941.85	45724.96	98536.16	77412.59	57167.02	44547.97
HC ppmvd Ref 15% O2	5	5	3	1	5	5	3	1
HC, lb/hr	5.57	3.90	1.60	0.58	5.39	3.74	1.78	0.71
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
AR	1.2188	1.2255	1.2294	1.2331	1.2188	1.2255	1.2312	1.2353
N2	71.4813	71.8682	72.0982	72.3138	71.4813	71.8682	72.2034	72.4420
O2	12.9894	13.8727	14.5303	14.9754	12.9928	13.8759	14.5690	15.0397
CO2	6.2762	5.7429	5.3357	5.0728	6.2740	5.7408	5.3307	5.0549
H20	8.0163	7.2752	6.7948	6.3957	8.0153	7.2742	6.6535	6.2185
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0143	0.0123	0.0087	0.0065	0.0142	0.0121	0.0091	0.0068
HC	0.0003	0.0003	0.0001	0.0001	0.0003	0.0003	0.0002	0.0001
NOX	0.0033	0.0030	0.0028	0.0027	0.0033	0.0030	0.0028	0.0027
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
AR	0.9744	0.9706	0.9677	0.9659	0.9744	0.9705	0.9676	0.9657
N2	81.4870	81.1666	80.9280	80.7728	81.4857	81.1653	80.9210	80.7581
O2	12.9639	13.7168	14.2791	14.6445	12.9671	13.7198	14.2950	14.6787
CO2	4.5543	4.1286	3.8124	3.6068	4.5527	4.1271	3.8030	3.5871
H20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0163	0.0139	0.0098	0.0072	0.0162	0.0137	0.0102	0.0076
HC	0.0007	0.0006	0.0003	0.0001	0.0007	0.0006	0.0003	0.0002
NOX	0.0034	0.0030	0.0028	0.0027	0.0034	0.0030	0.0028	0.0026
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
AR	0.8531	0.8606	0.8651	0.8693	0.8531	0.8606	0.8671	0.8717
N2	71.3480	71.9709	72.3475	72.6969	71.3482	71.9711	72.5126	72.8995
O2	11.3509	12.1628	12.7651	13.1803	11.3539	12.1656	12.8097	13.2503
CO2	3.9877	3.6608	3.4082	3.2462	3.9863	3.6595	3.4078	3.2360
H20	12.4424	11.3294	10.6026	9.9983	12.4408	11.3278	10.3908	9.7311
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0143	0.0123	0.0087	0.0065	0.0142	0.0121	0.0092	0.0069
HC	0.0006	0.0005	0.0003	0.0001	0.0006	0.0005	0.0003	0.0001
NOX	0.0029	0.0027	0.0025	0.0024	0.0029	0.0027	0.0025	0.0024

Aero Energy Fuel Number	**900-774 (So Cal Gas Line 2001)**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	96.1878	91.6553
Ethane	1.6674	2.9780
Ethylene	0.0000	0.0000
Propane	0.2679	0.7017
Propylene	0.0000	0.0000
Butane	0.0976	0.3369
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0072	0.0309
Cyclopentane	0.0000	0.0000
Hexane	0.0223	0.1141
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.3404	3.5040
Nitrogen	0.4081	0.6791
Water Vapor	0.0000	0.0000

Table 8.1B-1B

AES Highgrove Power Plant Turbine Performance - 80 F Ambient Temperature

GE Energy

TABLE 8.1B-1B

Performance By: **JWAY**

Project Info:

Engine: **LMS100 PA**

Deck Info: **G0179C - 87o.scp**

Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**

Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**

Time: **9:18:35 AM**

Version: **3.4.3**

80 F	Evaporative Cooler ON				Evaporative Cooler OFF			
Load (%)	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**35**
Oxygen	0.0000	0.0000						
Hydrogen Sulfide	0.0000	0.0000						
Ammonia	0.0000	0.0000						
Btu/lb, LHV	20577							
Btu/scf, LHV	915							
Btu/scf, HHV	1015							
Btu/lb, HHV	22815							
Fuel Temp, °F	175.0							
NOx Scalar	1.016							
Specific Gravity	0.58							
Engine Exhaust								
Exhaust MW	28.0	28.1	28.1	28.2	28.0	28.1	28.1	28.2
Inlet Flow Wet, pps	428.4	369.5	323.9	297.8	421.0	363.4	318.7	292.0
Inlet Flow Dry, pps	421.7	363.7	318.8	293.1	415.2	358.5	314.3	288.0
Shaft HP	132437	99690	66983	48005	129655	97608	65598	46048
Generator Information								
Capacity kW	128475	128475	128475	128475	130807	128475	128475	128475
Efficiency	0.984	0.981	0.973	0.964	0.980	0.980	0.973	0.963
Inlet Temp, °F	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8th Stage Bleed								
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0	0	0
CDP Bleed								
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CardPack	**87o**	**87o**	**87o**	**87o**	**87o**	**87o**	**87o**	**87o**
Intercooler Cardpack	**87m**	**87m**	**87m**	**87m**	**87m**	**87m**	**87m**	**87m**
NSI	**334**	**0**	**0**	**326**	**334**	**0**	**0**	**326**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 8.1B-1C

AES Highgrove Power Plant Turbine Performance - 97 F Ambient Temperature

GE Energy

TABLE 8.1B-1C

Performance By: **JWAY**
Project Info:

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**
Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**
Time: **9:12:48 AM**
Version: **3.4.3**

97 F	Evaporative Cooler ON				Evaporative Cooler OFF			
Load (%)	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**34**
Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**
Ambient Conditions								
Dry Bulb, °F	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
Wet Bulb, °F	66.9	66.9	66.9	66.9	66.9	66.9	66.9	66.9
RH, %	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Altitude, ft	945.0	945.0	945.0	945.0	945.0	945.0	945.0	945.0
Ambient Pressure, psia	14.201	14.201	14.201	14.201	14.201	14.201	14.201	14.201
Engine Inlet								
Comp Inlet Temp, °F	71.4	71.4	71.4	71.4	97.0	97.0	97.0	97.0
RH, %	79.6	79.6	79.6	79.6	20.0	20.0	20.0	20.0
Conditioning	EVAP	EVAP	EVAP	EVAP	NONE	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0	0	0	0
Pressure Losses								
Inlet Loss, inH20	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**34**
kW, Gen Terms	**97614**	**73232**	**48839**	**35021**	**91476**	**68629**	**45772**	**30901**
Est. Btu/kW-hr, LHV	**7897**	**8254**	**9116**	**10088**	**8054**	**8443**	**9344**	**10507**
Fuel Flow								
MMBtu/hr, LHV	770.8	604.4	445.2	353.3	736.7	579.4	427.7	327.8
lb/hr	37462	29375	21637	17176	35803	28158	20786	15929
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Water Injection								
lb/hr	30341	20304	12439	8551	30556	21044	13230	9695
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intercooler	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**	**Water-Air**
Humidification	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
IC Heat Extraction, btu/s	26514	20610	13554	9598	27185	21769	14920	10236
KOD Water Extraction, lb/s	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Control Parameters								
HP Speed, RPM	9359	9153	8976	8873	9352	9138	8952	8841
LP Speed, RPM	5285	4942	4718	4571	5290	5005	4777	4618
PT Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	541.1	451.3	350.4	288.1	516.9	432.3	336.9	268.8
T23 - Intcrl Inlet Temp, °F	346.3	325.9	288.4	259.5	373.2	353.0	316.4	282.5
P23 - Intcrl Inlet Pressure, psia	52.8	48.4	41.0	35.8	50.4	46.4	39.6	33.9
W23 - Intcrl Inlet Flow, lb/s	428.7	369.7	324.2	298.6	408.7	353.8	309.4	282.3
T25 - HPC Inlet Temp, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
T3CRF - CDT, °F	722	686	658	640	722	687	658	638
T48IN, °R	2031	1943	1877	1828	2031	1942	1874	1819
T48IN, °F	1572	1483	1418	1369	1572	1483	1414	1359
Exhaust Parameters								
Temperature, °F	793.4	772.6	789.3	810.6	805.6	784.1	797.6	825.0
lb/sec	444.5	381.3	302.8	252.6	424.9	365.5	291.7	236.6
lb/hr	1600377	1372634	1089993	909529	1529705	1315817	1050195	851748
Energy, Btu/s- ref 0 °R	144808	121291	97229	82338	139505	117054	93990	77702
Cp, Btu/lb-R	0.2773	0.2746	0.2737	0.2734	0.2771	0.2741	0.2729	0.2727

Table 8.1B-1C

AES Highgrove Power Plant Turbine Performance - 97 F Ambient Temperature

GE Energy

TABLE 8.1B-1C

Performance By: **JWAY**
Project Info:

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**
Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**
Time: **9:12:48 AM**
Version: **3.4.3**

97 F	Evaporative Cooler ON				Evaporative Cooler OFF			
Load (%)	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**34**
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	78	61	45	35	74	58	43	33
CO ppmvd Ref 15% O2	122	114	93	75	131	130	111	87
CO, lb/hr	230.09	169.31	101.00	65.05	237.16	183.68	115.70	70.13
CO2, lb/hr	100447.10	78838.30	58148.84	46192.14	95971.88	75540.52	55833.44	42841.20
HC ppmvd Ref 15% O2	5	5	3	2	6	6	4	3
HC, lb/hr	5.63	3.94	1.88	0.85	6.12	4.69	2.61	1.20
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
AR	1.2189	1.2255	1.2311	1.2349	1.2227	1.2304	1.2368	1.2412
N2	71.4821	71.8692	72.1957	72.4174	71.7103	72.1578	72.5318	72.7919
O2	12.9892	13.8719	14.5606	14.9977	13.0611	13.9616	14.6871	15.1807
CO2	6.2765	5.7436	5.3348	5.0787	6.2739	5.7410	5.3165	5.0298
H20	8.0153	7.2743	6.6656	6.2615	7.7127	6.8919	6.2138	5.7453
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0144	0.0123	0.0093	0.0072	0.0155	0.0140	0.0110	0.0082
HC	0.0004	0.0003	0.0002	0.0001	0.0004	0.0004	0.0002	0.0001
NOX	0.0033	0.0030	0.0028	0.0027	0.0033	0.0030	0.0028	0.0027
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
AR	0.9744	0.9706	0.9677	0.9658	0.9742	0.9704	0.9674	0.9654
N2	81.4871	81.1669	80.9236	80.7723	81.4747	81.1531	80.9004	80.7314
O2	12.9636	13.7159	14.2888	14.6452	12.9919	13.7470	14.3420	14.7402
CO2	4.5545	4.1291	3.8064	3.6058	4.5374	4.1100	3.7747	3.5509
H20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0164	0.0139	0.0104	0.0080	0.0176	0.0157	0.0123	0.0091
HC	0.0007	0.0006	0.0003	0.0002	0.0008	0.0007	0.0005	0.0003
NOX	0.0034	0.0030	0.0028	0.0027	0.0034	0.0030	0.0028	0.0026
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)								
AR	0.8531	0.8606	0.8669	0.8712	0.8574	0.8660	0.8733	0.8783
N2	71.3493	71.9724	72.5003	72.8596	71.7038	72.4238	73.0295	73.4532
O2	11.3508	12.1621	12.8015	13.2105	11.4339	12.2683	12.9467	13.4114
CO2	3.9879	3.6613	3.4102	3.2526	3.9933	3.6679	3.4074	3.2308
H20	12.4409	11.3280	10.4090	9.7963	11.9925	10.7567	9.7290	9.0153
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0144	0.0124	0.0093	0.0072	0.0155	0.0140	0.0111	0.0083
HC	0.0006	0.0005	0.0003	0.0002	0.0007	0.0006	0.0004	0.0003
NOX	0.0029	0.0027	0.0025	0.0024	0.0029	0.0027	0.0025	0.0024

Aero Energy Fuel Number	**s Line 2001)**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	96.1878	91.6553
Ethane	1.6674	2.9780
Ethylene	0.0000	0.0000
Propane	0.2679	0.7017
Propylene	0.0000	0.0000
Butane	0.0976	0.3369
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0072	0.0309
Cyclopentane	0.0000	0.0000
Hexane	0.0223	0.1141
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.3404	3.5040
Nitrogen	0.4081	0.6791
Water Vapor	0.0000	0.0000

Table 8.1B-1C

AES Highgrove Power Plant Turbine Performance - 97 F Ambient Temperature

GE Energy

TABLE 8.1B-1C

Performance By: **JWAY**
Project Info:

Engine: **LMS100 PA**
Deck Info: **G0179C - 87o.scp**
Generator: **BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)**
Fuel: **Site Gas Fuel#900-774T, 20577 Btu/lb,LHV**

Date: **12/19/2005**
Time: **9:12:48 AM**
Version: **3.4.3**

97 F	Evaporative Cooler ON				Evaporative Cooler OFF			
Load (%)	**100**	**75**	**50**	**36**	**100**	**75**	**50**	**34**
Oxygen	0.0000	0.0000						
Hydrogen Sulfide	0.0000	0.0000						
Ammonia	0.0000	0.0000						
Btu/lb, LHV	20577							
Btu/scf, LHV	915							
Btu/scf, HHV	1015							
Btu/lb, HHV	22815							
Fuel Temp, °F	175.0							
NOx Scalar	1.016							
Specific Gravity	0.58							
Engine Exhaust								
Exhaust MW	28.0	28.1	28.1	28.2	28.0	28.1	28.2	28.3
Inlet Flow Wet, pps	429.0	369.9	324.3	298.8	408.9	354.0	309.5	282.4
Inlet Flow Dry, pps	423.1	364.9	319.9	294.7	405.8	351.2	307.1	280.3
Shaft HP	133026	100131	67276	49668	124740	93928	63149	43148
Generator Information								
Capacity kW	117210	117210	117210	117210	130767	117210	117210	117210
Efficiency	0.984	0.981	0.974	0.965	0.980	0.980	0.972	0.960
Inlet Temp, °F	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8th Stage Bleed								
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0	0	0
CDP Bleed								
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CardPack	**87o**	**87o**	**87o**	**87o**	**87o**	**87o**	**87o**	**87o**
Intercooler Cardpack	**87m**	**87m**	**87m**	**87m**	**87m**	**87m**	**87m**	**87m**
NSI	**334**	**0**	**0**	**326**	**334**	**0**	**0**	**326**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

TABLE 8.1B-2
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(1)					Fuel Input[1,3]			Emissions[1,3]														Exhaust Stack Conditions				
								NOx			CO			VOC			Particulates			SO_2[2]			Stack Temp	Flow	Stack Height	Stack Diameter	Velocity
Ambient Temp F	GE Date	RH %	Evap %	Load %	Per CT MMBtu/hr (HHV)	Per CT 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	38594	0.87	11.2	268	61190	11.7	280	63986	2.2	53	11977	6	144	32850	0.6	14.8	3376	743	883683	80	12.50	120.01
30	**12/19/2005**	30	Off	75	694	30383	0.68	8.8	211	48144	9.2	220	50246	1.8	43	9855	6	144	32850	0.5	11.7	2658	737	743130	80	12.50	100.93
30	**12/19/2005**	30	Off	50	510	22339	0.50	6.5	155	35382	6.7	162	36844	1.3	31	6961	6	144	32850	0.4	8.6	1954	755	595326	80	12.50	80.85
80	**12/19/2005**	60	On	Base	852	37337	0.84	10.8	260	59243	11.3	272	62048	2.2	53	12198	6	144	32850	0.6	14.3	3266	784	861409	80	12.50	116.99
80	**12/19/2005**	60	Off	Base	839	36747	0.83	10.6	256	58292	11.1	267	60961	2.2	52	11804	6	144	32850	0.6	14.1	3214	789	850996	80	12.50	115.58
80	**12/19/2005**	60	On	75	668	29281	0.66	8.5	204	46427	8.9	212	48454	1.6	37	8541	6	144	32850	0.5	11.2	2561	763	723990	80	12.50	98.33
80	**12/19/2005**	60	On	50	492	21556	0.49	6.2	150	34163	6.5	156	35618	1.1	26	5840	6	144	32850	0.3	8.3	1886	781	582597	80	12.50	79.12
97	**12/19/2005**	20	On	Base	855	37462	0.84	10.9	261	59427	11.3	272	61955	2.3	54	12330	6	144	32850	0.6	14.4	3277	783	863615	80	12.50	117.29
97	**12/19/2005**	20	Off	Base	817	35803	0.81	10.4	249	56790	10.9	261	59471	2.0	49	11169	6	144	32850	0.6	13.7	3132	796	833580	80	12.50	113.21
97	**12/19/2005**	20	On	75	670	29375	0.66	8.5	204	46573	8.9	214	48788	1.6	38	8629	6	144	32850	0.5	11.3	2570	763	725731	80	12.50	98.56
97	**12/19/2005**	20	On	50	494	21637	0.49	6.3	150	34293	6.5	156	35676	1.3	30	6862	6	144	32850	0.3	8.3	1893	779	584169	80	12.50	79.34

(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 3.5 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 8.1B-3
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
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	20	14	24	12	24	40	134
Units in Operation Simultaneously	2	3	1	3	3	3	
Average Load (Percent)	0	5	50	100	75	100	
NOx lb/hr	91	99	175	81	35	8.1	
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	900.5	700	900.5	
Emissions							
NOx lb/mmscf[1]	616	558	355	91	51	9	
CO lb/mmscf[1]	372	338	341	287	13	14	
VOC lb/mmscf[1]	14	11	6	6	6	2	
Total Lb of NOx for 3 CTs	5,460	4,158	12,600	2,916	2,520	972	28,626
Total Lb of CO for 3 CTs	3,300	2,520	12,096	9,180	648	1,440	29,184
Total Lb of VOC lbs for 3 CTs	120	84	216	180	288	240	1,128

Source: Sun Valley AFC
Notes: 1. Fuel heat content is 1015 MMBtu/MMSCF.

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	12.50	65.89
50	781	582597	90	12.50	79.12
75	763	723990	90	12.50	98.33
100	789	850996	90	12.50	115.58

TABLE 8.1B-4
Modeling Emissions Summary

	Scenario	NOx (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	SO2 (lb/hr)	Velocity (m/s)	Velocity (ft/s)	Temperature F	Temperature K
Annual	30F Base Load	5.69	*	2.93	0.30	36.6	120.0	743	668
	30F 75% Load	4.68	*	2.93	0.25	30.8	100.9	737	665
	30F 50% Load	3.69	*	2.93	0.19	24.6	80.9	755	675
	80F Base Load + Evap	5.54	*	2.93	0.29	35.7	117.0	784	691
	80F Base Load	5.47	*	2.93	0.29	35.2	115.6	789	693
	80F 75% Load	4.55	*	2.93	0.24	30.0	98.3	763	679
	80F 50% Load	3.59	*	2.93	0.19	24.1	79.1	781	689
	97F Base Load + Evap	5.55	*	2.93	0.29	35.7	117.3	783	691
	97F Base Load	5.35	*	2.93	0.28	34.5	113.2	796	697
	97F 75% Load	4.56	*	2.93	0.24	30.0	98.6	763	679
	97F 50% Load	3.60	*	2.93	0.19	24.2	79.3	779	688
24-Hour	30F Base Load	11.37	*	5.98	0.61	36.6	120.0	743	668
	30F 75% Load	9.15	*	5.98	0.49	30.8	100.9	737	665
	30F 50% Load	6.97	*	5.98	0.37	24.6	80.9	755	675
	80F Base Load + Evap	11.04	*	5.98	0.60	35.7	117.0	784	691
	80F Base Load	10.88	*	5.98	0.59	35.2	115.6	789	693
	80F 75% Load	8.86	*	5.98	0.48	30.0	98.3	763	679
	80F 50% Load	6.77	*	5.98	0.36	24.1	79.1	781	689
	97F Base Load + Evap	11.07	*	5.98	0.60	35.7	117.3	783	691
	97F Base Load	10.62	*	5.98	0.57	34.5	113.2	796	697
	97F 75% Load	8.88	*	5.98	0.48	30.0	98.6	763	679
	97F 50% Load	6.79	*	5.98	0.36	24.2	79.3	779	688
	Pre- break-in Checkout	76	*	*	*	20.1	65.9	818	710
	Controlled Break-in Operation	58	*	*	*	20.1	65.9	818	710
	Water Injection Commissioning	175	*	*	*	24.1	79.1	781	689
	Complete AVR Commissioning	41	*	*	*	35.2	115.6	789	693
	SCR Commissioning	35	*	*	*	30.0	98.3	763	679
	Full load testing & checkout	8	*	*	*	35.2	115.6	789	693
8-Hour	30F Base Load	*	17.75	*	*	36.6	120.0	743	668
	30F 75% Load	*	15.74	*	*	30.8	100.9	737	665
	30F 50% Load	*	13.78	*	*	24.6	80.9	755	675
	80F Base Load + Evap	*	17.47	*	*	35.7	117.0	784	691
	80F Base Load	*	17.31	*	*	35.2	115.6	789	693
	80F 75% Load	*	15.48	*	*	30.0	98.3	763	679
	80F 50% Load	*	13.60	*	*	24.1	79.1	781	689
	97F Base Load + Evap	*	17.45	*	*	35.7	117.3	783	691
	97F Base Load	*	17.09	*	*	34.5	113.2	796	697
	97F 75% Load	*	15.53	*	*	30.0	98.6	763	679
	97F 50% Load	*	13.61	*	*	24.2	79.3	779	688
	Pre- break-in Checkout	*	55	*	*	20.1	65.9	818	710
	Controlled Break-in Operation	*	60	*	*	20.1	65.9	818	710
	Water Injection Commissioning	*	168	*	*	24.1	79.1	781	689
	Complete AVR Commissioning	*	255	*	*	35.2	115.6	789	693
	SCR Commissioning	*	9	*	*	30.0	98.3	763	679
	Full load testing & checkout	*	12	*	*	35.2	115.6	789	693
3-Hour	30F Base Load	*	*	*	0.60	36.6	120.0	743	668
	30F 75% Load	*	*	*	0.54	30.8	100.9	737	665
	30F 50% Load	*	*	*	0.48	24.6	80.9	755	675
	80F Base Load + Evap	*	*	*	0.59	35.7	117.0	784	691
	80F Base Load	*	*	*	0.59	35.2	115.6	789	693
	80F 75% Load	*	*	*	0.53	30.0	98.3	763	679
	80F 50% Load	*	*	*	0.47	24.1	79.1	781	689
	97F Base Load + Evap	*	*	*	0.59	35.7	117.3	783	691
	97F Base Load	*	*	*	0.58	34.5	113.2	796	697
	97F 75% Load	*	*	*	0.53	30.0	98.6	763	679
	97F 50% Load	*	*	*	0.47	24.2	79.3	779	688
	Pre- break-in Checkout	*	*	*	*	20.1	65.9	818	710
	Controlled Break-in Operation	*	*	*	*	20.1	65.9	818	710
	Water Injection Commissioning	*	*	*	*	24.1	79.1	781	689
	Complete AVR Commissioning	*	*	*	*	35.2	115.6	789	693
	SCR Commissioning	*	*	*	*	30.0	98.3	763	679
	Full load testing & checkout	*	*	*	*	35.2	115.6	789	693
1-Hour	30F Base Load	13.54	35.94	*	0.59	36.6	120.0	743	668
	30F 75% Load	13.06	35.44	*	0.57	30.8	100.9	737	665
	30F 50% Load	12.59	34.95	*	0.54	24.6	80.9	755	675
	80F Base Load + Evap	13.46	35.87	*	0.59	35.7	117.0	784	691
	80F Base Load	13.43	35.83	*	0.59	35.2	115.6	789	693
	80F 75% Load	13.00	35.37	*	0.56	30.0	98.3	763	679
	80F 50% Load	12.55	34.90	*	0.54	24.1	79.1	781	689
	97F Base Load + Evap	13.47	35.86	*	0.59	35.7	117.3	783	691
	97F Base Load	13.37	35.77	*	0.58	34.5	113.2	796	697
	97F 75% Load	13.00	35.38	*	0.56	30.0	98.6	763	679
	97F 50% Load	12.55	34.90	*	0.54	24.2	79.3	779	688
	Pre- break-in Checkout	91	55	*	*	20.1	65.9	818	710
	Controlled Break-in Operation	99	60	*	*	20.1	65.9	818	710
	Water Injection Commissioning	175	168	*	*	24.1	79.1	781	689
	Complete AVR Commissioning	81	255	*	*	35.2	115.6	789	693
	SCR Commissioning	35	9	*	*	30.0	98.3	763	679
	Full load testing & checkout	8	12	*	*	35.2	115.6	789	693

TABLE 8.1B-5
AES Highgrove Startup and Shutdown Emissions

Pollutant	Startup	Shutdown	Startup	Shutdown
	lb/event	lb/event	lb/hour	lb/hour
NOx	7.0	4.3	11.1	13.1
CO	15.4	18.2	19.7	27.5
VOC	2.1	1.6	3.0	3.4
PM10	3.5	1.1	5.8	6
SOx	0.36	0.11	0.59	0.60
NH3	2.86	0.90	5.2	5.8

Source: GE Energy and engineering estimates.
Start is assumed to take 37 minutes and shutdown takes 11 minutes until BACT is reached.
Exhaust Parameters for Starts and Shutdown Modeling for the 80 F Case at a 50% load

Stack Temp	Flow	Stack Height	Stack Diameter
F	ACFM	Feet	Feet
781	582597	80	12.5

TABLE 8.1B-6

AESH HAP Emission Estimates

Assume:

Assume heat input at 30 F at base load

Operating Hours for each CTG: 8760 Hours/Year

Given:

SCAQMD Rule 1401 is a permit unit evaluation - list emissions per turbine

CEC evaluation is plant wide - Combine emissions from all three turbines

Evaluate potential HAPS for Gas Turbine NESHAPS applicability, 10 tpy single HAPS or 25 TPY all HAPS - Plantwide evaluation

Gas Heat Content (MMBtu/MMCF) =	1015	MMBtu/MMSCF	1 CTG		3 CTGs	
Total Heat Input	881	MMBtu/Hr HHV	0.868	MMCF/Hr	22811	MMCF/Yr

				Turbine Emissions					
Compound	**Emission Factor (Lb/MMCF)[a]**	**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[b]	5 ppm	881	0.868	6.0	18.0	52531	26.3	157592	79
Acetaldehyde	0.040600	881	0.868	0.035	0.1	308.7	0.154	926	0.5
Acrolein	0.003690	881	0.868	0.00320	0.01	28.1	0.014	84	0.04
Benzene	0.003330	881	0.868	0.0029	0.01	25.3	0.013	76	0.04
1,3-Butadiene	0.000436	881	0.868	0.00038	0.001	3.3	0.002	10	0.005
Ethylbenzene	0.032480	881	0.868	0.0282	0.1	247.0	0.12	741	0.4
Formaldehyde	0.365400	881	0.868	0.317	1.0	2778	1.4	8335	4.2
Naphthalene	0.001320	881	0.868	0.0011	0.003	10.0	0.005	30.1	0.015
PAH[c]	0.000014	881	0.868	0.00001	0.00004	0.11	0.00005	0.3	0.0002
Propylene Oxide	0.029435	881	0.868	0.0255	0.1	223.8	0.112	671	0.34
Toluene	0.131950	881	0.868	0.115	0.3	1003	0.5	3010	1.5
Xylene	0.064960	881	0.868	0.056	0.2	494	0.2	1482	0.7
TOTAL HAPs						5122	2.6	15366	7.7

Notes:

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

[a] 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.

[b] Based on an exhaust NH_3 limit of 5 ppmv @ 15% O_2 and a F-factor of 8710. This value represents 24 hours per day and 365 days per year of operation.

[c] 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.

Exhaust Parameters for Base Load at 30 F

Temperature, °F	743.2
Stack Diameter, Feet	12.5
Exhaust Flow, ACFM	883683
Stack Height, Feet	80

TABLE 8.1B-7

AES Highgrove Cooling Tower Criteria Emissions Analysis

Assumed

Cooling tower operates 15 hours/day, 365 days per year at the design recirculation rate with 10 cycles of concentration.

2 Cooling Tower Cells per CT.

Givens

Cooling Tower Recirculation Rate per Cooling Tower[a]	6,900	GPM	3,452,760	Pounds/Hr
Drift Eliminator Efficiency[b]	0.0005	Percent		
Cooling Tower Cycles of Concentration	10			
Cooling Tower Drift	17.3	Pounds/Hr		

Component[c]	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	Annual Cooling Tower $PM_{10/2.5}$ Emissions for 3 CTs Tons/Year
Total Dissolved Solids	280	**2800**	0.05	0.13	0.40

Notes

a. Niagara Blower Co Specification dated 12-10-2004

b. Cooling Tower BACT Level

c. TDS from Well #2 water sample from 12/2004

Cooling Tower Specifications

Length (feet)	55.25	Total for 2 cells
Width (feet)	41.5	Total for 2 cells
Height to Fan Deck (feet)	15.5	
Height to Fan Exit (feet)	6	Exit to Atmosphere.
Air Exit Flow Rate (CFM)	365900	Flow Rate per cell.
Temperature (F)	93.3	
Number of Cells per CTG	2	
Fan Shroud Diameter (feet)	16	

TABLE 8.1B-8

Fuel Gas Analysis and Maximum Facility Fuel Usage

Constituents	Percent	MW	wt Avg
CH4	96.19	16.04	15.43
C2H6	1.67	30.07	0.50
C3H8	0.27	44	0.12
IC4H10	0.10	58.12	0.06
nC4H10	0.00	58.12	0
iC5H12	0.01	72.15	0.01
nC5H12	0.00	72.15	0
C6H14	0.02	86.18	0.02
N2	0.41	28.01	0.11
CO2	1.34	44.01	0.59
Total MW			16.83

Reference: Lange's Handbook of Chemistry

Maximum Facility Fuel Use (MMBtu)[a]

Period	Gas Turbines (each)	Total Fuel Use (all units)
Per Hour	881	2,643
Per Day	21,144	63,432
Per Year	4,823,475	14,470,425

[a] Based on firing rates at 30 degrees F, 24 hours per day and 5,475 hours per year, per turbine.

TABLE 8.1B-9

AESH Mitigation Liability

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	502.8	15,586	519.5	-	212,144	183,518
CO	657.2	20,373	679.1	814.9	-	-
VOC	111.8	3,465	115.5	138.6	-	-
SO2	26.8	831	27.7	33.2	-	-
PM_{10}[3]	268.8	8,333	277.8	333.3	-	-

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 80 F, base load with evaporators operating.
3. PM_{10} emissions do not include the 3 cooling towers as they are exempt from SCAQMD ERC requirements.