

S A C R A M E N T O
POWER AUTHORITY

P.O. Box 15830 • Sacramento, CA • 95852-1830 • SPA Cogeneration Project

DOCKET

93-AFC-3C

DATE APR 06 2009

RECD. APR 06 2009

April 6, 2009
SPA 09-007

Mary Dyas
Compliance Project Manager
California Energy Commission
Siting, Transmission & Environmental Protection Division
1516 Ninth Street
Sacramento, CA 95814

**Re: Sacramento Power Authority (SPA) – Docket No. 93-AFC-3C
Response to Data Requests 1 to 5 for Amendment 2009-1**

Dear Ms. Dyas:

The following responds to the Commission's Data Requests 1 to 5 dated March 11, 2009, regarding Amendment 2009-1 to the Conditions of Certification (COCs) for the Sacramento Power Authority (SPA) at Campbell Cogeneration Project, 93-AFC-3C. Data requests are repeated below in bold and are followed by the applicant's response.

1. **Please provide:**
 - a. **a specific breakdown of the various commissioning activities,**
 - b. **a description of each commissioning activity,**
 - c. **the anticipated duration (in minutes and/or hours) of each commissioning activity.**

Attachment 1 presents estimated emissions data and duration associated with the proposed commissioning activities. Attachment 2 presents the vendor's description of each commissioning activity. The projected schedule is for 164 hours of commissioning run time, not including startup and shutdown periods, over an 11-day period. It is important to recognize, however, that the commissioning schedule is subject to change based on real-time events. A process to test and commission complicated control system hardware and software that are integrated with complex machinery must necessarily be flexible and fluid to account for unforeseen though not unexpected malfunctions, troubleshooting, and adjustments. Depending on real-time results, commissioning activities may be revised and/or repeated as necessary, thereby making it impossible to precisely predict the commissioning schedule.

In order to account for the potentially fluid nature and unforeseen situations that can occur during the commissioning process, SPA proposed to limit hourly, daily, and quarterly emissions, rather than limit the duration of the commissioning period. Furthermore, SPA has evaluated the ambient air quality impacts based on the proposed commissioning emission limits and determined that these potential impacts will be insignificant. The operating flexibility associated with commissioning emission limits rather than commissioning duration limits is desirable to avoid the situation of having to seek additional variance relief or modifications to Conditions of Certification while in the midst of the commissioning process. Such a situation could significantly delay the commissioning process and restoration of the SPA Cogeneration facility to service.

2. Please provide NO_x and CO emissions estimates for each commissioning activity identified in the data request above.

Attachment 1 presents NO_x and CO emissions estimates for each commissioning activity and operating hour.

3. Please provide emissions data, graphical data or other turbine vendor supplied information that substantiates the requested NO_x emissions of 360 lbs/hr and the CO emissions of 500 lbs/hr.

Worst-case hourly NO_x and CO emissions estimates for the commissioning period are based on operating data from SPA's gas turbine during operation in diffusion mode, with a compliance margin added to ensure that these emissions levels will not be exceeded. Data from actual commissioning activities for this gas turbine are not available, and the proposed hourly NO_x and CO mass emission limits represent the best engineering estimates for the projected commissioning operating conditions.

Attachment 3 presents CEMS data for a sample of gas turbine diffusion switchover events that occurred at the SPA Cogeneration facility. The maximum NO_x emission rate during these sample diffusion events was 228 lb/hr at about full load with the SCR operational. The proposed 360 lb/hr NO_x commissioning limit represents a 58% compliance margin to account for maximum potential emissions during diffusion conditions at various operating loads. SPA seeks this compliance margin to account for the limited emissions data available during gas turbine diffusion operation, and to provide desired operational flexibility to complete the commissioning process efficiently and without having to return to the Commission seeking additional approvals.

The maximum CO emission rate during these sample diffusion events was 376.5 lb/hr at low load. The proposed 500 lb/hr CO commissioning limit represents a 33% compliance margin. Less variability is expected with CO emissions since the oxidation catalyst will become more effective as turbine load increases. As with NO_x, SPA seeks this CO

compliance margin to facilitate operational flexibility and an efficient commissioning process.

4. Please explain why up to 100 hours of operation without the SCR is being requested.

Attachment 4 from the Siemens Operation and Maintenance Manual indicates that the vendor's minimum allowable operating temperature for ammonia injection to the SCR catalyst is 572°F, which correlates to a turbine load of about 45 MW. Significant portions of the commissioning activities will occur at operating temperatures below the minimum allowable ammonia injection temperature. Therefore, SPA requested 100 hours of operating time to allow for proper commissioning of the gas turbine with new control systems.

The SCR system will be operated during the commissioning period when the flue gas temperature is above the minimum allowable temperature. The control system for the ammonia injection has a delay to account for temperature variation and system accuracy and may not precisely match the 572°F threshold. However, the SCR system will inject ammonia during commissioning activities as designed and operated under normal plant conditions. SPA notes however that the SCR system is not designed to achieve permitted NOx limits during diffusion mode operation at temperatures above 572°F, but will reduce excess NOx emissions during diffusion operations.

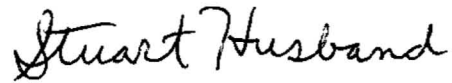
Finally, 100 hours was chosen as a proposed limit because this value is consistent with typical SCR operating limits during commissioning periods for new turbines. Actual NOx emissions during the commissioning period and without SCR will be restricted to the proposed hourly, daily, and quarterly NOx commissioning emission limits.

5. Please provide the necessary documentation from the turbine manufacturer (Siemens) or other engineering contractors that justifies the necessity of not operating the SCR system during this "commissioning" period.

The SCR system will be operated during the commissioning period when flue gas temperatures exceed the minimum allowable ammonia injection temperature in accordance with the ammonia injection control system design. Attachment 4 includes the SCR catalyst temperature specifications from the Siemens Operation and Maintenance Manual. However, the Siemens commissioning schedule in Attachment 2 also includes activities where the gas turbine is operated below the temperature threshold for injecting ammonia for the SCR system. Nonetheless, for plant reliability considerations, it is imperative that SPA fully implement the Siemens commissioning schedule including operation at low loads without a fully functional SCR system.

If there are any questions regarding these responses, please contact me at (916) 732-6246.

Sincerely,

A handwritten signature in black ink that reads "Stuart Husband". The signature is written in a cursive, slightly slanted style.

Stuart Husband
Regulatory Compliance Coordinator

Enclosures

cc: Jeff Adkins, Sierra Research
Ross Gould, SMUD
Kurt Hook, WGPO
SPA Files 500.04F
Corporate Files

ATTACHMENT 1

**SPA TURBINE CONTROL SYSTEM UPGRADE
ESTIMATED COMMISSIONING OPERATING AND
EMISSIONS PROFILE**

Time	Average MW	Turbine Firing Rate MMBtu/hr	NOx lb/hr	NOx ppmc	CO lb/hr	CO ppmc
Day 1 - First Fire						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	FSNL	33	25	205	500	6,741
1 - 2 hours	FSNL	33	25	205	500	6,741
S/D	Trip Test	33	10	82	125	1,685
Day 1 Total			70		1250	

Day 2 - Diffusion Mode Only						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	Exc. Tests	33	25	205	500	6,741
1 - 2 hours	0-20	376	35	25	500	593
2 - 3 hours	20-40	549	80	40	375	305
3 - 4 hours	40-60	722	140	53	156	97
4 - 5 hours	60-80	894	200	61	31	16
5 - 6 hours	80-100	1,067	280	71	11	5
6 - 7 hours	100	1,143	360	86	11	4
7 - 8 hours	100	1,143	360	86	11	4
S/D	HRSB Trip	33	10	82	125	1,685
Day 2 Total			1500		1846	

Day 3 - Swap Between Diffusion and Premix Modes						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-20	376	35	25	500	593
1 - 2 hours	20-40	549	80	40	375	305
2 - 3 hours	40-80	808	130	44	125	69
3 - 4 hours	80-40	808	130	44	125	69
4 - 5 hours	40-80	808	130	44	125	69
5 - 6 hours	80-40	808	130	44	125	69
6 - 7 hours	40-80	808	130	44	125	69
7 - 8 hours	80-40	808	130	44	125	69
S/D	Trip Test	33	10	82	125	1,685
Day 3 Total			915		1875	

Time	Turbine		NOx lb/hr	NOx ppmc	CO lb/hr	CO ppmc
	Average MW	Firing Rate MMBtu/hr				
Day 4 - Swap Between Diffusion and Premix Modes						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-20	376	35	25	500	593
1 - 2 hours	20-40	549	80	40	375	305
2 - 3 hours	40-80	808	130	44	125	69
3 - 4 hours	80-40	808	130	44	125	69
4 - 5 hours	40-80	808	130	44	125	69
5 - 6 hours	80-40	808	130	44	125	69
6 - 7 hours	40-80	808	130	44	125	69
7 - 8 hours	80-40	808	130	44	125	69
S/D	Trip Test	33	10	82	125	1,685
Day 4 Total			915		1875	

Day 5 - Normal Startup/Achieve Steam Quality						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-40	463	60	35	438	422
1 - 2 hours	40-80	808	130	44	125	69
2 - 18 hours	80	981	11	3.0	11	5
(No S/D)						
Day 5 Total			376		864	

Day 6 - ST Hot Commissioning and Testing to Synchronization						
(No S/U)						
0 - 24 hours	80	981	11	3.0	11	5
(No S/D)						
Day 6 Total			264		264	

Day 7 - ST Loading and Extraction Adjustments						
(No S/U)						
0 - 18 hours	80	981	11	3.0	11	5
18-24 hours	100	1,143	12.5	3.0	11	4
S/D	Normal	33	10	82	125	1,685
Day 7 Total			283		389	

Time	Average MW	Turbine Firing Rate MMBtu/hr	NOx lb/hr	NOx ppmc	CO lb/hr	CO ppmc
Day 8 - HRSG/ST Hot Commissioning w/Duct Firing						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-40	463	60	35	438	422
1 - 2 hours	40-100	981	11	3.0	125	57
2 - 18 hours	100	1,343	15	3.0	11	4
S/D	Normal	33	10	82	125	1,685
Day 8 Total			331		989	

Day 9 - HRSG/ST Hot Commissioning/PAG/Duct Burners						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-40	463	60	35	438	422
1 - 2 hours	40-100	981	11	3.0	125	57
2 - 18 hours	100	1,343	15	3.0	11	4
S/D	Normal	33	10	82	125	1,685
Day 9 Total			331		989	

Day 10 - HRSG/ST Hot Commissioning/ST load Rejection/PAG						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-40	463	60	35	438	422
1 - 2 hours	40-100	981	11	3.0	125	57
2 - 18 hours	100	1,143	12.5	3.0	11	4
S/D	Normal	33	10	82	125	1,685
Day 10 Total			291		989	

Day 11 - Final Optimization						
S/U	FSNL	33	10	82	125	1,685
0 - 1 hours	0-100	981	40	11	125	57
1 - 18 hours	100	1,143	12.5	3.0	11	4
(No S/D)						
Day 11 Total			262.5		437	

Commissioning Total (lb)			5,539		11,765	
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ATTACHMENT 2

**SPA TURBINE CONTROL SYSTEM UPGRADE
VENDOR ESTIMATED COMMISSIONING SCHEDULE AND
COMMISSIONING ACTIVITIES**

SIEMENS

Date: March 19, 2009

To: Will Pope
Project Manager
Sacramento Municipal Utility Department – Cogen Controls Upgrade

Subject: Hot Commissioning Schedule

Dear Will,

Hot Commissioning is scheduled for 11 days once the control system has been 100% checked out. The schedule is as follows:

HOT COMMISSIONING

Day 1

- Static Frequency Converter Runs
- Start up the Gas Turbine, first fire and reach FSNL (Full Speed No Load). Gas Turbine will be in diffusion mode. Two hours will be estimated for this run.
- Trip Test

Day 2

- Run up to FSNL
- Excitation tests
- Synchronization
- Loading the Gas Turbine in 20 MW steps up to 90 % load (Maximum allowable load when the Boiler is in Bypass mode and the Steam Turbine is not in operation). 6 – 8 hours with the Gas Turbine in Diffusion mode is estimated for this test.
- Stay 2 hours on 90% base load - Diffusion
- Unload the Gas Turbine and perform a trip test (preferably HRSG trip to CT)

Day 3

- FSNL
- Synchronization
- Load the Gas Turbine up to 20 – 30 MW. May take up to 2 hours on Diffusion depending on the Boiler conditions.
- Load the Gas Turbine further on and testing the change over between diffusion and pre-mix in the load range of 40 – 80 MW back and forth. This may take 6 – 8 hours depending on Boiler conditions.
- Unload the Gas Turbine and perform a trip test

SIEMENS

Day 4

- The same like day 3

Day 5

- FSNL
- Load to 20 – 30 MW. May take up to 2 hours in diffusion depending on the Boiler condition and / or commissioning requirements.
- Load the Gas Turbine to 80 MW and with Premix preselected (i.e. the Gas Turbine will be in Premix mode on this load.)
- Continue until steam quality is achieved. This can take up to 2 days.

Day 6

- Gas turbine will be on 80 MW (premix) from the day before
- Steam Turbine hot commissioning can start at that point
- Proceed with Steam Turbine tests. May take up to one full day before Steam Turbine synchronization

Day 7

- Gas Turbine is still on 80 MW – premix.
- Loading and extractions adjustments is happening on the Steam Turbine meanwhile
- Load the Gas Turbine to base load if the depending on the Steam Turbine conditions.
- This may take up to 6 hours on base load or until clearance for shutdown is given by the Mechanical / Process Engineer.
- Shutdown

Day 8, 9, 10

- Start CT and load to 20 – 30 MW (diffusion)
- Continue with required hot commissioning for the HRSG and the Steam turbine (about 1 hour)
- Change over to premix and load to base load
- Perform Water Injection (PAG tests) on the gas Turbine
- Start the Duct Burners (Days 8 and 9 only)
- Continue with other tests on the Steam Turbine if required (e.g. load rejection).

Day 11

- Final optimization
- Load up to base load
- Hand over

SIEMENS

Best Regards,



Bruce Marling, PMP
Project Manager
Sacramento Cogen Project

ATTACHMENT 3

**SPA TURBINE CONTROL SYSTEM UPGRADE
CEMS EMISSIONS DATA DURING DIFFUSION EVENTS**

Date: Dec 08 2008
Time: 12:49

Begin: Dec 13, 2004 09:00
End: Dec 13, 2004 14:14
(Page 001)

SAC PWR AUTH COGEN
3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	O2 %	NOX PPM	NOX PPM @15% O2	NOX LB/HR	CO PPM	CO LB/HR	EXH FLOW KSDCFH
12/13/04	%	ppm	ppmc	lb/hr	ppm	lb/hr	kscfh
09:00	14.3	3.1	2.8	13.4	0.0	0.0	36123.7
09:15	14.3	3.1	2.8	13.4	0.0	0.0	36118.2
09:30	14.4	3.1	2.8	13.6	0.0	0.0	36629.0
09:45	14.4	3.0	2.7	13.1	0.0	0.0	36539.4
10:00	14.7	57.1	54.3	228.0	0.0	0.0	33439.4
10:15	16.2	64.6	81.1	193.8	0.0	0.0	25129.1
10:30	16.1	56.4	69.3	168.5	0.2	0.4	25019.0
10:45	15.5	2.7	3.0	9.4	0.0	0.0	29119.5
11:00	15.2	1.8	1.9	7.2	0.0	0.0	33626.1
11:15	14.7	1.6	1.5	7.0	0.0	0.0	36598.6
11:30	14.1	1.4	1.2	6.0	0.0	0.0	36182.9
11:45	13.8	1.6	1.3	6.9	0.2	0.5	36302.7
12:00	13.6	1.5	1.2	6.5	0.5	1.3	36158.4
12:15	13.6	1.5	1.2	6.5	0.5	1.3	36128.5
12:30	13.6	1.5	1.2	6.5	0.5	1.3	36041.2
12:45	13.6	1.5	1.2	6.5	0.4	1.0	36061.2
13:00	13.6	1.5	1.2	6.5	0.4	1.0	36023.8
13:15	13.6	1.5	1.2	6.4	0.4	1.0	36006.3
13:30	13.6	1.5	1.2	6.4	0.4	1.0	36003.8
13:45	13.6	1.5	1.2	6.5	0.4	1.0	36036.2
14:00	13.6	1.5	1.2	6.5	0.4	1.0	36051.2
Avg	14.3	10.1	11.2	35.2	0.2	0.5	34539.9

Report produced by Cirrus

DAS S/N (00000001)

Date: Dec 08 2008
Time: 12:52

Begin: Dec 13, 2004 09:00
End: Dec 13, 2004 14:14
(Page 001)

SAC PWR AUTH COGEN
3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	CTG GAS KSCFH	MW GROSS	DB Gas KSCFH
12/13/04	kscfh	MWGE	kscfh
09:00	1162.42		122.83
09:15	1162.21		122.91
09:30	1159.79		123.71
09:45	1159.42		120.94
10:00	1051.15		66.56
10:15	636.71		0.00
10:30	647.35		0.00
10:45	847.74		0.00
11:00	1033.30		0.00
11:15	1185.99		37.31
11:30	1224.91		101.51
11:45	1290.31		99.19
12:00	1330.65		92.38
12:15	1330.76		91.02
12:30	1327.43		91.00
12:45	1328.59		90.48
13:00	1327.25		90.47
13:15	1326.65		90.38
13:30	1326.46		90.39
13:45	1328.31		89.84
14:00	1328.96		89.77
Avg	1167.45	0	76.70

Report produced by Cirrus

DAS S/N (00000001)

Date: Dec 08 2008
Time: 12:53

Begin: Dec 13, 2004 09:00
End: Dec 13, 2004 14:14
(Page 001)

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3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Plant Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	SO2 LB/HR	ROC LB/HR	PM10 LB/HR	HEAT INPUT MMBTU/HR
12/13/04	lb/hr	lb/hr	lb/hr	mmBtu/hr
09:00	0.79	6.33	5.45	1309.7
09:15	0.79	6.33	5.45	1309.5
09:30	0.79	6.35	5.45	1307.9
09:45	0.78	6.26	5.42	1304.7
10:00	0.68	4.41	4.48	1138.9
10:15	0.39	1.48	2.30	648.8
10:30	0.40	1.50	2.34	659.7
10:45	0.52	1.97	3.06	863.8
11:00	0.63	2.40	3.73	1052.9
11:15	0.75	3.86	4.67	1246.5
11:30	0.81	5.85	5.46	1351.6
11:45	0.85	5.93	5.67	1415.9
12:00	0.87	5.82	5.75	1450.0
12:15	0.87	5.78	5.74	1448.8
12:30	0.87	5.77	5.73	1445.3
12:45	0.87	5.76	5.72	1446.1
13:00	0.87	5.75	5.72	1444.6
13:15	0.87	5.75	5.71	1443.9
13:30	0.87	5.75	5.71	1443.8
13:45	0.86	5.74	5.72	1445.1
14:00	0.86	5.74	5.71	1445.7
Avg	0.76	4.98	5.00	1267.8

Report produced by Cirrus

DAS S/N (00000001)

Date: Dec 08 2008
Time: 12:53

Begin: Dec 13, 2004 09:00
End: Dec 13, 2004 14:14
(Page 001)

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Hourly Plant Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	COND uMHOS	TDS PPM	FLOW KGAL/HR	PM10 LB/HR	Plant PM10 LB/HR
12/13/04	mS/cm	ppm	kgph	lb/hr	lb/hr
09:00	1972.75	1066.35	2700.00	0.14	5.59
09:15	2000.13	1081.15	2700.00	0.14	5.59
09:30	2026.68	1095.50	2700.00	0.15	5.60
09:45	1997.74	1079.86	2700.00	0.15	5.57
10:00	1967.10	1063.30	2700.00	0.15	4.63
10:15	1951.05	1054.62	2700.00	0.14	2.44
10:30	2008.11	1085.47	2700.00	0.14	2.48
10:45	2080.57	1124.63	2700.00	0.15	3.21
11:00	2118.91	1145.35	2700.00	0.15	3.88
11:15	2037.58	1101.39	2700.00	0.15	4.82
11:30	1943.24	1050.40	2700.00	0.15	5.61
11:45	1909.87	1032.36	2700.00	0.14	5.81
12:00	1935.69	1046.32	2700.00	0.14	5.89
12:15	1964.72	1062.01	2700.00	0.14	5.88
12:30	1968.03	1063.80	2700.00	0.14	5.87
12:45	1924.20	1040.11	2700.00	0.14	5.86
13:00	1929.71	1043.09	2700.00	0.14	5.86
13:15	1961.67	1060.36	2700.00	0.14	5.85
13:30	1976.36	1068.30	2700.00	0.14	5.85
13:45	1937.43	1047.26	2700.00	0.14	5.86
14:00	1932.37	1044.53	2700.00	0.14	5.85
Avg	1978.28	1069.34	2700.00	0.14	5.14

Report produced by Cirrus

DAS S/N (00000001)

Date: Dec 08 2008
Time: 13:00

Begin: Sep 26, 2004 15:00
End: Sep 26, 2004 20:14
(Page 001)

SAC PWR AUTH COGEN
3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	O2 %	NOX PPM	NOX PPM @15% O2	NOX LB/HR	CO PPM	CO LB/HR	EXH FLOW KSDCFH
09/26/04	%	ppm	ppmc	lb/hr	ppm	lb/hr	kscfh
15:00	20.9 &	0.0 &	0.0 &	0.0 &	0.1 &	0.0 &	0.0 &
15:15	20.9 &	0.0 &	0.0 &	0.0 &	0.1 &	0.0 &	0.0 &
15:30	20.0 &	1.6 &	10.5 &	1.5 &	122.9 &	70.5 &	7885.2 &
15:45	20.9 &	0.1 &	0.0 &	0.0 &	4.9 &	0.0 &	0.0 &
16:00	19.1	8.2 #	26.9 #	24.7 #	161.7	296.7 #	25236.4 #
16:15	18.7	19.0	51.0	59.2	198.5	376.5	26089.5
16:30	18.0	32.7	66.5	98.6	128.6	236.0	25246.9
16:45	17.2	54.9	87.5	157.1	8.5	14.8	23965.2
17:00	16.3	69.6	89.3	198.2	1.1	1.9	23847.1
17:15	16.5	60.8	81.5	174.1	0.9	1.6	23987.8
17:30	16.5	54.7	73.3	153.9	0.9	1.5	23565.8
17:45	16.6	53.6	73.5	153.3	0.9	1.6	23952.9
18:00	16.3	61.4	78.8	174.5	0.3	0.5	23807.5
18:15	16.2	46.8	58.7	135.9	0.4	0.7	24327.4
18:30	15.6	3.8	4.2	12.4	0.0	0.0	27223.4
18:45	15.5	2.6	2.8	8.5	0.0	0.0	27407.0
19:00	15.5 #	2.3 #	2.5 #	7.5 #	0.0 #	0.0 #	27353.0 #
19:15	15.5 #	1.5 #	1.6 #	4.9 #	0.0 #	0.0 #	27366.5 #
19:30	15.6	1.7	1.9	5.7	0.0	0.0	27855.4
19:45	15.6	1.9	2.1	6.3	0.0	0.0	27913.8
20:00	15.6	1.8	2.0	6.0	0.0	0.0	27848.5
Avg	16.6	33.2	48.1	96.0	33.5	45.4	25502.7

Report produced by Cirrus

DAS S/N (00000001)

Date: Dec 08 2008
Time: 13:01

Begin: Sep 26, 2004 15:00
End: Sep 26, 2004 20:14
(Page 001)

SAC PWR AUTH COGEN
3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	CTG GAS KSCFH	MW GROSS	DB Gas KSCFH
09/26/04	kscfh	MWGE	kscfh
15:00	0.00 &		0.00 &
15:15	0.00 &		0.00 &
15:30	80.60 &		0.00 &
15:45	0.00 &		0.00 &
16:00	257.96		0.00
16:15	308.84		0.00
16:30	393.87		0.00
16:45	477.13		0.00
17:00	590.24		0.00
17:15	567.93		0.00
17:30	557.85		0.00
17:45	554.17		0.00
18:00	589.18		0.00
18:15	615.20		0.00
18:30	776.32		0.00
18:45	796.28		0.00
19:00	794.66		0.00
19:15	795.08		0.00
19:30	794.30		0.00
19:45	796.01		0.00
20:00	794.05		0.00
Avg	615.24	0	0.00

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DAS S/N (00000001)

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(Page 001)

SAC PWR AUTH COGEN
3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Plant Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	SO2 LB/HR	ROC LB/HR	PM10 LB/HR	HEAT INPUT MMBTU/HR
09/26/04	lb/hr	lb/hr	lb/hr	mmBtu/hr
15:00	0.00 &	0.00 &	0.00 &	0.0 &
15:15	0.00 &	0.00 &	0.00 &	0.0 &
15:30	0.05 &	0.19 &	0.29 &	82.3 &
15:45	0.00 &	0.00 &	0.00 &	0.0 &
16:00	0.16	0.60	0.93	263.4
16:15	0.19	0.72	1.12	315.3
16:30	0.24	0.92	1.43	402.2
16:45	0.29	1.11	1.73	487.1
17:00	0.36	1.37	2.14	602.6
17:15	0.35	1.32	2.06	579.8
17:30	0.34	1.30	2.02	569.6
17:45	0.34	1.29	2.01	565.8
18:00	0.36	1.37	2.13	601.6
18:15	0.38	1.43	2.23	628.1
18:30	0.48	1.81	2.81	792.6
18:45	0.49	1.85	2.88	813.0
19:00	0.49	1.85	2.88	811.4
19:15	0.49	1.85	2.88	811.8
19:30	0.49	1.85	2.88	811.0
19:45	0.49	1.85	2.88	812.7
20:00	0.49	1.85	2.87	810.8
Avg	0.38	1.43	2.23	628.2

Report produced by Cirrus

DAS S/N (00000001)

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Time: 13:01

Begin: Sep 26, 2004 15:00
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(Page 001)

SAC PWR AUTH COGEN
3215 47th Ave., Sacramento, CA 95824
***** MULTI-PARAMETER SUMMARY REPORT *****

Hourly Plant Emissions Report

Flags: @:missing data &:source down #:invalid \$:exclusion *:deviation

	COND uMHOS	TDS PPM	FLOW KGAL/HR	PM10 LB/HR	Plant PM10 LB/HR
09/26/04	mS/cm	ppm	kgph	lb/hr	lb/hr
15:00	1731.46	935.93	2700.00	0.13	0.13
15:15	1708.01	923.25	2700.00	0.13	0.13
15:30	1705.62	921.96	2700.00	0.12	0.41
15:45	1715.03	927.05	2700.00	0.12	0.12
16:00	1715.94	927.54	2700.00	0.13	1.06
16:15	1712.20	925.51	2700.00	0.13	1.25
16:30	1717.08	928.15	2700.00	0.13	1.56
16:45	1721.78	930.69	2700.00	0.13	1.86
17:00	1725.38	932.64	2700.00	0.13	2.27
17:15	1729.04	934.62	2700.00	0.13	2.19
17:30	1734.31	937.47	2700.00	0.13	2.15
17:45	1741.47	941.33	2700.00	0.13	2.14
18:00	1747.19	944.43	2700.00	0.13	2.26
18:15	1752.14	947.10	2700.00	0.13	2.36
18:30	1754.04	948.13	2700.00	0.13	2.94
18:45	1738.04	939.48	2700.00	0.13	3.01
19:00	1736.53	938.67	2700.00	0.13	3.01
19:15	1733.26	936.89	2700.00	0.13	3.01
19:30	1735.74	938.24	2700.00	0.13	3.01
19:45	1757.41	949.95	2700.00	0.13	3.01
20:00	1785.93	965.37	2700.00	0.13	3.00
Avg	1737.50	939.19	2700.00	0.13	2.36

Report produced by Cirrus

DAS S/N (00000001)

ATTACHMENT 4

**SPA TURBINE CONTROL SYSTEM UPGRADE
VENDOR DATA FOR MINIMUM ALLOWABLE SCR CATALYST
OPERATING TEMPERATURE**

SCR CATALYST (continued)

IV. CATALYST LOADING (continued)

D. Catalyst Loading (continued)

6. After the completion of the catalyst loading activity, the SCR reactor housing must be immediately closed to prevent exposure to rain. This could deposit minerals on the catalyst, adversely affecting performance and void performance and voiding the warranty.

V. COMMISSIONING AND OPERATION

The SCR catalyst needs no special pre-commissioning activity other than proper storage and installation. For maximum, long-term performance, the following precautions must be observed during operation:

- The flue gas should be clean, and shall be as defined in the warranty section of this manual.
- The flue gas temperature at the SCR catalyst must never exceed 785 °F.
- The rate of increase of the flue gas temperature shall not exceed 600 °F per hour
- The flue gas flow rate shall be gradually increased. During ammonia injection, the flue gas temperature shall be above 572 °F at all times.

VI. MAINTENANCE

As previously mentioned, extremely high temperatures, contamination, and foreign material deposits on the catalyst will reduce the performance as well as void the warranty. Therefore, the following continuous monitoring and recording activities are extremely important in assuring that the performance is maximized:

Recording of process variables such as the flue gas flow rate, temperature, inlet and outlet NO_x concentration, NH₃/NO_x ratio, NH₃ slip, differential pressure across the catalyst, and SO₂ conversion across the catalyst for the same load point is crucial in determining the current performance level of the catalyst. This data is used to trend the performance and can help explain possible increases and decreases in NO_x reduction and/or ammonia slip. If catalyst performance deterioration is found without any clear cause, Peerless should be consulted immediately and the data listed above supplied for our review. If foreign material (such as ceramic fiber or dust) is found on the catalyst surface, cleaning with air should be done with extreme care.



WATER CLEANING OF THE CATALYST SHALL BE STRICTLY PROHIBITED!

There are catalyst test elements provided as described in the receiving inspection part of this manual. These are to be used for periodic testing which will allow us to predict in advance when the replacement is necessary. Usually after every year of continuous operation, two test elements should be removed and chemically analyzed. During the removal process, care should be taken to prevent any damage from occurring to adjacent catalyst blocks as well as modules.

For extended shut-downs of the SCR reactor, where the SCR catalyst will remain installed, the reactor should be purged with dry air, and sealed to prevent moisture from entering.