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2485 Natomas Park Drive
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CH2MHILL

November 6, 2002

Ms. Kristy Chew
Siting Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

RE: Final Determination of Compliance, Errata Sheet
Cosumnes Power Plant (01-AFC-19)

On behalf of the Sacramento Municipal Utility District, please find attached 12 copies and one original of the Sacramento Metropolitan AQMD's Errata Sheet for the Final Determination of Compliance (FDOC) which was filed on October 21, 2002.

Please call me if you have any questions.

Sincerely,

CH2M HILL

John L. Carrier, J.D.
Program Manager

c: Colin Taylor/SMUD
Kevin Hudson/SMUD
Steve Cohn/SMUD

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Norm Covell
AIR POLLUTION CONTROL OFFICER

October 29, 2002

Mr. Colin Taylor
Sacramento Municipal Utility District
PO Box 15830
Sacramento, CA 95852-1830

Dear Mr. Taylor:

Attached is an errata for the FDOC of the Cosumnes Power Plant. The errata concerns the sample calculations of Appendix A.

If you have any questions, you may contact me at (916) 874-4856.

Sincerely,

Brian F Krebs

BRIAN F. KREBS
Program Coordinator

Enclosure

CONSUMNES PROJECT		
DISTRIBUTION	INFO	ACTION
Nicki Bradford		
Scott Flake		
Bob Nelson		
Joe Pennington		
Colin Taylor	✓	
Gary Van Meter		
Corporate File		(13)
Review	(12)	

CONSUMNES PROJECT
OCT 31 2002
RECEIVED

777 12th Street, 3rd Floor ▮ Sacramento, CA 95814-1908
916/874-4800 ▮ 916/874-4899 fax

COSUMNES POWER PLANT
FINAL DETERMINATION OF COMPLIANCE
DATED OCTOBER 21, 2002

ERRATA

Errors have been found in the sample calculations found in Appendix A of the Final Determination of Compliance dated October 21, 2002. Please discard pages A-1 through A-4 of Appendix A and replace it with the attached pages.

APPENDIX A

CPP PROJECT EMISSION CALCULATIONS

COMBUSTION TURBINES

Calculation procedure for the combustion turbine without duct burner.

Temperature = 34°F
Relative Humidity = 59%
Fuel Flow = 81,394 lb/hr
Air Flow$_{(wet)}$= 3,664,105 lb/hr
Water Injection Flow = 0 lb/hr
Dry Air Volume percentages
N_2 = 78.084%
O_2 = 20.946%
CO_2 = 0.033%
Ar = 0.934%

1) First determine mass of water in Air Flow due to the relative humidity.
ö = RH = P_V / P_G
P_G = 0.09613401 from steam tables at 34°F
P_V = 0.59*0.09613401 = 0.056719066
P_A = P - P_V = 14.696 - 0.056719066 = 14.63928093
ù = MW_V/MW_A*P_V/P_A = 18.0152/28.964 * 0.056719066/14.63928093 = 0.002409849
m_V = ù*m_A
m_{total}= m_V+m_A
m_V = ù * m_{total}/(1+ ù) = 0.002409849*3,664,105/(1+0.002409849) = 8809 lb/hr

2) Now that the volume percentages and mass flows are known, calculate the number of moles of each constituent.

3) Then with the use of the following theoretical combustion calculations, determine the number of moles flue products and then eventually the volume percentages.

$CH_4 + 2O_2 = 1CO_2 + 2H_2O$
$C_2H_6 + 7/2O_2 = 2CO_2 + 3H_2O$
$C_3H_8 + 5O_2 = 3CO_2 + 4H_2O$
$C_4H_{10} + 13/2O_2 = 4CO_2 + 5H_2O$
$C_5H_{12} + 8O_2 = 5CO_2 + 6H_2O$
$C_6H_{14} + 19/2O_2 = 6CO_2 + 7H_2O$

4) From the volume percentages, a Flue Gas Molecular Weight of 28.4604 can be calculated.

5) The previous four steps were repeated for the three different temperature scenarios and the three different load conditions.

Emission Factors

NOx = 2 ppmvd @ 15% O_2- BACT determination
= (20.95-(12.69/(1-7.71/100)))/(20.95-15)*2 = 2.42

CO = 4.0 ppmvd @ 15% O_2- BACT determination
= (20.95-(12.69/(1-7.71/100)))/(20.95-15)*4 = 4.84

ROC = 1.4 ppmvd @ 15% O_2- BACT determination
= (20.95-(12.69/(1-7.71/100)))/(20.95-15)*1.4 = 1.69

SOx = 0.71 lb/mmscf - Based on average sulfur content of 0.25 gr/dscf

PM10 = 9.0 lb/hr - Vendor guarantee

NH_3 = 10 ppmvd @ 15% O_2 - Vendor guarantee
= (20.95-(12.69/(1-7.71/100)))/(20.95-15)*10 = 12.10

NOx = (3,745,499 lb/hr)/(28.4604 lb/lb mole)*(1-7.71/100)*(2.42 mole NOx/10^6 lb mole)*(46 lb NOx/lb mole NOx) = 13.52 lb/hr

CO = (3,745,499 lb/hr)/(28.4604 lb/lb mole)*(1-7.71/100)*(4.84 mole CO/10^6 lb mole)*(28 lb CO/lb mole CO) = 16.46 lb/hr

ROC = (3,745,499 lb/hr)/(28.4604 lb/lb mole)*(1-7.71/100)*(1.69 mole CH_4/10^6 lb mole)*(16.04275 lb CH_4/lb mole CH_4) = 3.29 lb/hr

SOx = (81,394 lb/hr)*(22,912 BTU/lb)/(1019.303 BTU/CF)/(1,000,000 cf/mmCF)*(0.71356 lb/mmCF) = 1.31 lb/hr

PM10 =9.0 lb/hr

NH_3 = (3,745,499 lb/hr)/(28.4604 lb/lb mole)*(1-7.71/100)*(12.10 mole NH_3/10^6 lb mole)*(17.0304 lb NH_3/lb mole NH_3) = 25.03 lb/hr

COOLING TOWER

Cooling Tower Drift Rate = 0.0005%
Water Circulation Rate = 126,000 gal/min
TDS = 470 ppmw
Density of Water = 8.33 lb/gal
PM10=(126,000 gal/min)(60 min/hr)(8.33 lb/gal)(470/1,000,000)(0.0005/100)=0.15 lb/hr

MAXIMUM HOURLY

Maximum hourly emissions not including start-ups are established from the worst case scenario of temperature and load. For all pollutants the worst case scenario was 34°F and 100% load.

For the worst case hourly project emissions, two gas turbines were assumed to be in start-up mode, and two turbines at full load.

MAXIMUM DAILY

The maximum daily emissions were calculated based on one three hour start-up cycle for each turbine and then 21 hours of continuous operation at 100% load.

QUARTERLY EMISSIONS

The maximum quarterly emissions were calculated based on 15 3-hour startups per turbine per quarter and 2115, 2139, 2163, and 2163 hours of operation at full load 34° F per turbine per calendar quarters 1 through 4 respectively.