



# South Coast Air Quality Management District

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## COMPLIANCE ADVISORY

Date: November 13, 2009

To: RECLAIM Facilities with Major Sources and CEMS Vendors

Subject: Mass Emission Rate Calculation for RECLAIM Major Sources

Based on the most recent audits, the South Coast Air Quality Management District (AQMD) has discovered that some continuous emission monitoring systems (CEMS) at RECLAIM facilities are not determining mass emission rates in accordance with the method specified under AQMD Rules 2011 and 2012. The AQMD specified the appropriate methods to be used in our previous Compliance Advisory issued to RECLAIM facilities on March 17, 2006. The purpose of today's Compliance Advisory is to not only clarify the mass emission rate calculation methodology for RECLAIM major sources, but also to advise facilities to confirm that the correct logic is used in compliance with the RECLAIM protocols and to make any necessary changes, to the mass emission rate calculation methodology employed by their CEMS. This notice is also to inform you that such changes to CEMS computer software must be implemented by **January 1, 2010** to ensure emission calculations are performed in adherence to the RECLAIM Protocols.

AQMD Rules 2011 and 2012 (Appendix A, Chapter 2(B)(1) – Information Required for Each 15-Minute Interval and Chapter 2(B)(5)(c) – Requirements for Valid Data Points) require that all valid stack flow data obtained from the monitors in a 15-minute period are to be averaged to obtain an average stack flow value for that 15-minute period. Similarly, these same rules also require that all valid concentration data obtained from the monitors for each 15-minute period are to be averaged to obtain an average concentration value for that 15-minute period. The mass emission rate for that 15-minute period is then to be calculated from the period's average stack flow value and average concentration value using the applicable equations in Chapter 2(B)(1). Pursuant to Rules 2011 and 2012, Appendix A, Chapter 2(B)(2) – Hourly Calculations, valid hourly averaged concentration, stack flow, and mass emission rate values are each then to be calculated by averaging the four corresponding 15-minute period average concentration, stack flow, and mass emission rate values, respectively. The daily mass emission rate, per Rules 2011 and 2012, Appendix A, Chapter 2(B)(3) – Daily Calculations, is then calculated by summing the twenty-four hourly mass emission rate values. *It is **not** acceptable to calculate the mass emission rate for a 15-minute or an hour period by calculating a mass emission rate value for each pair of valid concentration and exhaust flow data points collected during a 15-minute or an hour period and then averaging those mass emission rates.* For further illustration, an example calculation is provided on the back of this advisory or can be downloaded from the AQMD web page (<http://www.aqmd.gov/docs/default-source/reclaim/compliance-advisories/cemsexample.pdf>)

If you know of any other person(s) (e.g. your CEMS vendor) that may be affected by this advisory, please forward a copy of this advisory or alert them of this matter. Finally, any questions regarding this notice should be directed to Mr. Mitch Haimov, Air Quality Analysis and Compliance Supervisor, at (909) 396-3129.

Example of Proper CEMS Calculation  
Valid 1-hour NOx Mass Emission Rate

Minute	Raw data from Monitors		15-minute Average data		Calculated NOx Mass Emission Rate <sup>2</sup> (lbs/hr)
	Concentration (ppm)	Stack flow rate <sup>1</sup> (scfh)	Concentration (ppm)	Stack flow rate <sup>1</sup> (scfh)	
1	47	80,643			
2	24	95,737			
3	31	31,204			
4	96	49,431			
5	21	52,748			
6	88	20,424			
7	11	81,994			
8	77	50,727			
9	21	-			
10	52	-			
11	32	-			
12	84	-			
13	28	74,008			
14	9	56,244			
15	69	83,365			
<b>15-minute Average Values</b>			45	61493.18	0.53
16	28	18,525			
17	33	74,898			
18	34	93,486			
19	25	74,159			
20	93	84,758			
21	57	39,434			
22	39	70,154			
23	60	56,045			
24	14	24,507			
25	18	24,326			
26	88	59,800			
27	39	61,688			
28	44	81,162			
29	35	39,974			
30	51	23,813			
<b>15-minute Average Values</b>			43.93	55115.27	0.29
31	33	53,980			
32	56	30,248			
33	22	46,905			
34	79	44,359			
35	52	23,284			
36	26	90,397			
37	24	77,899			
38	52	53,182			
39	89	47,129			
40	33	52,796			
41	88	15,097			
42	75	44,809			
43	58	18,863			
44	12	36,524			
45	65	86,103			
<b>15-minute Average Values</b>			50.93	48105	0.29
46	85	81,674			
47	74	52,078			
48	80	37,912			
49	10	51,298			
50	61	54,006			
51	50	82,770			
52	42	94,597			
53	82	69,048			
54	13	19,643			
55	50	12,819			
56	25	55,556			
57	80	74,777			
58	87	35,600			
59	87	77,027			
60	50	21,629			
<b>15-minute Average Values</b>			58.40	54695.60	0.38

  

Hourly Average Data <sup>3</sup>			Averaging four 15-minute rates
Concentration (ppm)	Stack flow rate (scfh)	NOx Mass Emission Rate (lbs/hr)	
49.57	54,852.26	0.32	

Daily NOx Emission Rate = Σ hourly NOx mass emission for all 24 hours of the day

Note:

- Exhaust flow rate may be obtained from either direct stack flow monitors or calculation based on fuel flow
- Mass flow calculation is only performed at the 15-minute level by using the following formula:  

$$\text{NOx mass emission rate (lb/hr)} = \text{concentration (ppm)} \times \text{stack flow (scfh)} \times 1.195 \times 10^{-7}$$
- Hourly Average Data are calculated by averaging the four valid 15-minute averages within the hour