

**Steiner Environmental, Inc.**

STATE OF CALIFORNIA  
AIR RESOURCES BOARD  
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BY BOARD SECRETARY

Diane ?

April 14, 1997

15-day Comment

cc: TAC  
Legal  
MED

Clerk of the Board  
Air Resources Board  
P. O. Box 2815  
Sacramento CA 95812

Reference: Comments on Revised CARB Test Methods  
Proposed Method 100, Page 7

The most important part of a continuous emission monitor test is the accuracy of the gas used to set the calibration on a given analyzer. Compromises may be made elsewhere in a test procedure, but not in the accuracy of the calibration gas because it can have the most impact on the measured result.

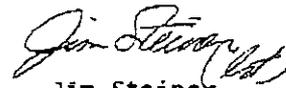
The calibration gases specified in 3.1 must be EPA Protocol 1, or NIST  $\pm 2\%$  only if an EPA Protocol 1 gas is not available. In the 15 years we have been in business, we have had very few instances where a Protocol 1 gas was bad. However, we have received several bad  $\pm 2\%$  traceable gases over the years. We now use EPA Protocol 1 gases for every test we run simply because they are the most accurate calibration gases available. This is especially important for gases in the 0 to 10 ppm range which are required in the SCAQMD. You cannot have a gas off by  $\pm 2\%$  or more when measuring 3-4 ppm NO<sub>x</sub> or CO and comparing this reading to a source CEMS.

The same is true for Section 3.2. The high level calibration gas must be EPA Protocol 1 to minimize the error created by the dilution of this gas to generate a low level calibration gas. CARB should not give in to those test firms who say it costs too much for Protocol 1 gases. The high level calibration gas must be the best available so that CARB has confidence in the accuracy of the generated low level calibration gases and hence, confidence the measured data.

There are a number of test firms who provide the best equipment, the best gases and experienced test personnel. There are a number of others who do as little as possible to get by. Why would CARB want to encourage cheap test results which may or may not be accurate (depending on the accuracy of the gases supplied), when an accurate alternative is at hand? Each year EPA evaluates the calibration gases produced by the various gas manufacturers. The variation between vendors making Protocol 1 gases is amazing. The variation between vendors making  $\pm 2\%$  NIST gases can only be worse since these gases only get analyzed once.

I urge you to require EPA Protocol 1 gases whenever available to enhance the accuracy of the source test data generated across the state.

Yours truly,



Jim Steiner

JS/1st:Carr 4B:CARBresp.1tr

Corporate Headquarters  
4930 Boylan Street  
Bakersfield, California 93308  
(805) 334-1102 FAX (805) 334-1440



April 8, 1997

WILLIAM LOSCUTOFF  
STATE OF CALIFORNIA EPA  
AIR RESOURCES BOARD  
P. O. BOX 2815  
SACRAMENTO CA 95814-2815

Post-It® Fax Note	7671	Date	4/8	# of pages	2
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COMMENTS ON ARB METHOD 100  
PROCEDURES FOR CONTINUOUS  
GASEOUS EMISSION STACK SAMPLING  
(REVISION DATED 3/31/97)

There are several corrections that I suggest for ARB Method 100 Draft.

Section 6.1

The definitions of  $c_{fb}$  and  $c_{fb}$  should be "the analyzer response for the calibration gas", not the concentration of the calibration gas. If you subtract the concentration of the cal gas from the cal gas, you get zero.

Also, the Drift equation needs " x 100" added to the end of the equation.

Section 6.2

The same as Section 6.1,  $c_{fb}$  and  $c_a$  should be "the analyzer response for the calibration gas", not the concentration of the calibration gas. If you subtract the concentration of the cal gas from the cal gas, you get zero.

Also, this is not how we calculate sampling system bias with SDAPCD Method 100. We use the following equation:

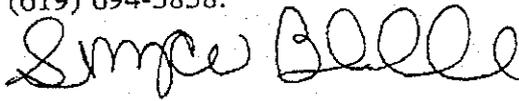
$$(100 - \{ [ (\text{syst reading} - \text{syst zero}) / (\text{direct reading} - \text{direct zero}) ] \times 100 \} )$$

Your equation doesn't take the system and direct zero readings into account. Also, subtracting the direct response from the system response will almost always give a negative bias. At the very least, the Bias equation needs " x 100" added to the end of the equation.

Section 7.2

The first line should say "Determine the emission rate in pounds per hour of pollutant, E, of each stack constituent using Equation 100-4:". Also, there should be a definition for E = Emission rate, lb/hr.

If you have any questions, my phone number is (619) 694-8972, and the FAX number is (619) 694-3858.



SUZANNE BLACKBURN  
Associate Air Pollution Control Chemist

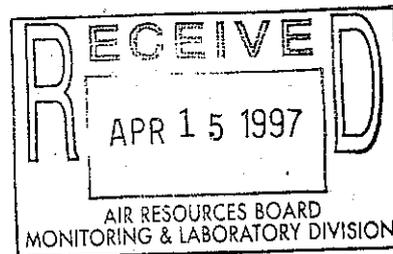
cc. George Lew, Cal EPA, ARB  
Cindy Castronovo, Cal EPA, ARB  
Frances Cameron, Cal EPA, ARB

April 11, 1997

96-7-2  
9/26/96

STATE OF CALIFORNIA  
AIR RESOURCES BOARD  
RECEIVED 4/16/97  
BY BOARD SECRETARY

15-Day Comment  
TAC  
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Mr. George Lew  
Chief, Engineering and Evaluation Branch  
Monitoring and Laboratory Division  
CALIFORNIA AIR RESOURCES BOARD  
P.O. Box 2815  
Sacramento, California 95812

Subject: **PROPOSED REVISION OF CARB METHOD 431**

Dear Mr. Lew:

The purpose of this correspondence is to present my comments and input regarding the latest revision of proposed Method 431. The revision of this test method presents an invaluable opportunity to incorporate into the method all of the testing techniques developed over the last few years in an effort to effectively accommodate all of the existing and emerging technologies for ethylene oxide emission control. These techniques have, to date, had to be incorporated into individual test protocols on a case-by-case basis. I will present my comments in order as related to the appropriate sections in the proposed revision of Method 431.

Page 1

Column temperature - I have found that lower column oven temperatures (@ 45 degrees C) allow better resolution of EtO and HCFC-22 peaks.

Freon-12 is listed as a possible interfering compound. Sterilizing gases containing Freon-12 have been unavailable since late 1995. HCFC-124 and HCFC-22 are the diluent gases currently used.

Page 2

Equipment - PID is not listed.

Page 5

Inlet Estimation - Reference is made to sterilant gas "make-up" charging into the sterilization chamber. This "make-up" charging should not have any effect on the inlet estimation procedure since the final chamber pressure and temperature, conditions immediately before the exhaust phase is initiated, are used for inlet mass calculation.

Inlet estimation is disallowed for all sterilizers using water ring seal pumps. This arbitrary stipulation prohibits the use of this method with systems such as the MG Industries SGR-H System and the AAT Safe Cell System. The inlet of emission-control systems like these cannot be measured directly because of extremely high sterilant gas

and moisture levels. Inlet estimation techniques can and have been used on these types of equipment when combined with testing to determine the amount of EtO present in the pump seal fluid before and after the exhaust phase. This testing allows the quantification of EtO subject to delayed off-gassing.

Inlet Measurement -

There appears to be no valid reason why a loaded chamber must be used when testing a sterilizer when no aeration testing is to be performed. Also, with almost all sizes of sterilizer, but particularly with larger chambers, there remains in an empty sterilization chamber, after the conclusion of the exhaust phase, sufficient EtO to generate inlet EtO concentrations of 10-1500 ppm during the first evacuation pulse of the in-chamber aeration phase.

Measurement Methods -

The documentation procedures for the verification of inlet probe placement are excessive and potentially inaccurate. Specific comments can be found below under Appendix D.

Page 6

Tedlar bag procedure -

The 24 hour holding time for tedlar bag samples is much too long. At low ppm-level concentrations, EtO starts to degrade within tedlar bags in a matter of a few hours. All sample analysis (or, at least all outlet sample analysis) should be performed on-site so that outlet concentration values will not be artificially biased low.

Direct Interface -

Reference is made to a sampling frequency of less than 2 minutes. While this is easily accomplished on sterilizers using 100 percent EtO or an EtO/CO<sub>2</sub> gas blend, it is impossible on sterilizers using an EtO/HCFC blended gas. The only EtO/HCFC blended gas now readily available (Oxyfume 2002) is comprised of EtO, HCFC-22 and HCFC-124. These three peaks cannot be resolved in less than 2 minutes, by any means. Typical retention times for HCFC-124, when allowing resolution of the EtO and HCFC-22 peaks, is approximately 3-4 minutes.

What is the reason for requiring sampling for the entire exhaust phase for acid scrubber control systems, but only the first chamber evacuation for cat-ox control systems? If there is no valid reason, the requirement should be the same for both.

The three-test-run requirement seems excessive for direct interface sampling. One of the advantages of performing this more complicated test is that you obtain real-time emissions levels directly from the source. The inherent accuracy of the test method should obviate the

need for triplicate test runs. One test run, two in a borderline compliance case, should suffice.

Page 9

Appendix C - Probe positioning verification requirements cannot be applied to aeration room testing because the procedures outlined in Appendix D entail the comparison of measured inlet EtO to estimated inlet EtO. Estimation procedures cannot be applied to aeration-only facilities, such as aeration rooms.

Page 10

Appendix D - As described above, these procedures cannot be applied to aeration rooms. They also cannot be applied to any sterilizer/control system which utilizes a liquid sealed vacuum pump, in accordance with requirements outlined in earlier sections of Method 431. This is due to the potential for delayed off-gassing, which would bias the measured inlet mass of EtO low in relation to the estimated inlet mass of EtO. Sterilizers which utilize water ring sealed vacuum pumps, discharging to cat-ox control units, are common and include those manufactured by MDT/Castle, Getinge, and ARS.

Rather than rely on this potentially inaccurate method of probe placement verification, it would seem more practical, enforceable, and technically feasible to establish a physical/positional requirement for inlet probe placement which can be implemented or verified by the tester.

Page 39-40 (Modified Text)

Appendix K -

EtO Emission points - Recovery compressor "burps" may be discharged to either an acid or thermal hydrolysis scrubber.

Reference is made to 12/88 sterilant gas, which is no longer available.

Chamber moisture, which is collected in the oil/water separator is normally only discharged once per cycle to the high-temperature thermal oxidizer ("heater").

Exhaust Phase Testing - No specific guidelines are given for the collection and analysis of water samples from the outlet of the chamber water (should be "steam") jacket. How should samples be collected? How many samples should be collected? When during the cycle should these samples be collected? How should the sample analysis be performed?

Mr. George Lew  
CALIFORNIA AIR RESOURCES BOARD  
April 11, 1997

Over the course of the last three years, a significant amount of testing, the majority of it by my company, has been performed on various liquid discharge streams from the Joslyn System. These testing methods, and the corresponding test results, should be examined by the CARB in its development of these specific testing standards.

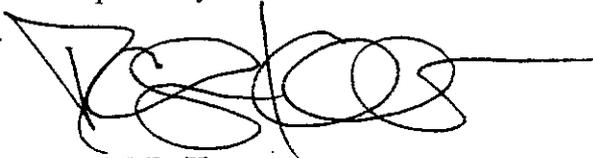
Aeration Phase Testing - Reference is made to using Appendix A measurement methods to determine inlet and outlet EtO emissions during the Joslyn aeration/detox-B phase. This is impossible. Aeration/detox-B emissions are uncontrolled and are discharged directly to the dedicated ventilation system. Therefore, no inlet vs. outlet comparison can be made. Also, it is not specified which Appendix A measurement methods are to be used, and at which points in the discharge stream sampling is to be conducted.

Again, no specific guidelines are given for the collection and analysis of water samples from the outlet of the aeration/detox-B pump. How should samples be collected? How many samples should be collected? When during the cycle should these samples be collected? How should the sample analysis be performed?

No Joslyn system utilizes a stand-alone aerator. Therefore reference to the aeration chamber ambiguous.

If you have any questions regarding this submittal, or would like to discuss results of or methodology employed in previous EtO source tests, please contact me at (714)770-6611. I appreciate the opportunity to offer my input regarding the revision of CARB Method 431, and I hope that these comments help in the drafting of the final test method.

Respectfully Submitted:



Daniel P. Kremer  
KREMER ENVIRONMENTAL SERVICES