



cc: Dr. Bob Brookman, *Freestone*
6/17/74 cc: RALPH LEVITON, NYO-4
INTERNAL CORRESPONDENCE

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JUN 05 1974

R. N. WHEELER, JR.

CHEMICALS AND PLASTICS

P. O. BOX 8361, SOUTH CHARLESTON, WEST VIRGINIA 25303

To (Name)	Mr. R. N. Wheeler ✓	Date	June 3, 1974
Division		Originating Dept.	Research and Development
Location	South Charleston, Bldg. 189	Subject	Proposed Standard for Exposure to Vinyl Chloride
Copy to	Mr. R. L. Anderson, 511 Mr. T. W. Carmody, NYO-31 Mr. R. E. Graebert, 511 Mr. H. R. Guest, 511 Mr. C. D. Hendrix, 511 Mr. A. W. Lutz, NYO-28 Dr. A. B. Steele, NYO-28 Mr. R. W. Wesson, NYO-32 Mr. J. W. Whittlesey, NYO-45 Dr. N. L. Zutty, NYO-32		

Dear Mr. Wheeler:

In accordance with your telephone request of May 28, I have reviewed the wording of the proposed permanent OSHA standard for vinyl chloride with respect to the statement of background information quoted below.

A. Level of exposure. The proposed standard for employee exposure is set at no detectable level, as determined by a sampling and analytical method capable of detecting vinyl chloride at concentrations of 1 ppm with an accuracy of 1 ppm $\pm$ 50 percent.

It is the consensus of the analytical chemists and statisticians I consulted, and my own feeling, that the statement as written above leads to varied interpretations with little chance of resolving the differences in viewpoint.

It could be argued that an analysis of 1.5 ppm or less would show compliance.

It could also be argued that an analysis of 0.5 ppm or more would show lack of compliance.

There are two main reasons for diverging interpretations. One is that the description of the method to be used is not precise. The other is that the statement of 1 ppm $\pm$ 50% refers to the method, not the permissible limit. A permissible limit of "none detectable", is virtually undefinable, even when coupled with a definition of the method to be used.

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In order to minimize varying interpretations, the 1 ppm sensitivity and the reproducibility of the method could be worded as follows:

"The proposed standard for employee exposure is set at no detectable level, as determined by a method capable of detecting 1 ppm with a reproducibility (2) of ± 0.5 ppm at the 95% confidence level (2), as defined by ASTM Standard E 180-67."

The above statement would provide a valid technical basis for a mutual understanding of the requirements of the method to be used. Even with the improved definition of the method, it would still be true that for all practical purposes a concentration level of 0.3 ppm or less would be required in order to assure an analysis showing compliance. (At 0.3 ppm the reproducibility of the method would be expected to be about ± 0.15 ppm).

Similarly a concentration of 3.0 ppm or more would be required in order to give an analysis conclusively showing non-compliance. (At 3.0 ppm the reproducibility of the method would be expected to be about ± 1.5 ppm.)

These relationships can be illustrated by the attached diagram, which shows the three zones of reproducibility associated with the use of the specified method.


N. H. Ketcham

- (1) Federal Register, Vol. 39 No. 92, May 10, 1974, page 16896.
- (2) "Reproducibility" and "Confidence Level" are defined in ASTM Standard E 180-67, Reapproved in 1972. These definitions are in paragraphs A 2.14 and A 2.12, respectively. Part F of E 180 illustrates the use of these terms in precision statements.

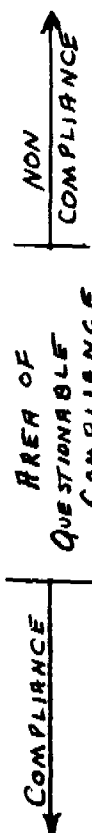
NHK/ml

Attachment

Reproducibility of the method
when analyzing a known con-
centration of 3.0 ppm

Reproducibility of the method
at the "detectable concentra-
tion" of 1 ppm

Reproducibility of the method
when analyzing a known con-
centration of 0.3 ppm



Analysis
(PPM by Vol.)

{ 4.5
3.0
1.5 } 3 ± 50%

{ 1.5
1.0
0.5 } 1 ± 50%

{ 0.45
0.3
0.15 } 0.3 ± 50%