UNION CARBIDE

INTERNAL CORRESPONDENCE

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To (Name) Mr. R. N. Wheeler

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June 3, 1974

Research and Development

Proposed Standard for Exposure to Vinyl Chloride

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 ± 50 percent.

It is the consensus of Messrs. Robert L. Anderson, Charles D. Hendrix and myself 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 ± 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.

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

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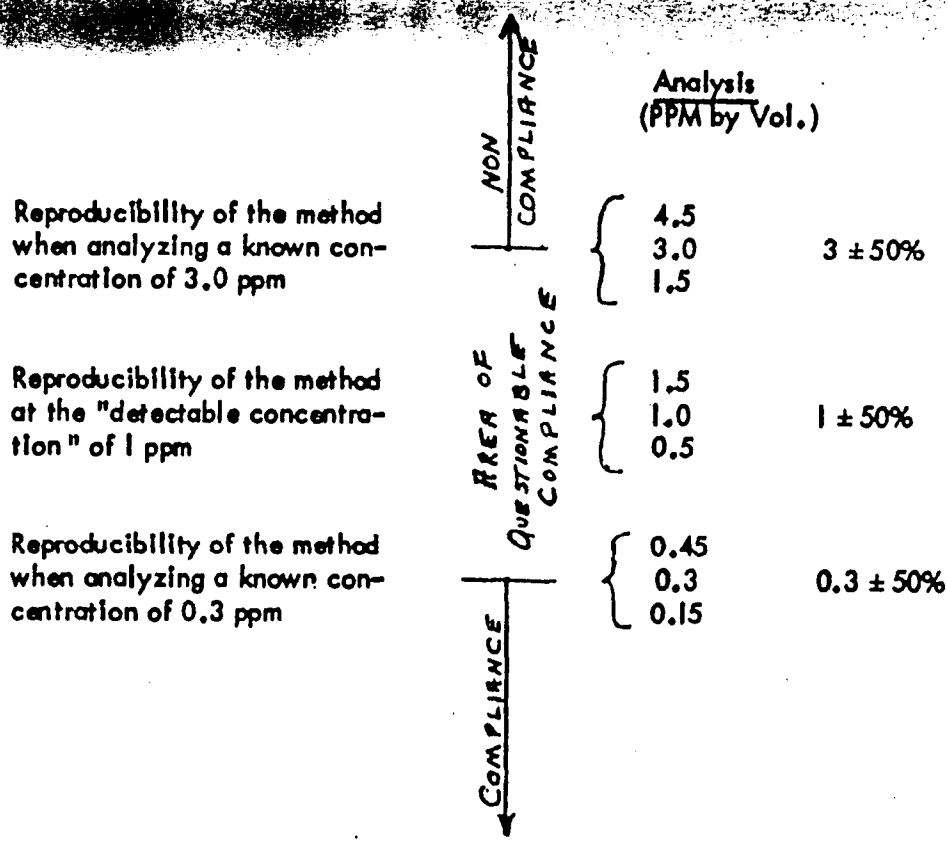
(1) Federal Register, Vol. 39 No. 92, May 10, 1974, page 16896.

(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

Attachments


Analysis
(PPM by Vol.)
NON COMPLIANCE
Reproducibility of the method when analyzing a known concentration of 3.0 ppm
4.5
3.0
1.5
3 ± 50%
AREA OF QUESTIONABLE COMPLIANCE
Reproducibility of the method at the "detectable concentration" of 1 ppm
1.5
1.0
0.5
1 ± 50%
Reproducibility of the method when analyzing a known concentration of 0.3 ppm
0.45
0.3
0.15
0.3 ± 50%
COMPLIANCE