INTER-OFFICE MEMO **TENNECO CHEMICALS, INC.**

TO J. Sandstedt AT DATE January 17, 1977

FROM P. M. Reed AT COPY TO R. J. Young
F. W. Kanzler
R. A. Lojewski
G. Rozand

SUBJECT Questions for EPA

In response to the questions of Mr. Marcus Kantz, the following is offered:

1. The methods proposed by EPA in the Rule on VCM include temperature and pressure correction factors whereas the Tenneco procedure has no comparable correction factor. The necessity for and importance of corrections in the EPA method is due to their indirectness of analysis as opposed to Tenneco's direct method. The EPA method involves the solution of the sample and the temperature and pressure equilibration of the solution in a closed system. Under these very special conditions, the amount of VCM in the vapor phase can be analyzed and the amount of VCM in the original sample calculated. As you can see, the method requires precise control of temperature and pressure to ensure known mass transfer and particularly partial pressure from the original solid to this vapor space. The Tenneco method on the other hand, employs a direct method in that the sample is dissolved in an appropriate solvent and the solvent with dissolved sample is directly injected into a chromatograph. Thus, as long as the temperature and pressure is the same on the standard as on the sample, no significant error will exist.

2. The question of a calibration curve is valid. Basically, a new calibration curve is made in the original calibration. Conditions are found by the adjustment of the hydrogen to air ratio such that the detector gives a linear response to the VCM peak. After this is done, it is only necessary to spot one point as long as the expected VCM content of the sample is close to the standard being used to verify the curve. This method of calibration is commonly employed in pratical gas chromatography. The following is from Ettre and Zlatkis titled, "The Practice of Gas Chromatography" on page 403. The following can be found:

> "In some cases, the measurement of peak areas is difficult or tedious. For example, the bands yielded by low boiling components and located at the beginning of the chromatogram are tall and narrow, maximizing errors in band-width

> measurements. On the other hand, peak heights of such bands are easily and accurately measured on strip chart recorders. Therefore, in many cases, peak heights are used instead of areas for quantitative evaluation". [1]

Also, on page 405, the following sentence is significant.

> "Calculations based on peak heights are preferable for analyses in which the peak width is very small and the concentration of the component is high." [2]

3. While Mr. Kantz did not ask, one part of the EPA rule has created much confusion in the industry. This is the necessity of utilizing calibration standard that is traceable to National Bureau of Standards calibration standard. This controversy has apparently been resolved by Robert L. Ajax, Chief of the Emission Measurement Branch in which he informs our supplier this is not necessary and a clarification will be published in January. A copy of Mr. Ajax's letter of December 20th is attached for your information.

If there are any further questions on the analytical procedure employed at Tenneco, do not hesitate to contact me.

P. M. Reed/alc

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PMR/alc

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[1] Leslie S. Ettre and Albert Zlatkis,"The Practice of Gas Chromatography" (New York: Interscience Publishers), p. 403

[2] Leslie S. Ettre and Albert Zlatkis, "The Practice of Gas Chromatography" (New York: Interscience Publishers), p. 405.