January 15, 1947

Mr. Allan L. Coleman
Chief Industrial Hygienist
Connecticut State Department of Health
Hartford (1), Connecticut

Dear Mr. Coleman:

Your letter of January 8 to Dr. Kehoe and your questionnaire concerning the analysis of chlorinated hydrocarbons have been turned over to me for reply.

I find thatIcannot give you the information which you require in tabular form, but must do it in the form of a letter. This is so because circumstance determines the proper analytical approach. In our own toxicological studies on contaminated atmospheres we have used successfully both catalytic combustion and absorption methods of sampling, the sampling procedure adopted in this work being determined by the chemical nature of the contaminant and the availability of certain equipment. When the exposure is to a known single compound, the absorption method of sampling gives considerable leeway in the choice of a method of final determination. Thus, it may be possible with samples collected by suitable absorption technique to determine the contaminant in question colorimetrically, by the degree of ultraviolet absorption or by the determination of chloride ion following either combustion or hydrolysis with suitable reagents.

In the case of certain aliphatic chlorinated hydrocarbons, the colorimetric method based on the Fujiwara reaction is far more convenient than the combustion or hydrolysis method, and we have used this method successfully for the determination of carbon tetrachloride, chloroform, brominated monochlorobutane, hexachlorobutadiene and trichloroacetonitrile. It is more than likely that many of the aliphatic chlorinated hydrocarbons in your list can be determined in the same fashion. When properly carried out the colorimetric method is precise, very sensitive and rapid.

In the case of the determination of aromatic chlorinated hydrocarbons, we would also prefer absorption methods which would then be followed preferably by ultraviolet absorption measurement, or, if this was not possible because of interference due to the admixture of compounds, by the determination of chloride ion following hydrolysis with suitable reagents.

From our own laboratory experience noted above, we have settled on the absorption method of sampling in the field since as indicated previously, this gives us considerable leeway in choosing our final estimation procedure. On the whole, we prefer to employ colorimetric and ultraviolet absorption methods for the estimation of the contaminant and would employ combustion methods or hydrolytic techniques only when the former are not feasible.

Outside of using the combustible material indicator, we have had no experience with field instruments employing physical properties. We have not been called upon to identify chlorinated hydrocarbons in organic solvent mixtures and therefore we have not given this topic any thought. However, we would be interested in such procedures and trust that in time information which you are gathering could be made available to us.

Very truly yours,

J. Cholak

JC:egm

cc.: Dr. Robert A. Kehoe

COMMISSIONER OF HEALTH
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STATE OF CONNECTICUT
DEPARTMENT OF HEALTH
HARTFORD, 1

January 8, 1947

Dr. Robert A. Kehoe
Kettering Laboratory of Applied Physiology
College of Medicine
University of Cincinnati
Cincinnati, Ohio

Dear Doctor Kehoe:

As a part of the program instituted by the Committee on Standard Methods of the American Conference of Governmental Industrial Hygienists, we have been asked to act as referee on methods for the sampling and laboratory determination of chlorinated hydrocarbons. This program consists of deciding upon the most satisfactory methods in common use and later in the evaluation of these procedures in various selected laboratories. At this time, we are enclosing a questionnaire, which is largely self-explanatory, for obtaining certain necessary preliminary data.

We shall appreciate it very much if you will provide the answers to the questionnaire and return it to us at your earliest convenience.

We know that you have done considerable work in the investigation of methods for the determination of toxic materials in industry and wonder whether you would be interested in participating in the present program.

Very truly yours,

Allan L. Coleman

ALC:scw
Enc.

Allan L. Coleman
Chief Industrial Hygienist

CHLORINATED HYDROCARBONS

The following are typical of the two groups which are encountered:

1) Aliphatic chlorinated hydrocarbons
   - Chloroform
   - Carbon tetrachloride
   - Ethylene dichloride
   - Tetrachlorethane
   - Pentachlorethane

   - Dichlorethylether
   - Dichlorethylene
   - Trichlorethylene
   - Tetrachlorethylene

   - Vinyl chloride
   - Chloroprene

2) Aromatic chlorinated hydrocarbons

   - Monochlorbenzene
   - Dichlorbenzene
   - Chlorinated naphthalenes
   - Chlorinated diphenyls

Atmospheric Determinations

1) What type of method do you prefer for sampling and determination of the above:

   a) Catalytic combustion in the field
   b) Absorption and combustion later in the laboratory
   c) Absorption and splitting off the chlorine by reflux with suitable reagents
   d) Portable field instrument wherein the sample is analyzed by physical properties

   Tabulate all four <u>in order of choice</u>

2) What method have you been using for the collection and analysis of chlorinated hydrocarbons?

3) What criticism do you have of the method you have been using?

4) Indicate for each of the above methods whether your experience has been limited, moderate or extensive.

Determination in Solvents

1) What chemical tests do you use for identification of various chlorinated hydrocarbons in organic solvent mixtures?