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DATE 1947

- published article from trade journal
- published advertisements
- newspaper article
- published government report
- government inspection results
- unpublished or internal report
- unpublished presentation from conference
- letter
- memorandum
- industry warning labels
- industry sales literature
- industry recommended practices
- ✓ — meeting minutes (with attachments)
- membership list
- BC notes

4/47

For Information Only - Not for Publication

AMERICAN PETROLEUM INSTITUTE
MEDICAL ADVISORY COMMITTEE

FIFTH MEETING

Minutes of Meeting
April 28, 1947
Statler Hotel
Buffalo, New York

MEMBERS PRESENT

M. N. Newquist - Chairman
J. P. Holt - Secretary

V. C. Baird
F. F. Boys
W. W. Brooks
Kieffer Davis
D. M. English

T. M. Frank
A. E. Hoag
R. A. Jewett
T. J. Kelly
W. R. Levis

E. K. Linder
R. C. Page
B. B. Reeve
McIver Woody

ASSOCIATES PRESENT

E. W. Adams
L. C. Beard, Jr.
R. S. Bonsib

R. C. Cole
N. J. Gothard
H. P. Lankelma
H. R. Warrick

F. M. Watkins
H. D. Wilde
H. H. Zuidema

GUESTS

Marshall Clinton, Jr.
N. V. Hendricks

F. F. Heyroth
R. A. Kehoe

G. L. Sumner

ADVISOR

D. V. Stroop - API

Total in Attendance - 32

MEMBERS ABSENT

W. O. Armstrong

W. A. Morrison

H. S. Thomson

ASSOCIATES ABSENT

C. R. Brown
T. G. Delbridge
R. S. Driver

E. W. Isom
A. J. Koewing, Jr.
D. W. Larner

C. R. McKay
R. B. Rooper
G. H. Taber, Jr.

.....

I

MINUTES OF PREVIOUS MEETING

Action

The minutes of the previous meeting, November 14, 1946, were approved as circularised.

API 06869

II

REPORT OF SUBCOMMITTEE ON CARCINOGENICITY - DR. McIVER WOODY, CHAIRMAN

The report of the meeting of the Subcommittee on Carcinogenicity held on March 14, 1947 was discussed. Photostat copies of three articles concerning the carcinogenic properties of petroleum products that have appeared in "The American Weekly," "Life," and "Medicine" were presented and discussed.

The report of the Subcommittee on Carcinogenicity was presented and is given in full in Appendix A.

Dr. F. F. Heyroth of the Kettering Laboratory of Applied Physiology, University of Cincinnati School of Medicine, presented a progress report on the experimental carcinogenic studies that they are carrying out on several petroleum samples for the API. A letter from Dr. Heyroth to Dr. Woody, dated April 25, 1947, describing the results of the studies that are being carried out at the University of Cincinnati is given in Appendix B.

Action In receiving the Subcommittee's report, the Medical Advisory Committee voted to adopt recommendations as follows:

- A. The animal experiments now under way at the Kettering Laboratory of Applied Physiology should be continued at least until the end of the current year.
- B. Extend the scope of investigation to a large number of samples so that they can be treated on a statistical basis rather than on a comparative basis using a small number of samples as in the present work. It would seem that the best attack would be to get out a form letter to a number of oil companies inquiring whether or not they would be willing to participate in such a program and, if so, request them to set aside barrel samples of catalytic recycle stock, catalytic resids, thermal recycle, hydroformer bottoms, thermal resids and other samples, and advise by what type of operation and under what conditions they have been produced. Then, after an analysis of responses to that questionnaire as many of these samples will be studied as is practical.
- C. The Chairman of the Subcommittee on Carcinogenicity is authorized to release samples up to one gallon of each, and to a total of 25 gallons, for physical and chemical studies with the objective of correlating these data with the tests on mice. The results of these physical and chemical studies shall be submitted to the Subcommittee on Carcinogenicity.
- D. Establish a registry of malignancies to report to the Subcommittee on Carcinogenicity. This registry would collect data on all malignancies incident in employees of the petroleum industry. It would set up its own procedures, forms, extent of data, follow-ups, pathology, treatment, outcome, autopsy reports, etc. after consultations with existing registries.
- E. Means must be found to refute the false and misleading statements that are continually appearing in newspapers and magazines as to the prevalence of cancer among those who work in refineries and

filling stations. The Subcommittee on Carcinogenicity is authorized to do the following:

1. Initiate a literature survey on the possible carcinogenic effects of petroleum products to man.
2. Initiate a study of the physical and chemical characteristics of petroleum products in an attempt to obtain a simple procedure to determine whether a particular petroleum sample is or is not carcinogenic.
3. To have experimental studies carried out on sludge, lubricating oils, gasoline and other oils.

III

REPORT OF SUBCOMMITTEE ON CUTTING FLUIDS - DR. B. B. REEVE, CHAIRMAN

The report of the Subcommittee on Cutting Fluids was presented to the Committee and is given in Appendix C. In receiving the Subcommittee's report the Medical Advisory Committee voted to adopt the following recommendations in the report as follows:

Action A. It is recommended that a complete survey of the literature and the compilation of a bibliography pertaining to dermatitis and other harmful effects of cutting fluids be made. The survey should include:

1. A review of the conditions under which cutting oil dermatitis most frequently occurs.
2. The part that bacteria do or do not play.
3. Physiological mechanism of oil dermatitis.
4. The review should include the known components of cutting oil; i.e., mineral oils, fatty oils, additives, etc.
5. Tabulation of the state laws or regulations relative to the use of oils or to their composition.
6. As a result of this survey the investigator will recommend a program for further study of this problem including suggestions for remedial measures.

It is understood that the participating members of the API Medical Advisory Committee will assist and facilitate the reviewer in supplying him with whatever information is already available in the various companies.

- B. The Subcommittee recommends that a system of exchange of information be established and correlated between the Independent Research Committee on Cutting Fluids and that of the API Medical Advisory Committee.
- C. It is recommended that consideration for research be withheld until the survey has been made.

- D. It is recommended that after the survey has been completed, consideration be given to the formulation of an educational program. The nature of this program will depend upon the information obtained from the survey.
- E. It is recommended that a grant be given to the Harvard School of Public Health to make this survey under the guidance of Dr. Marshall Clinton, Jr.
- F. It is recommended that a grant of \$2,500 from the \$5,000 appropriated to the Subcommittee be made to carry on this work.

IV

COMMUNICATION OF JANUARY 20, 1947 FROM MR. G. L. SUMNER,
CHAIRMAN OF SUBCOMMITTEE ON INDUSTRIAL DERMATITIS OF
THE INDEPENDENT RESEARCH COMMITTEE ON CUTTING FLUIDS

Mr. Sumner described the activities of the Independent Research Committee on Cutting Fluids and presented a report of a literature survey on this problem. Some of his report is given in Appendix D.

It was the consensus of the Medical Advisory Committee that it would cooperate on this problem with the Independent Research Committee, and the Medical Advisory Committee was very appreciative of Mr. Sumner's report and cooperation.

V

REPORT OF SUBCOMMITTEE ON FLUORIDES - DR. A. E. HOAG, CHAIRMAN

The report of the Subcommittee on Fluorides was presented and is given in Appendix E.

Dr. Robert A. Kehoe and Dr. Francis F. Heyroth of the Kettering Laboratory of Applied Physiology, University of Cincinnati College of Medicine, described the research program that they are carrying out on the toxicity of fluorides for an industrial group of five companies (Aluminum Company of America, du Pont, Pennsylvania Salt Company, Reynold Metal Company, and Universal Oil Products). They stated that this was a four-year project to study the physiological effects of fluoride ions.

The question of the desirability of the Medical Advisory Committee of the American Petroleum Institute contributing financial support to this group of five companies to carry out these toxicity studies on fluorides at the University of Cincinnati was discussed.

In receiving the report of the Subcommittee the Medical Advisory Committee voted to adopt the following motion:

Action

It is recommended that the American Petroleum Institute should contribute \$2,500 to the work being sponsored by an industrial group on fluorides at the Kettering Laboratory of Applied Physiology, University of Cincinnati College of Medicine, under the direction of Dr. Kehoe. The Chairman of the Subcommittee is authorized to make the necessary arrangements subject to letter ballot of approval by the API Medical Advisory Committee.

VI

REPORT OF SUBCOMMITTEE ON PERMISSIBLE CONCENTRATIONS - DR. V. C. BAIRD, CHAIRMAN

At the request of Dr. V. C. Baird, Dr. Marshall Clinton, Jr. presented the progress report on the work that they have been carrying out at the Harvard University School of Public Health under the direction of the Subcommittee on Permissible Concentrations, and the introductory material that will be distributed with the toxicological reviews that have been prepared. This report and the introduction are given in Appendix F.

The toxicological reviews were discussed as follows:

Aluminum chloride
Ammonia
Benzene
Boron trifluoride
Carbon tetrachloride
Chlorex
Cumene
Cresol
Furfural
Hydrogen chloride
Hydrogen sulfide
Iron carbonyl
Nitrobenzene
Phenol
Sulfuric acid
Styrene
Toluene
Xylene

Action

The following motions were voted by the Committee:

- A. An Editorial Committee will be appointed by the Chairman of the Medical Advisory Committee to review and approve the introduction presented by Dr. Clinton (see Appendix F) and to advise the Institute staff on matters of format and other details of publication. The following persons were appointed to serve on this committee:

Dr. J. P. Holt, Chairman
Dr. V. C. Baird, Vice Chairman
Dr. Marshall Clinton, Jr.
Dr. M. N. Newquist (Ex-officio)
Mr. D. V. Stroop (Ex-officio)

- B. The toxicological reviews on the following compounds were approved by the Committee and referred to the Editorial Committee for editing and publication, subject to approval by the Committee on Safety of the Board of Directors:

Aluminum chloride
Ammonia
Benzene
Boron trifluoride
Carbon tetrachloride
Chlorex

Cumene
Cresol
Furfural
Hydrogen chloride
Hydrogen sulfide
Iron carbonyl
Nitrobenzene
Phenol
Sulfuric acid
Styrene
Toluene
Xylene

- C. It was voted to state on each review that recommendations contained therein are tentative, not final, and are only being published for study and comment by all readers.
- D. It was voted that Section 1 in Dr. Clinton's report, which reads as follows:

"1. An evaluation of the acute and chronic toxicity of boron trifluoride and fluoride-hydrocarbon complexes. It is realized that this problem is being considered by the Subcommittee on Fluorides, but it is mentioned at this time for the sake of completeness."

would not be handled by the Committee on Permissible Concentrations but would be referred to the Fluorides Committee.

- E. It was voted to do nothing at the present time concerning the following recommendation given in Dr. Clinton's report, which reads as follows:

"2. A survey of the extent and harmfulness of air contamination by gaseous wastes from petroleum refineries, especially H_2S , SO_2 and HF . That the problem of SO_2 pollution can become a most expensive and serious one has been amply demonstrated by the unpleasant experiences of many of the larger smelting companies, who have paid vast sums for crop spoilage. More recently, the west coast aluminum refineries have had similar experiences with damage to cattle by fluorides absorbed from the air by vegetation."

- F. Dr. Marshall Clinton, Jr. of Harvard University School of Public Health is authorized to carry out toxicological screening studies on compounds selected by the Subcommittee on Permissible Concentrations from those indicated in his report with the funds now available. These compounds will be those that are of general interest to the petroleum industry as indicated in earlier surveys made by the Subcommittee. The compounds from which some will be selected to be studied by means of toxicological screening tests are as follows:

Iron carbonyl
Thiophene
Alkyl mercaptans
Alkyl disulfides

Aromatic mercaptans, including thiophenol
Maleic anhydride
Morpholine
Di-tertiary butyl para cresol
n-butyl p-amino phenol

Toxicological Literature Surveys

It was the consensus of the Medical Advisory Committee that any petroleum company having a desire to have a literature survey prepared on a particular compound should inform Dr. Clinton of their desire. After he has received several requests to prepare a review on a particular compound, he will circularize the industry and if there is general interest in a particular compound he will prepare a review on the subject.

VII

REPORT OF SUBCOMMITTEE ON MEDICAL POLICIES AND PRACTICES-DR. R.A. JEWETT, CHAIRMAN

The report of the Subcommittee on Medical Policies and Practices was presented as given in full in Appendix G.

Mr. Stroop presented a summary on the mortality statistics for 1946 as reported by oil companies covering approximately 127,000 employees and annuitants.

Action

The Medical Advisory Committee voted to adopt motions as follows concerning this report:

- A. The API Medical Advisory Committee endorses the principle of periodic examinations of employees.
- B. A majority of the members of the Medical Advisory Committee found that oil-company sponsorship of medical insurance for purchase by employees has definite value and should be encouraged.
- C. The Medical Advisory Committee endorses the policy of following up employees absent due to sickness by trained workers where possible.
- D. The Medical Advisory Committee recommends the carrying on of a continual health educational program for employees.
- E. The Medical Advisory Committee endorses the principle of periodic inspection from a health standpoint of offices and plants by a doctor or a representative of the medical department.
- F. The Medical Advisory Committee endorses the policy that companies should keep statistics of mortality and morbidity.
- G. It was recommended that mortality statistics be kept by petroleum companies and that the Standard Classified Nomenclature of Disease be used in compiling this information.

VIII

COMMUNICATION OF APRIL 1, 1947 FROM DR. THOMAS T. MACKIE,
PRESIDENT OF THE AMERICAN FOUNDATION FOR TROPICAL MEDICINE

The communication from Dr. Mackie as circularized on April 10, 1947 was discussed by the Committee (see Appendix H). It was the consensus that the objectives of The American Foundation for Tropical Medicine were very worthwhile.

IX

METHOD FOR INFORMING MEMBERS OF THE API OF WORK OF THE
MEDICAL ADVISORY COMMITTEE

Action

It was voted that the Chairman of the Medical Advisory Committee should present a report on the activities of the Medical Advisory Committee to the Committee on Safety of the Board of Directors of the American Petroleum Institute at such time as is indicated.

It was the consensus of the Committee that not all of the detailed activities of the Medical Advisory Committee would be reported to the Committee on Safety but that certain activities, depending on their nature and general interest, would be reported to the Board Committee.

Release of Information to the API

It was the consensus that any Medical Advisory Committee developments that are of particular interest should be sent to Mr. Stroop to be distributed to the members of the API.

X

NEW BUSINESS

Kerosine - The question of the toxicity of kerosine when ingested, which was discussed in the meeting of the Committee on November 14, 1946, was considered. It was stated that this question had been referred to the National Safety Council.

XI

Next Meeting - It was the consensus that the next meeting of the API Medical Advisory Committee should be held on Thursday, November 13, 1947 in Chicago, Illinois, and subcommittee meetings should be held on Wednesday, November 12, 1947.

Approved:

M. N. Newquist, M.D.
Chairman

J. P. Holt, M.D.
Secretary

APPENDIX A

PROGRESS REPORT TO THE API MEDICAL ADVISORY COMMITTEE
BY THE SUBCOMMITTEE ON CARCINOGENICITY

Dr. McIver Woody - Chairman

April 28, 1947

report: The Subcommittee on Carcinogenicity submits the following progress

1. The experimental work on animals, which was begun last year at the Kettering Laboratory, is being continued. It is still too early to draw any definite conclusions but one (Sample W-3632) out of the eight samples furnished by us produced lesions that grossly resembled papillomata in 11 mice out of 20 after 33 weeks. At the present time one of these tumors has been excised and studied by means of microscopic pathological examination and shows the tumor to be a squamous cell carcinoma which has invaded underlying striated muscle. Whether any of the remaining samples will give positive findings by the end of this year remains to be seen.
2. A meeting of the Subcommittee was held in New York City on March 14, 1947 to review what has been accomplished and formulate plans for the future. It was agreed that an excellent start had been made. Unsubstantiated allegations have appeared in both the technical and lay press that petroleum products are carcinogenic. Although studies on animals show certain petroleum products to be carcinogenic to certain experimental animals industry statistics do not confirm this in man. Much remains to be done to get the facts.
3. On March 26th, at the request of the Subcommittee, Mr. Stroop sent out the following questionnaire to all members of the Advisory Committee:

"Please report below the number of cases of cutaneous or superficial cancer occurring among your employees in the United States during 1946, in which the cancer was alleged to have been due to the occupation. If you have any such cases, kindly give pertinent details such as age, sex, nature of occupation, exposure, nature and location of lesion, diagnosis, tissue report, course of disease, autopsy report if any, and whether or not a Workmen's Compensation Award was granted."

Up to date Mr. Stroop has received reports from eight companies covering 99,435 employees, none of whom developed cancer during 1946.

Recommendations

- A. The animal experiments now under way at the Kettering Laboratory should be continued, at least until the end of the current year.
- B. Extend the scope of investigation to a large number of samples so that they can be treated on a statistical basis rather than on a comparative basis using a small number of samples as in the present

work. It would seem that the best attack would be to get out a form letter to a number of oil companies inquiring whether they would be willing to participate in such a program and, if so, request them to set aside barrel samples of catalytic recycle stock, catalytic resids, thermal recycle, hydroformer bottoms, thermal resids and other samples, and advise by what type of operation and under what conditions they have been produced. Then, after an analysis of responses to that questionnaire as many of these samples will be studied as is practical.

- C. The Chairman of the Subcommittee on Carcinogenicity is authorized to release samples up to one gallon of each, and to a total of 25 gallons, for physical and chemical studies with the objective of correlating these data with the tests on mice. The results of these physical and chemical studies shall be submitted to Dr. Kehoe and to the Subcommittee on Carcinogenicity before publication.
- D. Establish a registry of malignancies to report to the Subcommittee on Carcinogenicity. This registry would collect data on all malignancies incident in employees of the petroleum industry. It would set up its own procedures, forms, extent of data, follow-ups, pathology, treatment, outcome, autopsy reports, etc. after consultations with existing registries.
- E. Means must be found to refute the false and misleading statements that are continually appearing in newspapers and magazines as to the prevalence of cancer among those who work in refineries and filling stations. The Subcommittee on Carcinogenicity is authorized to do the following:
 - (1) Initiate a literature survey on the possible carcinogenic effects of petroleum products to man.
 - (2) Initiate a study of the physical and chemical characteristics of petroleum products in an attempt to obtain a simple procedure to determine whether a particular petroleum sample is or is not carcinogenic.
 - (3) To have experimental studies carried out on sludge, lubricating oils, gasoline and other oils.

Respectfully submitted,

Dr. McIver Woody, Chairman

Members:

Dr. M. N. Newquist	Mr. L. C. Board, Jr.
Dr. T. M. Frank	Mr. Roy S. Bonsib
Dr. A. E. Hoag	Mr. H. P. Lankelma
Dr. J. P. Holt	Mr. H. R. Warrick
Dr. T. J. Kelly	Mr. H. H. Zuidema
Dr. W. R. Levis	Mr. D. V. Stroop
Dr. R. C. Page	

APPENDIX B

UNIVERSITY OF CINCINNATI

CINCINNATI 19, OHIO

C
O
P
Y

Kettering Laboratory of Applied Physiology
College of Medicine - Eden Avenue

April 25, 1947

Dr. McIvor Moody
Statler Hotel
Buffalo, New York

Dear Doctor Moody:

The following represents the present status of the experiment on carcinogenicity. As you will see, the picture has not changed materially since your visit, although the number of animals in the group painted with Oil W 3632 has increased.

<u>Oil Number</u>	<u>Date Painting Started</u>	<u>Number of Mice at Start</u>	<u>Number of Mice That Have Died</u>	<u>Number of Mice With Tumors of Papillomas</u>
W 3632	Sept. 12, 1946	20	6	11
W 3631	Oct. 7, 1946	20	5	0
W 3630	Sept. 12, 1946	20	4	0
N 8295-2	Sept. 12, 1946	20	3	0
N 8295-3	Oct. 7, 1946	20	1	0
11896	Oct. 21, 1946	20	6	0
11885	Oct. 21, 1946	20	7	0
11980	Jan. 2, 1947	20	1	0
White Oil	Feb. 3, 1947	20	1	0
White Oil				
0.1%	Feb. 3, 1947	20	0	0
Methyl-Cholanthrene?				
Water Control	Sept. 12, 1946	20	7	0

The criterion for including a mouse in the number of those having tumors or papillomas has been the presence of a nodule of about a millimeter in diameter. In at least three of the eleven "tumor-bearing" mice in the group subjected to contact with Oil W 3632, more than one nodule is present.

The first tumor became apparent during the twentieth week, while most of the others were first noted during the twenty-seventh and twenty-eighth weeks.

The tumor which you saw when you were here was removed by biopsy during the twenty-sixth week. The pathologist's report is as follows:

An ulcerated papillomatous squamous cell carcinoma which invades and destroys the most superficial lamina of stratified muscle. The tumor is comprised of atypical large keratinized cells with

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large vesicular nuclei; mitotic figures, most atypical are fairly common and binucleate cells are numerous; there is edema and infiltration of the underlying connective tissue by large mononuclear cells, lymphocytes and a few polys.

One other animal of this group that died bore a tumor which on gross examination had a similar appearance. The sections of this tumor have not yet been read. The other tumor-bearing mice are still alive.

I have brought this information together rather hastily in order that it may reach you in time.

Very truly yours,

/s/ Francis F. Heyroth
Francis F. Heyroth, M.D.

FFH:VT

cc - Dr. R. A. Kehoe

APPENDIX C

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

BY THE SUBCOMMITTEE ON CUTTING FLUIDS

Dr. B. B. Reeve - Chairman

April 28, 1947

- A. It is recommended that a complete survey of the literature and the compilation of a bibliography pertaining to dermatitis and other harmful effects of cutting fluids be made. The survey should include:

1. A review of the conditions under which cutting oil dermatitis most frequently occurs.
2. The part that bacteria do or do not play.
3. Physiological mechanism of oil dermatitis.
4. The review should include the known components of cutting oil; i.e., mineral oils, fatty oils, additives, etc.
5. Tabulation of the state laws or regulations relative to the use of oils or to their composition.
6. As a result of this survey the investigators will recommend a program for further study of this problem including suggestions for remedial measures.

It is understood that the participating members of the API Medical Advisory Committee will assist and facilitate the reviewer in supplying him with whatever information is already available in the various companies.

- B. The Subcommittee recommends that a system of exchange of information be established and correlated between the Independent Research Committee on Cutting Fluids and that of the API Medical Advisory Committee.
- C. It is recommended that consideration for research be withheld until the survey has been made.
- D. It is recommended that after the survey has been completed, consideration be given to the formulation of an educational program. The nature of this program will depend upon the information obtained from the survey.
- E. It is recommended that a grant be given to the Harvard School of Public Health to make this survey under the direction of Dr. Marshall Clinton, Jr.
- F. It is recommended that a grant of \$2,500 from the \$5,000 appropriated to the Subcommittee be made to carry on this work.

/s/ B. B. Reeve, Chairman
/s/ E. W. Adams
/s/ N. J. Gothard
/s/ F. F. Boys
/s/ F. M. Watkins
/s/ H. H. Zuidema
/s/ Robert C. Page
/s/ Thomas J. Kelly
/s/ L. C. Board, Jr.
/s/ A. E. Hoag
/s/ H. R. Warrick

APPENDIX D

THE TEXAS COMPANY

135 EAST 42ND STREET
NEW YORK 17, N. Y.

C
O
P
Y

January 30, 1947

Mr. G. L. Sumner
Subcommittee on Industrial Dermatitis
Independent Research Committee on Cutting Fluids
Westinghouse Electric Corporation
East Pittsburgh, Pa.

Dear Mr. Sumner:

I have read with interest your letter of January 20, 1947, concerning the work of your Committee on Industrial Dermatitis as it relates to Cutting Fluids. Your communication will be circularized to the membership of the Medical Advisory Committee of the American Petroleum Institute for their information.

A Subcommittee on Cutting Fluids has just been appointed by the Medical Advisory Committee of the API of which Dr. B. B. Reeve, Standard Oil Company (Indiana), is Chairman.

The next meeting of our Medical Advisory Committee will be held in Buffalo, Hotel Statler, April 28, 1947. The subject matter of your communication will be presented for consideration at that meeting, after which Dr. Reeve will communicate with you.

In the meantime, I wish to thank you for your interest and offer of cooperation in this connection.

Very truly yours,

/s/ M. N. Newquist
M. N. Newquist, M.D.

MNN-IPM

cc - Dr. J. P. Holt
Mr. D. V. Stroop (Blind)

C
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WESTINGHOUSE
ELECTRIC CORPORATION

East Pittsburgh, Pa.

January 20, 1947

Dr. H. H. Newquist
The Texas Company
135 East 42nd St.
New York 17, N.Y.

Dear Dr. Newquist:

I understand from Mr. C. H. Larson that you are now the Chairman of the American Petroleum Institute Medical Advisory Committee for 1947; succeeding Dr. McIver Woody.

I am Chairman of a Subcommittee of the Independent Research Committee on Cutting Fluids on "Industrial Dermatitis." This Committee feels that it would be highly desirable to establish liaison with the API Medical Advisory Committee, and I am therefore attaching a summary of the work done by this Committee so far which is self-explanatory. After you have read this summary, I would very much appreciate suggestions from you for procedure. You will note that in the literature the opinions are quite conflicting and that it is probable that some of this literature is propaganda for house organs dealing in protectives and curatives for industrial dermatitis.

Our efforts, as you will note, are confined to the type of dermatitis that results from cutting fluids, and we would like to either de-bunk the propaganda or else come up with something constructive that would clarify the picture for the users as well as the producers of cutting fluids. You will note in the attached letter that we have three medical men on this Subcommittee, and it is quite probable that you know them, namely Doctors Boys, Cranch and Pharris, and it is probable that one or more of them may be on your API Committee of which you have just been appointed Chairman.

I would very much appreciate hearing from you in the near future with particular regard to:

- (1) as to whether it would be possible for the medical men to supply data on authentic cases of dermatitis resulting from contact with cutting oils.
- (2) whether our Committee can be of help to the American Petroleum Institute Medical Advisory Committee on this problem.

Very truly yours,

/s/ G. L. Sumner, Chairman
Subcommittee on Industrial Dermatitis

CLS/ak
cc - Dr. J. P. Holt

API 06883

WESTINGHOUSE
ELECTRIC CORPORATION

East Pittsburgh, Pa.

January 16, 1947

Dr. F. F. Boys, Sinclair Refining Co., East Chicago, Ind.
Dr. A. G. Cranch, The Union Carbide & Carbon Corp., New York, N.Y.
Mr. H. M. Fearon, Standard Oil Co. of N.J., 26 Broadway, New York, N.Y.
Mr. T. G. Huebler, Chief Chemist, Sugar Beet Co., Saginaw, Michigan
Mr. James McElgin, E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Dr. C. Pharris, Asst. Medical Director, United Aircraft Corp., E. Hartford, Conn.
Mr. F. Rosenstiel, The Texas Co., 135 East 42nd St., New York, N.Y.

CC - Mr. Joseph Geschelin, Chairman, Ind. Research Committee on Cutting Fluids,
1015 Stephenson Bldg., Detroit 2, Michigan.
CC - Dr. C. M. Larsen, Sinclair Refining Co., 630 Fifth Ave., New York, N.Y.

Independent Research Committee on Cutting Fluids
Subcommittee - Industrial Dermatitis

Gentlemen:

1. In order to clarify the work of the Subcommittee, a brief review of its history will be of interest to all of us.
2. The Subcommittee was formed under the Chairmanship of Mr. Fearon in 1943. Due to a request by Mr. Fearon to be released of these duties on account of the pressure of other work, I accepted the Chairmanship early in 1945. It was agreed that the first step should be a tabulation of literature bibliography in order to determine what work had been done on industrial dermatitis, particularly in regard to cutting fluids.
3. On October 8, 1945, I undertook to tabulate all the literature which I could find in addition to what Mr. Fearon had accumulated, and submitted it in the form of a report to the general committee at a meeting in Detroit.
4. Dr. Pharris wrote me a very constructive letter of criticism on this tabulation, including the data it contained and the summary of conclusions. In brief, Dr. Pharris disagreed with many of the house organs regarding protective creams, including the propaganda and suggested placing the leading role of our investigation in the lap of the medical men of the oil refiners. He felt that bacterial contamination of cutting fluids is greatly over-rated in that the bacteria are almost always non-pyrogenic.
5. I reported Dr. Pharris' reaction at the Cleveland meeting on April 9, 1946. His comments were well received and it was suggested that perhaps a liaison could be established between IRC and API. On April 11, 1946, I wrote to Doctors Pharris and Cranch, suggesting that perhaps we should meet for luncheon in the near future to map out a program, but received no reply.

6. On the same date (April 11, 1946) I also wrote to Mr. J. T. Beard regarding the mechanics in establishing liaison with API. I received a reply from Mr. Beard on April 23, which suggested passing a copy of my letter to Dr. McIver Woody, Chairman of the API medical committee, with copies to Dr. D. V. Stroop, in order to get a decision as to whether the API medical committee wishes to initiate study of the general subject of dermatitis from cutting fluids.

7. Mr. Geschelin wrote to Dr. Woody and received a reply that there would be a meeting in November at which some action might be taken. Mr. Geschelin has not heard from him since that meeting. However, Dr. Larson contacted Dr. Boys (Sinclair Oil Company), and advised on January 7 at a meeting of the general committee in Detroit, that API had made a decision on the matter and indicated that a liaison might be established between us. One "grape-vine" rumor indicates that a few producers who use chlorine and diphenyl-naphthalene have not been very cooperative and it is apparently this snag that has had a tendency to block progress on the project.

8. This brings us to date. It is now desirable to see what can be done to increase the usefulness of the Subcommittee to the API and to ascertain how we can best function to expedite this project.

9. It would seem that the logical approach would be to find out just what has been done in API and just what API is willing to do. I believe Dr. Larson indicated that Mr. Gothard and Dr. Boys would be in a good position to take this matter up with Dr. Woody. One of the points that was raised in Detroit indicated the desirability of attempting to obtain documentary evidence on cases of dermatitis from cutting fluids that come to the attention of industrial medical men. Since Dr. Boys is a member of this Subcommittee, I wonder if he will be willing to carry the ball on this phase and clarify it for us as regards API.

10. I am also wondering whether the subject may be broken down into types or classes of cutting fluids so that data may be accumulated to indicate the possibility and/or probability of dermatitis from specific types rather than statements that apply to cutting fluids in general. For example, the fluids might be divided as follows:

- I. Straight mineral oils.
- II. Mineral oils containing
 - (a) "Non-corrosive" sulphur.
 - (b) "Corrosive" sulphur.
- III. Sulphur bearing mineral oils with fats (such as lard).
- IV. Straight mineral oils with fats (lard oil, etc.).
- V. Mineral oils containing fats, sulphur and chlorine.
- VI. Water mixed emulsions
 - (a) Soluble oils
 - (1) Super type - with large fat content with and without chlorine and sulphur.
 - (2) Ordinary soap and mineral oil emulsions.
 - (b) Soap-paste compounds.

11. Another angle brought up by Mr. F. Rosenstiel (who replaces Dr. Raymond Haskell in this committee) is whether we can get agreement on a statement that new, unused oils contain no harmful bacteria - as a start. I personally have the feeling that we will make faster progress by taking one step at a time. Documentary evidence on individual cases would materially aid in making decisions, and each of you, who have or can obtain authentic data, are requested to send them in for tabulation analysis and discussion.

12. Mr. Huebler lived close to this problem at the Navy Centerline Plant which we operated for the Navy during the war, and I am asking him to submit the records, together with the methods used in controlling dermatitis there. Authentic records of this type from any source will be valuable to the Committee.

13. You will perceive that as Chairman of the Subcommittee, I am trying to inject new life into this important subject. The news that the API is in a more amicable mood to go along with us, gives the Committee renewed hope that we may, through our efforts, contribute something worthwhile to industry on dermatitis from cutting fluids, either from the standpoint of "debunking" propaganda or in offering a constructive program for its prevention in the machining of metals.

14. I would like to call a meeting of the Subcommittee as soon as it seems desirable, and would like to suggest that this meeting be held in Pittsburgh, but will be glad to entertain suggestions for other places. Perhaps New York would be more centrally located. Please express your opinion.

Very truly yours,

/s/ G. L. Sumner
G. L. Sumner
Chairman, Subcommittee

GLS/ak

APPENDIX E

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

BY THE SUBCOMMITTEE ON FLUORIDES

April 28, 1947

Dr. A. E. Hoag - Chairman

Since the last meeting an effort has been made to obtain from the members of the Subcommittee expressions of their desires as to the future course of the work. Conversations were had with Dr. P. W. Limerman at the Boyce-Thompson Institute relative to the plant physiological aspects of this problem and a synopsis of these discussions were transmitted to the Subcommittee.

More recently a meeting was held with Dr. Francis C. Frary, Director of Research for the Aluminum Company of America. Dr. Frary is one of the world's outstanding authorities on the subject. Some of the facts obtained from him were released verbally to the Subcommittee. Later it is hoped to confirm to them such data as he will approve.

In the course of the above discussions it came to light that there is an Industrial Group of five companies (Aluminum Company of America, du Pont, Pennsylvania Salt Company, Reynolds Metal Company, and Universal Oil Products) sponsoring work on fluorides at the Kottering Laboratory under the direction of Dr. Kehoe. The annual budget is of the order of \$17,000 per year. It was indicated by Dr. Frary that this Industrial Group might sympathetically entertain participation of the API Medical Advisory Committee.

At the meeting yesterday considerable time was devoted to a discussion of the desirability of joining this group. It was the consensus that it was only logical and economical to do so rather than to initiate independent and perhaps duplicating research. The suggestion was made that three members of the Subcommittee, representing different companies, visit Dr. Frary to more completely evaluate this matter. It was felt however such a procedure would be time consuming and that the monies involved in travel and salaries would in fact approach the magnitude of a modest contribution.

On the premise that the API Subcommittee on Fluorides would have access to the data and some voice in the steering of the research the following motion was submitted:

"That it be recommended to the API that it contribute \$2,500 to the work being sponsored by the Industrial Group on fluorides at the Kottering Laboratory under the direction of Dr. Kehoe and that the chairman of the Subcommittee be authorized to make the necessary arrangements subject to approval by the API with respect to its participation in such a group study and subject to letter ballot of approval by the API Medical Advisory Committee."

/s/ A. E. Hoag, Chairman
/s/ F. F. Boys
/s/ W. R. Levis
/s/ Kieffer Davis
/s/ R. C. Cole

/s/ E. Wade Adams
/s/ L. C. Beard, Jr.
/s/ E. B. Reeve
/s/ N. J. Gothard
/s/ F. H. Watkins

For Information Only - Not for Publication

APPENDIX F

REPORT TO THE API MEDICAL ADVISORY COMMITTEE BY THE SUBCOMMITTEE
ON PERMISSIBLE CONCENTRATIONS OF TOXIC SUBSTANCES IN THE PETROLEUM INDUSTRY

Dr. V. C. Baird - Chairman

HUBBLE OIL & REFINING COMPANY

P.O. Box 2180
Houston 1, Texas

C
O
P
Y

April 28, 1947

Re: Report of Subcommittee for
Permissible Concentrations
of Toxic Substances in the
Petroleum Industry.

Dr. M. W. Newquist
The Texas Company
135 East 42nd St.
New York 17, N. Y.

Dear Doctor Newquist:

Attached is a copy of the progress report of Dr. Marshall Clinton, Jr. and a proposed introductory section for the reviews. We would like to have the desirability of initiating a research program at Harvard under the direction of Dr. Clinton brought up for discussion.

Yours truly,

/s/ V. C. Baird
V. C. Baird, M.D.

B/H
Attach.

HARVARD UNIVERSITY

SCHOOL OF PUBLIC HEALTH

Department of Industrial Hygiene

55 Shattuck Street
Boston 15, Massachusetts

April 7, 1947

Dr. V. C. Baird
Mobile Oil & Refining Company
P. O. Box 2180
Houston 1, TexasProgress Report

Dear Dr. Baird:

During the period from November to the present the compilation and formulation of toxicological reviews has progressed fairly well, and reviews on nearly all of the substances selected for special emphasis last November are either completed or nearly completed. The "kinks" in the system of preparing reviews are becoming ironed out, so the work seems to progress more easily, even though less definitive information is available on the toxicology of many substances now being investigated.

The response of the medical and associate members of the medical advisory committee on the tentative reviews has been most gratifying, and has resulted in the addition of a great deal of valuable information about the various substances.

During the period, tentative drafts on the following substances have been sent to Mr. Stroop for distribution:

Carbon monoxide	Alkyl mercaptans
Kerosine	Aromatic mercaptans
Mercury	Acrylonitrile
Hydrogen fluoride	Maleic anhydride
Phosphoric acid	Morpholine
Sulfur dioxide	Diethylene glycol
Acetone	Alkyl disulfides
Methyl ethyl ketone	Dowtherm A
n-butyl p-amino phenol	Phosphorous pentasulfide
2, 6 di-tertiary butyl para cresol	Silica
Thiophene	Naphthenic Acids

In addition, final reviews on furfural and aluminum chloride were circularized some time ago, and final reviews on sixteen other substances were forwarded to Mr. Stroop on March 3rd for distribution prior to the Buffalo meeting. It is hoped, therefore, that the medical advisory committee will accept as official reviews on the following substances:

Aluminum chloride	Cumene	Nitrobenzene
Ammonia	Cresol	Phenol
Benzene	Furfural	Sulfuric acid
Boron trifluoride	Hydrogen chloride	Styrene
Carbon tetrachloride	Hydrogen sulfide	Toluene
Chlorex	Iron carbonyl	Xylene

An introductory section for the reviews has been prepared, and is presented for consideration at this time (copy attached).

During the next six months we plan to continue preparing reviews on the various substances. As our present "high priority" list is approaching exhaustion, it is hoped that a new list will be submitted by the committee. We are not in a position to know which substances are of the greatest interest to the industry. We also plan to prepare final drafts for acceptance next November of the substances circularized during the past six months, including the necessary revisions and additions dictated by the suggestions which have been received from the medical advisory committee.

On the basis of the work carried on at Harvard so far, it is evident that insufficient knowledge is available on the toxicity of the following substances:

- Boron trifluoride
- Iron carbonyl
- Thiophene
- Alkyl mercaptans
- Alkyl disulfides
- Aromatic mercaptans, including thiophenol
- Maleic anhydride
- Morpholine
- Di-tertiary butyl para cresol
- n-butyl p-amino phenol

It does not appear that immediate or intensive research is needed on all of these or that such research is practicable or desirable, but certain problems arising from these and from our contact with the general field of toxicity of petroleum substances are in need of early solution.

The following studies appear to be especially desirable:

1. An evaluation of the acute and chronic toxicity of boron trifluoride and fluoride-hydrocarbon complexes. It is realized that this problem is being considered by the subcommittee on fluorides, but it is mentioned at this time for the sake of completeness.
2. A survey of the extent and harmfulness of air contamination by gaseous wastes from petroleum refineries, especially H_2S , SO_2 and HF . That the problem of SO_2 pollution can become a most expensive and serious one has been amply demonstrated by the unpleasant experiences of many of the larger smelting companies, who have paid vast sums for crop spoilage. More recently, the west coast aluminum refineries have had similar experiences with damage to cattle by fluorides absorbed from the air by vegetation.
3. An investigation of the acute and chronic toxicity of the sulfur-containing hydrocarbons. It would appear especially desirable to obtain valid data on the acute and chronic toxicity for animals of thiophene and its derivatives, and of thiophenol and other aromatic mercaptans. Studies of the sulfur-containing aliphatic substances are less urgently needed, although the available information is far from adequate.
4. A basic study into the fundamental processes which govern the skin absorption of fat-soluble substances, and the alterations in skin structure and metabolism which accompany the development of dermatitis due to greases and

cutting oils. A variety of approaches are available other than the conventional and, so far, unsuccessful descriptive techniques of the dermatologists. Among the researches which appear promising would be studies of the rate of absorption and degree of uptake within the skin of fat-soluble substances, using radioactive tracer techniques; combined with investigations of the alterations in tissue respiration accompanying such absorption. The tracer technique approach would be especially easy to apply in the case of the sulfonated oils. Certainly the past approaches to the problem of dermatitis from cutting oils or other fat-soluble substances have not produced spectacular results. It appears that a basic approach to the problem, using the newer techniques now available, might succeed.

Our group at Harvard would be very much interested in a consideration of the problem of atmospheric pollution, or in a fundamental study of skin absorption and penetration of fat-soluble substances. We consider that we would be in a good position to undertake the first of these studies because of Professor Drinker's long association with one of the larger smelting companies, who had a serious pollution problem some years ago which it controlled only by constant effort. We would be readily able to handle the second study, on skin absorption, as we are already engaged in isotope tracer research and have a graduate student coming here to study for his doctorate in public health. He desires to attack a fundamental problem in dermatology for his thesis research.

Respectfully submitted,

/s/ Marshall Clinton, Jr.
Marshall Clinton, Jr., M.D.

ME, Jr. F

Enclosure

PROPOSED INTRODUCTION FOR TOXICOLOGICAL REVIEWS

The following toxicological reviews have been prepared under the auspices of the American Petroleum Institute at the Harvard School of Public Health by Dr. Marshall Clinton, Jr. and associates, under the guidance and direction of Dr. Cecil K. Drinker and Professor Philip Drinker. They are presented for the information and guidance of the producers and consumers of the various substances involved. In general, these reviews are limited to substances of particular interest to the petroleum industry.

Certain basic considerations concerning the general toxicity of petroleum products deserve consideration at this time. Many of the toxic substances encountered in the petroleum industry are volatile or occur as finely divided dusts, and are therefore capable of contaminating the air breathed by workers. Inhalation of this contaminated air may lead to sufficient absorption of the toxic agent to produce serious systemic poisoning. Many other toxic substances may be encountered by the skin, either in pure state or in lesser concentrations when added to petroleum products which are generally believed to be innocuous. Many of these toxic agents are capable of being absorbed through the intact skin in sufficient concentration to produce serious systemic poisoning, without producing any local skin irritation. It is apparent, therefore, that serious poisoning may follow inhalation or skin contact with a wide variety of agents, without the victim being in any way aware that the agent he is encountering is damaging or endangering his health. Such poisoning may occur after brief contact with the agent, or may not become manifest until weeks, or even months after such exposure, so that severe and sometimes irreversible damage may have resulted before the victim is aware that all is not well with his health. Poisoning due to the ingestion of petroleum products or related substances is a less serious hazard, as it is commonly accepted knowledge that petroleum products (except those prepared for medicinal use) may be toxic when ingested. Little thought, however, is given by most individuals to the possibility of poisoning

due to inhalation or skin contact with substances, as they are unaware that the skin will fail to exclude the toxic agent or that considerable doses may be absorbed from the air they breathe. Poisoning occurring as a result of skin contact or inhalation may develop insidiously over a long period of time, and since local irritation of the skin or respiratory tract may be entirely absent, the relationship between exposure and effect may be completely overlooked. Prevention of such delayed or insidious poisoning depends on familiarity with the possible toxic effects of the various agents encountered, as well as constant vigilance to keep such contact at a safe level.

Finally, it should be realized that many complex organic materials are carcinogenic. It is not possible to predict with any accuracy whether a given compound will or will not be carcinogenic, although those which contain the phenanthrene nucleus are suspect, and should be evaluated further before general use.

Unfortunately, there is no adequate or general classification of the various substances encountered in the petroleum industry which includes a consideration of their toxic qualities. A substance may or may not be capable of producing dermatitis or may or may not be carcinogenic, but these features of its action cannot be brought out on the basis of any existing classification. A working physiological classification of toxic agents which enter the body by inhalation has been developed by Doctors Yandell Henderson and Howard W. Haggard. This classification admittedly fails to include the problems of skin absorption, dermatitis, and carcinogenesis, but nevertheless is considered to be of sufficient general interest to the users of these reviews to justify its inclusion in this introduction.

For the sake of convenience and simplicity, the following classification was established:

- I. Irritants. This class of gases, mists, vapors and dusts injure the air passages or lungs or both, and induce

inflammation of the surfaces of the respiratory tract. These local effects overshadow any systemic effects occurring following absorption. Examples of this class are ammonia and acid gases or mists, such as sulfur dioxide or sulfuric acid mists.

II. Asphyxiants. This group of substances act by virtue of the exclusion of oxygen from the tissues. Two groups of asphyxiants are recognized; the simple asphyxiants such as methane, hydrogen, or nitrogen which, when breathed in sufficient concentration mechanically exclude oxygen from the lungs, and the chemical asphyxiants such as carbon monoxide, hydrogen sulfide or hydrogen cyanide, which interfere with oxygen transport by the blood, or oxygen utilization by the tissues.

III. Volatile Drugs and Drug-like Substances. This group contains substances which do not injure the air passages or lungs, but act after absorption by the blood and transportation to the tissues of the body. A large number of volatile hydrocarbon substances are included in this group. It is divided into various sub-groups, depending on the type and duration of disability or injury produced by the substance. It is not possible to predict accurately what sub-group a particular hydrocarbon or related molecule will occupy, but the following general rules are helpful. The unsubstituted aliphatic hydrocarbons usually exert an anesthetic or irritating effect on the nervous system, but seldom produce lasting injury. Aromatic hydrocarbons, on the other hand, are prone to produce lasting damage to the body, especially to the blood-forming tissues; chlorine-containing hydrocarbons typically exert a deleterious effect on the liver; and sulfur or nitrogen-

containing hydrocarbons may have varied severe and unpredictable systemic toxic effects.

- IV. Inorganic and Organometallic Substances. This group contains a variety of substances of interest to the petroleum industry, such as inorganic phosphorous compounds or substances such as tetraethyl lead or iron carbonyl.

As the toxic effects of the various substances encountered in the petroleum industry vary widely, it is not possible to generalize the question of treatment. Although chronic poisoning is the more important, there is time to investigate the question of therapy once the type of poisoning is recognized; therefore, the reader interested in the treatment of chronic poisoning is referred to the individual reviews, as generalizations on therapy are frequently not valid. Acute poisoning is less common, but when it occurs it may constitute a medical emergency. Certain rules which apply to acute poisoning deserve emphasis at this time, as their immediate application may be life-saving. When an individual has been overcome by a toxic gas or vapor, he should be immediately transferred to an area where the atmosphere is not contaminated, and kept warm and at complete rest. If natural breathing is interrupted, artificial respiration should be started at once, as the chances of recovery following cessation of respiration are inversely proportional to the elapsed time before it is started. If artificial respiration is begun within four minutes of the time breathing ceases, the victim has a fair chance of recovery; if the delay extends to ten or twelve minutes, recovery is most unlikely. If the gas or fume has a direct action on the lungs, complete rest is essential, and pure oxygen should be administered. If the gas or vapor has no local effect, but exerts a systemic action, elimination can be greatly accelerated by the administration of oxygen containing seven per cent carbon dioxide.

When an individual has been immersed in, or a considerable area of skin or clothing has been contaminated with an agent known to exert a serious local or systemic action, the immediate removal of the contaminating material from the skin and the discarding of the clothing is essential. In such an instance speed is imperative. Clothing should be cut away, and the skin should be cleansed by copious flooding with cool water and gentle wiping. Agents other than water may be most desirable for removing certain substances, but water is useful in any case because of its general availability. Substances not readily soluble in water are removed to a large extent by the direct mechanical action of the water.

A brief consideration of the structure and purpose of the individual reviews in this series is presented at this time. Each review presents the best information available at the time it was accepted for publication by the Medical Advisory Committee of the American Petroleum Institute. It is the intention of this committee to add to this collection regularly, as time permits, reviews on other substances of toxicological interest to the industry, and subject each review to mandatory reconsideration every three years, or oftener if requested by members of the Medical Advisory Committee.

Considerable variation exists in the amount of information presented and the completeness of the various reviews. This is inevitable, as they represent a compilation of available information, rather than any original investigation. The present state of knowledge with respect to many of the substances considered is incomplete and, in a few instances, almost entirely lacking. It is hoped that the collecting together of obvious deficiencies of our knowledge concerning the toxicology and safe handling of these substances will serve to stimulate the quest for further knowledge. These reviews should be considered a beginning, not an end.

API 06896

Each review is organized along fairly definite lines for the sake of clarity and utility. The first section presents the information necessary to definitely identify the substance, while the second presents the general physical

and chemical properties of the substance. Particular emphasis is given those characteristics influencing volatility, as these have a marked influence on the degree of atmospheric exposure which is likely. Each review on a substance commonly encountered as a gas or vapor includes factors for converting milligrams of substances per liter of air to parts per million by volume and vice versa, as the toxicological literature uses both types of unit-age. These factors apply at a pressure of 760 mm. Hg. and a temperature of 25°C. (77°F.), and are based on the fact that one gram molecule of every gas occupies the same volume as one gram molecule of any other gas when measured under the same conditions of pressure and temperature.

The third section considers the probable conditions and sources of exposure to the substance, and the consideration presented in subsequent sections assume the type of exposures cited unless otherwise specified.

Section four considers the toxicology of the substance. The information presented in this section varies widely, depending on the present state of knowledge. Where sufficient information is available to justify the procedure, this section is divided into general considerations, including information on metabolism and excretion; acute effects, chronic effects and, finally, safe limits of exposure for an eight-hour period, five days a week.

The fifth section presents any available information on the treatment of poisoning by the substance under consideration, with particular emphasis on specific therapeutic measures.

Section six considers the special preplacement or periodic examinations believed desirable for workers likely to be required to undergo significant exposures to the substance. It is assumed that all workers will undergo a careful and complete preplacement examination, including a chest X-ray, and emphasis in examination is placed on special tests or examinations pertaining to the substances under consideration.

Section seven considers the safety precautions, both mechanical and personal, which should be observed in handling the substance under consideration.

The final section presented a selected bibliography documenting the information given in previous sections.

APPENDIX G

REPORT TO THE API MEDICAL ADVISORY COMMITTEE
BY THE SUBCOMMITTEE ON MEDICAL POLICIES AND PRACTICES

Dr. R. A. Jowett - Chairman

April 23, 1947

M. N. Newquist, M. D., Chairman
Medical Advisory Committee
American Petroleum Institute

Dear Doctor:

On March 19, 1947, I wrote a letter to the members of my subcommittee, in which was set forth eight recommendations on which I requested the members to express approval or disapproval. Four members replied. I quote below my letter of March 19, tabulating therein the opinions of the members, from which it will be noted that the majority of the subcommittee approved this report. I wish to add my approval to each of the recommendations.

"You doubtless have read the report I made up and sent to Doctor Frank to be presented at the last January meeting. This report unfortunately arrived too late for presentation at the meeting, but was published in the minutes. I wrote this report as if it came with the approval of the committee members, but in reality it was not submitted to them for signature. I am therefore submitting to you recommendations made in this report, and would ask you to sign each one you approve - this for the purpose of presenting to the next meeting of the whole committee recommendations approved by our subcommittee and not by me alone.

First Recommendation: A periodic physical examination of all employees.

/s/ T. J. Kelly, M.D.

/s/ E. Kern Linder, M.D.

/s/ H. S. Thomson, M.D. (Comment: 'Certainly over 40. Biennial before?')

/s/ J. P. Holt, M.D. (Comment: 'Impracticable with present facilities available in industry.' 'We would be in agreement with a statement reading: A periodic physical examination of all employees.')

RECOMMENDATION APPROVED

API 06898

Second Recommendation: That oil companies sponsor medical insurance for purchase by employees.

/s/ J. P. Holt, M.D.
/s/ H. S. Thomson, M.D. (Undecided)
/s/ T. J. Kelly, M.D.
/s/ E. Kern Linder, M.D. (Undecided)

RECOMMENDATION APPROVED

Third Recommendation: Follow-up of employees absent due to sickness by trained workers where possible.

/s/ J. P. Holt, M.D.
/s/ H. S. Thomson, M.D. (Undecided)
/s/ T. J. Kelly, M.D.
/s/ E. Kern Linder, M.D.

RECOMMENDATION APPROVED

Fourth Recommendation: A definite rehabilitation plan for handicapped workers, with special emphasis on veterans.

/s/ J. P. Holt, M.D.
/s/ H. S. Thomson, M.D.
/s/ T. J. Kelly, M.D.
/s/ E. Kern Linder, M.D.

RECOMMENDATION APPROVED

Fifth Recommendation: The carrying on of a continual health educational program for employees.

/s/ J. P. Holt, M.D.
/s/ H. S. Thomson, M.D.
/s/ T. J. Kelly, M.D.
/s/ E. Kern Linder, M.D.

RECOMMENDATION APPROVED

Sixth Recommendation: Periodic inspection from a health standpoint of offices and plants by a doctor or a representative of the medical department.

/s/ J. P. Holt, M.D.
/s/ H. S. Thomson, M.D.
/s/ T. J. Kelly, M.D.
/s/ E. Kern Linder, M.D.

RECOMMENDATION APPROVED

Additional Recommendations:

1. That a manual be published outlining special diagnostic procedures for the hazardous substances used in the industry, as being outlined by the subcommittee on Permissible Concentrations, and the treatment for each could well be added.

/s/ J. P. Holt, M.D.
/s/ H. S. Thomson, M.D.
/s/ T. J. Kelly, M. D.
/s/ E. Kern Linder, M.D.

RECOMMENDATION APPROVED

2. That a study of the reasons for rejection of accepted applicants be compiled and published for a uniform policy of rejections.

/s/ J. P. Holt, M.D. (Undecided)
/s/ H. S. Thomson, M.D. (Undecided)
/s/ T. J. Kelly, M.D.
/s/ E. Kern Linder, M.D.

RECOMMENDATION APPROVED

Please add any further recommendations you may have on any subjects you wish presented."

Respectfully submitted.

* * * * *

On March 28, 1947, I addressed the following letter to committee members. I received but one reply, from W. A. Morrison, M.D. Therefore, these suggestions are presented to you for whatever action you may desire to take:

"Since my letter March 19, 1947, with recommendations on which I requested your approval, I have received from a member of the committee a list of subjects for consideration by our committee, and I am passing them along to you for your comments and approval if they are to be presented to the next meeting of the General Committee:

1. Methods of taking blood serology in the sales department areas; are these done privately or by state laboratories?
2. Are chest X-rays done routinely and, if so, how are they handled in the field?
3. Are electrocardiograms done routinely, particularly on executives and service personnel over fifty (50) years of age?
4. What efforts are being made in the industry for thorough vision testing of chauffeurs, particularly in reference to night vision, field of vision and depth perception?"

answer:

Since this letter, the following questions have been presented for

1. Is it advisable to use local practicing doctors for re-examinations, or to send a full-time company doctor to the scenes of employment to make these examinations?
2. Is it advisable to keep morbidity statistical data on the incidence of disease? If so, can reliable information be obtained when the employees are scattered?
3. How many treatments, if any, should be allowed to employees suffering from sickness or non-occupational injury located where dispensary, plant, and office service is available, without a direct cost to the employee?

On February 7, 1947, I addressed a letter to my subcommittee, in which I made the suggestion that we meet in Buffalo on the day previous to the General Committee meeting, on Sunday, April 27, in order to get something outlined. Of the replies I received, only two made reference to my request - one member expressing agreement that the meeting should be held, and offering to attend - the other stating that it would be difficult for him to be present, but expressing willingness to attempt it if all the other members were to attend.

Respectfully submitted:

R. A. Jewett, M.D., Chairman
Subcommittee on Policies and
Practices.

APPENDIX H

THE AMERICAN FOUNDATION FOR TROPICAL MEDICINE
Incorporated

270 Madison Avenue
New York 16, N. Y.

April 1, 1947

C
O
P
Y
Mr. W. R. Boyd, President
American Petroleum Institute
50 West 50th Street
New York 20, N. Y.

Dear Mr. Boyd:

The purpose of this letter is to call to your attention the activities of the American Foundation for Tropical Medicine, Inc., and to express the hope that the American Petroleum Institute may directly or indirectly assist us in obtaining the desired support from the oil industry in this country.

The Foundation is a non-profit tax exempt organization incorporated under the membership Corporation Laws of the State of New York. It was established in 1939 by the American Society of Tropical Medicine and the American Academy of Tropical Medicine to organize and support teaching and research in tropical medicine in the United States.

In 1946 Mr. Harvey Firestone, Jr. made a large gift to the Foundation for the establishment of a research institute in Liberia. The Liberian Government in turn has granted to the Foundation the necessary lands adjacent to Roberts Field, the Army Air Base during the war and now a regular station on the Pan American Airways route to Leopoldville in the Belgian Congo. Construction of the first units of Liberian Institute will be started this spring.

The Institute is to be developed and equipped for fundamental research into the three major problems of the tropics, disease of man, disease of domestic animals and the production of staple food crops. Direction of the scientific activities is vested in a Scientific Advisory Committee consisting of one member each from the scientific faculties of fifteen American Universities. Fiscal control is vested in the Board of Directors elected by members of the Corporation who are designated for membership by contributors to the Foundation.

The Liberian Institute will be operated as an international center for research. Its facilities are to be offered to the World Health Organization. Reciprocal agreements are being negotiated with research centers and schools of tropical medicine in Latin American, Europe, Africa and the East. These agreements will make the facilities of the Liberian Institute available to foreign scientists sponsored by the affiliating institutions, without financial subsidy however. In return these agreements will provide for similar courtesies and facilities to scientific workers sponsored by the American Foundation for Tropical Medicine.

The Foundation and the Institute have two fundamental objectives both of which are in the national interest. First, research into the fundamental problems of disease in the tropics and second, by the application of effective

methods of disease control, to improve local health and local economics. The high incidence of disease and consequent economic impoverishment result from three major factors — communicable diseases of man, diseases of domestic animals which limit food supplies for man, and inadequate agriculture with insufficient production of staple food crops. Improvement of these conditions will yield benefits to American Business through reduced production costs and developing markets.

Second, the lack of a fully developed Graduate School of Tropical Medicine in the Western Hemisphere constituted a serious handicap to the United States in the Second World War. The Foundation therefore is working toward the ultimate development of such an institution in the United States which will provide competent training of American and foreign doctors and research workers in preparation for work in tropical areas.

The Foundation and the Institute can provide certain services to the companies supporting its activities. These include advice and assistance in obtaining competent consultants to advise on particular problems of special tropical areas; the organization of research into particular problems; field testing of new preparations for the treatment and control of human disease and disease of domestic animals; field testing of insecticides and fungicides of potential medical, agricultural, or commercial importance; and guidance in the training for work in the tropics of physicians and technical laboratory workers.

Very sincerely yours,

/s/ Thomas T. Mackie

Thomas T. Mackie, President
The American Foundation for
Tropical Medicine, Inc.

Boylan Gray School of Medicine
Winston-Salem, North Carolina

TTM - rrw

IX

AIR POLLUTION CONFERENCE OF MANUFACTURING CHEMISTS' ASSOCIATION, APRIL 19-20, 1949

By unanimous vote the Committee requested Chairman Hoag to attend the MCA Conference as the designated representative of the Medical Advisory Committee.

X

TENTH MEETING

It was the consensus of those present that the Committee should hold its tenth meeting in Chicago on Friday, November 11, 1949, with subcommittee meetings to be held on Thursday, November 10, with a schedule such that Thursday afternoon will be devoted solely to a meeting of the Subcommittee on Carcinogenicity.

XI

ADJOURNMENT

There being no further business to be considered, the meeting was adjourned.

D. V. Stroop

Acting for J. P. Holt, M.D.
Secretary

Approved:

A. E. Hoag, M.D.
Chairman

APPENDIX A

To Minutes of 9th Meeting of Medical Advisory Committee

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

BY THE SUBCOMMITTEE ON CARCINOGENICITY

Dr. McIver Woody - Chairman

April 2, 1949

On behalf of the Subcommittee on Carcinogenicity, I wish to present to the Medical Advisory Committee for transmittal to the Safety Committee of the Board of Directors, the following report:

Dr. Kehoe assures us that laboratory facilities for a colony of 10,000 mice (enough to test at least 200 samples in the course of a year) will be available at the University of Cincinnati not later than June 30th. This was made possible by the American Petroleum Institute grant of \$40,000 for capital expenditures, of which \$30,478 has been put into the new building and \$8,264 has been put into new equipment, leaving \$1,258 to provide additional apparatus as needed. These new facilities are earmarked for the petroleum industry. The American Petroleum Institute has first call on them. After its needs have been met, work can be undertaken for individual oil companies up to the capacity that has been provided by the capital grant.

From the grant of \$25,000 for current expenses, with due regard for economy, \$2,482 was used during 1948, and expenditures for the first 6 months of 1949 are estimated at \$14,660. This will leave a balance of \$7,858 on hand July 1, 1949.

Dr. Kehoe estimates that a full utilization of these facilities by the petroleum industry will entail operating expenses of \$122,000 for the year ending June 30, 1950. He also estimates that from \$22,000 to \$32,000 of this cost will be met by grants from individual oil companies for special work to be done on their accounts. The balance of \$90,000 to \$100,000 would be chargeable to the American Petroleum Institute.

In appointing Dr. A. Wesley Horton as Assistant Professor of Industrial Hygiene, the University of Cincinnati has selected an organic chemist with practical experience in polycyclic hydrocarbons, a knowledge of physical chemistry and an understanding of our technical processes. He will devote his entire attention to the chemical aspects of the investigation and, having academic status, he can collect confidential data from competing companies without revealing the source from which it came. During the past 3 months he has called on many members of this committee, and conferred with many of their technical experts. He is now on the Pacific Coast and upon his return he will visit Oklahoma and Texas. On the basis of first-hand information thus obtained, he will prepare a list of samples to be tested at Cincinnati between now and July 1950. This list will be reviewed by the subcommittee and submitted to Dr. Kehoe for final approval.

In appointing Dr. J. J. Phair Professor of Preventive Medicine, the University of Cincinnati secures an epidemiologist with practical experience in public health and hospital administration. He is still

Commissioner of Health of Louisville, but after July 1st he will be able to devote half his time to American Petroleum Institute problems. He had already conferred with the medical directors of several oil companies to see what medical records are available and to determine what epidemiological techniques can be used to advantage. The long incubation period of cancer is one of the factors peculiar to the problem. A cancer registry for the petroleum industry is one of Dr. Phair's objectives, but he has his doubts concerning the successful enforcement of laws that require the reporting of occupational cancer as advocated by some authorities.

The National Cancer Conference which was held in Memphis, February 25-27 inclusive, under the sponsorship of the American Cancer Society and the National Cancer Institute of the U.S. Public Health Service was attended by over 350 investigators from all parts of the country, of whom 24 were assigned to the panel on occupational cancer. It was quite evident that the problem of carcinogenic agents in the petroleum industry is an open book and that control measures, both medical and technical, must be adopted. It was also agreed that the petroleum industry is to be congratulated on having undertaken a comprehensive study of the pressing problems.

A similar situation has developed recently in England, where the Medical Research Council has appointed a committee on occupational cancer of eight members, including Colonel S. J. M. Auld representing the Institute of Petroleum. He informs us that certain lubricating oils, notably those used in the textile industry, are being looked upon with suspicion and that some companies have undertaken the manufacture of white oils as substitutes, although there is no demand for them as yet. The valuable research done at Birmingham is now going forward with government support, and in view of the similarity of the problem in both countries, Dr. Auld advocated a free exchange of information between the American Petroleum Institute and the Institute of Petroleum.

It is recommended that:

1. The American Petroleum Institute exchange information on cancer with the Institute of Petroleum.
2. The allocation of funds to continue cancer research at the University of Cincinnati for the 12 months ending June 30, 1950 be increased from \$50,000 to \$100,000.

APPENDIX B

To Minutes of 9th Meeting of Medical Advisory Committee

REPORT TO THE API MEDICAL ADVISORY COMMITTEE

BY THE SUBCOMMITTEE ON FLUORIDES

Dr. Kieffer Davis - Chairman

April 2, 1949

On March 30, 1949, a meeting was held in Dr. Robert A. Kehoe's office at Kettering Laboratory, Cincinnati, Ohio, to discuss the research work on fluorides now under way at that institution. Representatives from all companies participating in this program were present - Pennsylvania Salt, Reynolds Metal, The Aluminum Company of America, du Pont, Universal Oil Products, and Medical Advisory Committee of the API. Doctors Hoag and Davis were present in behalf of the Subcommittee on Fluorides.

The annual report on the progress of experimental investigation of the storage of absorbed fluorides by man and animals was discussed and accepted by the group. At this time the group considered that sufficient animal experimentation had been completed on this matter and future work would be limited to human subjects (adults).

The following experiments are anticipated for this year:

1. Continuation of subject E.B. at the present level of ingestion, 12 mg. daily of fluoride as NaF, for several months.
2. Subject K.W. should begin a period of ingestion of fluorides, as NaF, at the rate 3 mg. daily, and continue that one or two years.
3. Observations on subject E.L. are discontinued but should be resumed when metabolic balance has again been reached.
4. Resume the collection of data on losses of fluorides through the skin when additional equipment has been installed.

A fifth experiment was proposed - to expose a subject over a considerable period of time to HF vapor, 1 part per million, and determine as in the ingestion procedures the amount of fluoride absorbed and stored. Because, however, of the great cost entailed in setting up the necessary chamber, other equipment and employing a subject, this procedure was deferred for the present time.

When it becomes possible to undertake them, the following investigations, under the direction of Dr. Kehoe, should be carried out:

1. Extend research on analytical methods to improve the determination of fluorides in blood, in particular, and in other biological samples as well.

2. The administration of fluorides in solution parenterally to study the relation of a maintained blood fluoride level to the rate of urinary excretion of fluorides.
3. Obtain data from workmen who have had several years of exposure to fluorides in industry, studying the loss of fluorides from the body and the reversibility of the total changes, chemical and pathologic, observed under conditions of exposure. Subjects might be available among employees of the industry.

During the meeting it was brought out that a number of other companies interested in this problem should be given the opportunity to join our group at Kettering Laboratory. By admitting others to this research problem not only would the information resulting from this procedure be further disseminated now to responsible companies, but, also, sufficient additional funds might be acquired to permit investigation of this problem beyond the work which was initially set forth. Dr. Frary was selected to correspond with peoples of these companies.

Abstracts of a considerable number of articles covering work completed on fluorides experimentation by others have been compiled and will soon be in mimeographed form for distribution to the companies sponsoring this work. Sufficient copies have been requested to allow each member and associate of the Medical Advisory Committee to receive one.

Dr. Kehoe was approached concerning the possibility of using Boron Trifluoride as a test agent in some one of these experiments. It was his opinion that a complete procedure should be worked out using the fluorides that were started with before testing other specific ones.

Because of the recognized increasing importance of this problem, the Subcommittee on Fluorides suggests that the Medical Advisory Committee consider this a long-range program (two or more years) and that the American Petroleum Institute continue to support Dr. Kehoe and his group at Kettering Laboratory in this research work.

This progress report is hereby submitted for your approval.

APPENDIX C

To Minutes of 9th Meeting of Medical Advisory Committee

PROGRESS REPORT TO THE API MEDICAL ADVISORY COMMITTEE
BY THE SUBCOMMITTEE ON PERMISSIBLE CONCENTRATIONS

Dr. V. C. Baird - Chairman

March 18, 1949

PROGRESS REPORT

American Petroleum Institute Project
at Harvard School of Public Health

Toxicological Reviews

During the past five months, tentative drafts of toxicological reviews on arsine and amyl acetate have been submitted to the Medical Advisory Committee for comments. Tentative drafts on acetic acid, betanaphthol, butyl acetate, cyclohexane, methylcyclohexane, mesitylene, amyl acetate, and hydroquinone have been revised in accordance with suggestions submitted by members of the Medical Advisory Committee and their associates.

Treatment of Burns

A great deal of time has been devoted to the preparation of a report summarizing current concepts on the treatment of burns. The report gives particular emphasis to information available concerning the pathological physiology of the seriously burned patient. Measures designed to correct the systemic disturbances are stressed in the discussion of therapy. We are anxious to receive suggestions from the Medical Advisory Committee that will help us improve this report so that it will prove to be of practical value to the physician who may not have the opportunity to review the vast and controversial literature on the subject.

Silica Catalyst Problem

A. Survey of Neighborhood Exposure to Catalyst Dust

API 07000

We have requested information from members of the Medical Advisory Committee on the silica-alumina dust distribution in the neighborhood of their refineries. Two companies have submitted quite detailed information on the matter and other companies have told us that they were planning to carry out such studies.

The following data gives an indication of the magnitude of neighborhood catalyst distribution on the basis of surveys by two refineries: