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Committee Meeting with Attachments

AMERICAN PETROLEUM INSTITUTE
MEDICAL ADVISORY COMMITTEE

Twenty-Fifth Meeting
April 21, 1958
Card Room, Haddon Hall
Atlantic City, New Jersey

MEMBERS PRESENT:

V. C. Baird, M. D., Chairman
J. W. Osborn, M. D., Vice Chairman
C. R. Miller, M. D., Secretary

W. O. Armstrong, M. D.
F. F. Boys, M. D.
Richard Call, M. D.
L. E. Curtis, M. D.
Keiffer Davis, M. D.
R. E. Eckardt, M. D.
K. R. Fourcher, M. D.
T. M. Frank, M. D.
F. D. Gassaway, M. D.

C. H. Hine, M. D.
T. J. Kelly, M. D.
T. H. Mitchell, M. D.
M. N. Newquist, M. D.
B. B. Reeve, M. D.
J. C. Ruddock, M. D.
G. M. Saunders, M. D.
(Rep. by L. C. Beard, Jr.)
Leo J. Wade, M. D.

TECHNICAL ADVISORS PRESENT:

W. L. Avrett
W. H. Barcus
B. E. Bennison, M. D.
Frank Born, M. D.
R. C. Cole
E. K. Daniels
H. W. Gerarde, M. D.
J. W. Hammond
P. D. Halley

C. A. Neilson
T. B. Rendel
L. E. Renes
F. J. Sanders (Rep. by
W. E. Scovill)
J. A. Spence
Fred Venable
G. M. Wilkening

MEMBERS ABSENT:

Lamson Blaney, M. D.
J. W. Crookshank, M. D.
J. H. Hege, M. D.
E. K. Linder, M. D.
E. P. Luongo, M. D.

B. S. Miller, M. D.
R. C. Page, M. D.
R. J. Potts, M. D.
Ralph Schneider, M. D.

OTHERS PRESENT:

S. S. Alexander
Dr. R. G. Birrell
M. A. Connell
Dr. De Boor
A. H. Diserens
Philip Drinker (Consultant)
J. L. Foub
John Hatch
Ed Herman
R. A. Jacobson
C. A. Nau, M. D.
E. O. Mattocks

- Phillips Petroleum Company
- Imperial Oil Ltd.
- Egle Products Company
- Dutch Shell
- Creole Petroleum Corporation
- Harvard University
- Imperial Oil Ltd.
- Phillips Petroleum Company
- Humble Oil & Refining Company
- Universal Oil Products Company
- University of Texas
- American Petroleum Institute

API 07331

N. J. Roberts	- Standard Oil Company (New Jersey)
T. J. Smith	- Standard Oil Company (Indiana)
Rupert Snolt	- Shell Oil Company
H. B. Snyder	- Humble Oil & Refining Company
R. J. Sorenson	- Shell Oil Company
E. A. Turcot	- Imperial Oil Ltd.
H. von Racter	- Shell Oil Company
McIvor Woody, M. D.	- Retired

I. OPENING REMARKS

The chairman welcomed everyone present. He indicated that the Medical Advisory Committee functions chiefly through its subcommittees who are the working groups. Actions of the Medical Advisory Committee are referred to the Medical and Health Committee of the Board of Directors for final approval.

The chairman requested each member to review the functions of the Medical Advisory Committee. He asked each one to review the booklet, entitled "Health. A Brief Review of API Medical Advisory Committee Activities," which is based upon an address presented at the November 14, 1955 API Meeting by George M. Saunders, M. D. The Appendix of this booklet has the Board of Directors action, dated April 21, 1954, related to the function, composition, organization, and procedures of the Medical Advisory Committee. A copy of this booklet is attached as Appendix A.

II. INTRODUCTION OF GUESTS

The chairman called upon the secretary, C. R. Miller, M. D., to introduce the guests at the meeting.

III. MINUTES OF 24TH MEETING

The chairman asked if there were any corrections or additions to the minutes of the last meeting of the Medical Advisory Committee.

ACTION: It was regularly moved, seconded, and unanimously passed that the minutes of the 24th meeting of the Medical Advisory Committee, held November 13, 1957, be approved as distributed.

IV. SUBCOMMITTEE REPORTS

A. Operating Subcommittee - V. C. Baird, M. D., Chairman

Dr. Baird reported the actions of the Operating Subcommittee, which held a meeting April 19, 1958. A copy of the minutes are attached (Appendix B).

ACTION: It was regularly moved, seconded, and unanimously passed that the actions of the Operating Subcommittee, together with their report, be accepted.

B. Program Subcommittee - E. K. Linder, M. D., Chairman

B. B. Reeve, M. D., reported for Chairman E. K. Linder, M. D. His report is given in Appendix C.

The desirability of having a Group Session during the November 1958 Annual API Meeting was carefully considered.

ACTION: It was regularly moved, seconded, and unanimously passed that there be no Medical Advisory Committee Group Session during the 1958 Annual API Meeting.

The need and frequency of discussion sessions, sponsored by the Medical Advisory Committee was reviewed.

ACTION: It was regularly moved, seconded, and unanimously passed that a round table discussion meeting for the Medical Advisory Committee be held once a year during the Annual API Meeting.

The members of the Medical Advisory Committee will be contacted by the chairman of the Program Subcommittee to determine if they have any topics for these discussion sessions and also if there is anyone who wishes to be a discussion leader.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

C. Subcommittee on Atmospheric Pollutants - John C. Ruddock, M. D., Chairman

Dr. Ruddock reported on the activities of his subcommittee. His report is given in Appendix D.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

D. Subcommittee on C₉ - C₁₂ Aromatics - Kieffer Davis, M. D., Chairman

Dr. Davis presented the report of his subcommittee which is given in Appendix E.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be approved.

E. Subcommittee on Carcinogenicity - R. E. Eckardt, M. D., Chairman

Dr. Eckardt reported on this group's activities which is given in Appendix F.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be approved.

F. Subcommittee on Dermatology - Leo J. Wade, M. D., Chairman

Dr. Wade reported that the Division of Marketing Industrial Hygiene Committee was currently reviewing a booklet to be published by the Industrial Hygiene Foundation.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

G. Subcommittee on Economic Poisons - J. W. Osborn, M. D., Chairman

API 07333

Dr. Osborn reported on the activities of this group. His report is given as Appendix G.

The usefulness of the Poison Centers was discussed. It was pointed out by one member that the Telephone Company has been contacted to determine if an arrangement could be worked out whereby a person dialing POISON would be connected automatically with the nearest Poison Center. Likewise, the question was raised as to whether the National Clearing House of the Public Health Service in Washington would disseminate information to all Poison Centers.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

H. Subcommittee on Medical Policies and Practices - Ralph Schneider, M. D., Chairman

Dr. Fourcher, Acting Chairman, gave the report of this group's activities. The report is attached as Appendix H.

Dr. Reeve, Acting Chairman of the Program Subcommittee, accepted the offer of the Medical Policies and Practices Subcommittee to arrange a half-day round table discussion during the November Annual API Meeting.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

I. Subcommittee on Physical Agents - C. H. Hine, M. D., Chairman

Dr. Hine reported on this subcommittee's activities. His report is given in Appendix I.

Dr. Hine reported that Mr. D. T. Staples, Chairman of the Medical and Health Committee, had requested Mr. J. G. Jordan of the Shell Oil Company to try and attend the meeting of the Medical Advisory Committee as a representative of the Board group. Unfortunately, Mr. Jordan was unable to attend the meeting but sent his best wishes by Dr. Hine.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

J. Subcommittee on Toxicological Reviews - H. W. Gerarde, M. D., Chairman

Dr. Gerarde presented his report which is given as Appendix J.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

The question was raised as to whether the Subcommittee on Toxicological Reviews had considered including, in the Reviews, the uses of the various materials under consideration. The subcommittee was to take this under advisement.

K. Subcommittee on Industrial Hygiene - Jack Spence, Chairman

Mr. Jack Spence, Chairman, presented his report which is given in Appendix K.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

L. Special Ad Hoc Committees

API 07334

The chairman explained that he appointed a Special Ad Hoc Committee

consisting of G. M. Saunders, M. D. and B. E. Bennison, M. D. to consider the establishment of a Subcommittee on Epidemiology. Dr. Bennison presented the report of the subcommittee, which is attached as Appendix L.

The discussion brought agreement that Dr. Bennison and Dr. Saunders be requested to continue to work on the advantage to the Medical Advisory Committee of establishing a subcommittee on epidemiology and make a report and recommendation at the Chicago meeting, November 1958.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

V. REPORT OF LIAISON MEMBERS

A. Dermatitis Survey

Dr. Leo J. Wade reported that there was no activity to report.

B. Asphalt Institute

Dr. R. E. Eckardt reported that there was no activity to report.

C. Smoke and Fumes

Dr. J. C. Ruddock stated that, at the request of the Smoke and Fumes Committee, his Subcommittee on Atmospheric Pollutants was attempting to prepare a statement of the possible effect of smoke and fumes on the health of human beings. He indicated that Dr. Philip Drinker was to help his subcommittee in the preparation of a statement which will be circulated to the Medical Advisory Committee for their approval, after being approved by the Subcommittee on Atmospheric Pollutants.

Dr. Eckardt indicated that the Esso Research & Engineering Company had prepared a proposed article on the toxicity of Sulfur, SO₂, and SO₃. The Subcommittee on Atmospheric Pollutants has taken the stand that the material in this proposed article fully represents their opinion.

ACTION: It was regularly moved, seconded, and unanimously passed that the action of the liaison member with the Smoke and Fumes Committee be approved.

D. American Standards Association

Mr. Allan E. Dooley reported that there was no activity on the Z-4, Z-37, and Z-62 Committees to report.

E. American Medical Association

J. W. Osborn, M. D. reported on his liaison activity with the American Medical Association. His report is given in Appendix M.

ACTION: It was regularly moved, seconded, and unanimously passed that the report be accepted.

The question was asked if the API will be represented at a meeting which Dr. Connelly has indicated he would call in the future to discuss the AMA proposed bill. Dr. Osborn indicated that his subcommittee recommended that the API send a representative to such a meeting. He further indicated that his subcommittee believed that Dr. Osborn should be considered as the Medical Advisory Committee

representative.

ACTION: It was regularly moved, seconded, and unanimously passed that Dr. Osborn represent the Medical Advisory Committee if they are called upon to discuss the AMA proposed bill.

F. Labeling

M. N. Newquist, M. D. reported that the API had published Bulletin 2511 on Precautionary Labels in January 1958. It was requested that copies of this Bulletin be sent to the Medical Advisory Committee and Technical Advisors.

G. First Aid Training

T. M. Frank, M. D. reported on the activity in First Aid Training. He indicated that there was considerable interest and activity in this field. The Manual on First Aid Training is being revised.

H. Wax Committee

R. E. Eckardt, M. D. reported that a formal contract had been entered into between the API and The Chicago Medical School for the determination of the toxicity of petroleum waxes. Dr. Philippe Shubik is the director of this project, MC-3. The contract, in the amount of \$100,000 for the first year, became effective March 1, 1958.

It was explained that a preliminary investigation of three different kinds of waxes used in milk cartons, as produced by the companies represented by members of the Wax Committee, was being made by Dr. Shubik and his co-workers.

A meeting of the Wax Committee has been called for April 28th in Chicago. At this time, it is hoped that a formal investigational program can be developed and approved.

I. Food Protection Committee

Dr. R. E. Eckardt reported that he had circulated a report to the committee on the activity of the Food Protection Committee. Nothing has occurred since the issuing of this report.

VI. NEW BUSINESS

Dr. Curtis reported that, through the courtesy of Dr. Reeve, his attention had been called to a report made by Dr. Charles P. Mathe, Urologist, St. Mary's Hospital, in San Francisco, to the effect that "workers in oil industries and those coming in contact with dyes show a high incident rate of bladder cancer." The chairman accepted the information on behalf of the committee and agreed to take cognizance of this report with whatever action seemed appropriate to be developed after due consideration.

VII. NEXT MEETING

API 07336

In accordance with the suggestion of the Operating Subcommittee, the Medical Advisory Committee's next meeting will be on Monday morning, November 10th, in the Conrad Hilton Hotel in Chicago. The Subcommittees are to meet on November 7th and 8th. The chairman stated that the request for subcommittee reports be submitted

30 days prior to the meeting of the Medical Advisory Committee was withdrawn because of the desirability of full committee discussion of its activities and the impracticability of subcommittee's additional meetings before the annual fall API meeting.

C. R. Miller, M. D.
Secretary

Reported by
E. O. Mattocks

Approved:
V. C. Baird, M. D., Chairman
May 13, 1958

APPENDIX A

HEALTH

A Brief Review of
API Medical Advisory Committee
Activities



American Petroleum Institute
50 West 50th Street
New York 20, N. Y.

The text of this booklet is based upon an address presented November 14, 1955, during the 35th Annual Meeting of the American Petroleum Institute, by George M. Saunders, M.D., Socony Mobil Oil Company, Inc.; then chairman of the API Medical Advisory Committee.

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API 07339

HEALTH

It has long been recognized that one of a country's greatest assets is a healthy population. This is particularly true of our industrial employees. There was early recognition by some of the larger American companies of the importance of employee health and of the wisdom of taking practical steps to protect employees from possible harm in their working environment. The value of preventive and constructive medicine has been amply proved and, since World War II, there has been an impressive growth of occupational health services throughout the petroleum industry.

The Growth of Petroleum Technology

For a long time after the birth of the oil industry the processes involved were relatively simple. However, the tremendous evolution, expansion, and growth which have taken place during the past 20 years have converted a relatively simple group of operations into a highly complex chemical operation, necessitating ever-increasing attention to the health and safety of employees in the industry. Improper use of the many new petroleum products vital to our ever-improving way of life may also be associated with health and safety hazards for consumers. The petroleum industry as a whole, through the American Petroleum Institute, has been alert to this progress and change, and to these hazards, and has given increasing attention to the problem of health.

The Origin and Objectives of the Medical Advisory Committee

Before 1944 medical and health problems in the petroleum industry were largely matters of concern to the individual companies. In fact, there were relatively few oil companies which

had full^{er} e medical directors. For the most part, any medical or health activities or advice were supplied by part-time or consultant physicians. In 1944 it was recommended to the Institute's Department of Safety that an investigation be made of possible health hazards associated with compounds made or used in refineries. In October of that year the Central Committee on Accident Prevention voted to request the appointment of a Medical Advisory Committee to formulate and to recommend studies of the health aspects of the petroleum industry. Early in 1945 the Institute's president, William R. Boyd, Jr., appointed 16 oil-company medical directors and physicians to serve as a Medical Advisory Committee, and on May 7 the first meeting was held. At that first meeting of the Medical Advisory Committee it was pointed out that there was need for special and detailed knowledge concerning, among other things, the toxic properties of chlorinated hydrocarbons and the alleged cancer-producing properties of some petroleum fractions. The committee requested authorization to establish research projects in these fields and to prepare reviews of medical information concerning various substances made, used, or sold by oil companies.

To some oil men it may seem strange that physicians should discuss and work on their professional problems in an oil man's association. It might be more to their advantage to take such problems to the American Medical Association or to the Industrial Medical Association. Of course, some medical problems of the oil industry are closely related to similar problems in other industries.

The oil industry, however, has potential health problems which are peculiar to it. The solution of these problems may require physicians, industrial hygienists, and others with specialized knowledge of, and experience in, petroleum technology.

The Past Ten Years

In the 10 years since the Medical Advisory Committee was first formed it has served well

tee of the Board. Research projects have been carried out at Harvard University, the University of Cincinnati, and the University of Texas. The results of these studies and progress reports are given to all contributing companies upon request. The work at Harvard has resulted in the publication of 65 API toxicological reviews, which are available for public purchase at nominal prices. The research projects initiated by the Medical Advisory Committee have covered a wide variety of potential or actual problems of concern to the petroleum industry. These have included studies on the toxicology of fluorides, the experimental production of skin cancer in mice by certain petroleum fractions, dermatitis, basic skin physiology, the toxicity of C₆-C₁₂ aromatics, and others.

In addition, work has been done on the organizational and administrative aspects of health services in the industry. The Medical Advisory Committee also provides representation on a sectional committee of the American Standards Association. If need should arise, it is prepared to function as advisor for the industry on the medical aspects of any problem arising from within or outside the industry. For example, it is represented on the API interdivisional Committee on Labeling, which was formed to consider problems of national significance in connection with precautionary labeling of petroleum products. Also, the Atmospheric Pollutants Subcommittee of the Medical Advisory Committee has been working closely with the Smoke and Fumes Committee of the Division of Refining. Members of the Medical Advisory Committee are serving on other interdivisional committees concerned with such subjects as labeling and dermatitis.

Cancer Research

One of the important medical research projects sponsored by the Institute, and the one upon which the major portion of funds has been spent, is that concerned with the possible cancer-producing properties of various products or

compounds used, produced, or so. Earlier British experience with occupational skin cancer, particularly from shale oils, and the appearance of a few cases of skin cancer among petroleum workers in the United States, suggested the possibility of an occupational cancer hazard in this country from some petroleum materials. Animal experiments which are being conducted at the University of Cincinnati under Institute sponsorship have for a major objective the development of an analytical tool to be used as an indicator in assessing the cancer-producing potential of petroleum hydrocarbons.

It has become evident from these studies and others that there are substances present in low concentration in most crude oils, the amounts varying in different crudes, which will produce skin cancers in mice when applied over prolonged periods of time. Furthermore, distillation may concentrate the substances in the high-boiling fractions, and cracking may create additional carcinogens. However, experience in our refineries has proved that the risk may be so slight as to be almost negligible if it is recognized and if simple precautionary steps are taken. For example, it is known that if human skin is bathed in some types of oils day after day, dermatitis is very likely to occur, and it is alleged that if such application be continued for many years, skin cancer may develop. However, simple measures of hygiene, such as careful washing of the skin with soap and water at the end of each work shift, will prevent dermatitis and the potential case of skin cancer. This is confirmed by the studies on mice which have demonstrated that simple washing with soap and water will minimize, or prevent, the harmful effects from these experimental procedures. Furthermore, in man, if skin cancer does develop, it is one of the least serious forms of malignancy, and simple excision usually will result in complete cure.

The Future

The science and art concerned with the prevention, the cure, or the alleviation of illness in

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industrial groups is young, but it is growing rapidly. One of the essential needs is an adequate and expeditious channel of communication in each field of specialization. In the oil industry, the API Medical Advisory Committee, during the past 10 years, has served as a clearinghouse for medical directors and their technical advisors. The petroleum industry, as a whole, should be commended for the forward-looking, progressive, and courageous stand it has taken in being alert for any potential hazards and in doing something about them when recognized.

Although progress has been made in the identification and control of several hazards specific to the petroleum industry, new ones are constantly arising to present problems which require consideration: for example, radioactive materials, noise, and some petrochemicals. The average age of employees covered by various health benefits and disability and retirement plans is rising. The cost of sickness, handicaps, and premature retirements will follow unless careful consideration is given to some provision for early detection of disease, health education, rehabilitation, and placement of partially disabled employees. The Medical Advisory Committee is prepared to give further advice on programs designed to meet these changing circumstances. Through the medium of its open sessions, it is prepared to discuss in nontechnical terms problems of a medical nature concerning the health of people in the petroleum industry.

The Medical Advisory Committee hopes to open a channel of communication between the medical men and all others who are interested in any phase of occupational health. Those interested should speak out and request assistance and advice on any potential or suspected health problems they may have today or in the years to come.

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APPENDIX

FUNCTIONS, COMPOSITION, ORGANIZATION, AND PROCEDURES OF THE MEDICAL ADVISORY COMMITTEE

(April 21, 1954)

1. Functions of the Medical Advisory Committee

- a. To advise the Institute on any existing and potential health problems of the petroleum industry represented by the American Petroleum Institute. This advice will be on problems associated with production, transportation, refining, or marketing of petroleum and its products.
- b. To provide a place for free exchange of professional information of a medical nature between the medical representatives of petroleum companies.

2. Composition of the Medical Advisory Committee

- a. *Members*—Physicians nominated by petroleum companies and appointed annually by the chairman of the Medical and Health Committee. These physicians may be employed by petroleum companies either full time, part time, or as consultants.
- b. *Observers*—If petroleum companies do not designate physicians to represent them on the Medical Advisory Committee, they may be represented at meetings by observers to report to them on the activities of the committee. Observers will have no vote in the Medical Advisory Committee.
- c. *Technical Advisors*—Any member may bring any technical advisors to the committee meetings that he believes he may need. Technical advisors will have no vote in the

Medical Advisory Committee, but they may be appointed to serve on subcommittees.

3. Officers of the Medical Advisory Committee

The chairman, vice chairman, and secretary of the Medical Advisory Committee will be appointed by the chairman of the Medical and Health Committee of the API Board of Directors, each for a term of one year.

4. Operating Committee

The chairman of the Medical Advisory Committee, with the help of the vice chairman, will appoint an Operating Committee to assist in the affairs of the Medical Advisory Committee between meetings.

5. Subcommittees

- a. The chairman of the Medical Advisory Committee, with the help of the vice chairman and the Operating Committee, will appoint subcommittees to study and report on special assignments.
- b. These subcommittees will study, review, and make recommendations on problems; propose indicated research; recommend research expenditures; and supervise research efforts, all as directed by the chairman.
- c. At the suggestion of the Medical and Health Committee of the Board or the chairman of a subcommittee, the chairman of the Medical Advisory Committee may appoint specially qualified individuals to provide technical advice to the subcommittee.

6. Procedure

- a. *Assignment of Projects*—Problems will be brought from any Division of the Institute to the Medical Advisory Committee through the Medical and Health Committee. Problems will also come to the Medical Advisory

Committee directly from members of the committee.

After deliberation of a problem by the members of the Medical Advisory Committee, this committee will make recommendations to the Medical and Health Committee of the Board for the solution, or study, of the problem. Final recommendations from the Medical Advisory Committee to the Medical and Health Committee will be determined by a majority vote of the members of the Medical Advisory Committee; but any dissenting minority (whether entitled to vote or not) should be requested to present their views to the Medical and Health Committee along with the majority report.

Actual investigation of the problem will be undertaken by the Medical Advisory Committee only upon specific approval of the Medical and Health Committee.

1. *Reporting of Results*—All subcommittee reports will be considered by the Medical Advisory Committee and adopted or rejected by that committee or returned to the subcommittee for further work or consideration.

If subcommittee reports are adopted by the Medical Advisory Committee, the chairman of the Medical Advisory Committee will transmit such reports to the Medical and Health Committee. Such transmittal will include specific recommendations from the Medical Advisory Committee as to the use, dissemination, or other suggested action to be taken with respect to the particular report. After consideration of the report, suggested action, minority reports, if any, and any other pertinent factors, the Medical and Health Committee will decide what course of action to follow and the secretary of the Medical and Health Committee will be directed to implement such decision. He will advise the chairman of the Medical Advisory Committee of the decision of the Medical and Health Committee.

7. Buu

The budget of the Medical Advisory Committee, broken down according to subcommittee activities, will be submitted by its chairman to the Medical and Health Committee of the Board for approval at least 30 days before the fall meeting of the API Program and Budget Review Committee.

1M--August 1956

API 07348

OPERATING SUBCOMMITTEE
V. C. Baird, M. D., Chairman

Minutes
MEDICAL ADVISORY COMMITTEE OPERATING SUBCOMMITTEE
April 19, 1958
Haddon Hall
Atlantic City, N. J.

Those Present:

V. C. Baird, M. D., Chairman
J. W. Osborn, M. D., Vice Chairman
C. R. Miller, M. D., Secretary

L. E. Curtis, M. D., Past Chairman
R. E. Eckardt, M. D.
E. O. Mattocks

I. APPROVAL OF OPERATING SUBCOMMITTEE MINUTES

ACTION: The minutes of the November 11, 1957 Operating Subcommittee meeting were approved as distributed.

II. AMERICAN MEDICAL ASSOCIATION PROPOSED LABELING ACT

President F. M. Porter received from Bernard E. Conley, Secretary of the American Medical Association Committee on Toxicology, a copy of the proposed Uniform Hazardous Substance Act. This was distributed to the Medical Advisory Committee and the Interdivisional Committee on Labeling. Subsequently, the Manufacturing Chemists' Association, the Chemical Specialties Manufacturers Association, the National Paint, Varnish and Lacquer Association, and the Soap and Glycerin Association indicated their intentions of getting together to discuss the implications of the proposed AMA bill. The API was invited to send representatives to this meeting. J. W. Osborn, M. D., W. H. Barcus, and R. D. Bent attended the meeting on April 17, 1958.

The details of the Inter-Association meeting were discussed in the meeting of the Subcommittee on Economic Poisons. A report of the AMA labeling activities, together with the recommendations of the Subcommittee on Economic Poisons, will be made to the Medical Advisory Committee for their consideration and possible action.

III. CONSULTANTS

API 07349

Currently the Medical Advisory Committee has one consultant who is paid a yearly retainer. The desirability of using this plan, as compared to paying the consultant for services rendered, was carefully reviewed.

It was agreed generally that it would be more desirable if all consultants could be paid on a per diem basis plus travel expenses rather than a yearly retainer. Further, it was thought desirable to permit the subcommittee to call upon the consultants to render any service considered necessary, the chairman of the subcommittee to clear such action first with the chairman of the MAC.

To facilitate the payment of required fees and expenses of consultants, the Medical and Health Committee will be requested to set up a special budget item to handle such expenditures. This will be in addition to any subcommittee's budgeted consultant costs, if a subcommittee wishes to handle their expenditures separately.

The chairman of the MAC is to discuss the above recommended procedure with the present consultant, who is on a yearly retainer, and determine if he is agreeable to the new procedure and, if so, when it could be initiated as far as he is concerned.

IV. VISITORS TO MEDICAL ADVISORY COMMITTEE MEETINGS

The API Board of Directors has approved a definite set of rules for membership on and association with the MAC. A physician of an oil company may be appointed a member of the MAC. Two types of associated membership is provided, namely: Technical Advisors, who are recommended by the members of the MAC, and Observers, who are suggested by oil companies who do not have physicians who can qualify as a member of the MAC.

If a member of the MAC wishes to invite to an MAC meeting a visitor who is directly associated with the member's company, he is free to do so. This would include employees of subsidiary or associated companies. If the MAC member wishes the Chairman of the MAC to issue such an invitation, such a request can be made but it is not necessary.

On the other hand, if a member of the MAC wishes to invite to a meeting a visitor who is not a member of his company, and the visitor's company is not a member of the MAC, the request should be referred to the Chairman of the MAC for consideration and action.

V. OUTSIDE MAILING LIST

Technical Advisors, Observers, and Consultants are sent material which is designated for general distribution.

VI. CERTIFICATES OF APPRECIATION

The MAC, at their November 13, 1957 meeting, formally requested that a committee be appointed to consider nominees to be recommended to the Medical and Health Committee to receive a Certificate of Appreciation. The Chairman requested the Operation Subcommittee to act as such a committee.

After due consideration, a nominee was suggested and the API staff requested to take the necessary steps to have the Medical and Health Committee approve such nomination.

VII. NON-PETROLEUM COMPANY MEMBERSHIP ON MEDICAL ADVISORY COMMITTEE

Physicians of non-petroleum companies cannot be officially appointed members of the MAC. It was agreed, however, that some physicians of non-petroleum companies, such as petro-chemical companies and some allied industries, could make a sizable contribution to the MAC.

It was agreed that an Associate Membership should be established in the MAC. Such membership to be for non-petroleum company physicians.

VIII. WORK PROGRAM

API 07350

Currently there is a requirement that subcommittee reports have to be submitted in writing 30 days prior to the November meeting of the MAC. This requirement is being adhered to by very few subcommittees. This and other operating items of the MAC need review and possible revision.

IX. NOVEMBER MEETINGS

At the November meeting of the API, it is necessary that the subcommittee meetings and the MAC meeting be held prior to the meeting of the Medical and Health Committee so that the report of MAC, together with any recommendations and budget requests, can be given consideration by the Board of Directors Committee and, if necessary, by the Board. Therefore, all MAC meetings should be held prior to Tuesday. It was agreed that the meetings of the subcommittees of the MAC should be held on Friday and Saturday prior to the November API meeting to allow subcommittee chairmen all day Sunday in which to prepare their group's written reports for presentation to the MAC on Monday.

X. ENLARGEMENT OF OPERATING SUBCOMMITTEE

The Chairman has requested that each subcommittee, including the Operating Subcommittee, review its scope and purpose. This is to be done prior to the November meeting.

There appears to be a need to enlarge the membership of the Operating Subcommittee immediately. The Operating Subcommittee will now consist of the following members of the Medical Advisory Committee. Chairman, Vice Chairman, Secretary, Past Chairman, all Chairmen of the MAC Subcommittees and the API Staff member. The enlarged Operating Subcommittee will be in effect the next time this group meets. It is planned to present to the MAC at their November meeting the written scope and purpose of the Operating Subcommittee.

XI. EPIDEMIOLOGY

The chairman appointed an ad hoc committee to study the need for a permanent Subcommittee on Epidemiology. The members of the group are: B. E. Bennison, M. D. and G. M. Saunders, M. D. They will make their report to the MAC.

E. O. Mattocks

Approved:
V. C. Baird, M. D., Chairman

APPENDIX C

PROGRAM SUBCOMMITTEE
E. K. Linder, M. D., Chairman

SUMMARY REPORT OF THE PROGRAM SUBCOMMITTEE FOR 1957-58

One of the activities of this committee has been to prepare a program for the annual meeting of the API. This has been an open meeting for the purpose of acquainting management with the medical problems and activities of the API Medical Advisory Committee. Excellent speakers have been obtained but it is my opinion that these meetings have not been too well attended.

Another duty of the committee is to prepare a discussion program for the API Medical Advisory group. In the past, these meetings have been on a bi-annual basis. Members have indicated that possibly this is too often as the Spring meeting is usually associated with the Industrial Medical Association meeting, which makes a very crowded program. This is a matter which the Medical Advisory Committee should decide.

As a long-range program, the Medical Advisory Committee should review the value of the open meetings and determine whether to continue them on an annual basis. If it is thought that such meetings should be continued, more effort should be made to reach a greater number of people.

Presented by
B. B. Reeve, M. D.

SUBCOMMITTEE OF ATMOSPHERIC POLLUTANTS

Of the Medical Advisory Committee to the API

MINUTES

The meeting of the subcommittee on Atmospheric Pollutants was held on Monday, April 21, 1958 in the Haddon Hall Library, Atlantic City, New Jersey, and was called to order at 9:30 a.m. by the Chairman, John C. Ruddock, M.D.

Members present were:

Richard W. Call, M. D.
Mr. R. C. Cole
Mr. E. K. Daniels
C. E. Hine, M. D., Ph. D.
C. R. Miller, M. D.
Mr. T. B. Rendel
J. C. Ruddock, M. D., Chairman

Members absent were:

L. E. Curtis, M. D.
E. P. Luongo, M. D.

Others present were:

V. C. Baird, M. D. - Chairman, MAC
J. W. Osborn, M. D. - Vice Chairman MAC
T. E. Mitchell, M. D. - Member, MAC
E. R. Hermann - Humble Oil and Refining
W. L. Avrett - Standard Vacuum
R. E. Scott - Shell Oil, London
R. J. Sorenson - Shell Oil
E. Van Raalte - Shell Oil
L. de Boer - Royal Dutch Shell, Amsterdam

The first order of business was the reading of the minutes of the Subcommittee meeting held in San Francisco on January 28, 1958. A motion was made and seconded that the Minutes be approved as read. This was passed unanimously.

In accordance with the minutes of the previous meeting, the Chairman announced that an agreement had been made with Dr. M. W. Goldblatt of London for a period of one year, to carry on the research as outlined in prior meetings. The contract prepared for Dr. Goldblatt by Mr. E. O. Mattocks was read to all present. A motion was made and seconded that this contract be accepted by the Committee. The motion was passed unanimously.

The Chairman read a letter from Dr. Goldblatt concerning his schedule while in the United States. He will arrive in New York on June 13, 1958, and meetings will be arranged for him at Harvard University with Dr. Phil Drinker, at the Franklin Institute in Philadelphia with Mr. Scott. at the U. S. Public

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Health Service in Washington with Dr. Fisher, at the U. S. Public Health Service in Cincinnati with Dr. Stern. In addition, while in Cincinnati, Dr. Goldblatt will meet with Dr. Phair and Dr. Horton at the Kettering Laboratory. He will meet with the Subcommittee on Atmospheric Pollution in San Francisco and Los Angeles after which he will return to London via the Panama Canal. Details of these commitments will be worked out later with the Chairman and Mr. Mattocks of the API Staff.

At the request of Dr. Baird it was unanimously agreed that a progress report on our Project MC-4 be submitted to the Operating Subcommittee of the Medical Advisory Committee in October of 1958, and that a final report be filed not later than September 15, 1959.

It was moved, seconded, and passed that Dr. Goldblatt be put on the mailing list for certain reports concerning air pollution and given subscription to American magazines that deal with this subject in a medical nature. These were left to the discretion of the Chairman.

A statement, which had been requested by the Smoke and Fumes Technical Research Committee concerning the effects of air pollution on health was presented. It was the consensus of the committee that this statement be rewritten stressing further points and that it be submitted for approval at a later date.

It was moved, seconded, and passed, that the report of Dr. Eckardt prepared by the Medical Research Division of Esso on the toxicity of sulfur oxides be adopted as a report of this Committee to the Smoke and Fumes Committee. The matter of distribution was discussed among the Committee and it was the opinion of Dr. Eckardt that as long as this report was not published there was no objection that it be distributed amongst the various members of the Smoke and Fumes Committee and their advisors.

A Bill, H. R. 9368, concerning the regulation of gasoline consumption was distributed for the information of the Committee.

It was agreed that the next meeting of the Committee be held in San Francisco in the latter part of June or early July at the time of Dr. Goldblatt's arrival there. The Subcommittee will be advised later as to the exact date.

There being no further business, the meeting was adjourned.

Respectfully submitted

JOHN C. RUDDOCK, M. D.
Chairman

SUPPLIED BY:
WESTERN OIL AND GAS ASSOCIATION
WASHINGTON, D. C.

D-3

80TH CONGRESS
1ST SESSION

H. R. 9368

IN THE HOUSE OF REPRESENTATIVES

August 20, 1957

Mr. SCHENCK introduced the following bill; which was referred to the Committee on Interstate and Foreign Commerce

A BILL

To prohibit the use in commerce of any motor vehicle which discharges unburned hydrocarbons in an amount which is found by the Surgeon General of the Public Health Service to be dangerous to human health.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 That (a) the Surgeon General of the Public Health Service
4 (hereafter in this Act referred to as the "Surgeon General"),
5 shall, after conducting such research as he may deem to be
6 necessary but not later than six months after the date of
7 enactment of this Act, prescribe and publish in the Federal
8 Register, standards as to the amount of unburned hydro-
9 carbons which is safe, from the standpoint of human health

1 (with particular reference to the carcinogenic nature of
2 unburned hydrocarbons), for a motor vehicle to discharge
3 into the atmosphere.

4 (b) Standards prescribed pursuant to subsection (a)
5 of this section may be revised from time to time by the
6 Surgeon General. Such revised standards shall be published
7 in the Federal Register.

8 SEC. 2. (a) No person shall use any motor vehicle
9 in commerce which discharges unburned hydrocarbons in
10 amounts in excess of the standards prescribed by the Sur-
11 geon General pursuant to the first section of this Act.

12 (b) Whoever violates this section shall be fined not
13 more than \$500, or imprisoned not more than 1 year, or
14 both.

15 SEC. 3. As used in this Act—

16 (1) The term "commerce" means commerce among
17 the several States, with foreign nations, in any Territory, or
18 in the District of Columbia, or between any Territory and a
19 foreign nation, or between the District of Columbia and any
20 State;

21 (2) The term "Territory" includes the Territories and
22 possessions of the United States and the Commonwealth of
23 Puerto Rico; and

24 (3) The term "motor vehicle" means any vehicle pro-

1 pelled by mechanical power and used for transporting passen-
2 gers or freight whether on a fixed track or on a highway.

3 SEC. 4. Section 2 (a) of this Act shall take effect 1
4 year after the date on which standards are first prescribed
5 and published in the Federal Register pursuant to subsection
6 (a) of the first section of this Act and thereafter any stand-
7 ards which are revised pursuant to subsection (b) of the
8 first section of this Act shall take effect 1 year after the date
9 on which they are published in the Federal Register.

Studies of Air Pollution Control

By Southern California Edison Company*

A. J. HAAGEN-SMIT
California Institute of Technology
Pasadena, California

In recent years the unpleasant discovery was made that the air over our densely populated areas is not as unlimited as some of us had thought. While at one time all waste products could safely be disposed of by dispersal in the rivers or in the air, this is no longer true, and stringent regulations have been made after several serious accidents had occurred. The best known are those of London, Donora, and Poza Rico, Mexico. No such accidents have been reported from smog-plagued Los Angeles, and extensive studies by epidemiologists have not been able to produce evidence that permanent damage to the health occurs in this area. Nevertheless, the frequent visitation by the eye-irritating smog cloud has resulted in the adoption of a number of relief measures, some based on extensive research and others on experience gained in other areas.

Research has shown that the major cause of Los Angeles smog difficulties lies in the release of large quantities of organic material, mostly from automobiles⁽¹⁾. These compounds are photochemically oxidized in the air by simultaneously emitted oxides of nitrogen, and these reactions give rise to eye-irritating and plant-damaging substances. An interesting side reaction during this oxidation produces relatively high concentrations of ozone which attacks rubber tires and is largely responsible for the so-called oxidant effect of Los Angeles smog, currently used as an objective measurement of smog severity^{(2) (3)}. The oxidant, being the result of a photochemical phenomenon, rises in the daytime and is low in the evening and during the night. These findings have resulted in extensive recovery measures in the oil industry, and in research on better combustion in the automobile. A

practical solution of this problem, and also the control of oxides of nitrogen, is still far away.

Based on experience gained in other areas, a great deal of stress has been laid on the control of directly visible pollution, dust and fume-producing sources. As a result, dust-fall has been reduced to half its former value; open dumps, foundries, steel mills and many sources of readily detectable, objectionable fumes have been corrected.

Careful investigations were made of industrial and municipal fuel-burning installations which were known to contribute considerably to air pollution in other areas. The problem in Los Angeles is, however, completely different, and a comparison with Eastern cities and their approach to clean air is rather useless, for no coal is burned in this area at all. Nearly all the power generated in this area is derived from petroleum products — fuel oil, gas and gasoline.

The power plant engineer is an expert in obtaining the maximum efficiency from his fuel. Routine industrial Orsat analyses are not able to detect any carbon monoxide; infrared spectrophotometric methods revealed the presence of only a few

ppm. of carbon monoxide. The concentration of hydrocarbons, aldehydes and organic acids do not exceed, as a rule 20 ppm. We may therefore, conclude that the combustion is, for all practical purposes, 100% complete. A constant check on this is part of the regular routine in the station. Moreover, smoke density is continuously measured in the stack, and this information is recorded in the control room. Also, the correct burning of the fuel is checked by means of a television set looking into the furnace. Under these ideal conditions, it would be expected that the stack gas would be wholly composed of carbon dioxide and water, the unused oxygen, and all the nitrogen and other normal components of air. Unfortunately, this view is rather optimistic, for we are not dealing with pure hydrocarbons in fuel, but with a product which contains, because of its origin, organic sulfur and nitrogen compounds. The inorganic materials, also present in the oil, give rise to a dust consisting, for the most part, of oxides of iron, nickel and vanadium.

During the combustion, organically bound sulfur is oxidized completely to oxides of sulfur, mostly sulfur dioxide, with a small amount of the trioxide. Depending on the nature of the nitrogen compounds, small amounts of oxides of nitrogen may be formed in addition to those produced in the fixation of atmospheric nitrogen at the high temperatures reached in the flame. A typical analysis of stack gas from a fuel-oil burning plant (Southern California Edison Company, El Segundo Steam Station) is shown in Table I. The Los Angeles County Air Pollution Control District has made estimates of the total quantities of all the various pollutants from the various sources in the Los Angeles Basin. These estimates are a matter of public record. Table II lists the relative contribution of dif-

TABLE I

Analysis of Stack Gas*	
Gas Velocity, F./Sec.	22
Gas Temperature, Deg. F.	688
Insoluble Solids, Gr./SCF	0.055
lb./Hr.	0.52
Soluble Solids, Gr./SCF	0.119
lb./Hr.	1.13
Water, %	9.4
Sulfur Trioxide, SO ₃ , ppm.	21.3
Sulfur Dioxide, SO ₂ , ppm.	945
Oxides of Nitrogen, NO _x , ppm.	670
ORSAT ANALYSIS	
CO ₂ , %	14.6
O ₂ , %	3.0
CO, %	0.0
N ₂ , %	82.4

*Franklin Laboratories Test No. 3, April 16, 1956, p. 2.

*Presented at the 50th Annual Meeting of the Air Pollution Control Association held at St. Louis, Mo., June 2-6, 1957.

TABLE II

Pollutants (Tons/Day) Emitted to the Atmosphere
in Los Angeles County from Combustion Processes

Fuel	Organics	Oxides of Nitrogen (as NO ₂)	Oxides of Sulfur (as SO ₂)	Aerosols Dust
Gas	20	100	100	10
Oil	10	200	300	30
Gasoline	1,000	400	40	30
Refuse	100	20	20	100
Total combustion	1,000	700	500	200
Total emissions	2,000	700	600	200

ferent fuels to the emissions from combustion sources alone.

The estimates in Table II have been rounded off, because it is rare when greater accuracy than 20 to 30% is obtained. This relatively large uncertainty is not a reflection on the quality of the work, but is inherent to this type of analysis. Especially in the case of computations of emissions of millions of automobiles and incinerators in all their variety, their different stages of disintegration, and manner of operation, it is practically impossible to obtain a satisfactory average. Then we introduce them, in addition, different weather conditions, sampling and analytical difficulties, to mention only a few more variables, it is clear that a figure such as the emission from gasoline combustion, indicated as 400 tons of NO₂ and 1200 tons of organics/day, must be accepted with considerable reservation. The hydrocarbon figure is probably reasonably accurate. There are differences of opinion on the quantity of oxides of nitrogen released by the automobile, and some maintain that the emission is nearly 800 tons/day. In the table, the lower figure has been chosen, which is already considerably higher than might be expected from the burning of 12,000 tons of gasoline/day.

Large scale testing of automobiles in the Los Angeles River bed has just been completed, and more definite figures will be available in the near future. It is not expected that the refinement in the analysis will cause a revision in the policy of air pollution control, based on obtaining the maximum efficiency in combustion of all kinds — gas, oil, gasoline or refuse. It does, however, emphasize the importance of the control of oxides of nitrogen in power sources other than automobiles.

Where methods of control are available, their application will be quite expensive in initial cost as well

as maintenance, and it is therefore necessary to discuss first the question why emissions of power plant stacks should be controlled. In attempting to answer this question, it is well to distinguish here between local and widespread effects.

While there is no debate about the necessity of controlling such nuisance effects, there is considerable difference of opinion on the need for control when no physiological effects are noticed on plants or animals. This is the case in the Los Angeles area, where complete lack of plant damage shows that the SO₂ content is less than 0.2 or 0.3 ppm. Chemical methods tend to confirm these low values, although it should be realized that most SO₂ measurements made in the Los Angeles area are based on conductivity measurements which are easily interfered with by other electrolytes occurring in this area. The uncertainty of the analytical results is ever greater in the determination of sulfur trioxide, or rather, sulfuric acid. There is no indication that there is any free sulfuric acid in the Los Angeles atmosphere, and any sulfate found was in bound form, either as calcium sulfate or ammonium sulfate, both harmless substances.

The investigations of Johnstone and Gerhard⁽⁴⁾ have shown that the oxidation of SO₂ to SO₃ is quite slow, and in laboratory experiments it was shown that during a 24-hr. period only 1/2% of the SO₂ is converted to sulfuric acid. The authors come to the conclusion that the gas phase oxidation of sulfur dioxide of naturally polluted atmospheres in natural sunlight would not be significant in effectively reducing the visibility, since it would require approximately 100 hr. of noon sunlight to reduce the visibility to one mile. For those living in other parts of the United States, this statement may do away with any suspicion that SO₂ has anything to do with a decrease in visibility. For the average Los Angeles

inhabitant, used to panoramic view of dozens of miles, Johnstone's arguments are not so convincing.

Recent investigations have directed the attention to the strong photochemical oxidizing effects of the oxides of nitrogen, and it has been shown that, in the photochemical oxidation of organic material under the influence of these oxides, aerosols are formed which are believed to be mainly responsible for the dense haze which accompanies the eye-irritating cloud.

It is suspected that sulfur dioxide is also subject to an accelerated oxidation. Although this acceleration could not be established for the reaction in gas phase, there is a distinct possibility that more rapid oxidation may take place in liquid phase reactions in fog droplets, or in a combustion of gas phase and liquid phase reactions at high humidity, whereby the presence of metal oxides may exercise a catalytic effect. In speculations of this kind, we should also take into account that the concentrations of SO₂ and NO₂ at the exit of the stack are several thousand times higher than at some distance away. Some conversion does take place at these higher concentrations, a fact which is familiar to any one who has made attempts to determine accurately the concentration of SO₂ and SO₃ in exhaust gases.

It is well known that the appearance of the plume varies greatly with atmospheric conditions, especially with high humidity and low temperature. Plume formation due to the presence of SO₂ is noticeable at concentrations of SO₂ above 20 ppm. The concentration of SO₂ measured in the flue gas of the El Segundo Station under ordinary conditions represents a borderline case. At times of high humidity, or low temperature, the plume is more pronounced than on dry and hot days, and on those hot, dry days the visible plume is probably caused, for the most part, by inorganic dust. These considerations are, of course, of interest to any one who installs corrective equipment. If the plume is caused by a conversion of SO₂ into SO₃, the removal of the sulfur trioxide is indicated. On the other hand, if dust is the major cause, electrostatic precipitation would be the method of choice. At present, the opinions are divided on this subject, and while this question remains undecided, both controls will have to be considered.

To study the removal of dust and sulfur trioxide, a Western Precipitation pilot installation has been in operation at the Redondo Steam Station, and more recently, a more refined unit of the same type was built at the El Segundo Station of the Edison Company to obtain data on the efficiency of collections at higher flow rates. An APRA precipitation unit, operating at a temperature of 700°F., is being tested at El Segundo.

Studies on the control of the emissions of oxides of sulfur and nitrogen by the electrostatic precipitator units show that dust and aerosol particles are collected, and gases such as the oxides of sulfur and nitrogen are not removed. There is some removal of sulfur trioxide, or sulfuric acid, and its concentration is reduced to 10-20 ppm., or about half of its original value. There is reason to believe that, after installation of full scale units of this type, the plume will have largely disappeared.

It is not expected that the removal of dust and sulfur trioxides from power plant emissions will have a noticeable effect on the smog conditions in general in the Los Angeles basin. Attempts are therefore made to combine the installation of dust removal equipment with means of reducing the sulfur oxides, and especially, the oxides of nitrogen which are known to be essential components in smog formation.

Control of Emission of Oxides of Sulfur

Processes have been developed in the past which reduce sulfur oxides occurring in stack gases at concentrations of several thousand ppm. to about one thousand ppm. In the burning of oil with low sulfur content, sulfur dioxide concentration in the stack gas is already down to the thousand ppm. level, or lower. There is, at present, no satisfactory process which could handle economically the large quantity of gas of the order of half a million cfm. and reduce the sulfur dioxide concentration appreciably. The same is true for the removal of oxides of nitrogen. Processes are known for the control of these gases in nitric acid plants, but here again, the concentrations are many times higher than we find in flue gases of Los Angeles power plants.

There are several approaches to the problem of reducing the sulfur dioxide content of stack effluents:

- (1) Use of gas, or fuel with lower sulfur content.
- (2) Scrubbing of exhaust gases with (a) liquids, and (b) solids.
- (3) Adsorption processes
- (4) Chemical conversions, and coupling with processes 2 or 3.

The Edison Company uses the maximum quantity of gas available, but the use of gas is unfortunately limited through its supply, and unless heroic measures are taken to increase importation of additional supplies, this shortage will be even more severe in coming years when more power is needed. The removal of sulfur from fuel is expensive, and would run into an increase in the fuel bill of several million dollars/year. The sulfur is present in complex ring systems and cannot be removed simply by washing with alkali.

The oil industry has been trying for years to break the heavy fuel oil to more valuable volatile products, but has not yet succeeded in doing this in an economically feasible manner. It is conceivable that a hydrogenation and special kinds of cracking processes could furnish more volatile fuel from which the sulfur has been removed as hydrogen sulfide. Any one of these processes will increase the cost of power considerably.

Scrubbing methods have been applied on large power plants in England along the Thames River. In the Battersea effluent process, SO₂ is removed by scrubbing with very large quantities of slightly alkaline river water. In the Howden I.C.I. non-effluent process the gas is scrubbed with a water slurry of lime or chalk. The resultant calcium sulfate, is removed by sedimentation and filtration, and is discarded. One of the objections to any scrubbing process is the cooling of the gases. Even though the gases are discharged from tall stacks they fall to the ground from time to time near the power station. This results in a nuisance, according to reports from England, where 2 stations are equipped with scrubbing devices. In order to prevent local complaints, it is necessary to remove almost completely both the obnoxious gases, SO₂ as well as NO₂, or reheat the flue gases before they leave the stack.

Other scrubbing processes use ammonia in ammonium sulfite with the intention of producing some usable product in the form of ammonium sulfate or sulfur dioxide or sulfuric

acid. Aqueous ammonia solutions are being used by the Olin Mathieson Chemical Corporation for the removal of sulfur dioxide, and it is claimed that one stage scrubbing will reduce the concentration of SO₂ in flue gas to 800 ppm.; a second scrubbing brings the concentration down to 300 ppm.

In the Fulham-Simon-Carves Ammonia Process, gases are scrubbed with a concentrated solution of ammonium salts (gas liquor), ammonia being added at a rate corresponding to that of the absorption of oxides of sulfur. Oxidation of sulfur dioxide to the trioxide was encouraged through the addition of iron hydroxide and air. Even with low incoming gas concentrations of 500 ppm., reduction in concentration to 30 ppm. was accomplished.

Wet scrubbing with organic solvents, such as xylidine has been considered and is similar to the Gerbitol process whereby H₂S is removed from refinery wastes with diethanolamine and similar basic solvents. In principle, the method can be applied to the removal of SO₂. The low concentration of the SO₂ and losses in solvents through the large volume of inert gas to be treated are not encouraging.

In general, the wet scrubbing processes do not seem too promising after the experience in London. The cost seems rather prohibitive when operating with low SO₂ concentrations. A cost estimate has been made by the U. S. Bureau of Mines⁽¹⁾ for the coal industry, and the table on the following page gives the estimated costs of 3 different processes, based on an assumed capacity of 20 million SCF/Hr., equivalent to 475,000 tons of coal/year. Annual operating costs are estimated for cases with and without the formation of saleable by-products.

Dry scrubbing is generally not regarded as economical because of poor penetration of the gases into the chemical agent or adsorbent. On the other hand, a selective removal of SO₂ and NO₂ by a solid has the advantage that cooling of the gases as in a wet scrubber may be prevented. The combination with alkaline chemicals is probably limited to the use of lime. In this respect, a combination of the waste products of cement plants and power plants deserves consideration, when the location of the plants is favorable and means of disposing of the combined waste products are available. This solution is,

Process	Capital Cost	Annual Operating Cost (Dollars/Ton of Coal)	
		No Credit	Credit
Limestone	\$1,131,150	\$1.23	\$1.23
Ammonia	2,855,500	3.00	1.40
Sodium Sulfite	2,176,650	1.99	1.79

of course, only feasible in a few selected areas and other means have to be found which are more generally applicable.

A modification of the dry scrubbing method consists in the introduction of potential alkaline reagents, such as chalk, dolomite or lime in the fuel bed at different locations. Some experiments along these lines are being conducted at the Southern California Edison Company El Segundo Station, mainly for the purpose of reducing the amount of sulfur trioxide. These methods are not expected to reduce materially the SO_2 or NO_x concentration. One disadvantage of the method is the addition of several tons of dust, which adds to the required size of the precipitators. A possible advantage may be that the stack gases are somewhat less corrosive.

Several of the experimentally tested methods of SO_2 control have been described in Mallette's *Problems and Control of Air Pollution*.⁽⁶⁾

Adsorption Methods

Adsorption on nonreactive media such as charcoal, silica and exchange resins opens the possibility of regenerating the adsorbed gases in more concentrated form by a simple process such as heating, treatment with steam or elution with aqueous ammonia solutions. Bench experiments at the Southern California Edison Company El Segundo Station have shown that activated charcoal adsorbs considerable quantities of sulfur as well as nitrogen oxides, even at temperatures of 150°F. The quantities adsorbed on different kinds of charcoal are listed in Table III. Recovery was accomplished by heating to 500-700°F., whereby the SO_2 is removed in concentrated form. After the adsorption and desorption the charcoal can be used again. This quality, very important for a successful technical application, is being investigated.

It has been observed that the oxides of nitrogen are adsorbed ahead of the sulfur dioxide and that they are gradually desorbed when the well defined SO_2 adsorption boundary

moves forward to the end of the column. Both oxides are concentrated in this process and existing methods of recovery could be applied without difficulty.

A process of this type is no doubt expensive. One of the best grades of charcoal adsorbs/gr. of charcoal, all sulfur dioxide from 2 ft.³ of flue gas, which means that at a rate of half a million ft.³/min. of flue gas, one needs every minute 2½ tons of charcoal. The possibility exists of accomplishing the adsorption in a flowing bed, as is being done for the separation of hydrocarbons by the petroleum industry. The conditions for sulfur dioxide adsorption are more favorable than for hydrocarbons because of the large quantities of SO_2 adsorbed. Some of the charcoals used adsorb as high as 30% of their weight of sulfur dioxide at room temperature and 10% at 150°F., notwithstanding the high water and CO_2 concentrations. An additional advantage is the complete absence in flue gases of gums which have given trouble in the technical application of adsorption methods.

Chemical Conversions

Many attempts have been made to convert sulfur dioxide into forms which would be easier to remove

from the gas stream. Reduction to hydrogen sulfide and sulfur, as well as oxidation to sulfuric acid have been carried out. Because of the low concentration of sulfur dioxide in flue gas, coupled with the presence of excess air, reduction methods seem not very promising. Oxidation to sulfuric acid, on the other hand, is carried out in the wet scrubbing Fulham-Simon-Carves process, but can also be accomplished by catalytic action of vanadium pentoxide.

The Control of Oxides of Nitrogen

In general, the oxides of nitrogen are more difficult to remove than the SO_2 . Scrubbing with alkaline reagent removes only a part of the oxides of nitrogen, even though strong bases are used. The major portion of the oxides of nitrogen originate in the fixation of atmospheric nitrogen at the high temperatures of combustion. The rapid cooling of the gases is an important factor in the relatively high nitrogen oxide content of the stack effluent, since rapid cooling prevents a shift of the equilibrium to the lower NO concentrations normally found at lower temperatures. It follows that a change in cooling rate or combustion temperature through changes in burner design or in the furnaces themselves might effect a considerable reduction in the nitrogen oxides formed.

There is also the possibility of decomposing the NO into nitrogen and oxygen, or of oxidizing it to the nitric acid stage. Both might be accomplished catalytically. After the oxidation, the strong acid character of nitric acid would make removal by

TABLE III
Adsorption of Sulfur Dioxide on Charcoal

Charcoal*	Adsorption Temperature (°F.)	Flow Rate Ft. ³ /min.	Mgs. SO_2 /g. Charcoal
A	77	0.1	153
	300	0.1	19
B	77	0.1	285
	150	0.1	127
	300	0.1	29
C	77	0.1	54
	300	0.1	30
D	77	0.1	244
	150	0.1	82
	220	0.1	62
E	77	0.1	143
F	77	0.1	253
G	77	0.1	225

*A, B, C, etc., are code letters for the different charcoals tested.

scrubbing with alkaline reagent a possibility, although the same objection can be raised against wet scrubbing as in the case of SO_2 . Chemical binding with lime is also a possibility, but will be dependent on the presence of cement factories. While work along these lines is going on, attempts are being made to eliminate the remaining oxides of nitrogen by chemical means. The most attractive process would consist in the decomposition to nitrogen and oxygen, and catalytic agents are being sought which will accomplish this.

Another approach is based on oxidizing the oxides to nitric acid, which then could be removed by scrubbing processes. The simultaneous presence of sulfur dioxide suggests the possibility of using reactions similar to those in the lead chamber process for making sulfuric acid. There are indications that catalytic agents can be used to convert both sulfur and nitrogen oxides to the higher oxides when excess air is present.

It is clear from the foregoing that no matter which process will ultimately be developed, the cost will be high. The return on valuable by-

products will be small, and even doubtful when all fuel burners begin to recover sulfur and nitrogen oxides. There is also no doubt that there will be a demand for ever-increasing completeness of the control, since the end of the population increase is nowhere in sight.

Such situations demand extraordinary methods, and one of these is the decision of all power generating agencies to work together to exchange information on anything that may lead to a solution to the problem of stack gas control. This decision is comparable to one taken several years ago in Pittsburgh when a council was formed by a group of people who had only one goal in mind — to clean up Pittsburgh. Forgetting private interests, these representatives of different industries prepared and carried out a campaign in air pollution control, which resulted in a marked improvement in the Pittsburgh atmosphere.

In Los Angeles, the Joint Research Council on Power Plant Air Pollution Control has been operating quietly since March of 1956. Its members include representatives from all the power companies in this area, to-

gether with delegates from the Los Angeles County Air Pollution Control District. These men meet regularly to exchange information on the research program now under way, and this in itself, is a big step in the right direction.

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4. E. R. Gerhard and H. F. Johnston, Photochemical Oxidation of Sulfur Dioxide in Air, *Industrial and Engineering Chemistry*, 47, No. 5, pp. 972-976. (1955).
5. From an unpublished report of the Bureau of Mines to the Public Health Service.
6. F. S. Mallett, Problems and Control of Air Pollution, Reinhold Publishing Corporation, New York, N. Y., 1st Edition, (1955).

REPORT OF THE SUBCOMMITTEE ON C₉ - C₁₂ AROMATICS

Kieffer Davis, M. D., Chairman

The interim meeting of the API MAC Subcommittee on C₉ - C₁₂ Aromatics convened at 9:00 A. M., April 21, 1958, in the Haddon Hall Hotel, Atlantic City. All but one subcommittee members were present. Also present were a number of visitors.

The chief investigator, Dr. Carl Nau, reviewed in detail the interim report which covered also the high lights of all of the subcommittee's activities from the inception of this program to the last annual meeting, November, 1957.

Significant findings to date are:

1. Painting the skin of C₃H brown male mice with C₉-C₁₀ leads to:
 - a. Amyloidosis in liver and spleen.
 - b. Sclerosis and cortical scarring in kidneyin greater frequency than in mice painted with C₁₁-C₁₂ or with n-decane. These changes are rarely observed in our "control" mice.

There is also observed:

- c. An increase in the percentage of polymorphonuclear cells.
2. Painting with C₁₁-C₁₂ leads to:
 - a. An increase in the number of white blood cells
 - b. An increase in the percentage of polymorphonuclear cells.
3. Inhalation studies using mice reveal:
 - a. An LD-50 indicating C₁₁-C₁₂ to be three times as toxic as C₉-C₁₀ and C₉-C₁₀ to be four and one-half times as toxic as benzene.
 - b. That benzene is rapidly eliminated or detoxified and that C₉-C₁₀ and C₁₁-C₁₂ are cumulative in effect-or detoxified slowly.
4. Inhalation studies using rabbits indicate that:
 - a. With adequate exposure (time and concentration) to benzene (3.2 mgm/liter) there is a fall in the white blood cell count and a rise in the percent of "polys."
 - b. With exposure to C₉-C₁₀ (3.2 mgm/liter) there is an increase in the white blood cell count.
 - c. With exposure to C₁₁-C₁₂ (3.2 mgm/liter) there appears to be a fall in the white blood cell count and a rise in the percent of "polys."
 - d. With exposure to n-decane (3.2 mgm/liter) there are no blood changes.
5. Inhalation studies using rats indicate that:
 - a. Blood benzene values can be determined in rats exposed to benzene - these values decrease very rapidly after exposure is ended.
 - b. Blood C₉-C₁₀ values are strongly suggested.
 - c. With 3.2 mgm/liter of benzene and 18 hours daily exposure, the low point of the white blood cell count occurs on the eighth day. This is followed by a rise with a secondary fall. The DNA is elevated when the white blood cell count is lowest. There is a shift in the lymphocyte versus polymorphonuclear percent on the eighth day. Exposed rats when killed show a hemorrhagic kidney and omental tissue and a congested liver.
 - d. With 3.2 mgm/liter C₉-C₁₀ the rats show hemorrhage around nose, white blood cell count falls rapidly (reaching "low point" on first day

following exposure), there is a fall in the percent of lymphocytes and a rise in the percent of "polys," the DNA rises and the platelet count falls. With continued exposure, these values all return to their original figures - or even beyond.

- e. Rats exposed to 3.2 mgm/liter benzene for 18 hours per day show no fall in body weight. Those exposed to 3.2 mgm/liter C₉-C₁₀ for 18 hours per day show an early fall in body weight followed by a rise to normal (or higher).

Although parts of the program are near completion, much is left to be done.

1. Additional work is necessary using C₁₁-C₁₂ and n-decane.
2. It was suggested that test animals be exposed to varying concentrations and for varying periods of time to the materials being tested and then set aside for observation of any latent manifestations that may develop.
3. Addition of larger species of animals (monkeys) to the testing program.
4. Human tests to determine concentration of materials necessary to cause irritation and other signs and symptoms (eye, throat, nose, skin). It is Dr. Nau's opinion that this can be accomplished this summer.

There was an unanimous expression that Dr. Nau is doing a genuine and creditable service for this subcommittee.

In view of the findings to date and because some time is needed yet to complete the program as planned, it is the recommendation of this subcommittee that funds in the amount of \$20,000 be made available for continuation of this work during the next fiscal year.

APPENDIX F

REPORT OF THE SUBCOMMITTEE ON CARCINOGENICITY

R. E. Eckardt, M. D., Chairman

The Subcommittee met in the Card Room of the Haddon Hall Hotel in Atlantic City on April 20, 1958 with numerous guests present. It received an interim report from Dr. A. W. Horton which is hereby transmitted to the Medical Advisory Committee. It received the final report of Dr. Phair's epidemiology studies. It transmits this report to the Medical Advisory Committee with commendation to Dr. Phair for a clear and lucid report which it feels is of value to the API MAC. The Subcommittee believes that a Subcommittee on Epidemiology should be created by the Medical Advisory Committee and that Dr. Phair's report be carefully reviewed by this new subcommittee as its first project.

The Subcommittee anticipates a final report from Dr. Horton by July 1, 1959, and anticipates no budgetary needs after that date.

REPORT OF SUBCOMMITTEE ON ECONOMIC POISONS

J. W. Osborn, M. D., Chairman

Meeting held Saturday, April 19th - Library - Haddon Hall - Atlantic City - 2-6 p.m.

Members Present

Dr. J. W. Osborn, Chairman
 Mr. R. C. Cole
 Mr. J. W. Hammond
 Dr. H. W. Gerarde
 Dr. M. N. Newquist
 Dr. T. G. Rigney (for Dr. Ralph Schneider)

Guests Present

L. C. Beard, Jr. (for Dr. George
 Saunders)
 Dr. B. B. Reeve
 Dr. L. E. Curtis
 Mr. C. A. Neilson
 Dr. Rupert Scott (London, England)
 Dr. Clark Miller
 Dr. Theodore M. Frank
 Dr. T. H. Mitchell
 Dr. L. deBoer (Amsterdam, Holland)
 Mr. Elmer Mattocks

The prepared agenda was discussed in the following order and these comments, opinions and recommendations represent the unanimous conclusions of the subcommittee for the MAC's consideration and information.

I. Status of Kerosine Research Program by Dr. Daeschner at Baylor University

A. The results of the Letter Ballot of March 7 on Dr. Daeschner's proposal resulted in 24 ballots cast by the April 1, 1958 deadline. Twenty (20) approvals and four (4) disapprovals were cast. Comments made by the four (4) disapproving and from one (1) approving were circulated to the subcommittee and these five individuals were specifically invited to attend the subcommittee meeting. Three (3) of those disapproving were present and changed their vote to approval. The fourth sent an alternate to the meeting who personally approves the proposal and voted "no vote" thus negating his principal's original disapproval. Therefore, Dr. Daeschner's Kerosine Research Program has received the unanimous approval of the MAC via Letter Ballot. Mr. Mattocks will promptly put the necessary contract procedure into effect and transfer the \$5,000 to Dr. Daeschner.

II. Model Precautionary Labeling Legislation of Hazardous Substances

The subcommittee reviewed and discussed in detail the information outlined in Report of Liaison Member - AMA - Dr. J. W. Osborn and makes the following observation and recommendations to the MAC:

1. In the past two weeks developments have occurred at the Federal level which will require the API President, Board of Directors, and Medical and Health Committee of the Board to make important decisions on this subject. It is the unanimous opinion of this subcommittee that the MAC should at once inform the Medical and Health Committee of the gist of the information contained in the Report of Liaison Member - in whatever form the Chairman of the MAC and/or the Director of the Department of Technical Services deem most important to the occasion.
2. The subcommittee unanimously believes that the primary "working responsibility committee" in this field is the Interdivisional Committee on Labeling insofar as the API is concerned. Should the Medical and Health Committee need further assistance from the MAC beyond or in addition to that which is available through the MAC medical representation on the Interdivisional Committee on Labeling (Drs. Newquist, Hine, and Gerarde), the Chairman of the Subcommittee on Economic Poisons (and Liaison Member-AMA), Dr. Osborn, will be available.

III. Possible Relationship Between Exposure to Stoddard-type Solvents and Thrombopenia

Clyde M. Berry of State University of Iowa (formerly Technical Advisor to MAC) raised this question for our consideration. The subcommittee knows of no connection other than coincidence and the Chairman will so advise Mr. Berry unless the MAC knows something to the contrary.

IV. Petroleum Products Used by Themselves Alone as Economic Poisons

A list of such substances was requested from Mr. E. P. Williams, Jr., Chairman of the API Committee on Agriculture in January 1958. He replied that his committee kept no such list of products and implied that this subject was not of interest to his committee. The Subcommittee on Economic Poisons voted to drop the preparation of a list from that source, it being of no interest to the Agricultural Committee.

V. Cooperative Project for the Evaluation of the Treatment of Kerosine and Related Petroleum Distillate Ingestion

The subcommittee has reviewed the work submitted to date on this study from Dr. Edward Press, Chairman Subcommittee on Accidental Poisoning, American Academy of Pediatrics. Dr. Horace Gerarde of our Subcommittee is participating in this Cooperative Project which provides additional liaison for us in this area.

VI. National Clearing House for Poison Control Centers

The subcommittee chairman wrote to Dr. Howard Cann, Director of the National Clearing House, Public Health Service, Washington, D. C. on March 3, 1958. He replied March 24th expressing gratitude for our interest in his poison control movement. His supply of list of Poison Control Centers of October 1957 was exhausted. There were 110 such centers then, now there are about 120. He will send me 30 copies for distribution to MAC as soon as the revised list is published. He indeed hopes to appoint an Advisory Council to the National Clearing House in the near future; thinks a representative from the API MAC would be an important representative; will keep the MAC in mind when this council is formed.

The subcommittee discussed this and the chairman will follow up.

VII. First Aid Measures for Persons Swallowing Petroleum Distillates

Communication from J. G. Schaafsma, Manager, Laboratories Department, General Petroleum Corporation dated January 24, 1958, at the suggestion of Dr. E. P. Luongo and E. K. Daniels was circulated to the subcommittee and discussed at this meeting.

In essence, the State of California Department of Professional and Vocational Standards Official Antidotes First Aid Treatment and Label Requirements latest bulletin, July 1, 1957, and the California Parent-Teacher Magazine, November, 1957, are widely publicizing "Gastric Lavage" and the "Universal Antidote" as first-aid in Coal Oil, Gasoline, and Kerosine Ingestion cases.

Even though this is contrary to the AMA Committee on Toxicology's published advice and this subcommittee's belief, the subcommittee unanimously agrees that the MAC is not in a position to recommend any official advice to the contrary at this time. The subcommittee chairman will attempt to explore this matter further for discussion at the next subcommittee meeting.

- VIII. A. Dr. V. C. Baird's request for a discussion of the scope and functions, short and long range goals of this subcommittee was done. A report in writing will be circularized through the subcommittee and submitted in final form in the near future to Dr. Baird.
- B. The summary report of the Subcommittee's annual activities due in the hands of the Operating Subcommittee by October 10th at Dr. Beard's request was discussed and the Chairman will do so.

Members Approving

R. C. Cole
J. W. Hammond
H. W. Gerarde
M. N. Newquist
T. G. Rigney (for R. Schneider)

Disapproving

C O P Y

April 21, 1958

CHALFONTE-HADDON HALL
Atlantic City, N. J.

Dr. V. C. Baird, Chairman,
Medical Advisory Committee,

The report of the Subcommittee on Medical Policies and Practices is that there has been no activity during the past year of this Subcommittee.

At the Subcommittee meeting yesterday, it agreed that it would offer its services to arrange a half day discussion at the Fall meeting. The necessary details could be handled by correspondence.

K. R. Fourcher, M. D.

REPORT OF THE SUBCOMMITTEE ON PHYSICAL AGENTS

C. H. Hine, M. D., Chairman

1. The Subcommittee has reviewed its function and has reconfirmed that this consists of service to the Medical Advisory Committee as a clearing house on matters of interest in the general area of physical agents relating to health. These include such items as noise, radiation (ionization), temperature extremes, repeated motion, ultrasonics, illumination, and radiation other than ionization.
2. The Chairman of the MAC has requested that the general scope of work of this Subcommittee on Physical Agents be defined. In compliance, the Subcommittee recommends as follows:
 - a. Short-term Goals
 1. To keep the MAC informed on important new items and developments in the area of physical agents relating to health.
 2. To prepare for submission to the MAC a list of journals, bulletins, new references, reports, etc., covering the best available new literature in the field of physical agents.
 3. To accept any assignment from the MAC on matters relating to physical agents.
 - b. Long-Term Goal
 1. To summarize on an annual basis for the MAC any new developments, progress, or other information relating to physical agents.
3. Members of the Subcommittee have been assigned responsibility for following individual technical areas included in the over-all coverage of the Subcommittee.
4. It is the consensus of this Subcommittee that no further donation to the Subcommittee on Noise in Industry of the American Academy of Ophthalmology and Otolaryngology should be made at this time. However, the work of that subcommittee is recognized as being important to the petroleum industry, and we, therefore, recommend that the possibility of a donation should be renewed at a future date, when economic conditions in the industry are more favorable.
5. No funds are requested for the next fiscal year.

REPORT OF THE SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS

H. W. Gerarde, M. D., Chairman

1. The committee recommends that the Medical Advisory Committee accept the invitation of the Editor of the AMA Journal of Industrial Health to publish the Toxicological Reviews (two each month) in this journal. The reviews would carry the announcement that copies are available from the API at 25¢ per copy.
2. The Subcommittee considers the following Toxicological Reviews ready for publication:

- a. Butadiene
- b. Naphthalene
- c. Toluene
- d. Copper Naphthenate
- e. Naphthenic Acids

These revisions will be circulated to the members of the Medical Advisory Committee for final review before publication.

3. Final drafts are in preparation on the following:

- a. Benzene
- b. Cumene
- c. Kerosine
- d. Xylene
- e. Cyclohexane
- f. Aromatic Solvent Naphtha

4. First drafts are in preparation on the following:

- a. Styrene
- b. Thiophene
- c. Morpholine
- d. Furfural
- e. Boron Trifluoride
- f. Nitrobenzene
- g. Diethylene Glycol
- h. Acrylonitrile
- i. Nickel Carbonyl
- j. Alkyl Disulfides
- k. Alkyl Mercaptans

Estimated cost for this group is \$1,500-\$2,500.

5. The next group of Reviews to be revised include:

- a. Aluminum Chloride
- b. Cresol
- c. Hydrogen Chloride
- d. Sulfuric Acid
- e. Ammonia
- f. Carbon Tetrachloride
- g. Mercury
- h. Methyl Ethyl Ketone
- i. Phosphorus Pentasulfide
- j. Sulfur Dioxide

API 07371

Estimated date of completion of this group is January 1959.

6. In response to a request by the chairman of the Medical Advisory Committee, the Subcommittee has defined its scope, functions, and objectives as follows:

- a. The accumulation, condensation, and presentation of the available toxicological information on a variety of substances of interest to the petroleum industry.
- b. The dissemination of this information in the form of Toxicological Reviews which are to be kept up to date by periodic revision every five years.
- c. Suggestions for new Reviews will be obtained by canvassing the membership of the Medical Advisory Committee.

New Toxicological Reviews will be prepared following approval of the Medical Advisory Committee from a list of substances selected by the Subcommittee.

APPENDIX K

REPORT OF THE SUBCOMMITTEE ON INDUSTRIAL HYGIENE

J. A. Spence, Chairman

The Subcommittee on Industrial Hygiene met on April 20, 1958 with nine (9) members and ten (10) guests present.

Liaison committee members to American Standards Association committees (Z-37, Z-4, and Z-62) reported no recent activities.

The matter of what action the subcommittee should take on The M. W. Kellogg Co. monograph "Health and Physiological Safety in the Process Industries" was reopened for discussion. The subcommittee again concurred that the excessive effort required to edit and modify this monograph is not justified. It is, therefore, the subcommittee's recommendation that work on this monograph be dropped.

As requested by the chairman of the Medical Advisory Committee, the subcommittee arrived at the following statement of its activities. The scope and functions are essentially the same as those previously stated at the November 1956 subcommittee meeting and are as follows:

Scope

The Subcommittee on Industrial Hygiene will concern itself with Industrial Hygiene problems common to the petroleum industry in general.

Functions

Its functions will include:

1. Advise concerning industrial hygiene matters on those problems referred to it by the Medical Advisory Committee,
2. Seek-out and evaluate industry-wide environmental health problems, referring those of significance to the Medical Advisory Committee with accompanying recommendations for handling when indicated,
3. Develop and provide industrial hygiene practices and methods for controlling environmental health hazards common to the petroleum industry and will keep informed of current developments in other industries,
4. Be responsible to the Medical Advisory Committee for those liaison memberships maintained with the American Standards Association committees.

Also as requested by the chairman of the Medical Advisory Committee, the Subcommittee arrived at the following statement of its current and long and short range goals.

Short-range Goals

API 07373

1. A preliminary summary of available industrial hygiene information on certain catalyst materials currently used in petroleum refining will be prepared within the next year (April 1959). Such processes as catalytic cracking, reforming, isomerization, hydroforming, alkylation, polymerization, hydrofining, and hydro-desulfurization will be studied. Subcommittee members have accepted assignments and will forward information to Mr. P. D. Halley, who is to serve as Catalyst Project Coordinator.

2. A roster in booklet form of industrial hygienists within the petroleum industry has been prepared and is available for limited distribution.

Long-range Goals

1. Work will continue on the catalyst project, amplifying and developing further information on the above catalysts. In addition, the study will be expanded to other refining and petrochemical type catalysts.

STUDIES IN EPIDEMIOLOGY IN THE AMERICAN PETROLEUM INDUSTRY

Report of Ad Hoc Subcommittee

1. It is recommended that the Medical Advisory Committee of the American Petroleum Institute create a standing subcommittee on epidemiology.
2. The objectives of the subcommittee should include but need not be limited to the following:
 - a. To collect information from member companies on the occurrence of new and unusual illnesses or health conditions thought to be related to the industry and to disseminate such information through the M.A.C. to member companies.

Examples: The occurrence of arsine poisoning; unusual lead exposures or poisonings.
 - b. To collect information upon the occurrence and conditions thought to be of particular concern to the industry within selected samples of employee population groups; to collect and analyze the information and to report the findings, conclusions, and recommendations, if any, to the M.A.C.

Examples: Skin cancer; cancer of the lungs; pneumoconioses.
 - c. To collect morbidity and mortality information upon selected conditions of major health importance among selected samples of employee populations; to collate and analyze the information and to report the findings, conclusions, and recommendations, if any, to the M.A.C.

Examples: Heart disease; accidental deaths, suicides.
3. It is recommended that the objectives should be, at least during the initial stages, strictly limited to a few conditions which can be measured quantitatively in a uniform manner where the population at risk is known.
4. It is recommended that the subcommittee be composed of seven members, four from the M.A.C., one of whom is to serve as chairman, and three from the technical advisors.
5. It is recommended that the scope of the studies and the methods of procedure be determined after study by the subcommittee.

George M. Saunders, M. D.

B. E. Bennison, M. D.

BEB/bpj
March 19, 1958

REPORT OF LIAISON MEMBER - AMA
J. W. Osborn, M. D.

A. Model Precautionary Labeling Legislation of Hazardous Substances.

1. The Chemical Specialties Manufacturers Association (CSMA), the Manufacturers Chemical Association (MCA), the American Association of Soap and Glycerine Producers (AASGP), and the National Paint, Varnish and Lacquer Association (NPVLA) have had Congressman Curtis (Missouri) and Congressman Williams (Mississippi) each introduce identical bills into the U. S. House of Representatives (now commonly referred to as the Curtis Bill). This bill is a Hazardous Substances Labeling Act to regulate the distribution and sale of packages of hazardous substances intended for household use for the purpose of promoting uniformity in Federal and State Legislation covering this field as defined. It is not intended to cover commercial, industrial, agricultural, horticultural, and related uses, nor does it invade the Food, Drug, and Cosmetic field.

2. The above Inter-Associations would like to see the Curtis (Williams) Bill passed in this session of Congress. The model on which it is based has received wide circulation and has helped in States where legislation is being considered. Their reason for Federal Passage of the Curtis Bill is that next year with many (over 40) State Legislatures in session there will be an avalanche of this type of legislation, and a Federal law would be a real stabilizing factor.

3. These Inter-Associations invited the API to attend an informal discussion meeting in Philadelphia last Thursday, April 17th. Mr. Mattocks asked Dr. Osborn to represent the MAC and Mr. R. D. Bent, and Mr. W. Herrman Barcus to represent the Interdivisional Committee on Labeling at this meeting.

4. The purpose of the meeting was to compare the Curtis Bill with the American Medical Associations Committee on Toxicology's proposed law which its Secretary, Bernard E. Conley, Ph.D., is currently attempting to persuade Congressman Curtis to introduce into the House of Representatives. This proposed bill is called the Uniform Hazardous Substances Act, and Dr. Conley describes it as follows: "A broad and encompassing act requiring precautionary labeling of hazardous substances in commercial, household, and industrial chemicals"-----and "is intended as a model for uniform laws to require the declaration of hazardous ingredients and warning statements on the label and in the accompanying literature of chemical products."

A copy of the act and a digest of its main features were submitted to Mr. Porter, President of API for his review and comment. Dr. Conley also advised that "A meeting to discuss this and other tentative legislative measures will be held in the near future."

5. These 2 proposed laws were compared thoroughly at the April 17th Philadelphia meeting. The Inter-Associations are to send 3 representatives headed by Mr. R. L. Ackerly of the CSMA to a discussion meeting in Washington, 5 P. M., Monday, April 21st, with Congressman Curtis' Deputy Assistant. The 3 API representatives agreed the API need not be represented.

B. Current State and City laws, Regulations and Enabling Acts already passed or under serious consideration in many States make it seem almost inevitable that some law on Federal level will be passed soon in the field of Hazardous Substances. The Inter-Association believes that the Curtis Bill is reasonable in scope, definition and content so that industry and commerce on the one hand and the Medical and legal professions on the other should be able to comply and be satisfied with it in helping to reduce the current number of morbidity and mortality cases that occur, and

without producing an undue burden upon the manufacturer to comply and the household consuming public to pay. The main objectives to the AMA proposed Bill seem as follows:

1. It is unnecessarily broad in scope, requiring "the labeling of all chemical products containing hazardous substances which are not now so regulated."
2. It eliminates the word "Poison" and substitutes "Toxic" with a very broad definition of "Toxic" which would probably, for example, require the precautionary labeling of Rock salt when sold to spread on the consumer's icy sidewalks.
3. It defines the signal words "Danger," "Warning," or "Caution" in such broad terms that thousands of chemicals would probably be required to carry one of them on the label so that they would rapidly be ignored as a signal word in the minds of the public and lose their effectiveness.
4. It introduces "strong sensitizer" to the list of Hazardous Substances, then defines it as any sensitizer, then says: "The frequency and severity of the sensitization reaction shall determine whether a sensitizing material offers a significant potentiality for causing injury." But it doesn't provide any guide as to who shall make this determination.

In short, the AMA proposed Bill seems to be verbose, confusing, and somewhat contradictory. It presents a very broad scope and rigid tests for substances to be included within its boundaries. It makes unnecessary distinctions between different types of products and different degrees of hazard - distinctions which, to the lay public which it is designed to protect, would have little or no effect, distinctions which could cause needless and undue burden upon a producer and confusion in the minds of the public.

C. Assuming that some Federal Law or Regulation may be in order as a model of sensible application in the field of hazardous substances, it would be this observer's opinion that, of the two proposed bills, the Curtis Bill is definitely preferable for the following reasons:

1. It is limited in scope to hazardous substances for household use where percentage-wise the need is greatest.
2. It retains the use of the word "Poison" which is arresting to most reasonably intelligent people when properly applied.
3. It defines "Poison" in sensible terms which can be understood as a Precautionary word and tested for both in the laboratory and on the basis of human data with reasonably accurate results for practical use.
4. It reserves for the producer and distributor of Hazardous Substances the choice of using on his labels any one of the three signal words "Danger," "Warning," or "Caution" which by dictionary definition and common usage are practicably synonymous.
5. It does not attempt to compete with or supercede the Federal Food, Drug and Cosmetic Act in the field of "Sensitizers" which are probably more prevalent in drug and cosmetic usage than in household, commerce and industry usage of Hazardous Substances outside the F. D. and C. Administration.

D. In conclusion, the entire field of prevention in this "Chemical and Atomic Era" in which we are living should rest its case more on "Education" than on "Compulsion through Legislation" for the "greatest good of the greatest number" with the necessary corollary never forgotten --- "and at the same time the least harm to the smallest number."