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February 16, 1953

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Mr. N. C. McGowen, Chairman
Safety Committee of Board of Directors
c/o United Gas Pipe Line Company
P. O. Box 1407
Shreveport 92, Louisiana

Dear Mr. McGowen:

At its meeting on September 25, 1952 the Institute's Medical Advisory Committee requested me to review its eight years of work and to report the results to you.

The report is enclosed.

Additional copies of it are available for transmittal to members of the Safety Committee of the Board if and when you desire to have them mailed.

Very truly yours,

E. Kern Linder

E. K. Linder M. D., Chairman
Medical Advisory Committee for 1952

mc - Members and Associates
Medical Advisory Committee

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Report of Progress
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in the

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of

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Final report is 26-60028, available
from HESD.

EP

The Kettering Laboratory
in the
Department of Preventive Medicine and Industrial Health
College of Medicine
University of Cincinnati
Cincinnati, Ohio

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Appraisal of the Potential Carcinogenic Properties
of
American Petroleum Products

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Report of the Progress
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Epidemiological Studies

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The Kettering Laboratory
in the
Department of Preventive Medicine and Industrial Health
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Cincinnati, Ohio

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American Petroleum Institute

Medical Advisory Committee

Report for Period 1945 - 1952

February 16, 1953

(1) Chronological Highlights*

- May 7 - 8, 1945 - Committee held organization meeting.
- May 15, 1945 - Executive Committee of Board approved Medical Advisory Committee recommendations to establish:
- (a) Special Medical Research Fund
 - (b) Three research projects:
 - 1. Chlorinated compounds
 - 2. Carcinogenic properties
 - 3. Permissible concentrations
- November 14, 1946 - Medical Advisory Committee requested increase in research fund and addition of two more projects, namely:
- (1) Cutting fluids study
 - (2) Fluorine study
- April 2, 1948 - Medical Advisory Committee recommended increase in program of work on carcinogenicity.
- November 11, 1949 - Medical Advisory Committee recommended retention of Professor Philip Drinker, Harvard School of Public Health, as consultant on industrial-hygiene problems.
- November 3, 1951 - Medical Advisory Committee recommended participation and financial support by and for petroleum industry in research on physiology of skin at Kettering Laboratory.

* See outline of Objectives, Functions and Procedures (January 18, 1952) attached as Appendix A.

(2) Financial Summary

(a) Contributions received 1945 - 1952	\$ 528,187.00
(b) Expenditures and commitments to June 30, 1953	
<u>University of Cincinnati</u>	
Carcinogenicity	\$ 396,506.91
Fluorine Studies	11,500.00
Physiology of Skin	7,500.00
<u>Harvard University</u>	
Toxicological Reviews	45,453.73
Cutting Oil Study	2,500.00
Philip Drinker	12,500.00
<u>Miscellaneous</u>	447.28
Total	\$ 476,407.92
Unobligated balance, December 31, 1952	\$ 51,779.08

(c) Budget for year ending June 30, 1954

<u>University of Cincinnati</u>	
Carcinogenicity	\$ 78,283.00
Fluorine	2,500.00
Physiology of Skin	5,000.00
<u>Harvard University</u>	
Philip Drinker	2,500.00
Total	\$ 88,283.00

(3) Objectives of Work

The Medical Advisory Committee functions as an advisory group to provide the Board of Directors with medical information deemed to be helpful in protecting oil-company employees against known and potential sources of industrial disease. It serves only in an advisory capacity. Its recommendations relate only to the medical aspects of specific problems.

Therefore, the committee by cooperative study, discussion, and recommendation seeks to anticipate and to ascertain conditions which may adversely affect the health of oil-company employees; to investigate the causes and circumstances giving rise to such conditions; to seek ways and means to prevent or remedy such conditions; and to make its findings available to the Board and, through it, to the industry.

(4) Status of Work

a. Carcinogenicity

As evidenced by the amount of money expended during the past eight years, the investigation of carcinogenicity properties of petroleum constitutes the major part of the committee's work. This long-range study may require the continued attention of the committee for many years; however, its immediate objectives are now well defined and on the road to accomplishment. The rate of expenditure should decrease substantially after June 30, 1954. (For detailed report on this study, see Appendix B to this report.)

b. Other committee activities

1. Toxicological Reviews

Literature reviews on sixty-three substances used or produced by oil companies have been prepared and made available primarily for oil-company use; but as a public service they are also available to public purchase at nominal prices. (See Subcommittee report attached as Appendix C.)

2. Fluorine Studies

Cooperating with industries and others interested in fluorine compounds, the Medical Advisory Committee is one of the sponsors of the investigative work being done at Kettering Laboratory (University of Cincinnati). The results obtained are available to the oil companies which contribute to the special medical research fund. (See report attached as Appendix D.)

3. Philip Drinker

Professor Drinker is an outstanding authority in the field of industrial hygiene. He has been retained by the committee and is available for advice upon request from any contributing oil company.

4. Physiology of Skin

The great need for knowledge on the physiology of skin and the lack of financial support for research on the subject have impelled the committee to take a modest share of the cost of a project underway at Kettering Laboratory. This is research of a fundamental character. There is no certainty of compensatory results. (See report attached as Appendix E.)

5. Atmospheric Pollutants

The committee seeks to keep informed on the medical aspects of atmospheric pollutants. (See report attached as Appendix F.)

6. First Aid

The committee has assisted in the preparation of the API First Aid Training Guide.

7. Cutting Fluids

The committee has endeavored to assist in problems incidental to the use of cutting fluids, but to date circumstances have not favored an organized study of the subject.
(See report attached as Appentix G.)

8. Medical Policies and Practices

This committee has arranged to make available upon request by any member or associate member the various records and record systems used by member physicians in their respective medical organizations. These records are available in the API headquarters. In April 1952 this subcommittee sponsored an information illustrated resume of how a good medical program functions in the petroleum industry. In September 1952 the subcommittee presented to members and associates a complete method of uniform medical records and sponsored a discussion on "What Constitutes a Good Record System in the Petroleum Industry".

In addition, in response to request made by the General Committee, Division of Refining, the Medical Advisory Committee is formulating the following:

1. Suggested minimum standards for physical examination of employees,
2. Suggested qualifications for medical directors and plant doctors,
3. Suggested uniform methods of preparation and maintenance of medical records of employees.

Additional information on any phase of this report or the work of the Medical Advisory Committee will be supplied promptly upon request.

E. Kern Linder, Chairman
Medical Advisory Committee for 1952

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OUTLINE OF OBJECTIVES, FUNCTIONS AND PROCEDURES
OF THE
MEDICAL ADVISORY COMMITTEE

(AS RECORDED IN COMMITTEE FILES AND MINUTES OF MEETINGS)

* * * * *

June 1, 1944 Dr. Robert E. Wilson, President, Pan American Petroleum and Transport Company, suggested by letter that the API Department of Safety investigate as to the availability of information on degree of hazard involved in the more important compounds being made or used in refineries.

June 21, 1944 Circular letter addressed to 27 members of the Institute's Board of Directors transmitted copy of Dr. Wilson's letter and quoted in part a letter referring to carcinogenicity of certain residue oil and requested expression of views on dissemination of information on health hazards and supplying of names of representatives.

August 25, 1944 Recirculated June 21 letter to 28 API directors, with statement of favorable response already made by 15 and with invitation to attend a joint meeting of safety and medical men in Chicago on October 2, 1944.

October 2, 1944 At the October 2, 1944 meeting of the Central Committee on Accident Prevention (attended by representatives of medical departments), those present voted unanimously to request the appointment of an API Medical Advisory Committee to formulate and recommend a program of work on the medical aspects of occupational health problems in the petroleum industry.

November 1, 1944 Circular letter to 28 directors requested names of medical men who should be made members of the Medical Advisory Committee.

February 23, 1945 Pursuant to nominations made by API directors, President Boyd appointed 16 oil company medical directors and physicians to serve as the Institute's Medical Advisory Committee.

April 3, 1945 Notice of first meeting (May 7 and 8, 1945) was issued with suggestion that members may be accompanied by non-medical technologists who are familiar with recent progress in hydrocarbon research and development.

May 7 & 8, 1945 Actions taken at first meeting of the Medical Advisory Committee included:

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1. Dr. McIver Woody, Standard Oil Company of New Jersey, was chosen to serve as chairman for 1945.
2. Selection of four studies for 1945, as follows:
 - a. Medical policies and practices and formulation of tentative procedures.
 - b. Chlorinated compounds, particularly chlorinated cutting oils used in petroleum products.
 - c. Possible carcinogenic properties of hydrocarbons.
 - d. Toxic effects and properties of other hydrocarbons, products and substances.
3. Placed names of each duly authorized associate on committee mailing list to receive all committee communications.
4. Recommended to the Executive Committee of the Board of Directors a three-year program of medical research to be conducted under the auspices of the American Petroleum Institute with guidance and advice of the Medical Advisory Committee, with authority to:
 - a. Raise \$25,000 special Medical Research Fund.
 - b. Establish three research projects on substances made, used, or sold by oil companies, as follows:
 - (1) Chlorinated compounds.
 - (2) Carcinogenic properties.
 - (3) Permissible concentrations.

May 15, 1945

The Executive Committee of the Board of Directors approved the recommendations as submitted by the Medical Advisory Committee.

July 1945

(See API Quarterly, Vol. 15, No. 3, July 1945, pages 18, 19, and 20, for public announcements on appointment and work of the Medical Advisory Committee.

November 16, 1945

At its second meeting, the Medical Advisory Committee:

1. Accepted subcommittee reports as follows:
 - a. Carcinogenicity - Dr. M. N. Newquist, Chairman
 - b. Chlorinated Compounds - Dr. F. F. Boys, Chairman
 - c. Permissible Concentrations - Dr. V. C. Baird, Chairman.
 - d. Medical Policies and Practices - Dr. R. A. Jewett, Chairman.

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2. Established budgets for allocation of funds for research on:
 - a. Carcinogenicity.
 - b. Permissible Concentrations.
3. Recommended that Dr. McIver Woody should continue as chairman during 1946 and that he should make changes in subcommittee memberships.
4. Recommended circularization of subcommittee reports in advance of each meeting.
5. Recommended Dr. Woody and Mr. Bonsib as member and alternate respectively on ASA Committee on Toxic Dusts and Gases (Z37).

April 5, 1946

At its third meeting the Medical Advisory Committee received and accepted recommendations reported by its subcommittees.

November 14, 1946

At its fourth meeting the committee received and accepted recommendations reported by the subcommittees, and voted to ask the Executive Committee to authorize solicitation of \$30,000 for allocation to research work in 1947 as follows:

1. Carcinogenicity	\$ 10,000
2. Permissible Concentrations	10,000
3. Cutting Fluids	5,000
4. Fluorides	5,000
TOTAL	\$ 30,000

April 28, 1947

At its fifth meeting the committee received reports and adopted recommendations submitted by its subcommittees, and voted that the chairman should report committee activities to the Safety Committee of the Board of Directors.

November 13, 1947

In addition to the adoption of subcommittee recommendations reported at its sixth meeting, the Medical Advisory Committee voted that all meetings of the committee and its subcommittees should be closed to all persons except members, associates, and invited guests.

April 2, 1948

The seventh meeting of the committee resulted in recommendations to the Safety Committee of the Board for the enlargement of the program of work on carcinogenicity at Kettering Laboratory.

November 12, 1948

The eighth meeting produced recommendations relating to API medical publications and circulars and to atmospheric pollution, in addition to those pertaining to subcommittee work.

April 2, 1949

Preliminary to the regular order of business at the ninth meeting, the chairman stated that the members of the Medical Advisory Committee, in executive session, had requested him to report statements of committee policy as follows:

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Appendix A

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1. Decisions on recommendations as to medical problems and policies and as to appropriations of funds for medical research should be the sole responsibility of the fully accredited members (MDs) of the Medical Advisory Committee.
2. Recommendations to individual oil companies about contributions to the API Medical Research Fund also should be the sole responsibility of the fully accredited members.
3. In keeping with these responsibilities, each motion and each vote on such a matter should be made or cast by a fully accredited member or, in his absence from the meeting, by his duly designated representative.
4. No limitations should be imposed upon associate members or invited guests in the discussion of motions at meetings of the Medical Advisory Committee.
5. At meetings of subcommittees there should be no restrictions limiting the making of motions or voting by associate members of the Medical Advisory Committee.

(The members present voted unanimously to adopt these statements of committee policy.)

November 11, 1949

At the tenth meeting the Medical Advisory Committee was informed of action taken by the Executive Committee of the Board of Directors on November 10, 1949, to wit: "That the Safety Committee of the Board of Directors of the API be requested to ask the Medical Advisory Committee to refer to the General Committee of the Division of Refining all material dealing with or affecting refinery operation or petroleum products, prior to approval for the publication of this material by the Institute or through other channels."

April 24, 1950

The eleventh meeting was devoted almost entirely to actions on subcommittee reports.

November 10, 1950

At the twelfth meeting members were of the opinion that work was being delayed and in some cases jeopardized by the number of guests in attendance, particularly when guests are unidentified. This led to adoption of a committee policy that future meetings of the Medical Advisory Committee and its subcommittees should be "closed" except for the first of the two sessions of the Medical Advisory Committee.

April 21, 1951

The thirteenth meeting was concerned only with reports and appointments of subcommittees.

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PROGRESS REPORT OF SUBCOMMITTEE ON CARCINOGENICITY

MEDICAL ADVISORY COMMITTEE A.P.I.

British experience with occupational skin cancer, particularly from the oils, a few cases of skin cancer among petroleum workers in the United States, and the fact that catalytic cracking produces polycyclic aromatic hydrocarbons suggested the possibility of an occupational skin cancer hazard in this industry from some petroleum materials. Research Project (MC-1) was, therefore, established to study this subject.

OBJECTIVES of the research project are (1) determination of which, if any, refinery streams and products are carcinogenic, (2) identification of cancer-causing agents, (3) development of an analytical tool for determining the carcinogenic potency of any oil instead of having to rely on time-consuming, expensive biological testing, (4) investigation of protective measures which might be applicable, and (5) epidemiological studies to determine cancer incidence among workers in the petroleum industry. A special progress report from Dr. R. A. Kehoe summarizes the research work to date and is attached hereto as part of this report.

Summary of Dr. Kehoe's report and of the research work are as follows:

1. Carcinogens are present in low concentrations in crude oil, the amount varying in different crudes.
2. These carcinogens are concentrated by distillation in the high-boiling fractions. Catalytic cracking, and thermal cracking to a lesser degree, create additional carcinogens and these are likewise concentrated in the high-boiling fractions.

Progress is being made toward identifying the individual or classes of polycyclic aromatics which cause the skin cancers.

An analytical tool (spectrophotometric) has been developed by which the potencies of cracked residues apparently can be predicted with fair accuracy. To date this tool has not proven applicable for high-boiling straight-run or cracked distillates due to variables such as the presence of materials, as yet unidentified, which accelerate or retard the action of the carcinogens.

In a carcinogenic oil was removed from the skin of mice by washing with soap and water 10 minutes after applications, practically no skin cancers developed. Washing 4 hours after applications greatly delayed the time before skin cancers appeared in the mice. When washing was done 9 hours after applications, skin cancers developed on almost the same basis as if there had been no washing. This is of considerable practical significance since it confirms previous opinions and experience that personal cleanliness is the most effective preventive measure.

Mouse studies have shown that the potencies of catalytic cracked residues can be reduced by dilution with non-carcinogenic oils. Mouse tests of some samples from certain refining processes which are known

to alter or remove polycyclic aromatics have revealed a reduction or elimination of cancer potency of such samples to mice. Further studies may yield information of practical significance, but present studies are directed towards the fundamental aspects of the problem rather than the testing of large numbers of individual samples. No studies are directed towards changes in processing.

7. The study of incidence of skin cancer among employees in the petroleum industry (epidemiological survey), which is not a costly item, should be continued for a period of years in order to be of practical value.
8. This research project (MC-1) started on a small scale in 1946 and was expanded in 1949. Expenditures and allocations up to June 30, 1953, will total \$404,893.33. The budget for this project for the year starting July 1, 1953, is \$78,283.00.

DISCUSSION - While the results of experimentation on mice may not be strictly applicable to man, these findings plus the development of scrotal cancers among some wax pressmen and the fact that catalytically cracked residues have a close resemblance to coal tars in their effects on mice and in their content of certain types of polycyclic aromatics, indicate that a potential skin cancer hazard exists in certain petroleum materials and that appropriate control measures are advisable. Three points should be emphasized: first, the time it takes for a skin cancer to develop in man after exposure to a carcinogen is long, estimates being as high as ten to twenty years or more; second, skin cancer on the surface can be readily detected in its early stages when it can be treated; and third, whether or not a skin cancer is due to oil requires careful evaluation of all pertinent facts and circumstances.

FUTURE ACTIVITIES - While it is not expected to develop all the answers to this problem, it is reasonable to expect that within the next year or two it will be possible to outline more clearly the magnitude of the hazard and to recommend specific preventive measures where indicated. It is also expected that further progress will be made in developing analytical methods which will enable a refiner to determine the carcinogenic potencies of oils without resorting to time-consuming biological testing or at least to minimize the need for animal testing.

PREVENTIVE MEASURES - Industrial hygiene engineering controls, avoidance of unnecessary skin contact, good personal cleanliness, and adequate medical control which includes periodic physical examinations are the fundamentals in the prevention of occupational skin cancers due to oils. Of these, good personal cleanliness is a simple measure which can and should be observed by everyone. It will not only aid in this particular problem but is of value in the control of occupational dermatitis in general.

HAZARD TO CUSTOMERS - An epidemiological study of cancer among employees in the petroleum industry to aid in evaluating the hazard is a part of the research project. The matter of similar studies to determine whether a hazard exists among customer employees exposed to petroleum products has been kept in mind since the inception of the subcommittee. Due to the many difficulties and possible undue implications that would be involved in an epidemiological study

Appendix B

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of cancer among employees of oil company customers, it is the consensus of the subcommittee that no action be taken with respect to such a study. However, the subcommittee will continue to give this subject its earnest consideration and no recommendations for action will be made without the knowledge and consent of interested divisions of the Institute.

M. N. NEWQUIST, M.D., Chairman

November 20, 1952

ATTACHMENT: Progress report from Dr. R. A. Kehoe (November 7, 1952)

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Kettering Laboratory - University of Cincinnati

THE POTENTIAL CANCER HAZARD IN THE PETROLEUM INDUSTRY

Introduction

This investigation has as its primary purpose the appraisal of the hazard of cutaneous cancer to persons whose work involves contact of their skin with petroleum products. For the sake of perspective, it is well to recognize that occupational cancer has long been known to medical men. Examples are "mule spinners" cancer, the bladder cancer of workmen employed in the manufacture of beta naphthylamine, and the malignant tumors of the lung, skin, bone and blood of those whose occupations have provided exposure to certain radiations and radioactive materials.

A feature of occupational cancer which should be mentioned to provide further perspective is the time factor so often associated with its induction. Regular or intermittent exposure to cancer-inducing materials over periods of ten or fifteen years may be required to induce the disease. This and other features of the disease necessitate reliance upon employment and medical records for direct information. Since such records are not available, generally, in the petroleum industry, it is impossible to determine by direct means, the significance of the hazard which has existed up to the present time. Resort must be had to indirect measurement of the potential hazard, therefore, and adequate recording must be instituted for the future.

This report must limit itself to the experimental program undertaken and thus far prosecuted by the staff of the Kettering Laboratory. Acknowledgement must be made, however, if only in passing, of the many contributions of other investigators in this country and abroad, and also of the invaluable information and help given by many representatives of the companies that have supported the investigation.

Initiation and Cost

The work of this Laboratory on this problem, under the sponsorship of the American Petroleum Institute, and at the instigation of its Medical Advisory Committee, began in April of 1946, in a preliminary manner. The early observations served to point up the need for precision in the experimental methods and for means of expressing the results in numbers which would portray the relative carcinogenic potencies of materials under test.

A systematic attack on the general problem was initiated in 1949, after extensive planning by representatives of API and the Laboratory. Funds were provided for an expanded experimental program, and additional sums have been added annually. The investigation has been carried out essentially as planned under the critical guidance of a Research Advisory Committee. The expenditures made for the prosecution of the work, including those involved in the preliminary work (\$6000.00) and those provided for physical facilities (\$40,000.00), will have reached the total sum of approximately \$335,000.00 by the end of 1952, and somewhat more than \$400,000.00 by the end of 1953.

Scope and Methods

The investigation has been conducted along the following four main lines:

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1. Representative samples of petroleum products derived from various raw materials and technologic processes have been selected;
2. The samples have been tested (biological tests) for their capacity to induce cancer in susceptible mice;
3. Systematic efforts have been made to relate the cancer-inducing capacity of these materials to certain physical and chemical properties and to certain specific chemical constituents (chemical research);
4. Data on the incidence of cancer among employees of the petroleum industry are being gathered (epidemiologic research) to establish the scope of the control measures that might be required, and the extent to which control measures, once applied, shall have achieved success.

The procedure that seemed to be required to carry out these four lines of investigation within reasonable limits of time and cost, was that of applying the available biological and technologic methods of study to relatively few samples of clearly defined type with respect to source and processing procedure, while at the same time subjecting the experimental methods to critical examination, and adapting them to specific practical ends.

The ultimate goals of the investigation are intensely practical, in that the work is pointed toward precise localization of the hazard, the determination of its significance, and the elaboration of the means by which it may be prevented or controlled. Such information will enable the industry to apply measures of prevention or control which will be appropriate, whether based upon technologic or hygienic procedures.

Progress

Samples of three hundred and forty (340) product and feed streams have been collected from over two hundred (200) operating units, in conjunction with continuing study of detailed data on charge streams and operating conditions. These samples have been examined for physical properties, among which the pattern of their transmission of ultraviolet light has appeared to be of special significance as a means of predicting their cancer-inducing capacity. Further work has tended to relate these properties to specific chemical compounds. One hundred and sixteen (116) samples of such products have been subjected to biological tests. Some of these have been fractionated and retested piecemeal, one of them to the extent of thirty (30) different fractions, and others in lesser numbers of fractions.

The epidemiologic aspects of the investigation have developed slowly, but are now progressing. Medical records are being gathered in accordance with a plan accepted by medical representatives of a number of the participating companies.

Results

A firm foundation has now been laid for further work. Careful exploration of significant variables in the methods of biological testing has led to the development of techniques of observation and recording whereby all results can be related to each other and expressed in simple terms of cancer-inducing potency.

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Certain practical questions have been answered by the biological tests. As a generalization, it can be said that certain current technologic processes in the petroleum industry tend to concentrate cancer-inducing substances which are present in low concentration in crude petroleum, while certain other processes result in an absolute increase in the available quantity of cancer-inducing substances. By this means certain products and intermediate materials come to possess a significant capacity for inducing cancer of the skin of mice. Cracked residua from catalytic cracking commonly exhibit relatively high potencies of this type, although it should be noted that these potencies may vary over a ten-fold range from one source to another. These products bear such close resemblance to the coal tars, with respect to their effects upon mice and also as to their content of certain types of polycyclic aromatic hydrocarbons, as to support the belief that the hazards of the two types of materials are comparable.

It has been established that the high cancer-inducing capacity of a catalytic gas oil cannot be reduced by further thermal cracking on a practicable basis. However, by such methods, appreciable proportions of the hazardous streams may thus be broken down to valuable noncarcinogenic products such as gas and gasoline.

Spectrophotometric analysis of distillate fractions of residua from catalytic cracking and also from thermal cracking of catalytic gas oils has revealed in them characteristics which have been associated with their relative cancer-inducing potency. Such analysis, therefore, has become a useful tool, when employed experimentally with appropriate reservation of judgment, for the estimation, by physical means, of the extent of carcinogenic properties in these types of cracked residua. Satisfactory analytical methods for predicting the potencies of side-stream products of catalytic cracking and coking operations are still being sought. An increasing body of evidence is being developed, which indicates that a major contribution to the potencies of such distillate streams is being made by noncarcinogenic alkylbenzene components, which boil in the range 400°-600°F, acting as accelerators. The fuller understanding of this phenomenon which has come out of the work of the past few months has given promise of the development of a reliable and widely applicable physical method of estimating the carcinogenic potency of any petroleum intermediate or product.

Chemical fractionation experiments are pointing the way toward a classification of the polycyclic hydrocarbons which are responsible for the carcinogenic potency of catalytically cracked oils, and which, at the same time, are responsible for the characteristic absorption spectra of such oils. The specific carcinogenic compound, 3,4-benzpyrene, has been isolated from a sample collected from a catalytic cracking unit, in a state of purity satisfactory for its positive identification.

The information obtained by animal experimentation, while not strictly applicable to man or to the conditions of his occupational exposure, is such as greatly to strengthen the suspicion, which was responsible originally for these investigations, that an occupational hazard actually exists. There is need, therefore, for the development and application of appropriate and effective measures of control.

From the Kettering Laboratory in the Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati.

Robert A. Kehoe, M. D., Director

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ASSIGNMENTS AND ACCOMPLISHMENTS OF THE
SUBCOMMITTEE ON TOXICOLOGICAL REVIEWS

The Subcommittee on Toxicological Reviews, of which I am chairman, was created in 1951, to replace or succeed the Editorial Subcommittee in the handling of work on toxicological reviews. Both of the above mentioned subcommittees in turn were created for the purpose of editing the toxicological prepared reviews at Harvard University by Professor Philip Drinker and associates under the auspices of the Subcommittee on Permissible Concentrations. The Subcommittee on Toxicological Reviews has compiled comments from member companies and carried on minor editorial revising of the toxicological reviews. In addition they have seen to the publication of the various toxicological reviews already distributed and in process.

Two additional toxicological reviews have been prepared by Professor Drinker during the past year. These reviews on oil mists and lead compounds and cutting oils have been circularized among the Medical Advisory Committee members and associates.

Marshall Clinton, M. D., Chairman

October 20, 1952

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REPORT OF

SUBCOMMITTEE ON FLUORIDES

The introduction of HF alkylation caused the petroleum industry to be confronted with the question of health hazards arising from the operation of HF alkylation units as affecting man, animals, and plant life. In January, 1946, considerable hysteria arose among farmers and residents in the industrial regions of Southern New Jersey relative to potential and alleged crop damage. Prior to this and in the central part of the United States, the aluminum industries had experienced great difficulty with fluorosis of cattle grazing in the vicinity of aluminum plants. Accordingly, the A.P.I. Subcommittee on Fluorides was formed to study the matter from the standpoint of the petroleum industry.

One of the first efforts of the Subcommittee was to seek a scientific organization that would undertake such studies. After considerable investigation it was found that the Kettering Laboratory was already working on fluorides, the project being sponsored by five companies handling HF or fluorides to the extent of \$17,000.00 per year. The five companies extended an invitation to A.P.I. to participate in the work and made available all previous data and reports on the project. A.P.I. agreed to contribute \$2,500.00 per year (on a year-to-year basis) and thus received the benefit of an extensive investigation at a nominal cost. Payments of \$2,500.00 per year started in 1947 and have been continued to the present time. Since 1947, several other interested companies have joined the group, the active sponsors in 1952 being:

The Pennsylvania Salt Manufacturing Company
Aluminum Company of America
Reynolds Metal Company
Universal Oil Products Company
American Petroleum Institute
Kaiser Aluminum and Chemical Company
Tennessee Valley Authority
The Harshaw Chemical Company
Minnesota Mining and Manufacturing Company

During the past years reports have been issued on the fluoride problem covering such investigational studies as:

Ingestion of Fluorides
Inhalation of Fluorides
Metabolism of Fluoride by Man
Effects of Fluoride on Man and Animals
Report on Legal Treatment of Fluorine

In addition to the above, a complete and extensive literature abstract survey has been made containing all known references to the subject of fluorine. In 1950, Part I, a 525-page bibliography, was issued on Inorganic Fluoride Compounds entitled, "Publications Concerning Fluorine and Its Compounds in Relation to Man, Animals and Their Environment Including Effects on Plants". In 1952, Part II was issued, a 464-page volume on Organic Fluorine Compounds.

Appendix D

- 2 -

In summary, the A.P.I. Subcommittee on Fluorides has been very fortunate in participating and helping to promote an extensive investigation on fluorides through cooperation with other industrial companies interested in the problem. It has received through this means the benefit of a study far more comprehensive than it could possibly undertake itself at a fraction of the cost of such work.

It is therefore the recommendation of the Subcommittee that the A.P.I. Medical Advisory Committee continue to support this research at the Kettering Laboratory.

George M. Saunders, M. D., Chairman

By

A. C. Pabst

October 20, 1952

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REPORT OF THE
SUBCOMMITTEE ON SKIN PHYSIOLOGY

The Subcommittee on Skin Physiology was created in the fall of 1951 in order to consider a request by Dr. Robert A. Kehoe of the Kettering Laboratory for financial assistance in studies being conducted in his laboratory on the physiology of the skin. These studies were already in progress at the time of the creation of the Subcommittee and were being supported by several other interested groups, including the Air Force.

At its first meeting, the committee believed that the work at the Kettering Laboratory on skin physiology was of such importance to petroleum industry that the Medical Advisory Committee of the API could well recommend that financial support be given to this work. This was based on the knowledge that dermatitis to petroleum products is an ever present problem and on the fact that little is known about the normal physiology of the skin. Therefore, it is believed that until such information on the normal physiology of the skin is developed it will be almost impossible to understand the pathologic physiology of the skin. In consequence, therefore, the committee recommended that the API Medical Advisory Committee support this research at the Kettering Laboratory to the extent of \$5,000 a year, this money to be given as \$2,500 in 1951, \$5,000 in 1952 and an additional \$5,000 in 1953.

One progress report has been submitted by Dr. Kehoe in which it was reported that the laboratory is studying the chemical composition of the fats of the skin in order to understand the chemical changes that occur in these fats in the presence of certain types of dermatitis. In addition, absorption into and through the skin is being studied by radioactive tracer techniques. It is contemplated that information of this type may ultimately lead to basic knowledge on skin physiology, which will be of great value to the petroleum industry in its attempt to control the dermatitis which may result from certain petroleum products.

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

October 15, 1952

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REPORT OF SUBCOMMITTEE ON
ATMOSPHERIC POLLUTANTS

The American Petroleum Institute and other organizations have undertaken the study of atmospheric pollutants and are attempting to determine causal relationships to the petroleum industry. These studies are many and varied and much has been learned concerning pollutants and the characteristics of atmosphere. Investigations involve studies by engineers, chemists, physicists, meteorologists, botanists, economists and others.

Your Subcommittee of the Medical Advisory Committee has constantly kept itself informed of the results of these various studies and researches to the present time. We, as a part of the Medical Advisory Committee, are interested in the factors of air pollutants that might injure or affect the health of the human being either directly or indirectly. To date little is known about the exact effect of smog on human health. Your committee is aware that certain presumptions have been made to the effect of air pollutants is detrimental to well being. How serious this presumptions threat may be has not yet been established. U.S.P.H. is undertaking certain studies at this time which may give us some factual exact data with regard to what acute or chronic effect or physical residuals, air pollutants may have on the well being of humans.

Your Subcommittee has not received any assignments nor any questions for solution on the general subject of air pollutants. Your Subcommittee awaits the results of research that is being carried on at the present time or future research that might connect in some manner any deleterious physiologic effect of air pollutants. At the present time your Subcommittee is not sure whether there is an unknown substance "X" or unknown substances "X, Y, Z" that might affect the well being of man, animals or plants. Theories and presumptions are numerous and when more exact information is available to your Subcommittee, it is felt that no research be undertaken at this time for the determination of whether or not air pollutants are harmless or a nuisance or that it may have a physiological effect that is harmful to the human being.

E. P. Luongo, M. D., Chairman

By

John C. Ruddock, M.D., Vice Chairman