



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FYI-AX-0382-0148
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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

REGISTERED MAIL

MEMORANDUM

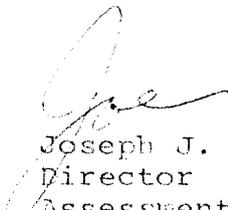
TO: Charles Gray, Director
Emission Control Technology Division
Office of Mobile Source Air Pollution Control/OANR
(ANR-455)

SUBJECT: Referral of Final Report on Unleaded Gasoline

Attached is the final report (4 volumes) of a chronic rat and mouse inhalation study of unleaded gasoline, which was performed by the International Research and Development Corporation for the American Petroleum Institute. According to this report, there was an increased incidence of renal carcinomas in male rats at all test concentrations. On the basis of test material and exposure route employed in this study, the Office of Mobile Source Air Pollution Control may be the most appropriate Office within the Agency to consider the need for further assessment.

On April 6, 1982, Terry O'Bryan of my staff discussed this matter by telephone with Joe Somers of your staff, who requested a copy of the final report.

If you have any questions or would like to discuss this matter further, please contact Frank Kover, Chief of the Chemical Hazard Identification Branch at FTS 382-3436.


Joseph J. Merenda
Director
Assessment Division (TS-778)

Attachments

cc: Stanley Blacker ONSAPC/OANR
Frank Kover CHIEF/AD

000002



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 21 1982

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Mr. Milton Rhoad
Executive Director
International Institute of Synthetic Rubber Producers
Suite 133
2077 S. Gessner
Houston, Texas 77063

(713) 783-7511

Dear Mr. Rhoad:

Further to our telephone conversation of June 16, 1982, the U.S. Environmental Protection Agency would appreciate receiving complete copies of the final reports and addenda of the long term inhalation study and inhalation teratology study of 1,3-butadiene in rats conducted at Hazelton Laboratories Europe, Ltd. The Agency has already received preliminary reports of the former study from Exxon Chemical Americas (EPA Document Control Number: 8EHQ-1180-0370 et seq.) and of the latter study from the Dow Chemical Company (EPA Document Control Number: 8EHQ-0382-0441) under Section 8(e) of the Toxic Substances Control Act (TSCA). Please address the requested reports and addenda to:

Document Control Officer
Management Support Division
Office of Toxic Substances (WH-557)
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

If you have any questions regarding this request, please contact me at (202) 382-3466.

The Agency looks forward to continued cooperation with the International Institute of Synthetic Rubber Producers in its efforts to evaluate potential risks posed by chemicals to health and the environment.

Sincerely,

Terry R. O'Bryan

Terry R. O'Bryan
Environmental Scientist
Assessment Division

File with FYI-AX-00148

NINETY-EIGHTH CONGRESS

1181

Congress of the United States

House of Representatives

ENVIRONMENT, ENERGY, AND NATURAL RESOURCES
SUBCOMMITTEE

OF THE

COMMITTEE ON GOVERNMENT OPERATIONS
RAYBURN HOUSE OFFICE BUILDING, ROOM B-371-8-C
WASHINGTON, D.C. 20515

SUBCOMMITTEE ON ENVIRONMENT, ENERGY AND NATURAL RESOURCES

DATE: July 14, 1983
TIME: 10:00 a.m.
PLACE: 2154 Rayburn House Office Building
SUBJECT: Subcommittee Hearing on Potential Health Risks
Associated with Exposure to Gasoline Fumes

WITNESS LIST

- (1) Charles DiBona
President
American Petroleum Institute

- (2) Mr. Vic Rasheed
Executive Director
Service Station Dealers
of America

PANEL

Dr. Ellen Silbergeld
Environmental Defense Fund

DR.
Mr. Robert E. McGaughy
Acting Director
Carcinogen Assessment Group
Environmental Protection Agency

DID NOT ATTEND

Dr. Norton Nelson
Institute of Environmental
Medicine
New York University Medical
Center

MIKE SYNAR, OKLA. CHAIRMAN
ROBERT E. WISE, JR., W. VA.
BARBARA BOXER, CALIF.
MEL LEVINE, CALIF.
JOE KOLTER, PA.
TOM LANTOS, CALIF.

LYLE WILLIAMS, OHIO
WILLIAM F. CLINGER, JR., PA.
LARRY E. CRAIG, IDAHO

MAJORITY—225-6427
MINORITY—225-2738

NINETY-EIGHTH CONGRESS
Congress of the United States
House of Representatives

ENVIRONMENT, ENERGY, AND NATURAL RESOURCES
SUBCOMMITTEE

OF THE

COMMITTEE ON GOVERNMENT OPERATIONS
RAYBURN HOUSE OFFICE BUILDING, ROOM B-371-B-C
WASHINGTON, D.C. 20515

OPENING REMARKS OF

MIKE SYNAR, CHAIRMAN

July 14, 1983

Today the Subcommittee on Environment, Energy and Natural Resources will begin its examination of potential health risks associated with exposure to gasoline fumes. Specifically, the Subcommittee will review a report compiled for the American Petroleum Institute that found that gasoline fumes caused kidney cancer in male rats at all exposure levels tested, and cancer in female mice at the highest level of exposure tested.

Based on the International standards for determining the cancer potential of a substance, gasoline vapors must be considered an animal carcinogen posing a potential threat to humans through exposure to those fumes. It should be noted, however, that these tests do not confirm that a cancer risk is posed for humans, and much additional testing must be done.

Today we will explore whether or not the estimated 47 million Americans who use self service gasoline pumps may be exposed to any health risk. We will also address whether any greater potential risk may be posed for the 1.5 million gasoline service station workers, and an undetermined number of terminal and refinery workers and gasoline haulers.

Unfortunately, we come to this hearing with more questions

than answers. We don't know, for example, if these gasoline fumes pose any cancer risk to persons exposed to them at low levels. We don't know the exposure levels for average consumers or those working with gasoline. We don't know for certain at what exposure levels a real risk might be posed.

In an action to be commended, the American Petroleum Institute has provided draft warning labels to its member companies for placement on pumps or islands, so that workers and consumers may be alerted to a potential risk.

We do not know which constituent or group of constituents in the gasoline mixture is responsible for the animal cancer found through recent research conducted for API.

While the Environmental Protection Agency has been reviewing the data on this matter for over a year, we still have no conclusions from them concerning the potential risk, or whether any steps should be taken to limit exposure to gasoline fumes.

The National Institutes of Health and the National Toxicology Program are the federal agencies designed to review toxic substances and make recommendations on the degree of danger which may be posed by them. However, those agencies have not even begun to consider whether any health risk may be posed by exposure to gasoline fumes.

Clearly, we must take a cautious approach. It may be possible that at some point steps should be taken to limit human exposure to these fumes. We will be exploring that possibility here today.

It is my hope that through an open dialogue we can begin to provide some information to consumers and workers about any potential threats they may face.

Before introducing our first witness, I'd like to make one additional observation. The tests conducted for API were conducted on unleaded gasoline. Last year, this Subcommittee held hearings on the dangers posed by leaded gasoline. Leaded gasoline probably poses an even greater health threat than unleaded gasoline, and I want to note that we are not suggesting that the regulations enacted last year to restrict the levels of lead in gasoline should be reduced. Nor should consumers switch to leaded gasoline based simply on the results of API's tests.

Tetraethyl lead used in leaded gasoline is a proven neurotoxin and has contributed to unhealthful levels of lead, particularly in children. As a result, companies may wish to consider posting the warning labels on both leaded and unleaded gasoline pumps.

I'm going to call on my friend and colleague from Ohio, Mr. Williams, our Ranking Minority Member, for a statement.

First, however, I want to conclude by noting that our first witness today is Mr. Charles DiBona, President of the American Petroleum Institute. I would like to thank Mr. DiBona and his staff at API for their considerable cooperation with the Subcommittee on this matter. I would also note for the record that it is indeed unusual and refreshing to see the head of a major organization such as API take such swift action on a matter of potential importance to many million Americans.

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Testimony by

Charles J. DiBona
President, American Petroleum Institute

before the
ENVIRONMENT, ENERGY AND NATURAL RESOURCES SUBCOMMITTEE

COMMITTEE ON GOVERNMENT OPERATIONS
UNITED STATES HOUSE OF REPRESENTATIVES

July 14, 1983

ties, for years we have contracted with a variety of institutions for studies of issues relating to our industry. Our commitment to health research alone has involved budgeting more than \$22 million by API over the past 10 years.

One of our primary research interests relates, obviously enough, to gasoline -- the main product of our industry. In the mid-1970's, for example, we looked at the effects of short-term (acute) exposure to gasoline on a variety of animals. Nothing remarkable was found; indeed essentially all the tests were negative. In 1978 we continued this line of inquiry by contracting with the International Research and Development Corporation (IRDC) of Mattawan, Michigan for an examination of the effects of long term exposure to gasoline vapors.

In essence, the chronic study involved 800 rats and 800 mice, equally divided by sex. For six hours a day, five days a week, these experimental subjects were assigned to one of the following treatment groups: one group exposed to an atmosphere in which gasoline vapors were diffused at 67 parts per million; a second group with vapors at 292 parts per million; a third group with vapors at 2,056 parts per million; and a control group exposed only to filtered air.

The vapor concentrations were created from a standard EPA reference fuel. Some of the animals, at periodic intervals, were sacrificed, and others died of other causes, during the course of the 27-month study. (Incidentally, the normal life-expectancy of these animals is two years.) All were given complete examinations, including microscopic tissue evaluation. To date,

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Mr. Chairman, members of the Committee: my name is Charles J. DiBona and I appear before you as the president of the American Petroleum Institute. The API is a trade association serving 6,000 individuals and 275 corporate members involved in all facets of the petroleum industry.

Your invitation requested that I discuss, from a historical perspective, our research into the relationship between exposure to gasoline vapors and health. I am pleased to have the opportunity to do this. My testimony will summarize our program. More detailed scientific discussions of our research are available and can be supplied to the Committee if you so desire.

At the outset, I want to emphasize one major point. Based on available research, it does not appear that there is significant risk to consumers from normal exposure to gasoline vapors, such as encountered using self-service pumps. Nevertheless, the results of preliminary research with some laboratory rodents and suggestive data from studies on workers make the preparation of model hazardous communications material a responsible, cautious step to take at this time.

With that important point made, I would like to begin my testimony with some background.

Since 1945, API has sponsored research designed to increase our understanding of petroleum products and the processes used to produce them. While API has no in-house health research facili-

the experts who have carefully looked at the research agree that its methodology was sound and its design was consistent with the highest scientific standards. Basically, the experimental design was an improved version of that " used by the National Cancer Institute.

The principal findings of the study indicated that while survival of the exposed animals was excellent, the 154 male rats exposed to gasoline vapors for 18 months or longer developed 14 dose-related kidney tumors, of which 11 were malignant. None of these animals died from the tumors. Female mice showed a statistically significant elevation in liver tumors only at the highest exposure level. In addition, there was progressive kidney damage in male rats at all dose levels tested.

These results, Mr. Chairman, are a part of only a small body of scientific literature on this subject. Scientific knowledge in this area is uncertain and will remain so for some number of years. The literature does not establish a consistent pattern. While microscopic kidney damage has been observed in male rats after a 90-day exposure to gasoline, no similar effect has been observed in mice or monkeys which also have been exposed. So far as we know, the effect may be confined to certain species of animals. Beyond that, toxicological research, by its very nature, is not designed to provide definitive answers about human risk. To get a sense of that, we need to turn to other fields of science, including epidemiological studies which attempt to determine the causes and levels of disease in human populations.

When we look at the available epidemiological studies of workers, the evidence indicates that there is no major human health problem. Indeed in the case of refinery workers, the overall level of mortality is below that of the general population. It is the case that levels of kidney cancer in some of these studies are somewhat above the level found in the general population. However, the most recent study of refinery workers, by Texaco in May 1983, shows less than the normally expected number of cases of kidney cancer among those with job categories involving potential exposure to gasoline and middle distillates.

In a British study of driver-loaders, the authors report a statistically significant increase in kidney cancer among a subpopulation of older workers. In that study overall, there was no statistically significant increase in kidney cancer. With respect to interpreting this study, the authors themselves have cautioned "Several aspects of the study method, or non-occupational factors such as lifestyle, could influence differences between observed and expected deaths."

So the evidence of this relationship is mixed at best, and clearly does not suggest a problem of major proportion.

Empirically, we see no widespread problem among workers who have higher levels of exposure. Logic thus suggests that consumers face even less of a problem. In that regard, it is essential to recognize that experimental exposure levels and "normal" exposure levels differ. Based on recent but limited exposure data, self service customers at gasoline stations are exposed to less than one part per million on an eight-hour time

weighted average, service station attendants to less than 8 parts per million, and tank truck drivers to 13 parts per million. As you recall, the lowest exposure used in our research was 67 parts per million, and the highest was 2,056 parts per million.

There is no definitive evidence which suggests that we are facing a major human health problem. Again, it does not appear that there is a significant risk from normal exposure to gasoline. Nevertheless, the questions raised by the studies are sufficient to suggest that further work would be prudent. API and the industry have responded in three separate ways.

First, because it is common sense to learn more about this issue, API is continuing with on-going research and initiating a substantial additional research effort concerned with possible links between exposure to gasoline vapors and human health. Let me, briefly describe this ongoing research program.

There are several structural steps we have already undertaken. We have retained Universities Associated for Research in Pathology (UAREP) -- an internationally renowned consortium of universities -- to review the original research findings to help determine their relevance to humans. Next week we are sponsoring a symposium in Boston which will draw together 200 scientists, including many of the leading kidney experts in the world, in order to discuss the current state of knowledge and consider where we should go from here in addressing this issue.

Beyond these efforts, we have undertaken a series of studies, now in various stages of development and all designed to answer

different questions which have emerged over time as we continue to work through this problem.

We want to continue to expand our knowledge of actual levels of exposure to gasoline in different circumstances. Accordingly, we have various industrial hygiene projects underway which will allow us to better estimate the levels of gasoline vapors in different environments.

As we are learning more about actual exposure levels, it is logical that we also attempt to learn more about the causes and distribution of kidney cancer in humans. To facilitate that process, we have contracted for an extensive literature review to track down the available evidence.

And it also makes sense to try to go beyond existing information. We will be initiating a series of studies designed to determine how worker health may or may not have been affected by exposure to gasoline. In that context we are planning an epidemiological study of terminal and distribution workers. We are also looking into the feasibility of conducting a case control study using mortality data gathered by some of our member companies. And we will sponsor an analysis of kidney cancer cases previously collected from a Minnesota population.

In addition, as still another prudent action, we are asking experts in renal physiology and functional pathology to devise an early screening test capable of monitoring the kidney functions of people exposed to gasoline vapors. When this capacity is developed, comprehensive clinical research of exposed workers will be possible.

We recognize that this kind of research will take years to complete and even then it probably will not answer all the questions society has. To minimize that time lag and to try to fill in some of the gaps in our knowledge, we plan a series of additional animal tests. One such test is a short-term study of rats to determine if we can identify specific nephrotoxic components and fractions of gasoline and then use those components in more complex life cycle tests to determine if we can replicate the results of our original tests. This research could be valuable in determining what corrective action, if any, might be appropriate if subsequent research suggests that a genuine risk exists. We also want to examine more closely the dynamics of pulmonary absorption of gasoline as well as look at the effects of skin exposure.

This research program, we hope, will continue to give us a greater understanding of the effects of exposure to gasoline on human health.

Even though current knowledge does not suggest that a serious problem exists, an obvious second response to the data was in recognition of our responsibility to report our results to the government and to our members. API's standard policy is to report the results of all health and environmental effects research to the appropriate government agencies within 15 working days of receipt, and we carefully follow that policy. When IRDC sent us a letter in November 1981 designed to call our attention to the kidney damage they found, we provided copies to both EPA and OSHA. Later the same month, a lengthy letter from one of the firms

providing consulting services on this research was received and sent to the government. Additional materials, such as draft final reports, were also forwarded to the government. In addition, some of our members sent our data to EPA under section 8(e) of the Toxic Substance Control Act. Since the research was sponsored by API, we have acted on behalf of our members in communicating the results of our research. In addition to informing appropriate agencies, I have also sent a letter to every member of Congress informing them of our findings. We have, then, taken action to keep the government informed.

Thirdly, we know that we should broadly disseminate the information that we have. While the available evidence indicates that the probability of a significant association between renal cancer and normal gasoline exposure is minimal; the possibility of such an association, however remote, cannot be ignored. Accordingly, we have shared our data with the news media and they in turn have helped inform the public. Between April and June of this year, for example, API has talked with more than 100 reporters and contributed to the development of the more than 70 stories that have appeared in the general press and on radio and TV. Additionally, we put out a general news release on our work.

In addition to working with the media, we have undertaken efforts to disseminate this information among others, including, of course, our member companies. At the request of our members, API has voluntarily developed suggested language which can be posted at gasoline pumps and passed out to consumers informing them of any possible risks they may face from exposure to gasoline

vapors. May I again emphasize that, based on evidence in hand, we do not believe those risks are significant. Nonetheless, such warnings may be a prudent precaution and that is why our members asked us to develop them. We sent the suggested warning language out in late June to individual companies for use by petroleum companies as they see fit.

Let me conclude, Mr. Chairman, by making this observation. Over the past few years, there has been a growing concern about the dangers to human health that may be created by a variety of substances. The petroleum industry is sensitive to that concern and committed to dealing with this issue in a way which protects consumers and workers.

We believe that goal can be accomplished only if we follow a course of total honesty, total communication, and total cooperation with the government. If there is a problem, we want to be the first to know about it. Equally important, if there is a problem, we want to be the first to tell people about it. Our research is designed to get us answers. Our public affairs program is designed to share those answers with the government and the public.

So far I believe we have been fair and forthcoming. We intend to continue to behave in that way. In that spirit, if you have any questions, I would be delighted to answer them.



2024 F STREET N.W. SUITE 303
WASHINGTON, D.C. 20006
202 293-1566

VIC RASHEED
Executive Director

17

TESTIMONY OF
*
VIC RASHEED
ON BEHALF OF THE
SERVICE STATION DEALERS OF AMERICA
BEFORE THE
HOUSE SUBCOMMITTEE ON ENVIRONMENT AND ENERGY
AND NATURAL RESOURCES
ON GASOLINE VAPOR STUDY
JULY 14, 1983
WITH ATTACHMENTS

OFFICERS

DON SHILLING
President
Mil Valley, CA

TRACY STANTON
First Vice President
Bexley, OH

DAVE WOODWARD
Second Vice President
Ft. Lauderdale, FL

EMMETT PROBUS
Third Vice President
Louisville, KY

TOM MARKOS
Treasurer
Mountainside, NJ

JERRY COHEN, Esq.
General Counsel
Washington, DC

CHAIRMAN SYNAR, MEMBERS OF THE SUBCOMMITTEE, THE SERVICE STATION DEALERS OF AMERICA APPRECIATES THIS OPPORTUNITY TO EXPRESS OUR CONCERN OVER THE RESULTS OF THE RECENT API STUDY WHICH INDICATES THAT GASOLINE VAPORS MAY CONTAIN A POTENTIAL CANCER-CAUSING AGENT.

SOME OF OUR STATIONS ARE ALREADY POSTING WARNING SIGNS ON THEIR PUMPS AS A RESULT OF THE STUDY. UNTIL THIS ISSUE HAS BEEN RESOLVED, WE MUST CONTINUE TO FEEL A DEEP CONCERN FOR THE HEALTH OF THE NEARLY ONE AND A HALF MILLION PEOPLE WHO WORK IN SERVICE STATIONS. PERHAPS EVEN MORE SO, OUR CONCERN EXTENDS TO THE MILLIONS OF MOTORISTS WHO NOW REFUEL THEIR AUTOMOBILES EACH DAY AT SELF-SERVICE PUMPS.

SELF SERVICE NOW ACCOUNTS FOR AN ESTIMATED 70% OF OUR GASOLINE SALES.

BEARING IN MIND OUR RESPONSIBILITY TO BOTH OUR EMPLOYEES AND CUSTOMERS, I BELIEVE WE IN THIS INDUSTRY HAVE A DUTY TO PRESS FOR A NATIONAL POLICY TO BE PUT IN PLACE AS SOON AS POSSIBLE, TO SAFELY HANDLE ALL GASOLINE VAPORS RESULTING FROM AUTOMOBILE REFUELING.

THE SYSTEM THAT THIS INDUSTRY RECOMMENDS IS THE SELF-CONTAINED, ON-BOARD VAPOR RECOVERY SYSTEM WHICH CAN BE ADDED TO NEW AUTOMOBILES. A VERSION OF THIS SYSTEM HAS BEEN INSTALLED IN ALL AUTOMOBILES BUILT SINCE 1971 TO MEET EPA'S EVAPORATIVE EMISSION STANDARD. THIS STANDARD FOR ALLOWABLE HYDROCARBONS WAS REDUCED TO ABOUT 1/5 THE 1971 STANDARD IN 1981.

THE SEALED HOUSING SYSTEM IN USE TODAY IS LIMITED TO RECOVERING VAPORS ESCAPING FROM THE CARBURETOR WHEN THE VEHICLE IS STOPPED AND VAPORS EMITTING FROM THE GAS TANK AS THE GAS EXPANDS WHEN THE TANK TEMPERATURE RISES. HOWEVER, IT CAN BE EASILY ADAPTED TO BECOME A COMPLETE VAPOR RECOVERY UNIT TO ALSO RECOVER THE VAPORS WHICH ESCAPE DURING THE REFUELING OPERATION. THESE ARE DRAWN INTO THE MOTOR AND BURNT.

THIS CAN BE DONE BY INCREASING THE SIZE OF THE CHARCOAL RECOVERY CANISTER FROM ITS PRESENT SIZE OF ABOUT ONE QUART TO ONE GALLON, AND BY ADDING A DONUT RING IN THE FILLER-PIPER TO EFFECT A SEAL WITH THE GASOLINE NOZZLE. IT THEN BECOMES AN EFFECTIVE VAPOR RECOVERY SYSTEM WITH ADEQUATE BUILT-IN PROTECTION FOR MOTORISTS AND ATTENDANTS ALIKE.

I HAVE SPOKEN ABOUT THIS TO DESIGN ENGINEERS FROM THE BIG THREE AUTOMOBILE MANUFACTURERS IN DETROIT. THEY BELIEVE THE COST OF EXPANDING THE EXISTING UNIT TO BE \$10-15 PER VEHICLE. THEIR

MAIN CONCERN SEEMED TO BE FINDING ROOM TO PLACE THE LARGER CANISTER UNDER THE HOOD.

I BELIEVE THE AVERAGE NEW CAR BUYER WOULD GLADLY PAY \$20 FOR THE ASSURANCE THIS TYPE OF PROTECTION WOULD PROVIDE.

THE ALTERNATIVE IS THE COMPLICATED, CLUMSY VAPOR-RECOVERY STAGE II SYSTEM CURRENTLY BEING TRIED ON PUMPS IN CALIFORNIA AND WASHINGTON, D.C. THE SYSTEM HAS PROVEN EMINENTLY UNSATISFACTORY AND UNRELIABLE TO OPERATORS AND MOTORISTS ALIKE.

THE STAGE II NOZZLES ARE HEAVY, AND THEIR TWO HOSES MAKE THEM UNWIELDY. THE NOZZLES ARE NOT SUPPOSED TO PUMP GAS UNLESS THEY EFFECT A SEAL WITH THE FILL-PIPE. THIS OFTEN CAUSES SLOW REFUELING. MOTORISTS CIRCUMVENT THIS BY PRESSING BACK THE SPRING-LOADED SEAL WITH THEIR FINGERS AND ALLOW THE VAPORS TO ESCAPE ANYWAY.

THE VAPOR RECOVERY HOSE HAS BEEN KNOWN TO SUCK BACK GASOLINE AND SIMPLY RECIRCULATE IT. SIXTY GALLON FILL-UPS IN VOLKSWAGENS HAVE BEEN RECORDED. THE NOZZLES ALSO BECOME STUCK IN VEHICLE FILL-PIPES, BREAK OFF IN GAS TANKS AND REGURGITATE GAS OVER MOTORISTS WHEN THEY MALFUNCTION. THEY ARE EXPENSIVE TO MAINTAIN AND AWKWARD TO USE. THEY FRUSTRATE MOTORISTS AND OPERATORS ALIKE.

THEY ARE LIMITED TO STATIONS DOING OVER 50,000 GALLONS PER MONTH BECAUSE OF THE EXPENSE OF INSTALLING THEM. THIS RUNS ABOUT \$20-25,000 PER STATION AND WOULD PROBABLY RESULT IN THE CLOSING OF MANY SMALLER STATIONS IF STAGE II WERE ADOPTED NATIONALLY. THE NOZZLES WERE ORIGINALLY INTENDED PRIMARILY TO COMBAT HIGH OZONE LEVELS IN HIGH DENSITY AREAS, NOT FOR COMPREHENSIVE GASOLINE VAPOR RECOVERY.

SOME ENVIRONMENTAL OFFICIALS IN CERTAIN STATES ARE PUSHING FOR STATE ADOPTION OF THE NOZZLE. THIS WOULD ALLOW THEM TO MAINTAIN FEDERAL FUNDING FOR THEIR DEPARTMENTS AND ALSO WOULD LEAD TO MORE STATE FUNDING.

SELF-CONTAINED, ON-BOARD SYSTEMS REQUIRE NO FUNDING OR POLICING. THEY GIVE PROTECTION IN RURAL AREAS AS WELL AS IN CITIES. THE MOTORIST DOES NOT HAVE TO BOTHER WITH IT, BUT HAS ADEQUATE PROTECTION AT ALL TIMES.

IF GASOLINE VAPORS ARE HARMFUL, THEY ARE AS DANGEROUS IN THE SMALL TOWNS AS IN LARGE CITIES. ONLY A SELF-CONTAINED, ON-BOARD SYSTEM CAN GUARANTEE COMPLETE PROTECTION.

WE CANNOT AFFORD A PIECEMEAL SOLUTION TO WHAT APPEARS TO BE A MAJOR NATIONAL PROBLEM. THE SOONER WE BEGIN EQUIPING VEHICLES WITH SELF-CONTAINED VAPOR RECOVERY UNITS, THE SOONER AMERICAN MOTORISTS WILL BE ABLE TO BREATHE EASIER AND SAFELY AGAIN.



2021 K STREET, N.W. SUITE 303
WASHINGTON, D.C. 20006
202/293-6868

April 27, 1983

VIC RASHEED
Executive Director

Mr. William D. Ruckelshaus
Environmental Protection Agency
Office of the Administrator
401 M Street, SW
Washington, DC 20460

Dear Mr. Ruckelshaus:

The Service Station Dealers of America is deeply concerned with the results of a recent study done by the American Petroleum Institute. This indicates that over a two year period, gasoline vapors did cause kidney cancer in male rats. A further study of oil refinery workers in Texas confirms a higher than normal incidence of cancer. These tests are continuing.

To safeguard the health of our 60,000 service-station-dealer-members, their employees and customers, we believe that all new cars should be equipped with the "onboard", vapor recovery system, which has been studied by EPA in recent years.

This system like the Stage II vapor recovery nozzles installed in California and the District of Columbia, is intended to recover all gasoline vapors containing carcinogens. Stage II however, was approved for an ozone strategy, primarily in high density areas. The onboard system would clearly be the most practical and effective in a comprehensive program to control all gasoline vapors throughout the country.

EPA came very close to approving the "onboard" system in 1978 after a favorable evaluation program. The oil industry gave full support to the "onboard" system, and continues to do so.

There are compelling reasons to reexamine this system today, one of them being the increased use of self-service pumps by motorists and the potential hazard to them from gasoline vapors.

The system is also needed to protect service station employees and the whole environment, rather than just a few selected areas. People living near service stations could also become victims of gasoline vapors.

OFFICERS

DON SKILLING
President
Mill Valley, CA

TRACY STANTON
First Vice President
Bexley, OH

DAVE WOODWARD
Second Vice President
Ft. Lauderdale, FL

EMMETT PROBUS
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Mountainside, NJ

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General Counsel
Washington, DC

Page 2
Mr. Ruckelshaus
April 27, 1983

The system is much more practical to install today because of the evaporative emission controls which are currently being installed in new cars. This includes many components of the "onboard" vapor control system.

While this device is designed to recover and burn vapors which escape from the carburetor, it already has a collection canister containing activated charcoal under the hood, and has the connection to the fuel tank. All that would be required to make it an effective onboard vapor recovery system would be a larger canister and a rubber "doughnut" in the filler pipe, to effect a seal with the pump nozzle to prevent escaping vapors.

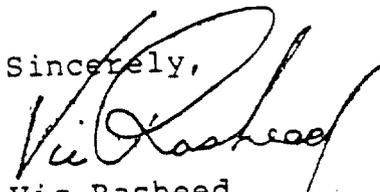
The additional cost for each vehicle to make this a full-fledged vapor recovery system would be negligible.

A program to retro-fit older cars might also be devised.

The widespread, obvious advantages to be gained from this system would win broad approval for and indicate this administration's commitment to a cleaner, safer, environment.

We urge your serious consideration of this project.

Sincerely,



Vic Rasheed
Executive Director

VR:er

cc: Lee Verstandig, Acting Administrator

American Petroleum Institute
2101 L Street Northwest
Washington, D.C. 20037
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ON-BOARD CONTROL OF REFUELING EMISSIONS

Demonstration of Feasibility

PROGRAM OVERVIEW

PROGRAM OVERVIEW

Background

At a meeting with Environmental Protection Agency's staff in November 1977, American Petroleum Institute representatives were advised by EPA that timing constraints precluded EPA from conducting an in-depth research evaluation of the "feasibility and desirability" of on-board control of vehicle refueling vapor emissions, a statutory requirement of the Clean Air Act Amendments of 1977.¹ A suggestion by EPA that API might wish to consider such a research program then led to a series of meetings with staff at EPA's Ann Arbor Motor Vehicle Source Pollution Control Laboratory to discuss what an adequate onboard study might constitute for purposes of decision making by the Administrator. It was very clearly indicated by EPA at these meetings that an appropriate effort would require only the demonstration of technically feasible and cost/effective control concepts in a few representative late model or prototypes passenger car vehicles. Preferably, these test vehicles should be equipped with advanced exhaust and evaporative emission control hardware to the extent practical within the required time constraints and hardware availability. Should EPA then decide in favor of on-board control technology over the alternative of Stage II service station vapor controls, reduction to commercial practice would follow as a result of normal rule making procedures, recognizing the need for adequate lead-time.

¹ Section 202(a)(6) of the Clean Air Act, as amended, 42 U.S.C. 7521(a)(b)

In March 1978, as a result of these meetings with EPA staff, and after considerable planning effort, API initiated an intensive demonstration program of onboard control technology by an extension of the carbon canister method employed so successfully for many years by the auto industry to control evaporative vapor emissions from the fuel tank and carburetor. Design and supervision of the program was delegated by API's Environmental Affairs General Committee to a Task Force of oil industry experts, who, in recognition of the magnitude of the undertaking and EPA's desire for an early decision, selected by open bid three contractors (Atlantic Richfield, Exxon and Mobil research companies) to perform the several phases of the program in parallel. This program is now completed and the attached contractor reports provide detailed summaries of each of their programs including program design test protocols, and test results.

While the attached contractor reports cover the entire program, much of this information was previously supplied to EPA, in response to their June 27 Federal Register call for public comment and data.² Additionally, a meeting was held with Assistant Administrator David G. Hawkins and staff on July 6 to summarize the status of the API program as of that date, to display test cars modified with on-board control, and concepts for achieving a tight seal at the nozzle-fill-pipe interface. EPA suggestions for additional work were incorporated into the ongoing program.

² API letters and attachments of July 20, 1978 and August 29, 1978 to P. M. Stolpman, EPA.

On August 23, the attached evaluation of the comparative costs and benefits of onboard versus Stage II service station control of refueling vapor losses, prepared by Exxon Research and Engineering as part of their contract with API, was transmitted to EPA.³ The attached cost/benefits report is¹⁸ unmodified from the August 23 EPA submission.

Although each of the attached contractor reports includes its own summary and conclusion section, a brief review of the overall findings is included in this program overview.

Demonstration of Technical Feasibility of Onboard Control

Using carbon canister technology similar to proven vehicle evaporation loss control technology currently employed by auto manufacturers, technical feasibility was clearly demonstrated on four representative automobiles; a Chevrolet Caprice, Ford Pinto, Pontiac Sunbird, and Chevrolet Chevette. These cars were purchased for the program in California and thus were certified to meet the more stringent California 1978 emission standards of 0.41 gram/mile HC, 9.0gram/mile CO, and 1.5gram/mile NO_x; measured emissions actually fell below these values both before and after modification. These cars were also certified to meet a 6gram/HC evaporative loss standard. All four cars, when modified to capture vehicle refueling vapors, met the more stringent 2gram/test standard recently promulgated by EPA for light duty vehicles starting with the 1981 model. The four test cars were selected after careful consideration to reflect a range of engine and fuel tank sizes and to include both

³ API letter and attachment of August 23, 1978 to Mr. P. M. Stolpman, EPA

oxidation only (Caprice and Chevette) and three-way catalyst technology with exhaust feed-back control (Sunbird and Pinto) which appears to be the auto industry's preferred technology for meeting future statutory standards. "

Using severe test procedures developed by the contractors after consultation with EPA's Emission Control Technology Division, the following results were attained with the modified cars:

- o consistent 96 to 99 percent control of refueling emissions in numerous tests in all test cars,
- o no measurable change in tailpipe FTP exhaust emissions on the Sunbird and Chevette and only slight CO increase on the Caprice and Pinto, estimated to be no more than a few percent under more representative testing conditions or typical driving schedules,
- o no increase in evaporative emissions, in fact, a reduction was obtained in three of the test cars,
- o capture of over 99 percent of benzene in the refueling vapors,
- o no effect on driveability in road tests,
- o no effect on fuel economy.

Demonstration of Tight Seal Concepts

An essential feature of an on-board carbon canister control system is a tight seal between the fuel dispensing nozzle and the vehicle fillpipe to force vapors into the canister. Three tight seal concepts were demonstrated in the API program, each capable of achieving 99% effectiveness of vapor control at the interface:

- o a seal, similar to those used for rotating shafts in machinery, mounted in the fillpipe for use with conventional dispensing nozzle and compatible with existing lead restrictors,
- o a modified Stage II service station vapor capture dispensing nozzle for use in an unmodified fillpipe,
- o a combination nozzle/fillpipe modification employing features of the above two concepts.

Testing of the fillpipe seal concept was the most extensive including both laboratory and field efficiency and durability evaluations. Results showed excellent potential for development of a low-cost commercially acceptable fillpipe sealing device with no maintenance and minimal enforcement requirements for the life of the vehicle. This effort included consultation with seal manufacturers on issues critical to the design and materials selection for this special application.

Results of Cost/Benefits Analysis

The API cost and benefits analysis phase of the study, conducted by Exxon Research and Engineering, concluded that:

- o The carbon canister onboard system and Stage II balanced displacement systems are about equal in cost effectiveness.

A 1992 illustrative case showed the following:

<u>System</u>	<u>Cost of Control</u>
Onboard with seal in fillpipe	\$0.36/lb. hydrocarbon
Onboard with sealing nozzle	\$0.42/lb. hydrocarbon
Stage II-Balanced Displacement	\$0.53/lb. hydrocarbon
Stage II-Vacuum Assist	\$1.55/lb. hydrocarbon

- o' Because it involves less cumbersome equipment and is relatively maintenance free, onboard control should be more acceptable to attendants and customers. Thus, continued control of refueling losses at the design efficiencies is better assured.
- o Enforcement procedures for onboard could be readily incorporated into the existing Federal motor vehicle test procedure, thus eliminating the burden which would face state and local agencies with Stage II.
- o If refueling control is considered as a means of reducing population exposure to gasoline vapors, the large number of existing and proposed exemptions of certain classes of service stations are avoided by onboard control.
- o The adverse economic impact of Stage II on small business is avoided.

Not covered in the attached reports are results of tests conducted on two of the API four test cars, the Pinto and Sunbird, by the EPA Ann Arbor laboratory. The Mobil Sunbird test car, equipped with a fillpipe rotary seal as designed by Atlantic Richfield for the API program, was delivered to Ann Arbor on September 19, 1978 with initial testing scheduled during the first week in October 1978. The Exxon Pinto, with modified vapor capture nozzle, was delivered to EPA the first week in October 1978. It is expected that EPA's test results on these two API demonstration cars will become part of the record before the Administrator makes a determination of the feasibility and desirability of onboard control as required by Section 202(a)(6) of the Clean Air Act.

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Testimony

Before

Committee on Government Operations
Environment, Energy, and Natural
Resources Subcommittee
House of Representatives

July 14, 1983

Norton Nelson

My name is Norton Nelson. I am Professor of Environmental Medicine at the Institute of Environmental Medicine at New York University Medical Center. My career has been spent in environmental health, toxicology, and the study of environmental carcinogens. I directed the Institute of Environmental Medicine for some 25 years; I stepped aside as Director three years ago, but remain full time in teaching and research.

I would like to comment on carcinogenesis and hydrocarbons; particularly, gasoline and gasoline related products. My statement suffers from the limitation that I have had access only to secondary sources and have seen essentially none of the original data bearing on this case. However, I believe that for my purposes, this access is sufficient to make the points that I wish to develop.

The present major concern stems from a laboratory study on rats and mice conducted under the auspices of the American Petroleum Institute (API) and on other earlier laboratory studies. There is also some epidemiological data, which again I have not examined in its original form, but which may have relevance.

There appears to be no dispute about the basic findings in the laboratory studies. The API work was a carefully conducted inhalation study involving substantial numbers of rats and mice which exposed these animals, over a two year period, to graded concentrations of an unleaded gasoline. The rats showed a dose related response in the form of kidney cancer found in male rats only. These tumors did not occur in female rats, nor in mice. The incidence levels were low, reaching 6% at the highest dose level. This is a quite rare tumor in rats, so that the background levels in the controls were very low leading to statistically

significance of the low levels of observed tumors. Although as noted, these tumors were not found in female rats or mice, there was a statistically significant increase in liver tumors in female mice.

These laboratory findings would clearly lead to the identification of these exposures as providing sufficient evidence of carcinogenicity according to the standards established by the International Agency for Research on Cancer. Under these circumstances that agency then makes the statement that "in the absence of adequate data on humans it is reasonable, for practical purposes, to regard chemicals for which there is sufficient evidence of carcinogenicity in animals as if they presented a carcinogenic risk to humans."

The material used in the API study was a mixture of a number of hydrocarbons blended together to achieve certain performance characteristics containing a variety of different hydrocarbons.

There is a history in laboratory tests of the production of rather specific kidney injury from a variety of hydrocarbons (memo Welch to Kover, June 23, 1982, on 8EHQ-0682-0446). This injury appears to be limited to the male rat. These earlier studies were conducted for relatively short periods of time; apparently at most 90 days, and may not have been of sufficient duration to develop malignancy if in fact they would have done so. It may well be that one is dealing with a rather specific species- and sex-related phenomenon. Obviously, one can not make that assumption without further information and further study.

Information has reached me that a study conducted in Great Britain entitled "An Epidemiological Survey of Oil Distribution Centers in Great Britain" reports the occurrence of 12 kidney cancers amongst drivers transporting petroleum products in that particular study group compared

to 7.03 expected. The cited reference states that the excess was statistically significant. However, an excerpt from the report states:

"Depending on the actual test of significance used, the value could be greater than 0.05."

Dr. Stephen Nesnow of EPA states in an internal memorandum dated April 1, 1983:

"that approximately 6,800 people die per year from adult kidney cancer, with an average age of diagnosis of 55 to 60 years. The suggested long latency of this tumor in humans, as in lung cancer, also suggests an environmental exposure etiology. It is also interesting to note that the adult tumor type is kidney adenocarcinoma which occurs in 80% of the individuals with a 2:1 male predominance, a result seemingly in accord with the experimental the findings."

For present purposes I think we need to be concerned primarily with the laboratory findings of kidney cancer. These results appear not be in dispute. These findings may be of only limited relevance to man, occurring as they do in a sex- and species-specific way. We can not, however, make that assumption.

Accordingly, the issue can not be allowed to rest at this point, and a response to this signal must, therefore, be activated. The EPA Cancer Assessment Group has carried out a risk assessment which puts these results in a category of relatively low potency, being about 100 times less potent than benzene and one-half as potent as vinyl chloride (memorandum Anderson to Somers thru McGaughy, May 6, 1983). This comparison may give some reassurance for general community exposures.

It is not, however, particularly reassuring in respect to service station attendants, refinery workers, or those using self-service pumps at service stations.

Benzene now has an occupational exposure standard of 10 ppm, which is widely regarded as dangerously high. Vinyl chloride is now regulated at 1 ppm in the workplace. Estimates of exposure of service station attendants, (and perhaps those operating self-service pumps) and refinery workers appear to be limited, but might well be as high or higher than to these two regulated chemicals.

I suggest that this is an issue urgently requiring examination. I will make a specific recommendation along these lines. There are certain obvious gaps in our knowledge which need filling: 1) we need to launch careful epidemiological studies, (perhaps in duplicate, to be sure of appropriate sensitivity and objectivity) on refinery workers and service station attendants; 2) we need to develop an estimate of the range of exposures to gasoline vapors encountered by service station attendants, by refinery workers, and by those using self-service pumps, 3) we need to know which hydrocarbon fractions are responsible for the kidney lesions. This can perhaps be established through short-term studies without necessarily going all the way to the production of malignancy.

Meanwhile, of course, increased attention should be directed to the limitation of exposure to gasoline vapors.

The suggestions I make here are based on incomplete examination of the evidence. I feel that this issue is of sufficient urgency that to expedite appropriate resolution of the problems and in order to allay public concern a national commission be established that will undertake

an expeditious review of the evidence and make formal recommendations for needed action regarding research and control.

I can see two appropriate agencies for undertaking such a national review, the National Academy of Sciences/National Research Council or the Office of the Assistant Secretary^{of} Health and Human Services.

Thank you.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 22 1983

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Mr. Randy Plener
Ministry of Labour
Special Studies Branch (8th Floor)
400 University Avenue
Toronto, Ontario M7A1T7

Dear Mr. Plener:

Enclosed is a microfiche copy of our file on unleaded gasoline and a paper copy of the final report submitted to EPA by the American Petroleum Institute. API plans additional studies on gasoline distillates/fractions, but details are not yet available. If you have any questions on the subject, please do not hesitate to contact me at (202) 382-3483.

Sincerely,

A handwritten signature in cursive script that reads "Terry O'Bryan".

Terry O'Bryan
Environmental Scientist
Chemical Screening Branch/
ECAD (TS-778)



Ontario
Ministry of
Labour

file with FYI - AX - 0883 - 0148



Special Studies and Services Branch
400 University Avenue
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Toronto, Ontario
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Telephone: (416) 965-6375

December 1, 1983

12/6/83
TOB/CSB

Mr. Terry O'Bryan
Environmental Scientist
Chemical Screening Branch/ECAD (TS-778)
United States Environmental Protection Agency
Washington, D.C. 20460
U.S.A.

Dear Terry:

I would like to acknowledge receipt of the microfiche copy on unleaded gasoline. Your co-operation is greatly appreciated.

If the Special Studies and Services Branch of the Ontario Ministry of Labour can be of any help to you in the future, please do not hesitate to contact us.

Thank you again.

Yours sincerely,

Randy S. Plener, B.A., M.H.Sc.
Occupational Health Scientist

RSP:mv