



**Winston H. Hickox**  
Secretary for  
Environmental  
Protection

# Air Resources Board

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**Alan C. Lloyd, Ph.D.**  
Chairman

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**Gray Davis**  
Governor

## MEMORANDUM

TO: Winston H. Hickox  
Secretary for Environmental Protection

FROM: Michael P. Kenny  
Executive Director

DATE: February 22, 1999

SUBJECT: HEALTH & ENVIRONMENTAL ASSESSMENT OF MTBE,  
NOVEMBER 1998

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We have reviewed the report to the Governor, Health & Environmental Assessment of MTBE (November 1998). The report was prepared by research staff of the University of California, as required by Senate Bill 521 and is subsequently referred to as the SB 521 Report. This memo transmits our comments for your consideration.

Air Resources Board (ARB) staff concur with a number of the conclusions in the SB 521 Report, and with the overall finding that California can move away from the use of MTBE in gasoline and still retain the substantial and essential air quality benefits provided by the current State regulations for California Phase 2 Reformulated Gasoline (CaRFG). We concur that our regulations and available refining technologies allow complying gasoline to be produced and marketed without adding MTBE or any other oxygenate. Such gasoline provides equivalent emissions benefits as fuel produced with oxygenates, provided the formulation is allowed under the ARB's predictive model compliance option. However, while some refiners are now able to make a portion of their gasoline under this option, it is important to note that it will take substantial refinery modifications and time before California refineries can make sufficient fuel under this option to satisfy the State's demand for gasoline with in-state production and retain the air quality benefits of CaRFG.

We also concur with the SB 521 Report that changes to the Federal Clean Air Act to remove the 2.0 percent oxygen requirement, that currently applies to most of the gasoline produced in California, are needed to enable an orderly move away from MTBE. Significant changes to the existing reformulated gasoline program in California are contingent upon changing federal law to lessen or eliminate the mandate for oxygenates in reformulated gasoline. The California gasoline program is designed to allow refiners the flexibility to decide which, if any, oxygenate to use and how much to use, while preserving the full air quality benefits of the

program. It is this flexibility that is presently allowing California refiners to market, in non-federal RFG areas, gasoline with no or reduced amounts of oxygenates with no loss in air quality benefits. Without a change in federal law, the transition away from MTBE will be more time consuming, more difficult and more costly.

We agree that additional study of the environmental and health effects of alternative oxygenates such as ethanol are needed before they are used as a widespread replacement for MTBE. We have addressed the impact of ethanol use on ozone air quality, but the questions raised by U. C. Scientists should be examined.

In December 1998, the ARB found that the ozone forming potential of gasoline with 10 percent ethanol and an elevated Reid Vapor Pressure (RVP) would increase ozone levels when compared to a gasoline fully complying with CaRFG requirements. This finding allows the use of elevated levels of ethanol as an oxygenate, but only if it is used in gasoline blends that fully comply with all CaRFG specifications, including RVP. Since evaporative emissions from vehicles and gasoline marketing are a substantial portion of overall vehicle related emissions of smog precursors and toxics, we believe the use of ethanol in CaRFG must be accomplished without any increase in evaporative emissions unless this increase is fully offset through decreases in exhaust emissions. The ARB staff report, a peer review conducted by a University of California Berkeley Scientist, and the Board's resolution on this are attached.

Finally, we have already acted to implement, or are pursuing a number of the policies suggested for consideration in the SB 521 Report. For example, the ARB acted in December, 1998 to adopt emission standards for personal watercraft and outboard engines. As part of this action, we established labeling requirements that allow consumers and officials charged with ensuring water quality protection with a means to determine the relative emissions from engines we regulate. Both of these options will greatly help to reduce discharges of MTBE and other gasoline components to surface water due to boating activity.

We also acted last year to remove the wintertime requirement to add oxygen to gasoline in most of the State, and will expand this action to include more areas as they attain the air quality standards for carbon monoxide. We are planning on revisiting our CaRFG regulations this year to amend the rules to provide gasoline producers greater flexibility to make gasoline without oxygenates such as MTBE, while maintaining or improving the emissions reductions obtained by the rules. The degree of flexibility we will be able to provide is affected by our success in obtaining relief from the federal oxygenate mandate. Without such relief, our ability to provide flexibility to refiners while preserving air quality benefits, will be limited.

Although we agree with the overall thrust of the SB 521 Report, and with much of the analysis in the report that is within our area of expertise, there are several aspects of the assessment that we believe are not adequate. These are briefly discussed below.

First, we do not concur that the use of MTBE and other oxygenates in gasoline would not provide significant air quality benefits in vehicles with more advanced emission control technologies. Older vehicles that are prone to fail rich (have excess fuel which increases hydrocarbon and carbon monoxide emissions because it escapes from the engine unburned) realize significant emissions benefits directly from the oxygen in the fuel, which promotes more complete combustion under these circumstances. More advanced vehicles encounter this type of operation much less frequently, and receive less direct benefit from the added oxygen in the fuel. However, oxygenates do provide value in that they have blending properties that facilitate meeting the overall specifications for CaRFG. Also, the added volume from oxygenates helps refiners make up for lost volume from removal of undesirable components. Based on our assessment of the role of oxygenates, we believe it is more accurate to conclude that oxygenates are effective in making gasoline with lower emitting properties, but that alternative gasoline formulations that are equally effective and do not use oxygenates are also feasible to produce.

Second, we do not believe Cal/EPA should rely upon the cost benefit analysis in the SB 521 Report as the best source of information on the economic impacts of removing MTBE from gasoline. The analysis in the SB 521 Report has been extensively critiqued by others, and we believe that it includes several unrealistic assumptions. For example, the analysis of the cost of water remediation associated with the continued use of MTBE is dominated by the cost of cleanup of leaks that have already occurred. While these costs may be substantial, they will not be mitigated by a decision to phase out MTBE use. Similarly, we find that we cannot support the analysis of the relative cost of gasoline alternatives that employ MTBE, ethanol and a non-oxygenated blend that uses toluene as a replacement for MTBE. Using more reasonable assumptions we believe that analysis will show that the toluene blend is infeasible (because it does not comply with the CaRFG rules), and that both the toluene and the ethanol blends are more costly than the current fuel with MTBE.

Our conclusion is not that economic impacts preclude the ability to phase out MTBE, but rather that eliminating MTBE will likely result in higher fuel costs, and that this impact needs to be incorporated into the State's decision on how to deal with MTBE. Fortunately, the economic impacts of phasing out MTBE use were addressed extensively by the Energy Commission. We recommend that the Commission's assessment be used in preference to that in the SB 521 Report.

Attachment 1 contains our background discussion and specific comments pertaining to

Volume I: Summary & Recommendations, and selected comments on items in subsequent chapters. These are more detailed comments that provide further clarification where we believe they are necessary.

In conclusion, I would like to reiterate that California gasoline regulations have been a vital part of our effort to improving air quality, and provide extensive health benefits in terms of reduced ozone, carbon monoxide, fine particles and airborne toxic compounds such as benzene. Cleaner-burning gasoline reduces ozone forming emissions from motor vehicle evaporative and exhaust emissions by about 15 percent and it reduces cancer risk from exposure to air toxics emitted by motor vehicles by about 40 percent. Also, motor vehicles built for sale in California since 1996 have been designed to take advantage of cleaner-burning gasoline's properties. Maintaining existing fuel standards is essential to maintaining the emission performance of these advanced vehicle technologies. These benefits are an essential element of California's federally required clean air plan (the SIP or State Implementation Plan), and cannot be replaced through any alternative controls. Whatever course is decided on relative to the future use of MTBE, it is essential that the health and emissions benefits of the CaRFG program be maintained.

ARB staff does not have the expertise of our sister agencies to critically review areas of the SB 521 Report related to health effects of MTBE or the impacts on groundwater resources. We did not review these sections in detail. However, we have been involved in the debate about MTBE for some time. From our perspective, it seems clear that MTBE is far more mobile in water than the more traditional constituents of gasoline, and there remains great uncertainty over the extent to which gasoline leaks, spills and boat exhaust will eventually contaminate water supplies. It also appears that even a low level of MTBE contamination can limit the use of water resources simply because of the impact on taste and odor, and because of the public's understandable reluctance to consume drinking water that may pose a health threat. Therefore, we believe that California refiners should move away from the use of MTBE as expeditiously as possible, either through a voluntary phase down, or by complying with a required phase out by a certain date. We further believe that elimination of the federal oxygenate mandate is vitally needed so that the transition from MTBE usage can proceed quickly, with minimum impact on consumers, and with preservation of the significant air quality benefits of CaRFG. We will do all we can to assist this movement in a way that continues the air quality benefits of CaRFG and concurrently reduces the risks posed to water and health by MTBE or its replacement chemicals.

If you have any questions regarding our comments on the report, please contact me at

Winston H. Hickox  
February 22, 1999  
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(916) 445-4383.

Attachments

cc: Alan C. Lloyd, Ph.D., Chairman  
Air Resources Board

Walt Pettit, Executive Officer  
Water Resources Control Board

Joan Denton, Director  
Office of Environmental Health Hazards Assessment