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ARCO CHEMICAL COMPANY

TESTIMONY TO THE

COLORADO AIR QUALITY CONTROL COMMISSION

ON

PROPOSED REGULATION NO. 13

(OXYGENATE MANDATE PROGRAM)

Exhibits not received. BB 6/15/87

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JUNE 4, 1987

EXHIBIT 9/14/00 15 YOGIS KV

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ARCO CHEMICAL COMPANY PRE-CONFERENCE STATEMENT

ARCO Chemical Comapny is the world's largest producer of MTBE. We strongly support the Colorado Air Quality Control Commission's proposal to develop a regulation that allows all commercially available oxygenates to be used in a program to reduce carbon monoxide emissions from motor vehicles. We believe that this approach will increase the likelihood that the proposed program will succeed in its objective.

ARCO Chemical has submitted test data ? which shows that gasoline containing 1.5 to 2.0 wt% oxygen will result in reductions of CO emissions of 20% to 30% respectively. Tests conducted by the Colorado Department of Health show similar results.

MTBE has met with widespread acceptance from amongst the major oil refiners and automobile manufacturers. MTBE production and use has risen significantly over the past years as the industry has sought octane replacements for lead in gasoline. Sixteen of the top twenty oil companies are using MTBE blends in their gasoline today and additionally fourteen of the top twenty companies are currently producing or have plans to produce their own MTBE. At the same time, the auto industry has widely accepted the use of MTBE as a fuel additive. Fleet tests and consumer use have shown that there are no driveability performance problems with gasoling containing 1.5 to 2.0 wt% MTBE and that fuel system and engine components are compatible with MTBE.

Supplies of MTBE have grown over the past few years consistent with product demands. Current domestic capacity is rated at 84 MB/D compared to 32 MB/D just two years ago. It is estimated that capacity will grow to 92 MB/D by the end of 1988 and more than double on a worldwide basis by the early 1990.

ARCO Chemical feels that the current and future capacity of MTBE is sufficient to meet the needs of Colorado under proposed Regulation 13 for the 1987-1988 phase of the program, at a maximum cost to the consumer which would average out to less than $2.00/yr. In fact, ARC feels the current supply of MTBE could allow Colorado to start this program without a phase-in period.

There are two major areas of concern that we feel need to be raised about proposed Regulation 13. First, the proposed calls for a minimum of 2 wt% oxygenate for the period November 1988 through March 1989 and each November to March period thereafter. This minimim requirement conflicts directly with the 2 wt% maximum requirement of EPA's substantially similar rule. Since refiners cannot always guarantee an exact consistent 2.0 wt% level, some flexibility will be needed in order to insure refiners will not be violating the law.

In addition, ARCO Chemical feels that the proposal for fuel pump labeling indicating the type and amount of oxygenate in the gasoline is unnecessary for MTBE. Only two automakers (BMW and Mercedes) make any mention of the use of MTBE in gasoline. We question the need for this requirement if the auto warranty does not mention its use. We do feel, however, that labeling of alcohol fuels is appropriate since nearly all automakers caution about the amount and type of alcohol fuel blends which should be used. ARCO Chemical supported the use of alcohol fuel pump labels when we were selling OXINOL (R), a blend of methanol and cosolvent.

In conclusion, ARCO Chemical agrees with the CAQCC that the use of oxygenated fuels, such as MTBE, will have a postive affect on reducing CO tailpipe emissions. We feel this is a viable proposal in light of the fact that the current U.S. production of MTBE is sufficient to meet expected demands of Colorado. We do not feel that MTBE pricing or logistics will be a significant impediment to your goals. We do recommend amending proposed Regulation 13 to address the problem of your proposed 2.0 wt% minimum requirement versus EPA's 2.0 wt% maximum requirement.

INTRODUCTION

ARCO Chemical Company, a division of Atlantic Richfield Company, has been a major producer of oxygenated octane enhancers for gasoline since 1969. Since passage of the Clean Air Act of 1977, ARCO companies have successfully obtained waivers from the U.S. EPA for three oxygenated gasoline components, Gasoline-Grade Tertiary Butyl Alcohol (GTBA), Methyl Tertiary Butyl Ether (MTBE) and OXINOL (R) blending component, a 50/50 blend of GTBA and methanol. ARCO Chemical Company is the world's largest producer of MTBE, with domestic capacity rated at 42,000 BBL/D located in the Texas Gulf Coast area.

In addition to being a major marketer of oxygenated fuels for gasoline blending, ARCO Chemical has conducted extensive testing in the development of these fuels to determine their performance in automotive engines. This testing includes the effects on vehicle exhaust and evaporative emissions, as required by the EPA in order to obtain a waiver.

With this background, ARCO Chemical Company feels especially qualified to comment on the technical and commercial issues surrounding the Colorado Air Quality Control Commission's (CAQCC) proposed rulemaking to require the use of oxygenates in gasoline.

The findings of the Colorado Oxygenated Fuels Committee, that the use of oxygenates in gasoline will reduce tailpipe emissions of carbon monoxide, are consistent with studies conducted by ARCO Chemical Company. To the extent that the CAQCC feels that mandating the use of oxygenates in gasoline will help to achieve ambient air quality, ARCO Chemical believes that this goal can be achieved as long as the mandate allows all oxygenates to participate. In response to the CAQCC request for comments on the proposed regulation, ARCO Chemical offers the following technical support for the use of MTBE in Colorado and suggested amendment to the proposed rules.

DISCUSSIONS OF TECHNICAL ISSUES

EMISSIONS EFFECTS

It has been well documented that the addition of oxygen bearing hydrocarbons, mainly alcohols and ethers to gasoline will reduce tailpipe emissions of carbon monoxide (CO), and hydrocarbons (HC) (1-15). The results of testing by ARCO Chemical Company in support of its successful waiver applications to EPA have shown this reduction to be significant (Exhibit 1). At 1.5 - 2.0 wt% oxygen, the reduction on CO emissions has been demonstrated to be 20 to 30% respectively. These tests were conducted on a cross-sample of vehicles equipped with standard oxidation catalyst and carburation systems as well as fuel injection systems. A study conducted by the Colorado Department of Health showed similar results (5).

The Colorado Department of Health study showed that the benefits of oxygenate blending in gasoline are significant even with new computer controlled vehicles (closed loop systems) produced since 1982. These vehicles are designed to adjust air-to-fuel ratios automatically, which could compensate for the additional oxygen in the motor fuel. These test results, summarized in Exhibit 2, show that the addition of oxygenates still reduce emissions of CO by 11% at the 2.0 wt% oxygen level.

Recent tests conducted by ARCO Chemical on closed loop vehicles found an average CO reduction of 20% at the 2.0 wt% oxygen level (see Exhibit 3). These reductions are only slightly lower than those found on older vehicles without closed loop systems. Both of these studies indicate that the effect of oxygenates on CO reduction is not affected by the type of emissions control system to the extent claimed by other parties.

In addition to reducing CO emisions, our waiver data also has shown that oxygenated gasoline blends reduce unreacted hydrocarbon tailpipe emissions by up to 8% at the 2.0 wt% oxygen level. Emissions of nitrous oxide (NOx) compounds, a precursor of ozone formation, remains unchanged at the this level (1).

Emissions of evaporative hydrocarbons are not directly affected by the presence of oxygenated compounds. These emissions are a function of the RVP of the finished fuel blends. MTBE, which has an RVP less than that of gasoline (Exhibit 4), can be added by refiners without adversely impacting the finished fuel Reid Vapor Pressure (RVP). This insures the emissions of evaporative hydrocarbons will remain unchanged.

Alcohols on the otherhand, exhibit volatility characteristics higher than that of gasoline, requiring refiners to adjust the composition of the final gasoline blend to maintain a constant RVP. If these adjustments are not made, such as when alcohols are blended at a gasoline terminal, the result will be an increase in vehicle evaporative emissions.

PERFORMANCE OF GASOLINE CONTAINING MTBE

The performance of MTBE as a gasoline additive is best demonstrated by its wide use among major refiners and the absence of concern on the part of vehicle manufacturers.

Since the introduction of oxygenated fuel blends containing ethanol or methanol, most automakers have seen the need to caution customers about their use. A summary of these motor vehicle manufacturer's statements are listed in Exhibits 5 & 6 (a copy of each statement is in the Appendix). Except for BMW and Mercedes, no automaker has made any precautionary statement about MTBE. Where as, almost all automakers warn consumers about potential problems with alcohol blended fuels.

Despite the lack of concern with MTBE by automakers, ARCO Chemical has continued to test the performance of MTBE in motor fuel blends to assure its effectiveness. These tests include compatibility studies with fuel system materials, effects on gasoline specifications, and driveability impacts. None of thse tests have uncovered significant areas of concern.

A summary of motor vehicle materials tested for compatibility with fuels containing MTBE, is provided in Exhibit 7. The materials tested are typical of those used in vehicle fuel systems. Exhibit 8 illustrates the test results for MTBE with various elastomers (16). All these tests have shown that fuels containing 11 Vol % MTBE (2 wt% oxygen) perform comparable to base gasoline.

Driveability performance of MTBE blends was tested by ARCO Chemical in vehicle fleet studies. These tests used employee vehicles at ARCO Petroleum Product Company's former Technical Center in Harvey, Illinois to evaluate the the performance of fuels containing MTBE and other oxygenates against base gasolines. The fleets were composed of a cross-section of vehicle makes and model years. Tests were conducted under winter and summer driving conditions. Drivers would rate the performance of their cars under normal driving conditions, noting any problems such as vehicle hesitation or stalls. The frequency of these problems were tallied for each test fuel and compared to the base fuel performance on the same car as well as a control fleet. The performance of fuels containing MTBE in these fleet studies is shown to be excellent when compared to the hydrocarbon-only base fuel (17).

The most recent driveability study on MTBE was conducted by Esso Canada. The results summarized in Exhibit 9 indicate that fuels containing MTBE showed improved driveability versus base gasoline. This can be explained by MTBE's positive impact on the driveability Index, a measure of driveability performance developed by the Coordinating Research Council (CRC), a joint auto/oil industries' research group (18).

COMMERCIAL EXPERIENCE WITH MTBE

Use of MTBE as a gasoline octane enhancer was first developed by ARCO Chemical in 1978. Initial production commenced in 1979 using olefin plant derived isobutylene as the feedstock.

In that year ARCO Chemical was granted a waiver by the U.S. EPA to allow blending of up to 7 vol% MTBE into unleaded gasoline. This was the second of three waivers to be granted to ARCO Chemical for its line of oxygenated blending components, the most held by any company. The approved blending level of MTBE was later raised to 11 vol%, 2.0 wt% by oxygen, in 1981 under EPA's substantially similiar ruling.

Over the years, ARCO Chemical has increased its MTBE production by dehydrating tertiary butyl alcohol (TBA), a byproduct of ARCO Chemical's proprietary propylene oxide process, into isobutylene.

MTBE has a "typical" octane blending value of 110 (R+M)/2, which is higher than any other fully fungible octane blending component used by refiners as shown below:

Blending Properties of Refinery

Gasoline Components

	Octane Rating (R&M)/2	Volatility RVP (psi)
Butane	93	55
Alkylate	93	5-6
Toluene	114	0

MTBE	110	8
Premium Gasoline	92	9-15

This excellent octane rating has made MTBE an attractive alternative for meeting the octane needs of refiners. In addition, its relatively low volatility means MTBE will not increase the RVP of the finished blend. This increases MTBE's value as refiners can increase the use of other low cost, high volatility components such as butane.

Since 1979, the number of refiners blending MTBE into their gasoline has grown to include virtually all the major refiners and most of the intermediate refiners in the U.S., (Exhibit 10). The growth in this demand has, of course, lead to an equally dramatic growth in the number of MTBE producers. MTBE's commercial success is proof of its economics and quality performance.

MTBE SUPPLY

MTBE is produced by the chemical reaction of isobutylene and methanol:

$$H3C - \underset{\underset{CH2}{\parallel}}{C} - CH3 \; + \; CH3OH \longrightarrow H - \overset{\overset{CH3}{|}}{\underset{\underset{CH3}{|}}{C}} - CH_2 - O - CH3$$

Methanol, produced from natural gas, is a worldwide commodity which is in surplus. Isobutylene is available from a variety of sources, most notably: olefins plants, refinery catalytic crackers, TBA dehydration and butane dehydrogenation.

Exhibit 11 lists the current domestic MTBE plants along with their source of isobutylene feedstock. As shown in this Exhibit, the current domestic capacity is 84 MB/D versus a capacity of only 32 MB/D just two years ago.

The bulk of this increase in MTBE capacity has come from new plant construction by ARCO Chemical. In 1985, in response to growing octane demand due to the EPA's lead phasedown program, ARCO Chemical brought on stream a 12 MB/D MTBE plant, constructed from surplus refinery equipment. This plant more than doubled ARCO Chemical's MTBE capacity and began an aggressive move into the MTBE market. ARCO Chemical continued to increase its capacity with the start up of a new 18 MB/D MTBE plant in late 1986. These moves by ARCO broadened the use of MTBE from the Gulf and East Coast area and allowed sales to the West Coast and export markets, thus, making MTBE a highly accepted gasoline blending component.

The acceptance of MTBE is evident from plans of many refiners to build MTBE plants in their own facilities. Exhibit 12 shows that planned additions in refineries will add an additional 14 MB/D of MTBE capacity between 1986 and 1988. These additions are expected to increase domestic MTBE capacity to 92 MB/D.

The MTBE market is generally divided into two segments, a captive and a merchant market (Exhibit 13). MTBE produced at refinery locations usually is used captively on site. MTBE produced at petrochemical facilities is either sold to a refinery division of the particular company or sold on the merchant market.

The merchant market can be divided into two segments, spot and contract. "Spot" sales mean that the potential customer has no contract and simply negotiates the price with the MTBE supplier on a given quantity. Orders are typically in the range of 50,000+ bbls. This market is tied closely with the general spot/trading market for gasoline components. In addition, there is a contract segment of the MTBE market. This is comprised of customers that tend to use MTBE on a daily basis. This is the smaller of the two markets and also tends to be short-term oriented. Contracts are typically 3 months to 1 year. ARCO Chemical and Texas Petrochemical Company (TPC) are the largest merchant marketers. ARCO Chemical sells exclusively to the merchant market.

Given the large volume of MTBE sold in the spot market, we think that in the short term, MTBE can be diverted from this existing market to supply the Colorado oxygenate mandate. There are no significant contractural limitations that would prevent existing supplies from being used. From a pricing viewpoint, Colorado refiners would be simply bidding away MTBE from other markets for a small premium, 1 or 2¢/gal of MTBE. This happens in the current spot market routinely. We would not expect the overall market price for MTBE to increase significantly because other octane alternatives exist (see MTBE Demand/Pricing Section).

The increased use of MTBE has not been limited to the U.S. In Europe and the Far East, blending of MTBE has increased in recent years. This increased demand worldwide has been met by new capacity additions as refiners tap into isobutylene streams available to them. Third world countries with indigenous natural resources are in the process of building MTBE plants to add value to their hydrocarbon exports. By the early 1990's new capacity in the Middle East and Latin American is expected to add 45- MB/D of MTBE production. Most of this will be exported to Europe and the U.S. Gulf and East Coasts. As shown in Exhibit 14, by the early 1990's, the worldwide production capacity is expected to more than double from the current level as MTBE use continues to grow.

As sources of readily available isobutylene are used by refiners and petrochemical companies to produce MTBE, new MTBE capacity beyond 1990 will likely be based on conversion of normal and iso butane. (Also, see Chemical Week article on MTBE growth, in Appendix). Butane is recovered from natural gas and crude oil producing wells and is also produced as a byproduct from various processes in refineries and petrochemical plants. Current U.S. production of butanes is estimated to be 400 MB/D, with additional supplies available from crude oil producing countries.

Estimates for the cost of constructing new facilities to convert butane to MTBE indicate that, at or near current MTBE price levels, investors could justify new grassroot facilities (Exhibit 15). These economics are based on fourth quarter, 1986 prices (Exhibit 16). The use of idle equipment at existing chemical sites would reduce capital substantially. Both of ARCO Chemical's most recent MTBE plants and TPC's MTBE plant involved the significant use of existing equipment and sites.

Conversion of butane to MTBE would become even more attractive if regulations restricting gasoline vapor pressure, currently under consideration by the EPA, are adopted. These regulations would require refiners to remove butane from their gasoline to achieve lower volatility levels designed to reduce evaporative hydrocarbon emissions to the atmosphere. This action would dramatically increase the supply of butanes, creating a surplus which would make MTBE production from butane even more economical.

Based on the above arguments, ARCO Chemical does not consider the supply of MTBE needed for compliance of CAQCC proposed Regulation 13 to be an issue for the initial 1987-88 phase of the program. Future availablity, while not guaranteed, is also not expected to be a significant issue. Cost implications of the mandate are discussed in the following section.

MTBE DEMAND/PRICING

With the exception of this proposed mandate, there is no demand for MTBE per se. MTBE is one of several sources of octane available to refiner for the production of gasoline. MTBE's high octane rating (110 (R+M)/2) vs. 87 (R+M)/2 for unleaded regular gasoline), makes it, along with other high octane components, a valuable additive for gasoline.

Since MTBE is generally considered a fully fungible gasoline blending component, refiners will consider MTBE the same as anyone of a number of other alternative sources of octane. These include purchase alternatives such as BTX (benzene, toluene, and xylene), other high octane components from petrochemical plants, or premium gasoline. There also are available internal refinery sources such as reformer severity, alkylation or isomerization. When planning gasoline production requirements, a refiner will assess the cost of each of these alternatives, generally choosing the most economic. Therefore, any "out-of-line" pricing for anyone of these octane sources should quickly be brought "in-line" as refiners move towards less costly alternatives. Also, refiners always have the option to purchase or exchange gasoline rather than produce it if incremental production costs are too high relative to market prices for the gasoline produced. Exchanges of unleaded regular gasoline plus a price differential for unleaded premium, are quite common in today's market. This is another aspect which contributes to putting a lid on octane costs. This approach helps level out the market so that the disparity in octane costs between "octane poor" and "octane rich" refiners are minimized.

On a short term basis, MTBE's price is dependent on the spot gasoline market, with emphasis on the spot premium gasoline market. Therefore, its price will vary on a day-to-day basis with toluene or premium gasoline prices. Exhibit 17 shows a plot of MTBE price versus toluene equivalent value (TEV) and premium equivalent value (PEV). TEV and PEV respectively, are calculated refinery break even values for MTBE as compared to other octane alternatives in the marketplace, such as toluene purchases, or premium purchases (or exchanges) respectively. As this plot illustrates, MTBE price cannot exceed these breakeven values for any significant period or refiners will switch to other, lower cost options, forcing MTBE price back in line.

In the short term, it is obvious that the price of MTBE will be effectively controlled by the larger forces of the overall octane market. The demand created by a mandate in Colorado can be shown to also have no significant impact. ?

Since 1984, demand for octane has grown substantially due mainly to the EPA lead phasedown program. The octane need of 2+ octanes created by this EPA program has been fulfilled. This has been accomplished by a combination of octane producing alternatives such as: use of spare reforming capacity, octane catalyst upgrades, investments in refinery octane processes like C5/C6 isomerization, and purchased octanes (MTBE, etc.). In assessing octane demand on MTBE prices, it should be noted that lead phasedown during this period created an octane demand equivalent to 700 MB/D of MTBE (Exhibit 18). During this period, MTBE availability averaged about 50 MB/D. Despite this huge octane demand, MTBE's price during the 1985/1986 period was relatively constant at 20 to 25¢/gal over unleaded gasoline. (Exhibit 19) Given that this large demand relative to MTBE capacity had little effect on MTBE price, the much smaller MTBE demand created by the Denver mandate, would similarily not be expected to have any significant price impact.

Unlike ethanol, whose production costs are based on farm products, like corn, MTBE's product value and feedstock costs move with crude and gasoline prices. The cost of butylenes, the major feedstock for MTBE, is dependent upon the value of gasoline and crude oil. The same is true for butanes. As the prices of gasoline and crude rise and fall, so too will these feedstocks for MTBE.

This relationship is important to the consumers of Colorado if an oxygenate mandate is to be imposed for for two reasons. First, since MTBE feedstock and product prices move together Gulf Coast MTBE production will be economical under any reasonable crude oil price scenario. This means that supply will not be disrupted because of unfavorable crude price movements. Secondly, since MTBE price can be expected to move with gasoline, a sharp drop in crude oil prices, as occured in 1986, would not result in MTBE prices significantly higher than gasoline. This prevents Colorado consumers from adsorbing significantly higher gasoline costs due to the proposed mandate during crude price fluctuations.

MTBE EFFECT ON COLORADO GASOLINE PRICES

What is the likely impact on consumers in Colorado if an oxygenate mandate were imposed, assuming MTBE to be the oxygenate of choice?

Using U.S. Gulf Coast area gasoline and octane costs as a basis, Exhibit 20 shows the derivation of the value of MTBE to refiners. Prices are posted spot market prices for August 1986. Based on a toluene price of 63¢/gal, the cost of octane to a refiner is calculated to be 1.0¢/octane gallon, (i.e., the cost for a refiner to increase the octane rating of gasoline one octane number, e.g., from 87 to 88, is 1¢/gal of gasoline.)

The value of MTBE is found by adding the value of each of its individual components: octane and vapor pressure value plus the value of gasoline. As shown in Exhibit 20, MTBE's gasoline value is 41¢/gal. Its octane value is shown to be the difference between MTBE's octane rating, 110, and that of gasoline, 87 times the refiners octane cost, 40¢/octane bbl. The butane credit is shown to be 2¢. The total value of MTBE to a Gulf Coast refiner then is 65¢/gal. MTBE price at this time was 63¢/gal giving the refiner a 2¢ profit incentive for each gallon of MTBE used.

Exhibit 21 shows a similiar calculation for the value of MTBE to a refiner in Colorado. It assumes slightly lower octane cost, a Denver equivalent spot gasoline price of 45¢/gal, and butane/gasoline relationships similar to the Gulf Coast. This results in a calculated refiner value for MTBE of 67¢/gal.

This indicates that Denver area refiners would find MTBE to be economical if the transportation cost from the Gulf Coast to the refinery location were excluded. Exhibit 22 shows our estimates for costs to transport MTBE to various refiners. The costs assume all MTBE is shipped by railcar and is based on our estimates of anticipated rail rates. The refiners are divided into three classes: Denver, Wyoming, and other (Texas and Kansas).

Exhibit 23 shows that when transportation costs are included, MTBE use will result in higher costs to produce gasoline in the Denver area. Depending on the level of MTBE mandated, and the refiners production location, costs for gasoline will be increased by 0.2 to 1.2¢/gal. For a 4 month period, our best estimate is that the average increase in gasoline costs would be $5 million or less than $2.00/year per motorist (Exhibit 24). Obviously, the CAQCC needs to assess these and other costs in determining the cost/benefit of the proposed regulation.

What might the cost of MTBE be in the future and what effect would this have on gasoline products costs for the Denver area? As has already been stated, the cost of MTBE will be a function of the price of gasoline and the alternative cost of octane available to refiners.

As shown in Exhibit 17, since 1984 MTBE's price has generally been about 20 to 25¢/gal higher than gasoline. This has been during a period in which crude price has been very volatile and octane demand has been strong. Therefore, the impact on gasoline prices to consumers should not vary much under any foreseeable crude oil/gasoline price scenario or octane scenario. However, concerns have been raised at previous CAQCC meetings that increasing demand for octane due to EPA's lead phasedown program or other factors may bid up the price of MTBE on the Gulf Coast and that increased demand created by imposition of a mandate in Colorado would add additional upward pressure to MTBE price.

The most comprehensive effort to determine future U.S. refining industry octane costs was undertaken by Turner, Mason & Company under contract by several major refiners (19). Turner, Mason determined that average U.S. octane costs could vary form 0.5 to 2.3¢/octane gal. The costs vary depending on assumptions, such as: overall gasoline demand, mid-grade premium and premium grades growth, octane investments, the effect and number of catalyst upgrades, and future gasoline RVP specs. Put in perspective, this range of octane costs would result in equivalent MTBE values to refiners ranging from 11 to 53¢/gal over unleaded gasoline. This wide range shows both the difficulty and uncertainty in developing any estimates for future octane costs. Any effort to predict MTBE prices, are especially difficult since it is only one component in a very large octane market. We would expect MTBE prices in the long term to be determined by supply/demand for octane as discussed in the previous section on pricing. We would not expect mandated oxygenates use in Colorado to have a significant impact on MTBE prices.

MTBE LOGISTICS

The domestic production capacity for MTBE is concentrated on the Gulf Coast area of Texas and Louisiana. Therefore, any mandate of oxygenate use in Colorado must consider the cost to transport MTBE, as well as other oxygeantes to the refiners serving the Colorado market.

In the example cited earlier, it was assumed that MTBE would be transported by railcar at costs varying from 6 to 15¢/gal depending on location. These rates are our best estimates at this time. Lower rates may be established where a consistant, repeatable shipment of material is anticipated. Refiners planning to use MTBE on a daily basis from November thru February may negotiate lower rates.

An alternative to railcar transportation would be pipelining of MTBE. ARCO Chemical has already contacted pipeline companies who believe they could move MTBE from the Gulf Coast to the Rocky Mountain area refiners.

Preliminary discussions indicate that this transportation option is viable and could substantially reduce the cost of transporting MTBE. Initial estimates indicate that costs relative to tank cars could be reduced by 30 to 70%. This could result in a breakeven cost to refiners and no cost impact to consumers at some locations.

ISSUES OF PARTICULAR CONCERN TO CAQCC

In its proposed rulemaking notice, the CAQCC raised four issues of concern, several of which are addressed below.

Phase-in Options

From an MTBE supplier's viewpoint, ARCO Chemical is prepared to participate in the market to the maximum. We believe MTBE supplies are adquate to supply 100% of the mandate requirements without a phase in period. A phase in is not recommended if it's being considered solely due to concerns about MTBE avails.

However, in our May 27th letter to the CAQCC (see Appendix) we requested that the minimum level for oxygen not be set at 2.0 wt% minimum due to practical problems in complying with Regulation 13 and existing EPA regulations. Given our concerns about these potential conflicts, we recommend a 1.8 wt% oxygen minimum this year (November 1, 1987) with no increases in future years penging resolution of the conflict with EPA regulations.

Implementation Date

Timing will be tight but feasible to set up a MTBE supply system for the proposed November 1, 1987 commencement date. ARCO Chemical began making plans and commitments to supply MTBE a few months ago in anticipation of the November 1, 1987 implementation date for the mandate. At this point, we can state that satisfactory logistic arrangements have been made already with several potential customers that have approached us seriously about MTBE supply.

If all refiners were to meet the mandate using MTBE, it is possible that the refiners responding the slowest may have to use less efficient/economical supply methods for the first year of the mandate. However, at this point in time, we would expect all refiners to be able to obtain MTBE supplies to meet the November 1 commencement date.

We recommend that if the program is to go forward, that it be implemented this year in order to maximize the benefits to Colorado and maintain the momentum and interest that has been established. Also, the sooner the regulation is finalized and the commencement date set, the quicker industry will work together to assist the CAQCC in fulfilling the mandate.

Cost/Benefits .

The Commission has asked for comments on several specific issues under this section. ARCO Chemical wants to comment on: year round program versus limited applicability during the November-March period, affects of adding detergents and other additives, and labeling of product at point of sale.

Year Round vs. 4 Months

From an MTBE supply logistics standpoint, a year round program has significant advantages. It insures ratable, annual business to the MTBE producer and reduces logistics related operational problems and costs in supplying the mandate area. The major advantage of the year round program is that it allows the supplier and customer to develop the most economic and efficient logistical system. With a year round regulation, pipelining of MTBE is definitely feasible. This method would reduce logistics costs to the point that many refiners could receive MTBE at essentially their breakeven value. Thus, final costs to consumers would be minimal.

Also, the year round approach has advantages in the case where a refiner needs to obtain rail cars to bring in MTBE for the mandate. The 4 month program makes it more difficult to economically justify rail car lease costs which tend to be based on year round operations. Also, rail cars tend to sit idle the other 8 months unless they can be subleased.

Adding Detergents and Additives

Data on MTBE indicates it does not adversely affect fuel injector deposits which is a major concern of automakers (18). Our commercial experience indicates that MTBE doesn't significantly impact the quality of gasoline with respect to gum formation and otherfuel system cleanliness issues. In the case of MTBE,we would recommend that the CAQCC not make detergents and other additives a requirement.

PUMP LABELING OF OXYGENATES

In its proposed rulemaking, the CAQCC asked for comments on the appropriateness of pump labeling to notify customers of the presence of oxygenates in gasoline. Since the mandate as proposed requires all motor fuel to contain oxygenates from November through February, ARCO

Chemical sees little purpose in labeling of fuels. It would only add additional burdens for retailers and enforcement officials and could cause confusion for consumers if not promptly removed by March 1 of each year.

Pump labels have traditionally been used to provide consumers with important information needed to ensure they are dispensing the correct fuel into their car. This includes information on the octane rating and lead content of fuels. Vehicle owner's manuals usually provide recommendations for consumers regarding these specifications. In these situations, the need for pump labeling is obvious.

Most owners manuals make no recommendation concerning the use of oxygenates in general. As noted earlier, they do caution against the use of certain types of alcohol, specifically methanol and ethanol. Given the consumer has the "right to know" this information when purchasing fuel for his vehicle, ARCO Chemical has supported proper labeling of fuels when it marketed methanol (alcohol) blends (see Appendix).

No similar warnings are made on the use of MTBE or other oxygenates. Therefore, labeling fuel dispensers because oxygenates are used would not only provide confusing information, it could lead to undue concern on the part of consumers if they are unaware of the type of oxygenate in use. It is ARCO Chemical's recommendation that any labeling be restricted only to those properties of motor fuels which are referenced in car owner's manuals, such as alcohol content, octane rating and lead content.

The Regulation should include a bill of lading requirement for MTBE. This is necessary since MTBe is blended at refineries while ethaol is generally blended at terminals. This regulation would prevent the inadvertent addition of 10% ethanol to a fuel already containing MTBE. This has significant quality and regulatory implications.

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