

## THE CLEAN AIR ACT. IMPACT ON THE FUELS INDUSTRY. BACKGROUND . . . AND FUTURE?

James M. Kulakowski  
Texaco Refining and Marketing Inc.  
10 Universal City Plaza  
Universal City, CA 91608

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### The Clean Air Act - Presentation Topics (Slide 1)

Environmental regulations, including the Clean Air Act have a profound impact on the petroleum industry. For example, a recent study by the National Petroleum Council found that compliance with environment, health and safety regulations would cost the US refining and marketing industry some 37 billion dollars in the 1990s. This is greater than the entire 31 billion dollar asset base in 1990.

The federal Clean Air Act is arguably the most comprehensive single piece of legislation ever passed by Congress. The act was originally passed in 1963 and has had several revisions, the most recent being in 1990. The act has provisions that cover many pollutants and different sources of pollution.

This paper will only discuss limited portions of the clean air act that impact "mobile sources", that is fuels and vehicles. In addition to a discussion of the background for several of these issues, the paper provides a report of the current status. Finally, some recommendations are made to improve the flexibility in the act and the regulations it requires.

### Setting Air Quality Goals (Slide 2)

The clean air act requires that the EPA set standards for air quality. The "criteria" pollutants include sulfur dioxide (SO<sub>2</sub>), particulate matter, nitrogen dioxide (NO<sub>x</sub>), carbon monoxide (CO), ozone and lead. Areas that meet a standard for a pollutant are in "attainment", while those that do not are in "non-attainment". The clean air act specifies attainment dates for areas based on the level of a pollutant in a base year. For example, an area with ozone between 138 and 160 ppb ozone is classified as "moderate" and must attain the standard by 1996 while an area with greater than 280 ppb ozone is classified as "extreme" and must attain the standard by 2010. These ambient air quality standards also indicate how often an area can exceed the standard and remain in attainment. For example, the fourth 1 hour measurement over the 120 ppb ozone standard in 3 years puts an area in non-attainment. Stated another way, an area may exceed the standard 0.011% of the time and remain in attainment. The EPA has set standards for many pollutants but those that most impact mobile sources are ozone, carbon monoxide and particulate matter. It should be noted that EPA is considering a revision to the ozone standard. One revision being considered would increase the number of ozone non-attainment areas by 60%, from 79 to 119 based on estimates by the American Petroleum Institute.

Tropospheric (low level) ozone, or "summer smog" is a secondary pollutant, that is a pollutant which is formed in the atmosphere as opposed to being directly emitted from a source. The primary reactants are hydrocarbons and oxides of nitrogen, or NO<sub>x</sub>. Under certain conditions, these reactants, in the presence of sunlight which acts as a catalyst, react to form ozone. The atmospheric chemistry is very complex and is dependent on the ratio of hydrocarbon and NO<sub>x</sub>. In some areas, reducing one reactant can actually increase ozone. Tropospheric ozone should not be confused with stratospheric ozone, the subject of global warming concerns.

Carbon monoxide (CO) pollution is typically a winter time problem. CO is directly emitted, primarily from gasoline powered vehicles (as opposed to diesels).

Particulate matter is the fine particles suspended in the air. The current standard only covers particles less than 10 microns in diameter (PM10). This would include windblown dust as well as man made particulates. EPA is considering a new standard that would cover smaller particles and would focus more attention on man made particulate emissions.

#### State Implementation Plans (Slide 3)

States have the primary responsibility for meeting the federal air quality standards. They are required by the Clean Air Act to submit a plan to the EPA detailing how they will meet these standards. This plan is called the State Implementation Plan or SIP. Failure to submit a SIP can result in sanctions against an area in the form of lost federal highway funds. Actual demonstration of attainment is determined by monitoring ambient air quality.

Once a SIP is accepted by EPA, the regulations contained therein are federally enforceable.

#### Clean Air Act - Specific Control Measures (Slide 4)

The Clean Air Act includes mandated measures for certain areas. For example, the 9 areas with the highest ozone levels are required to include federal reformulated gasoline in their SIPs. Areas in non-attainment for CO are required to implement an oxygenated gasoline program. States with higher levels of ozone or CO are required to implement an enhanced vehicle inspection and maintenance program. The EPA-designed inspection and maintenance program is very specific as to type of test equipment, testing frequency and repair cost limits to earn a waiver from the program.

#### Clean Air Act - Reformulated Gasoline (Slide 5)

The reformulated gasoline (RFG) program is contained in the clean air act. The act specifies several elements of the program, while leaving other key elements to the discretion of EPA. The statutory provisions for the RFG program contain both performance and prescriptive standards. For example, RFG must attain certain emission reductions, which are performance based, for toxic compounds, hydrocarbons and NOx. In addition, RFG is mandated to contain a minimum of 2.0 wt% oxygen and less than 1 volume % benzene. These are prescriptive standards that must be met irrespective of the emissions performance of the fuel.

As was noted earlier the 9 worst ozone areas are mandated to have RFG. The act also provides the opportunity for other non-attainment areas to "opt-in" to the program. Several areas did this, and subsequently desired to opt-out of the program. EPA allowed these "opt-outs", changing the overall volume of RFG demand. This change in RFG volume had the potential to drastically reduce the value of investments made for RFG compliance.

The enforcement program for RFG is very complex. In essence, it requires tracking of every molecule of gasoline from cradle to grave. Some of the elements include independent sampling and testing, year-end audits of production, and periodic reporting. Several of these provisions also apply to non-reformulated, or conventional, gasoline.

The RFG program includes two phases. The first phase, which was effective in 1995, includes statutorily developed targets for toxic and hydrocarbon emission reductions as well as a requirement that there be no increase in NOx emissions. In the second phase, EPA was given discretion over the level of the more stringent standards required by the act. EPA included a requirement for NOx reduction not originally conceived of in the act, in addition to further reductions in hydrocarbon and toxic emissions. This second phase is effective in 2000.

#### Clean Air Act - Regional Air Quality Organizations (Slide 6)

The Clean Air Act provides for several regional air quality organizations. This was done in recognition that some pollutants may be transported from one air basin to another and impact

air quality in these "downwind" areas. An example is the Ozone Transport Assessment Group which consists of representatives of the 37 states east of the Rocky Mountains. These states are evaluating a host of measures that could assist downwind ozone non-attainment areas to reach the standard. The analysis of transported pollutants and their impact on ozone is exceedingly complex and is only now beginning.

These organizations face an implicit political problem. Namely, it will be difficult for an elected official to pass a regulation which will cost his constituents when the benefits will be realized by others, perhaps in another state.

#### What's Going On Now? (Slide 7)

Several initiatives are underway which could further impact the fuel and automotive industries.

As mentioned above, the OTAG is looking at options, some of which include further fuel reformulation to address the issues related to pollutants transported from attainment to non-attainment areas.

EPA is considering revisions to the air quality standards for ozone and particulate matter. These standards are expected to be more stringent than the current standard and will put pressure on states to find more emission reductions.

EPA is considering revisions to allow attainment areas to opt-in to federal RFG. This could drastically increase the volume of RFG requirements. There are significant legal questions regarding whether the Clean Air Act grants EPA the authority to allow attainment area opt-ins.

California has included in its ozone SIP a measure that calls on EPA to adopt more stringent emissions standards nationwide for diesel trucks. This is driven by the fact that a significant portion of the Los Angeles NOx emissions inventory is sourced in out-of-state trucks visiting the area. EPA is working with California regulators and the engine manufacturers to determine whether these standards are attainable. At this point, it appears that changes to diesel fuel will not be immediately considered as a part of this strategy.

Finally, the auto makers are calling for a "nationwide fuel" that would have tighter specifications than those of the American Society for Testing Materials (ASTM) whose specifications are enforced by most states. The environmental necessity of such a fuel is questionable, as many areas of the country in which the fuel would be sold already attain federal air quality standards. Such a requirement would provide a fuel with less variability and assist the auto makers in the design of their vehicles, but would also represent a costly reformulation of gasoline for most refiners.

None of these initiatives were considered in the 37 billion dollar investment cited earlier. Needless to say, there will be continued pressure on the petroleum industry to deliver cleaner products to market.

#### What Needs to Happen? (Slide 8)

There are several areas where the Clean Air Act and the regulations it spawns can be improved. The items detailed below are but a few ideas.

Use of performance based standards will allow greater compliance flexibility and result in lower compliance cost. However, recent regulations that are advertised as performance based, are overlaid with elements of the command and control regulatory mind set. For example, if a party were to develop an additive that was demonstrated to reduce vehicle emissions to the same level as RFG, that party would have several regulatory hurdles to clear to certify that additive as a part of the RFG program. Hopefully, as more experience is gained in implementing performance based regulations, this will change.

The practice of air quality management needs better tools with which to do the job. An example is the Urban Airshed Model for predicting ozone. These models are tremendously complex, needing super computers to run efficiently. However, even with this complexity, their predictive capabilities are only marginal. Another area which needs improvement is the type of test used to characterize vehicle emissions. There are recognized shortfalls in the "federal test procedure". For example, it does not adequately test all driving modes (e. g. high acceleration) and is capped at 55 miles per hour. Finally, there needs to be testing of reformulated fuels on prototype advanced vehicles. Questions regarding the need for, and performance of these fuels of the future in the vehicles of the future have not been addressed.

There needs to be a consideration of risk-based air quality standards. Can our society afford to guarantee pristine air in all air basins regardless of the levels of population and economic activity? Risk-based, rather than health-based air quality standards will allow EPA to consider these types of questions.

Finally, there needs to be an explicit requirement that major regulations be subjected to some type of cost effectiveness test. To their credit, EPA generally has attempted to apply this type of analysis to fuels regulations. The California Clean Air Act contains such an explicit requirement. This has impacted the decisions of California regulators. It is time for all parties to recognize the need for air quality regulations to provide the necessary emissions reductions at the lowest possible cost.

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**Mike Kulakowski**  
Texaco Refining and Marketing  
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**Clean Air Act  
Presentation Topics** 

- **The Clean Air Act:**
  - Sets air quality goals
  - Outlines process by which states develop clean air programs
  - Outlines specific measures
    - Reformulated gasoline
    - Vehicle inspection and maintenance
  - Establishes regional air quality organizations

**Air Quality Goals** 

- **Health-based standards set by EPA**
  - Ozone (formed by hydrocarbons and NOx)
  - Carbon monoxide
  - Particulate matter
- **Attainment deadlines set by initial air quality levels**
  - Higher levels of pollutant result in more time to attain standard
  - Example: Moderate ozone 1996. Extreme ozone 2010

**State Implementation Plans  
(SIPs)** 

- **SIP details how an area will meet federal air quality standards**
  - Quantifiable
  - Enforceable
- **Regulations in SIP are federally enforceable**
- **Very specific guidance to states by EPA**
- **State maintains autonomy**

### Clean Air Act. Specific Control Measures



- **Reformulated Gasoline (RFG)**
  - 9 mandatory areas specified in Act
  - Opt-in of ozone non-attainment areas allowed
- **Oxygenated Gasoline**
  - Winter carbon monoxide strategy
- **Vehicle inspection and maintenance**
  - Goal - On road vehicles' emission performance maintained at or near design levels

### Clean Air Act Reformulated Gasoline



- **Performance standards**
  - Hydrocarbon/NOx/Toxic emissions
- **Prescriptive standards**
  - Oxygen/benzene fuel content
- **2 Phases to program**
  - Phase I - 1995
  - Phase II - 2000
- "Anti-dumping" controls
- Very complex enforcement scheme

### Clean Air Act - Regional Air Quality Organizations



- **Examples**
  - Ozone Transport Commission (OTC)
  - Ozone Transport Assessment Group (OTAG)
  - Grand Canyon Visibility Task Force
- **Recognition of transported pollutants and precursors**
- **Allow for coordinated planning**
- **Political Issues**

### What's Going on Now?



- **OTAG - Region-wide fuel standards?**
- **EPA reassessment of ozone and particulate matter standards**
- **EPA - Attainment area opt-in to RFG?**
- **EPA - Nationwide diesel engine standards?**
  - Driven by Los Angeles' ozone non-attainment
- **Automakers - desire for nationwide fuel specifications.**

### Clean Air Act What Needs to Happen?



- **Better performance-based regulations**
  - More flexibility
  - Lower cost
  - Opportunities for new technologies
- **Better tools**
  - Air quality models
- **Risk-based air quality standards**
- **Explicit requirements for cost benefit tests for new regulations**