

May 22, 2006

Clerk of the Board
Air Resources Board
1001 I Street, 23rd Floor
Sacramento, CA 95814

RE: Comments to ARB's Notice of Public Hearing to Consider Adoption of New Emissions Standards, Fleet Requirements, and Test Procedures for Forklifts and Other Industrial Equipment

IMPCO Technologies, Inc. (IMPCO) appreciates the opportunity to comment on the subject proposed regulations.

IMPCO has been extremely involved with the development of this Large Spark-Ignition (LSI) engine rule, and has been represented in every conference call, workshop, and Board hearing since the ARB LSI rulemaking process began. While IMPCO will continue to work through a number of issues with ARB staff, this letter focuses on three items of paramount importance as they relate to the proposed Model Year 2010 (MY2010) 0.6 g/bhp-hr HC+NOx standard. IMPCO urges the Board to consider the following:

- Provide manufacturers with a second option to meet the 0.6 g/bhp-hr HC+NOx standard,
- Recognize the fiscal impact and unfair timing expectations placed upon manufacturers, and
- Enforce propane fuel quality standards

Background

For almost 50 years, IMPCO has developed engine fuel systems that allow automotive, stationary, and industrial engines to operate on clean, alternative fuels such as natural gas and propane.

Since MY2001, IMPCO has spent \$7 million to certify over 25 LSI engine families to ARB and EPA LSI emissions standards, and plans to certify at least 6 engine families per year in MY2007 and subsequent years. IMPCO sells these certified engines to over 20 forklift Original Equipment Manufacturers who then install these certified engines into their forklifts. In 2007 and subsequent model years, a projected **45%** of all new, emission-certified LSI forklift engines introduced into the United States will use IMPCO-certified engines or IMPCO components.

Proposed MY2010 0.6 g/bhp-hr HC+NOx Emission Standard

Proposal

IMPCO respectfully proposes that ARB allow manufacturers to choose one of the two following compliance options:

- Option 1: MY2010 Transient Test Option
Meet the 0.6 g/bhp-hr HC+NOx standard in MY2010 over the transient test cycle as currently proposed by ARB
- or
- Option 2: MY2007 Steady-State Test Option
In addition to meeting all applicable EPA emissions standards, meet a 0.6 g/bhp-hr HC+NOx standard over the steady-state test cycle MY2007-2015; no additional reduction in transient HC+NOx emissions would take place during this time.

This option provides ARB with three additional years of emissions reductions.

Option 1

To limit their in-use liability, those manufacturers who are able to meet the proposed MY2010 0.6 g/bhp-hr transient HC+NOx standard with either calibration-only or minimal hardware changes can wait until MY2010 to meet the lower standard.

Option 2

Those manufacturers who are able and willing to meet the standard over the steady-state test cycle in MY2007 may do so. This will provide manufacturers with much-needed flexibility and ARB will achieve substantial emissions reductions from MY2007-2009.

ARB's Proposed 0.6 g/bhp-hr Transient HC+NOx Standard

In 2002 EPA adopted a MY2007 transient HC+NOx standard of 2.0 g/bhp-hr based upon the best data available at that time. EPA intentionally did not mandate HC+NOx emissions standards below 2.0 g/bhp-hr because EPA determined that it was inappropriate to do so given the very limited data available. From EPA's Draft Regulatory Support Document dated September 2002:

“Considering the need to focus on transient emission measurements, **we believe it is not appropriate to adopt more stringent emission standards** based on the steady-state duty cycles. Stringent emission standards based on certain discrete modes of operation may inappropriately constrain manufacturers from controlling emissions across the whole range of engine speeds and loads. We therefore intend to rely more heavily on the transient testing to determine the stringency of the emission-control program.”

Using this same data, ARB somehow determined that it *was* appropriate to reduce the EPA standard by an additional 70% to 0.6 g/bhp-hr HC+NOx. Note that ARB used only EPA's data as a basis for determining the proposed 0.6 g/bhp-hr HC+NOx standard; no new data was generated or introduced for ARB to consider the appropriateness of a tighter emission standard.

Effect of Transient versus Steady-State Testing on HC+NOx Emissions

Very little is known about transient testing and its effect on HC+NOx emissions over an LSI engine's useful life. ARB has stated that there is approximately a 15 percent increase in HC+NOx emissions when measured over the transient test cycle as compared to the steady-state test cycle.

The ARB Staff Report released May 6, 2005 states:

“Some manufacturers have expressed concerns about the impact of the 2007 transient test cycle on these numbers [HC+NOx]. To date, information provided by the Southwest Research Institute indicates that, under the transient test cycle, hydrocarbon emissions from an LPG engine increased by about 30 percent, but NOx emissions remained relatively constant. ... At 50 percent HC, **the new test cycle could lead to a potential emissions increase of 15 percent** over those under the steady state test cycle. ... To date, transient cycle test data has been limited.”

After repeated requests by IMPCO and industry, ARB has not been able to provide the data used to make this assertion.

Given the lack of data available to determine the feasibility of the proposed 0.6 g/bhp-hr transient HC+NOx standard, it is reasonable for ARB to either specify that the HC+NOx standard be met over the steady-state test cycle, or postpone finalizing a radical reduction in transient emissions until the technological feasibility can be ascertained.

Fiscal Impact and Timing

Cost

From MY2001-2007, IMPCO invested over \$7 million dollars to develop and certify new LSI engines to ARB and EPA standards. To meet the proposed MY2010 transient HC+NOx standard, IMPCO must invest an additional \$3 million to develop a new-generation technology and perform new durability demonstration programs to meet the proposed standard over the transient schedule.

Note that this \$3 million expense is for LSI engine sales into California only as EPA does not intend to create more stringent emissions standards any time in the near future. As a result ARB has, in effect, created a \$3 million dollar barrier to entry into the California market.

Impact to California Business

IMPCO is a California business headquartered in Santa Ana, California. California Code 11346.3 requires that ARB assess the potential for adverse economic impacts on California business. ARB's Initial Statement of Reasons (ISOR) states:

“Engine manufacturers are located mostly outside of California.”

And the Notice of Public Hearing states:

"In accordance with Government Code section 11346.3, the Executive Officer has determined that the proposed regulatory action will not affect the creation or elimination of jobs within the State of California, the creation of new businesses or elimination of existing businesses within the State of California, or the expansion of businesses currently doing business within the State of California."

IMPCO will incur significant costs to meet ARB's proposed transient HC+NOx standards. The statements above seriously misrepresent and undermine the financial impact to IMPCO, a California company that will represent almost 50% of the total LSI forklift market in California. In addition, IMPCO is a public company; any additional cost incurred will directly impact the bottom line and affect thousands of shareholders.

Timing

Staff raised the possibility of a technology review in 2008. This might seem like a reasonable gesture, however, it will take at least three years to develop a new, robust technology to meet the proposed transient HC+NOx standards. Development includes design concept, technology assessment, vehicle integration, engine durability, certification, and production. This means that development must begin today to make the MY2010 timeframe.

With a minimum three-year design cycle, a technology review in 2008 is far too late to assess the feasibility of a radical reduction in emissions effective MY2010.

LPG Fuel Quality

ARB has drastically reduced onroad emissions standards over the last ten years. However, ARB has also developed and rigorously enforced reformulated gasoline and low-sulfur diesel fuel quality standards to help manufacturers meet these emissions standards. Although LPG fuel specifications exist on the books, they are not nor have they ever been enforced.

ARB recognizes the importance that clean fuels play when developing new emissions standards and technologies. From a 2005 Off-Road LSI workshop presentation, ARB stated that "Clean fuel is important", "Heavy ends are detrimental to control technologies", and "Strive to ensure high-quality fuel throughout distribution chain".

New technologies designed to meet lower emissions standards are far more sensitive to LPG fuel contaminants such as oily residues, paraffins, and propene as compared to older technologies. Such contaminants may reduce the effectiveness of the emission control system and increase emissions. In many cases, this reduced effectiveness is not reversible and components must be replaced to operate as designed.

Before more stringent emissions standards can be implemented, ARB must first enforce fuel quality standards.

Summary

Due to (1) The absence of data available to support the proposed transient HC+NOx standard, (2) The cost and amount of time involved to develop a new, robust technology to meet the proposed standard, and (3) The effect of LPG fuel quality on long-term durability with technologies that have yet to be developed, it is most appropriate to either allow for compliance with the standard over the steady-state test cycle, or postpone proposing a more stringent transient HC+NOx standard until these uncertainties are addressed.

Please call me at (714) 656-1245 if you have any questions or would like additional information.

Regards,



Karen Szabo Hay
Certification and
Regulatory Affairs