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ABOUT IMPCO

- For almost 50 years, IMPCO has developed engine fuel systems that allow automotive, stationary, and industrial engines to operate on gaseous fuels such as natural gas and propane
- From Model Year 2001-2007, IMPCO invested \$7 million to develop and certify over 25 Large Spark-Ignition (LSI) engine families to ARB and EPA emissions standards
- IMPCO sells these certified engines to over 20 forklift manufacturers who then install these certified engines into their forklifts



ABOUT IMPCO (cont'd)

- In 2007, a projected **45%** of all new, emission-certified LSI forklift engines introduced into the US will use IMPCO-certified engines or IMPCO components
- IMPCO has been extremely involved with the development of this LSI rule and has attended every conference call and workshop since the ARB LSI rulemaking process began



ARB's PROPOSED 2010 HC+NOx STANDARD

- ARB has proposed a 0.6 g/hp-hr HC+NOx standard in 2010 - a 70% reduction over the new 2007 2.0 g/hp-hr HC+NOx standard
- ARB has stated many times that this new standard can be met through minor calibration and catalyst changes alone
- However, IMPCO will incur a tremendous cost to re-certify these engines, even if only minor calibration and catalyst changes are made



CERTIFICATION 101

- To certify an LSI engine, a manufacturer such as IMPCO must demonstrate 5,000 hours of engine, fuel system, and catalyst durability.
- This is achieved by accumulating hours on the engine and periodically performing emissions tests at specified intervals, typically every 500 hours, to demonstrate compliance with the emissions standards
- Durability programs are typically run 24 hours per day, 7 days per week, with an average cost of \$500,000 per engine



CERTIFICATION 101 (cont'd)

- Any time that there is a change in the engine, fuel system, or catalyst, ARB requires that manufacturers perform a new durability demonstration program
- Assuming that the proposed 0.6 g/hp-hr HC+NOx standard can be met through minor calibration and catalyst changes alone as stated by ARB, under current regulation IMPCO would still be required to perform 4 new durability demonstration programs
- The cost of these programs will be approximately \$2 million with no benefit to Californians or clean air



CERTIFICATION 101 (cont'd)

- Note that IMPCO will incur this \$2 million cost for engines to be sold into California only; engines certified to the existing EPA MY2007 2.0 g/hp-hr HC+NOx standard can continue to be sold into 49 states
- While there will be an incremental cost per engine for an improved catalyst and calibration change, the cost of these 4 new durability programs is excessive for these relatively minor changes for the fairly small volume of units to be introduced into California only



PROPOSAL

- ARB will allow manufacturers to consolidate their durability programs to meet the proposed MY2010 0.6 g/hp-hr HC+NOx standards
- For example:
 - In 2007 IMPCO performs 4 durability programs
 - To meet the new standard in MY2010, hardware is similar to that of 2007, but upgrades are made to the calibration and catalyst
 - As a result, IMPCO proposes to perform a maximum of one durability program on the expected worst-case engine to fulfill the durability demonstration requirement for these 2010 engines, rather than performing 4 separate durability demonstration programs.



PROPANE FUEL QUALITY

- A secondary issue related to meeting this proposed 0.6 g/hp-hr HC+NOx standard is propane fuel quality
- ARB has mandated drastically reduced emissions standards for over-the-road vehicles over the last decade. However, ARB has also developed and rigorously enforced reformulated gasoline and low-sulfur diesel fuel quality standards to help manufacturers meet these emissions standards
- LPG fuel specifications exist on the books, however, they are not nor have they ever been enforced



PROPANE FUEL QUALITY (cont'd)

- New LPG 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
- ARB clearly recognizes the importance that clean fuel plays into meeting more stringent emissions standards
- However, before implementing new emissions standards, ARB must enforce the existing LPG fuel quality standards



SUMMARY

1. Allow manufacturers to consolidate their durability programs to meet the proposed MY2010 0.6 g/hp-hr HC+NOx standards
2. Enforce LPG fuel quality standards before implementing new standards