Submitted via email to a-and-r-docket@epa.gove and via http://www.regulations.gov

April 4, 2012

Air Docket
Environmental Protection Agency
EPA Docket Center
Mailcode: 2822T
1200 Pennsylvania Avenue NW
Washington, DC 20460

Subject: Comments in Response to Nonconformance Penalties for On-Highway Heavy-Duty Diesel Engines; Proposed Rule (Docket ID No. EPA-HQ-OAR-2011-1000)

Dear Sir or Madam,

Attached are comments from Cummins Inc. regarding the above-referenced proposed rule. We thank you for this opportunity to provide our comments. If you have any questions, please contact Bridget Revier at 812-377-2586 or bridget.m.revier@cummins.com.

Sincerely,

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Introduction

Headquartered in Columbus, Indiana, Cummins designs, manufactures, distributes and services engines and related technologies for a variety of applications all over the world. The company is an advocate for consistent and responsible regulations that provide environmental benefit and recognize the needs of business by offering clear direction and incentives to manufacturers that create innovative solutions.

The Heavy-Duty Highway Rule that EPA finalized in 2001 embodies these qualities. Over ten years ago, EPA and the industry embarked on a collaborative path to achieve near-zero emissions of particulate matter (PM) and oxides of nitrogen (NOx) from on-highway heavy-duty vehicles. The regulation provided clarity, certainty and lead-time to achieve the stringent standards. The Agency also included flexibility mechanisms to help manufacturers comply, such as the ability to average, bank and trade credits, and a phase-in period from 2007 through 2009 to meet the NOx standard.

In light of that clear mandate, Cummins and other manufacturers set themselves to the difficult challenge of developing the technology needed to meet these stringent standards. They invested millions in an iterative process to design and produce engines capable of meeting the extremely tight limits in EPA's rule. To meet the NOx limits, industry as a whole settled on selective catalytic reduction (SCR) as the one technology capable of meeting those limits with a commercially viable engine.

Recently, EPA came to the conclusion that one manufacturer was unable able to achieve the NOx standard. As a result, the Agency is establishing Non-Conformance Penalties—or NCPs. Under the Clean Air Act, NCPs permit a manufacturer which cannot meet an emission standard for technological reasons to continue to sell non-conforming engines by paying a monetary penalty until it can comply. Importantly, and as stated by EPA in its proposal, the "Clean Air Act NCP provisions require that the penalty be set at such a level that it removes any competitive disadvantage to a complying manufacturer." In other words, it should cost less to comply than not to comply. Unfortunately, EPA did not meet this mandate in the Interim Final Rule, as the penalty levels enacted are too low. This discrepancy must be addressed appropriately in the Final Rule that is the subject of these written comments.

EPA refers to the challenges of determining the penalty level in its rulemaking documents. We agree that this determination is complicated and requires a careful and deliberate process. That is why we are strongly opposed to EPA taking action in an Interim Final Rule without prior proposal and public comment, and have sought redress in a court that will decide that issue. EPA must follow due process to allow all parties to contribute their expertise and perspective to create NCPs that are set at appropriate levels and truly remove the competitive disadvantage to complying manufacturers. We, along with others, have taken judicial action on EPA's use of an Interim Final Rule process. We will comment on the Interim Rule briefly and then turn our attention to the Proposed Rule.

The Interim Final NCP Rule that Accompanied the Proposed Rule Is Invalid

On the same day that EPA issued its Proposed Rule, it also issued a parallel Interim Final Rule announcing NCPs for heavy heavy-duty diesel engines for model years 2012 and 2013. 77 Fed. Reg. 4678 (Jan. 31, 2012). The Interim Final Rule took effect immediately upon promulgation and was issued with no advance notice or opportunity for public comment or hearing. *Id.*

Cummins and other engine manufacturers submitted written requests for EPA to issue an administrative stay of the Interim Final Rule (all three petitions were later denied by EPA), then petitioned for judicial review of the Interim Final Rule in the U.S. Court of Appeals for the D.C. Circuit. *See* Administrative

Petition by Mack Trucks, Inc. & Volvo Group North America, LLC (Jan. 27, 2012); Administrative Petition by Daimler Trucks North America, LLC and Detroit Diesel Corporation (Feb. 2, 2012); Administrative Petition by Cummins, Inc. (Feb. 15, 2012); *Mack Trucks Inc. v. EPA*, D.C. Cir. No. 12-1077 and consolidated cases (D.C. Cir. 2012). Cummins hereby incorporates by reference all of the arguments it made in its administrative petition to EPA and in the Petitioners' Brief filed in the D.C. Circuit on March 12, 2012. This incorporation is being made, and the summary below is provided, because these arguments overlap in substantial part with comments on the Proposed Rule.

In summary, the Interim Final Rule is invalid for the following reasons:

- EPA improperly relied on the "good cause" provision of the Section 553(b)(B) of the Administrative Procedure Act ("APA") for its promulgation of the Interim Final Rule without advance notice and opportunity for public hearing. The APA good cause exception categorically cannot be used by the Agency for this purpose, because Section 202(g)(1) of the Clean Air Act expressly provides that NCPs can only be issued *after* those procedural requirements are met.

- Even assuming that the APA good cause exception was theoretically available to the Agency, EPA's purported "good cause" for setting interim NCPs falls far short of the legal requirements for invoking that narrow exception.

- For the same reasons discussed above with respect to the Proposed Rule, the Interim Final Rule does not satisfy any of EPA's three regulatory prerequisites for establishing NCPs.

- In setting the NCPs, EPA failed to adequately explain its major deviation from its prior practices, which was arbitrary and capricious.

- The NCPs made available by the Interim Final Rule are too low to remove the competitive disadvantage to Cummins and other conforming engine manufacturers, in violation of Clean Air Act section 206(g)(3)(E).

Recommendation: Cummins expects the Interim Final Rule to be vacated by the D.C. Circuit. In the meantime, no new certificates using NCPs should be granted based on that rule.

The following comments pertain to the Proposed Rule.

EPA's Regulatory Criteria for Issuance of NCPs Are Not Satisfied

EPA has established three regulatory criteria that must be met before it may promulgate NCPs. 40 C.F.R. § 82.1103-87. Not a single one of those criteria is met here.

First, there must be a new or revised emission standard, or an existing emission standard that has become more difficult to achieve because of a new or revised standard. *Id.* § 82.1103-87(a). There is no new or revised NOx standard for 2012. The 2010 NO_x standard was enacted eleven years ago, in 2001. That standard has not become "more difficult to achieve" in 2012. Engine manufacturers were given years of lead time before it began to be phased in, and the standard has been in full effect for over two model years.

Second, EPA must find that "substantial work *will be required*" to meet the emission standard, meaning that compliance requires "the application of technology not previously used in an engine or vehicle class

or subclass, or the significant modification of existing technology or design parameters." 40 C.F.R. § 82.1103-87(a)(1) & (b). In other words, if a manufacturer will have to use technology never previously used in a class of engines to meet an emission standard, the "substantial work" criterion is met. That is manifestly not the case here. For many years, industry has recognized that SCR technology would be necessary to achieve the low NOx standard first set forth in the 2001 Rule, and all manufacturers save one are using that technology to achieve the 2010 NOx standard.

EPA has previously spoken directly to this point: "Obviously, substantial effort would not be required if many manufacturers' vehicles/engines were already meeting the revised standard or could do so with relatively minor calibration changes or modifications." 50 Fed. Reg. 35,374, 35,403 (Aug. 30, 1985). Here, except for one company, *all* manufacturers' vehicles and engines are meeting the 2010 NOx standard using SCR technology. Thus, "technology not previously used in an engine or vehicle class or subclass" is not required in order to meet the 0.20 g/hp-hr standard. Even if one manufacturer may *prefer* to use a technology other than SCR, it is not *required* to do so. In fact, there is no question that the one manufacturer, Navistar, could choose to adopt SCR for its engines in North America: that company uses SCR in some of its own engines marketed overseas. Today'sTrucking.com, *Navistar OK with SCR Engines—In S. America* (Aug. 25, 2009), *available at* http://www.todaystrucking.com/news.cfm?intDocID=22361.

In the Proposed Rule, EPA makes *no* finding that substantial work "will be required" to achieve the NO_x standard, as its regulations mandate. Instead, it alters the regulatory language by formulating the test in the *past*, rather than the present. EPA posits that because the rest of the industry worked so hard developing SCR systems to meet the 0.20 g/hp-hr standard, "[i]t is ... logical to conclude ... that substantial work *was* required to meet the emission standard." 77 Fed. Reg. at 4738 (emphasis added). But the regulation does not inquire whether substantial work *was* required in the past to meet the standard. Rather, it requires EPA to find that substantial work *will be* required in the future in order for NCPs to be issued. The difference in verb tense is significant and determinative of the regulation's meaning. The Supreme Court has recognized as much in the analogous task of interpreting statutes. *Ingalls Shipbuilding v. Director, OWCP*, 519 U.S. 248, 255 (1997) (tense of verb is an element of plain meaning); *United States v. Wilson*, 503 U.S. 329, 333 (1992) ("Congress's use of a verb tense is significant"); *see also Carr v. United States*, 130 S. Ct. 2229, 2236-37 (2010) (collecting cases).

EPA also takes inconsistent positions in trying to justify that substantial work is required to meet the 2010 NOx standard on the one hand, and proposing as its "baseline" engine an engine *capable* of emitting 0.20 g/hp-hr NOx that is de-tuned to meet the "upper limit" of nonconformity proposed for the rule, 0.50 g/hp-hr NOx. 77 Fed. Reg. at 4740. EPA presents the facts one way to meet one requirement, and another way to meet a different requirement of its regulatory scheme. That is inappropriate.

Third, EPA must find that there is likely to be a "technological laggard." 40 C.F.R. § 82.1103-87(a)(2). In the preamble to the Proposed Rule, as with earlier NCP rules, EPA defines "technological laggard" as "a manufacturer who cannot meet a particular emission standard due to technological (*not economic*) difficulties and who, in the absence of NCPs, might be forced from the marketplace." 77 Fed. Reg. at 4738 (emphasis added). EPA also reaffirms the importance of finding a *true* technological laggard exists, noting "NCPs have always been intended for manufacturers that cannot meet an emission standard for technological reasons rather than manufacturers choosing not to comply." *Id.* at 4739.

But that is precisely the situation presented here: Navistar has *chosen* not to utilize SCR technology to comply with the 0.20 g/hp-hr NOx standard. It decided instead to pursue a different path, not based on a lack of technological ability to employ SCR, but because of a conscious business calculation. As one

Navistar official explained, "There's no question that SCR works. It's just not the choice our management wanted to take. It's just too easy." E. Ballam, 2010 Emission Standards Limit Apparatus Engine Choices, Fire Apparatus & Emergency Equipment, Mar. 2009, *available at* http://www.fireapparatusmagazine.com/index/display/article-display/4258450219/articles/fire-apparatus/Volume-14/issue-03/features/2010-emissions-standards-limit-apparatus-engine-choices.html. The fact that Navistar is currently using SCR technology in some of its engines in other countries further underscores this point. *Navistar OK with SCR Engines—In S. America*. If Navistar's decision to achieve compliance with the 0.20 g/hp-hr standard using alternative technology has not worked, that makes the company an *economic* laggard, not a technological one.

Nonetheless, EPA finds there is "a significant likelihood that [NCPs] will be needed by an engine manufacturer that has not yet met the requirements for technological reasons." 77 Fed. Reg. at 4738-39. It bases this finding solely on the following assertions: (1) that manufacturer is currently using NOx credits to certify all of its heavy heavy-duty diesel engines at 0.50 g/hp-hr; (2) based on that company's current credit balance and projected sales for this service class, EPA does not expect it to have sufficient credits to cover its entire model year 2012 production; (3) the manufacturer intends to use a different technology to meet the NOx standard but has not yet submitted an application for the 2012 model year with NOx emissions at or below the 0.20 g/hp-hr standard that would not require emission credits. *Id.*

The first two of EPA's "bases" for its technological laggard finding again point to *economic* decisions by Navistar, not to technological difficulties in using SCR to comply with the standard, should it choose to do so. A company is not obligated to consume its NOx emission credits at any particular rate. Alternatively, for example, it could significantly slow down engine production for a period of time. Because there is no discussion or evidence in the rulemaking record about what Navistar's emission credit balance actually is, we are left only to speculate about its available options.

EPA's final assertion to support its "technological laggard" finding—that the Agency had not received an application for a certificate of conformity from Navistar that did not rely on the use of emissions credits to comply—is now untrue. Shortly after promulgating the Interim Final Rule, EPA did receive an application for a certificate of conformity from Navistar for an engine that complies with a 0.20 g/hp-hr standard. As such, a critical fact—the most important fact—supporting EPA's technological-laggard determination no longer exists.

Recommendation: The Proposed Rule should be withdrawn because none of EPA's own regulatory criteria for the availability of NCPs has been met. NCPs are not authorized, and NCPs should not be issued. For the same reasons, as discussed further below, the Interim Final Rule is unlawful.

The Factual Basis for the NCP Rule is No Longer Valid

EPA states that the manufacturer that requested the promulgation of NCPs "intends to use a different technology [than SCR] to meet the NOx standard but has not yet submitted an application for the 2012 model year with NOx emissions at or below the 0.20 g/hp-hr standard." 77 Fed. Reg. at 4738. The Agency goes on to state that "[s]ince it has not yet submitted an application," NCPs are justified because EPA therefore has a reasonable concern that the manufacturer may not be able to comply with the 2010 NOx standard. *Id.* at 4738-39. But the fact on which EPA's concern is based is no longer correct. Shortly after EPA issued the notice, Navistar did in fact submit an application for a certificate of conformity for a 0.20 g/hp-hr engine.

In these circumstances, where the factual predicate for the agency's proposed action has completely changed, EPA must reconsider whether an NCP rule is appropriate at all. Where, as here, there is only one company that EPA intends to benefit by this rule, EPA should first determine whether that company's certificate application will be granted. If so, then EPA should withdraw the proposed rule and should not certify any engines with NCPs under the Interim Final Rule. On the one hand, Navistar is representing to EPA (through its application) that it has a certifiable engine, while on the other hand it has already certified two engine families on the basis of the Interim Final Rule NCPs, which ostensibly are only available because the company is unable to manufacture a compliant engine. EPA cannot justify certifying engines based on NCPs if the one company they are intended to benefit might not need them in any event.

Recommendation: If EPA decides to issue a certificate of conformity to Navistar for an engine meeting the 0.20 g/hp-hr NOx standard, EPA should not proceed with the final rule and should not issue any additional certificates with NCPs under the Interim Final Rule.

The Proposed NCPs Are Too Low and Thereby Create a Competitive Disadvantage for Compliant Manufacturers, In Conflict with the Clean Air Act and Congressional Mandate

Paying NCPs to produce noncompliant engines must never be a lower-cost option compared to compliance. But with this proposed rule, EPA is creating precisely that situation. Although much attention has been paid to the difference in compliance costs between EGR and SCR manufacturers, the too-low NCPs create a much greater issue with regard to compliance among SCR manufacturers. Since NCPs are available to all manufacturers once enacted, and since the cost of the proposed NCPs are much lower than the economic value that can be created by paying them and optimizing engines at higher, noncompliant NOx levels, SCR manufacturers that are otherwise capable of producing compliant engines will be driven by competitive market forces to pay NCPs as a license to produce higher emitting engines. That is directly contrary to the statutory purpose of NCPs

It is a core legal requirement that NCPs "shall remove any competitive disadvantage to manufacturers whose engines or vehicles achieve the required degree of emission reductions...." Clean Air Act section 206(g)(3)(E). That is why EPA must capture all the investments that compliant manufacturers put into meeting stringent emission standards, and all the cost of ownership benefits of operating at higher NOx levels lest EPA confer an economic *benefit* on companies who choose to pay the NCPs to produce non-compliant engines.

That is to say, there is an overriding Congressional purpose to NCPs that EPA cannot ignore, which is to *incentivize compliance*, not *noncompliance*. As a result, if NCPs are set so low that *compliant* manufacturers will be incentivized to use NCPs and increase emissions in order to level the competitive playing field, then the NCPs are unlawful, arbitrary and capricious. In other words, NCPs that encourage backsliding are facially invalid.

When Congress authorized NCPs, it foresaw this possibility and spoke directly to it: "The Committee does not intend to encourage noncompliance with the revised standards. For example, if a manufacturer opts to pay the penalty and to design or tune the vehicle or engine to higher emission levels, the nonconformance penalty would probably be inadequate and should be revised." House Rep. No. 95-294 at 276 (95th Cong. 2d Sess. 1977), 2 U.S.C.C.A.N. 1355 (1977). But that is just what EPA has done here. As explained in detail in these comments, SCR is not a binary technology; it can be optimized at different levels. At higher NOx levels, engines with SCR NOx control systems can be reoptimized to deliver improved fuel economy and to reduce precious metal content in the catalyst. That results in an

economically significant and meaningful decrease in cost for the consumer at the expense of increased NOx emissions. So obviously, if the NCPs are set *lower* than the amount of the decrease in lifetime costs for the consumer, the market will drive manufacturers to pay the NCP to produce a product that, over its life, is less expensive to own and operate.

This conclusion is obvious when one looks at the Cummins product offerings in the market today. Cummins employs emission credits, which have been earned by producing engines that over-achieve on NOx emissions in the past, to produce engines at up to 0.50 g/hp-hr NOx precisely because they deliver greater economic value to the customer. SO this is not a hypothetical argument, it is very real and can been seen in the market today. Absent NOx credits, the same economic value for the customer can be created by paying NCPs. The difference being: engines certified using NOx credits are fully compliant to the prevailing emission standards; whereas, engines sold using NCPs are not.

Setting NCPs at a level that drives SCR manufacturers to use them, thereby increasing emissions, also violates the fundamental requirement that section 202(a) standards should be technology-forcing. *See* Clean Air Act section 202(a)(3)(A)(i) (EPA must set "standards which reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology"). NCPs cannot trump this express statutory requirement, but that is the effect of the proposed NCPs. By setting NCPs so low that SCR manufacturers will be compelled by market forces to use them, EPA undercuts its own emission standards. This is very different than the flexibility provisions that EPA fairly incorporated into the 2001 rule (e.g., averaging, banking and trading, and the 2007-2009 phase-in of stringent standards). Those provisions allowed an efficient forward path towards compliance. Here, however, this misuse of NCPs creates, in effect, technology-*relaxing* standards, engineering a path *away* from compliance. That cannot be squared with the statute. *See Natural Resources Defense Council v. Thomas*, 805 F.2d 410, 424 (D.C. Cir. 1986) (the legislative history of section 202(a) "'clearly' outlaws laggard-based standards"). The NCP provisions of the statute must work in harmony with the standard-setting requirements; under EPA's proposal, they work at cross-purposes.

Congress's mandate also appears in Section 206(g)(3)(D) of the Act. EPA is directed that NCPs "shall be increased periodically in order to create incentives for the development of production vehicles or engines which achieve the required degree of emission reduction." The directive is clear: NCPs must incentivize compliance by escalating the amount of the penalty. But if the penalty is initially set so low that it creates incentives for the development of products that do *not* achieve emission standards, that is a clear violation of the law.

The proposed NCPs here are available to *all* manufactures. At the arbitrarily low level set by EPA, the marketplace will compel *compliant* manufacturers like Cummins to pay NCPs and certify to a standard above 0.20 g/hp-hr NOx. That is plainly unlawful and demonstrates that the proposed NCPs are not sufficiently high as to "remove any competitive disadvantage."

Recommendation: The proposed NCPs are too low to eliminate the competitive disadvantage to compliant manufactures and must be adjusted significantly upward consistent with the comments that follow.

Market Experience with SCR Engines and DEF Prices Shows That EPA Economic Analyses of Engine Costs and DEF Costs are Incorrect, and Lead to Unreasonably Low NCP Values

Engine Market Experience

Cummins has unique expertise as a global engine manufacturer that gives us firsthand experience with evaluating the cost of compliance and helping the Agency determine the appropriate level for NCPs. We employ the broadest technology portfolio in the industry to meet emissions standards around the world for on and off-highway products.

The Heavy-Duty Highway Rule finalized in 2001 did not mandate any specific emissions control technology. Instead, the regulation laid out a ten-year roadmap for ever-tightening emission standards. Cummins evaluated each step along with customer requirements to determine the right technology approach from a suite of options. In 2002, this involved the adoption of cooled Exhaust Gas Recirculation, or EGR, to reduce NOx. The particulate matter standards dropped significantly in 2007—which led to the application of diesel particulate filters, or DPFs.

After achieving a 99% reduction in particulate matter, the next significant challenge was NOx. In 2007, Cummins was the first diesel engine manufacturer to certify a product in all 50 states to the stringent 2010 NOx standard. In partnership with Chrysler, we utilized a NOx adsorber catalyst for the 6.7L Turbo Diesel to achieve this milestone a full three years ahead of the schedule laid out by EPA.

Looking ahead to meeting the NOx standard for the rest of our engines, Cummins considered a range of technological solutions. We initially announced that we would use Selective Catalytic Reduction (SCR) for our midrange engines and an EGR-only solution for heavy-duty engines. However, in 2008, as we continued to develop both systems, we saw significant improvements in SCR efficiency and durability for heavy-duty applications and decided to adopt SCR across all of our heavy-duty and midrange engines in the U.S. except for the Chrysler pickup.

Thus, the question before the Agency on the cost of compliance is not an intellectual exercise for Cummins. We know exactly what it takes to change direction and adopt the technology needed to comply with the NOx standard. And we—along with our customers—could not be happier with our choice to utilize SCR.

Customer feedback on the 2010 launch indicates that this has been their best-ever experience with emissions-driven technology change. In addition to improved reliability, the Cummins SCR system is delivering up to 6% better fuel economy than the engines we produced in 2009. Indeed, the heavy-duty on-highway engines we sell today are the most efficient engines we have ever made—at almost zero levels of NOx and particulate matter.

SCR is continuing to improve and provides a foundation for the future. We continue to improve the conversion efficiency of the SCR system—which is leading to even greater fuel economy improvements. This moves us well down the path of meeting the new greenhouse gas and fuel efficiency standards adopted by EPA and NHTSA.

Cummins SCR-equipped engines are working effectively not only in the lab, but under real-world driving conditions to deliver the required NOx emission reductions. By controlling exhaust temperatures through thermal management, Diesel Exhaust Fluid (DEF), is being dosed to reduce NOx emissions under a wide range of conditions, including stop-and-go, cold and lightly loaded operation. Cummins has

demonstrated particulate matter and NOx control and full SCR system operation in ambient temperatures from 0 degrees to over 110 degrees Fahrenheit. Additionally, Cummins continues to work with EPA through guidance documents and certification to ensure that the operator maintains the necessary supply of DEF on the vehicle and does not interfere with the proper function of the SCR system. Separate examinations by the California Air Resources Board, American Trucking Associations, Cummins and others have all confirmed that commercial vehicle operators are not risking their time or money trying to circumvent the SCR system.

With that being said, this discussion is not about SCR versus EGR or any other technology. Cummins engines use both SCR and EGR. This is about setting the appropriate level for penalties for any manufacturer that, after more than 10 years of lead time, does not comply with EPA's NOx standard.

Cummins invested over $200 million dollars to comply, and according to media reports, heavy-duty truck prices increased by $10,000 and medium-duty truck prices increased by $6,000 as the emissions surcharge for 2010-compliant equipment. Yet, EPA has proposed maximum penalties of only $1,919 for heavy heavy-duty engines and $682 for medium heavy-duty engines. While the NCP calculation involves a variety of considerations, it is clear that the penalties put forth by EPA are significantly lower than what is needed to represent the significant investments that Cummins and other complying manufacturers have made.

According to EPA, one of the main challenges it faced in setting the NCPs was that "compliant manufacturers have not designed and optimized in-production engines for the U.S. market at 0.50 g/hp-hr NOx (the upper limit)." 77 Fed. Reg. at 4741. This is not true. There are Cummins engines for sale at Family Emission Limits (FELs) of up to 0.50 g/hp-hr NOx using credits. These are useful, practical examples of optimization at higher NOx levels.

By reducing NOx emissions more than required in the past, Cummins generated NOx emission credits that could be applied today and in the future. This approach has benefitted the environment because it delivered greater emission reductions sooner and because the credit balance is discounted before it can be withdrawn for use—ensuring a net absolute benefit for the environment in addition to an early benefit. Thus, we are able to certify some engines at emission levels up to 0.50 g/hp-hr NOx, we have engines at 0.35 g/hp-hr NOx, and we have engines at 0.20 g/hp-hr NOx. These engines are all optimized to provide the best solution for our customers, taking into account cost, reliability, durability and fuel economy.

Why did we do this? At a higher NOx level, we are able to deliver even greater fuel efficiency savings for our customers.

Cummins is now fully engaged in making the technological changes necessary to reduce all engine emissions to 0.20 g/hp-hr NOx. We are advancing technology to drive down NOx while maintaining and even improving fuel efficiency. The product comparisons in this NCP rulemaking are not a hypothetical exercise for Cummins, but are part of our development work going on right now in our Technical Centers. We know exactly the development, hardware, operational and other impacts of this change. Cummins provided this as confidential business information to the Agency in the months leading up to this rulemaking and will share some of that information in this document, to the extent it can be presented in a form that does not compromise the company's proprietary interests.

EPA Error in Analysis of Engine Costs Grossly Underestimates the Cost of Compliance / Benefit of Noncompliance

The Agency correctly recognizes in the Proposed Rule that *optimized* engines at 0.50 g/hp-hr NOx and 0.20 g/hp-hr NOx must be compared. However, this is not how the analysis was conducted.

Instead of using available, real-life experience as the basis for its calculation, and even though stated differently in their technical support document, EPA's analysis actually started with a *fully* compliant engine as its baseline. The Agency then reduced DEF consumption and made small hardware changes with *no change to fuel consumption* at higher NOx levels, creating a hypothetical 0.50 g/hp-hr NOx engine that would not be competitive in the marketplace and completely missing the point of operating at higher NOx levels. A number of Cummins engines are certified at a higher NOx level by using credits specifically because of the well-known NOx-fuel consumption relationship.

Higher NOx Emissions Allow Significant Improvements In Fuel Consumption

Fuel is a major cost for all heavy-duty vehicles, and fuel consumption is a major consideration when customers are purchasing a new heavy-duty vehicle. An NCP engine would have a 2% fuel consumption advantage over a compliant engine when fuel and DEF consumption are optimized. Rather than holding engine-out NOx as constant, as in EPA's incorrect baseline assumption, a manufacturer could hold constant the percent reduction of NOx across the SCR catalyst, which is a more realistic optimized baseline. This leads to a fuel consumption advantage due to higher engine-out NOx, reduced exhaust backpressure, and reduced particulate filter regenerations for the NCP engine.

The fuel consumption advantage of a 0.50 g/hp-hr NOx optimized baseline compared to a 0.20 g/hp-hr NOx engine can be seen in Figure 1 for a variety of NOx compliance levels. The fuel economy is expressed in terms of a percentage improvement compared to the 0.20 g/hp-hr NOx engine. The NOx compliance levels were determined using the EPA steady-state emissions certification cycle. The fuel economy data were determined using a Cummins proprietary drive cycle representing vehicle applications utilizing heavy duty engines. By comparing an engine optimized at 0.50 g/hp-hr to a compliant engine at 0.20 g/hp-hr, a 2% fuel economy improvement has been demonstrated. The fuel economy benefit of the 0.50 g/hp-hr NOx engine comes from a nearly constant SCR conversion efficiency, increasing engine-out NOx, and therefore using less fuel.

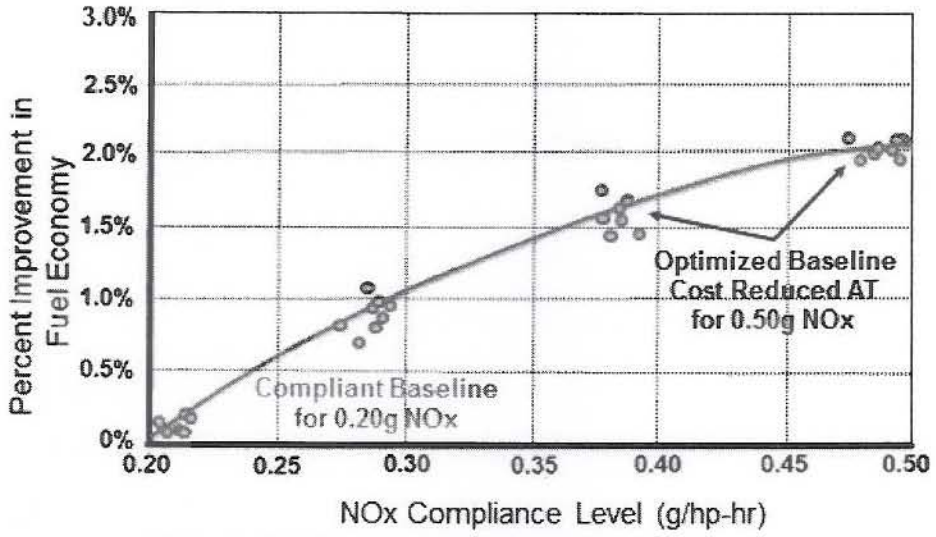


Figure 1: Fuel Economy Variation with NOx Emissions

Higher NOx Allows Cost of SCR System to be Reduced

Furthermore, the SCR system efficiency implicit in EPA's hypothetical noncompliant engine was far below ordinary system performance. This further distorts the cost comparison and underestimates the cost of compliance because the cost of the hardware in the hypothetical noncompliant system is too high. EPA did allow for precious metal reduction in the SCR catalyst; however, there are other hardware changes between compliant and noncompliant engines that were not taken into account.

Precious metals used for the diesel oxidation catalyst (DOC) and ammonia oxidation catalyst could be reduced and reformulated with a greater substitution of cheaper precious metals for the optimized NCP baseline. The cost reduced DOC is possible because the optimized NCP baseline engine would experience more passive DPF regeneration due to the higher engine out NOx and would not need as much nitrogen dioxide (NO_2) production from the DOC. This results in lower precious metal content required to produce the needed levels of NO_2 used for the DPF regeneration process. The SCR catalyst performance over the lifetime of the vehicle is not diminished using the cost reduced DOC because the SCR catalyst will experience less high temperature exhaust due to lower temperature DPF regeneration (i.e., less thermal aging of the SCR catalyst). The NCP baseline engine will have a reduced need for aftertreatment and vehicle insulation to prevent excessive heat loss. Thermal management of the aftertreatment system and providing acceptable driving performance to the end user will be easier to achieve on the NCP baseline engine so cost reduced turbomachinery can be utilized. Additionally, improved emissions measurement devices for NOx-related, on-board diagnostics would be removed, because the NCP baseline engine will not have to measure the smaller amounts of NOx and a sensor with a higher level of accuracy will not be needed. These hardware differences are important to account for when going between a nonconforming and compliant engine. A customer purchasing a 0.50 g/hp-hr NOx engine would not be willing to pay the additional upfront costs of extra precious metal, insulation, turbomachinery, and OBD equipment that the engine does not require for regulatory or performance reasons.

An optimized NCP baseline engine will have warranty and down time cost advantages compared to a compliant engine. First, the addition of the hardware mentioned in the paragraph above will be

associated with warranty costs. Second, as the level of NOx is reduced, the NOx OBD requirements become more stringent, which will likely lead to more OBD-triggered warranty claims. Last, it is important to consider the cost to the customer for the additional down time associated with this additional warranty.

These have been detailed in our CBI submission and are realized today in our 0.35-0.50 g/hp-hr NOx products.

EPA's Estimate of DEF to Diesel Price Ratio is Too High and Does Not Represent Real-World Purchasing Practices And Projected Prices During the NCP Period

The economic benefit of improved fuel economy at higher NOx levels is offset to some degree by increased DEF consumption. Overall this is a favorable tradeoff and the net economic benefit depends on diesel fuel price and DEF price. Therefore, the ratio of DEF to diesel price is important because it defines the tradeoff available to an engine manufacturer for the optimization between DEF and diesel consumption. A ratio of DEF to diesel price is also more appropriate to use because it accounts for market impacts on these commodities that would not be included in EPA's incorrect assumption of a constant DEF price. When Cummins completed its first estimates of this DEF to diesel price ratio, a conservative approach was taken using jug, retail pump, tote, and bulk supply prices of DEF. Price data from Integer Research was used but little data had been collected at the time to determine the usage rate of each distribution method. This conservative approach resulted in an assumption that the cost of DEF would be about 60% the cost of diesel fuel. EPA's estimate at that time was even higher.

Since those initial conservative estimates, the view of the DEF market has changed significantly in that there has been a shift towards more bulk distribution thereby driving down the average price of DEF. This trend is expected to continue for several more years. Cummins has combined data from large fleets, truck stops, and Integer Research to show the relative use of each distribution method and price information. An extensive set of data has been gathered by Cummins Filtration which sells packaged and bulk DEF. These data have been compiled and are shown in Figure 2 below. The fact that more customers are continuing to convert their DEF purchases to bulk distribution is supported by the front page article in Transport Topics titled *Truck Stops, Fleets Respond to DEF Demand By Installing More Bulk Filling Dispensers* published April 2, 2012. As stated in the article, "All the major truck-stop chains have bulk DEF available, and many small and midsize operators are following suit." An increasing number of customers are installing bulk DEF sites even if the customers do not distribute their own fuel. This trend toward bulk distribution of DEF is further supported by Integer Research's DEF Tracker monthly price reporting service. According to Figure 2, over forty percent of the total volume of DEF distributed in North America will be by bulk distribution channels by 2017. Customers site the ability to transition to on-site bulk dispensing due to the safe and economical solutions provided by an increasing number of companies that offer equipment assistance programs. With the growing number of vehicles utilizing SCR engines, customers are increasingly moving to bulk dispensing. This market dynamic is driving the cost of bulk and retail pump prices lower as shown in Attachment A. The retail pump operators (truck stops) are challenging other DEF supply formats on cost (bulk and totes) as a necessity to preserving diesel fuel sales.

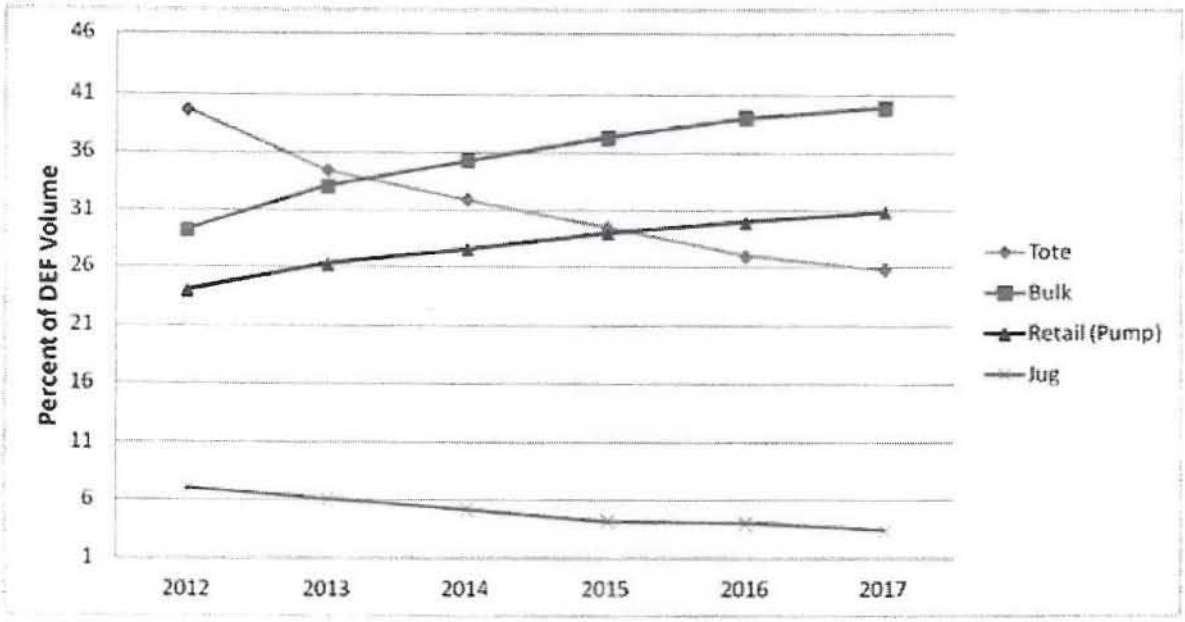


Figure 2: DEF Distribution Volume by Method

Combining the information on DEF distribution method with diesel price information from http://www.eia.gov/petroleum/gasdiesel and with the DEF price data provided by Integer Research, which can be found in Attachment A, Figure 3 was created. Figure 3 provides a volume weighted DEF/diesel price ratio. This shows that a 0.4 DEF/diesel price ratio is a good forward looking representative value. It incorporates the DEF price variation associated with the distribution methods along with the downward price pressure due to market competition. This type of price projection is typical of a new market where the volume of DEF consumed is increasing rapidly while the distribution channels mature.

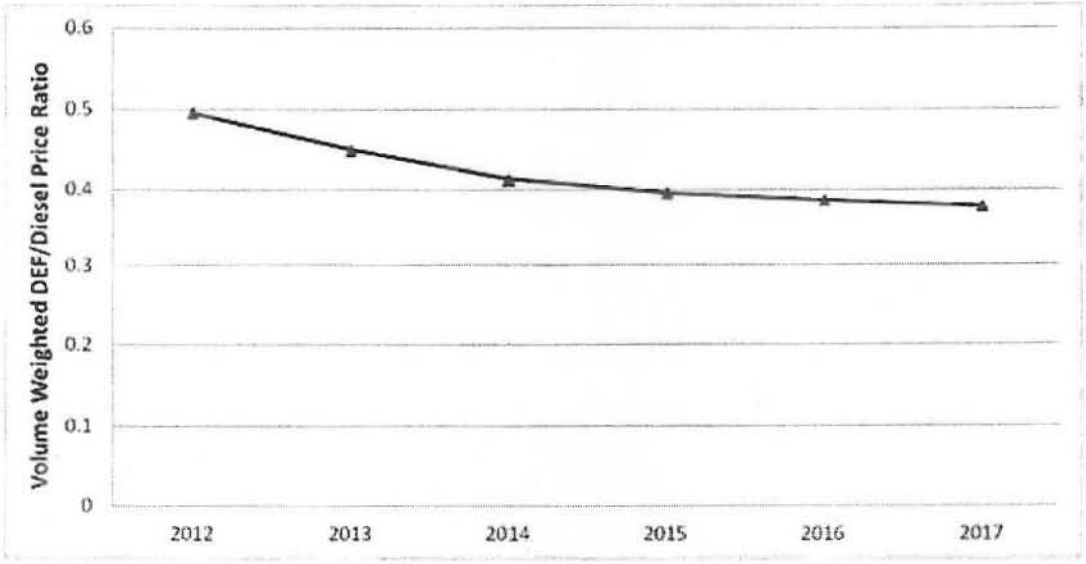


Figure 3: Composite DEF/Diesel Price Ratio: Volume Weighted Based on Distribution Method

Additionally, we expect that going forward the price of DEF will more closely track the price of natural gas. Urea, the active component in DEF, is manufactured from natural gas, and the price of natural gas has been and is projected to remain lower relative to the price of diesel. This likely results in the cost ratio of DEF to diesel decreasing even further.

Further details have been provided in our CBI submission.

Summary

So EPA fundamentally erred in its analysis of first cost and operating cost benefits at higher NOx levels up to 0.50 g/hp-hr . By employing as a baseline a 0.20 g/hp-hr NOx capable engine adjusted to produce 0.50 g/hp-hr NOx simply by reducing the amount of DEF dosed without any change to engine-out NOx or any other operating feature, the analysis fails to account for substantial fuel savings for the customer. It also carries with it a good portion of the cost of compliance, because the baseline engine is already 0.20 g/hp-hr NOx capable. Although EPA did account for some reduction in catalyst cost at the higher NOx level, other cost reductions were omitted. Furthermore, EPA did not employ DEF/diesel price ratio appropriate for the NCP period. Therefore, almost none of the benefits of operating at the higher NOx level are accounted for in the baseline resulting in a gross underestimation of the economic benefit of noncompliance. In effect, the proposed penalty levels make the cost of compliance higher than the cost of noncompliance, which is the wrong way around.

A correct analysis would recognize the first cost and operating cost benefits of operating at higher NOx levels up to 0.50 g/hp-hr and would incorporate a more appropriate DEF/diesel price ratio. This would result in a much higher NCP level of $8,100 for a heavy heavy-duty diesel engine and $2,600 for a medium heavy-duty diesel engine. These NCPs would account for the fuel consumption, hardware cost, development cost, warranty cost, and down time cost differences between a noncompliant and compliant engine and eliminate the economic benefit of operating at higher NOx levels.

It is important and incumbent upon EPA to include all aspects of the cost of compliance. This includes fuel and DEF costs and cost differences in hardware, warranty and down time and development and capital for a more appropriate NCP of $8,100 for heavy heavy-duty engines. For medium heavy-duty engines, there are fuel and DEF costs and cost differences in hardware, warranty and down time and development and capital for a more appropriate NCP of $2,600.

Recommendation:

- EPA must use an NCP baseline engine that reflects the true benefit of optimizing DEF and fuel consumption and hardware.
- NCPs should account for all aspects of the cost of compliance including fuel, DEF, hardware, warranty, down time, development and capital costs.
- EPA must include appropriate fuel economy improvements (e.g., 2%) and a DEF/diesel price ratio of 40% to accurately account for the fuel to DEF optimization.
- EPA should raise the NCPs to $8,100 for heavy heavy-duty engines and $2,600 for medium heavy-duty engines so that compliance is not penalized compared to noncompliance.

Current Penalties Create an Incentive for Noncompliance

Manufacturers, especially those with SCR-based systems that are capable of full compliance, should not be enticed to pay NCPs to produce noncompliant engines because it is more cost effective to be noncompliant than compliant.

And vehicle owners and operators who buy compliant engines should not be penalized compared to their competitors who purchase noncompliant engines.

EPA apparently believes that disallowing the ability to generate greenhouse gas credits for engines that use NCPs is a sufficient deterrent to prevent otherwise compliant engine manufacturers from using NCPs to economic advantage. Cummins disagrees and believes that market forces and customer demand will force manufacturers to use NCPs in order to provide customers with the lowest total cost of ownership.

If the NCP and "Year 1" stay at EPA's proposed levels, Cummins believes SCR manufacturers will be driven by market forces to use NCPs in order to provide to our customers the lowest total cost of ownership and best fuel economy engine.

Continuing with the assumptions that the NCP and "Year 1" stay at the proposed level, an SCR manufacturer would economically apply NCPs until 2015. Although the EPA has applied an escalator as required by Congress, the escalation is not adequate to eliminate economic advantage for noncompliance until 2015. The following table is based on an engine using NCPs to comply at a 0.50 g/hp-hr NOx level. The NCP values assume 15% of total industry production use NCPs in 2012 followed by 50% or greater (i.e., the maximum usage factor) in subsequent years. It further assumes the percent increase in overall consumer price index is a constant 3%. Details of the formula can be found in 40 CFR § 86.113-87(a)(3)(ii).

The escalation of the NCPs under this scenario is shown in Table 1 below.

Table 1: Escalation of NCPs Over Time

Year	Heavy Heavy-Duty NCPs	Medium Heavy-Duty NCPs
2012	$1,919	$682
2013	$2,242	$797
2014	$3,744	$1,331
2015	$8,650	$3,074

Even assuming the highest possible usage level starting in 2013, NCPs would be less than the cost of compliance until 2015. This means it would be more economical to use NCPs for at least 3 years than to comply. Based on the cost of compliance calculations recommended above, an SCR manufacturer would provide a benefit of $5,900 and $4,400 per heavy heavy-duty engine and $1,800 and $1,300 per medium heavy-duty engine by paying NCPs in 2013 and 2014 at the levels proposed by EPA.

Recommendation: EPA must increase NCPs so that compliant manufacturers are not compelled by market forces to use penalties in lieu of meeting stringent emission standards.

The First Year for the NCPs Should be Set at 2010

EPA has incorrectly selected 2012 as the proposed "first year" for purposes of the NCP annual escalator adjustment factor. *See* 77 Fed. Reg. at 4739, 4745. EPA provides scant justification for this proposal. While the first year for NCPs has "traditionally" been the first year the new emission limit went into effect, EPA says that it was not apparent in 2010 that NCPs would be needed because the one lagging manufacturer had emission credits available to offset its excess emissions in 2010 and 2011. *Id.* at 4745. Thus, the Agency determined that the first year should be 2012, the year when it "became apparent" that NCPs may be needed by Navistar. *Id.*

Setting the "first year" for purposes of penalty escalation based on the time that one particular manufacturer runs out of credits is wholly at odds with the purpose of the statutory provision requiring NCPs to escalate over time: to increase the incentive to come into compliance quickly. *See* 42 U.S.C. § 7525(g)(3)(D). Here, Navistar allegedly had sufficient credits to continue selling nonconforming engines through at least 2011. But the availability of credits should not exempt any manufacturer from the escalation of NCPs required by Congress. By proposing that 2012 be the first year, EPA improperly reduces the incentive for a non-complying manufacturer to timely come into compliance. The correct first year should be 2010, the year the new NOx standard came into full force and effect. The selection of 2012 in the final rule would be inconsistent with the Clean Air Act.

Recommendation: EPA should set 2010 as the first year for the NCPs.

EPA Should State the Upper Limit With the Correct Number of Significant Digits

While the preamble to the Proposed Rule states that EPA proposes an upper limit of "0.50 g/hp-hr," *see* 77 Fed. Reg. 4740, the agency proposes regulatory text that would set the upper limit at "0.5 grams per brake horsepower-hour." *Id.* at 4749 (§ 86-1105-87(j)(1)(i)(A)(4)). In other words, whether intentional or unintentional, the preamble and proposed regulatory language vary by one significant digit. The correct upper limit should contain the extra significant digit, consistent with prior EPA practice (*e.g.*, including the 2010 standard, which is expressed as 0.20 g/hp-hr). The difference is not trivial. Assuming for the sake of argument that a 0.5 g/hp-hr standard would permit an actual upper limit of up to 0.549 g/hp-hr based on rounding conventions, the absence of the additional significant digit would permit upper limit NO_x emissions approximately *nine percent higher* than a 0.50 g/hp-hr standard. *See* 40 CFR § 1065.650(h).

Recommendation: The final NCP rule should express the upper limit to two significant digits in the regulatory text, *i.e.*, as "0.50 grams per brake horsepower-hour."

Total Life Cycle Cost Should be Included in NCPs

Cummins supports EPA's use of total life cycle cost and the inclusion of operating costs for all future years in the NCP calculation. Engines that use NCPs will have a cost advantage for the entire life of the engine. This cost advantage will include lower fuel consumption and better resale value based on this lower fuel consumption. More importantly, engines that use NCPs will emit a higher level of NOx for the entire life of that engine, not just the first five years. If the entire life cycle cost is not included, this could result in a lower NCP which would be more enticing for manufacturers to use, resulting in a greater NOx impact on the environment.

Recommendation: EPA should include the total life cycle cost for all future years in NCP calculations.

EPA Should Not Set Nonmonetary NCPs

EPA has solicited comments on whether NCPs should also extend to nonmonetary relief, such as recoupment of excess emissions. 77 Fed. Reg. at 4745. We recognize that EPA appropriately uses nonmonetary relief to offset penalties in certain other contexts, *e.g.*, in lieu of civil penalties in enforcement cases. In those instances, EPA has inherent enforcement discretion to resolve contested matters and has a long history of allowing those offsets. That approach, however, is inappropriate for NCPs in light of the specific requirements of the statute. Section 206(g) calls for manufactures to "pay" a nonconformance "penalty" in "amounts" set by EPA. 42 U.S.C. § 7525(g). These terms are customarily used in connection with money, not other metrics. Furthermore, the terminology used by Congress in the legislative history of the NCP provision also makes clear that Congress was intending a monetary penalty: "The provision requires that the nonconforming technology penalty to be set at a level which will eliminate the competitive advantage, if any, for the manufacturer of a nonconforming vehicle or engine. Thus, its calculation would include such items as the actual *cost* of compliance for complying vehicles, the capital *costs* foregone as a result of noncompliance, the market *value* of any fuel economy gains made by non-complying vehicles compared to complying vehicles...." House Conf. Rept. No. 95-564 at 163 (95th Cong., 2d Sess. 1977), 2 U.S.C.C.A.N. 1544 (1977) (emphasis added). In sum, this particular statutory scheme does not provide EPA with the discretion to allow non-monetary NCPs.

Recommendation: EPA should not pursue establishing alternative nonmonetary NCPs.

Summary

It is important to step back and look at the big picture. EPA's Heavy-Duty Highway Rule finalized in 2001 is one of the nation's most significant environmental accomplishments. Cummins is proud to have been a partner with EPA and all U.S. heavy-duty engine manufacturers in developing the rule, and we have delivered technologies and products that comply. We support the principle in the Clean Air Act of setting NCPs so that manufacturers who invested and are achieving the emissions standards *and their customers* should not be penalized compared to manufacturers who do not comply.

EPA must set NCPs at the appropriate level to ensure the cost of compliance is not greater than the cost of noncompliance.

If EPA continues on the path to set NCPs, then we urge the Agency to follow due process expeditiously and finalize a sound rule that ensures all manufacturers are treated fairly, so that the emissions reductions envisioned by the landmark 2001 rule are fully realized.

In conclusion:

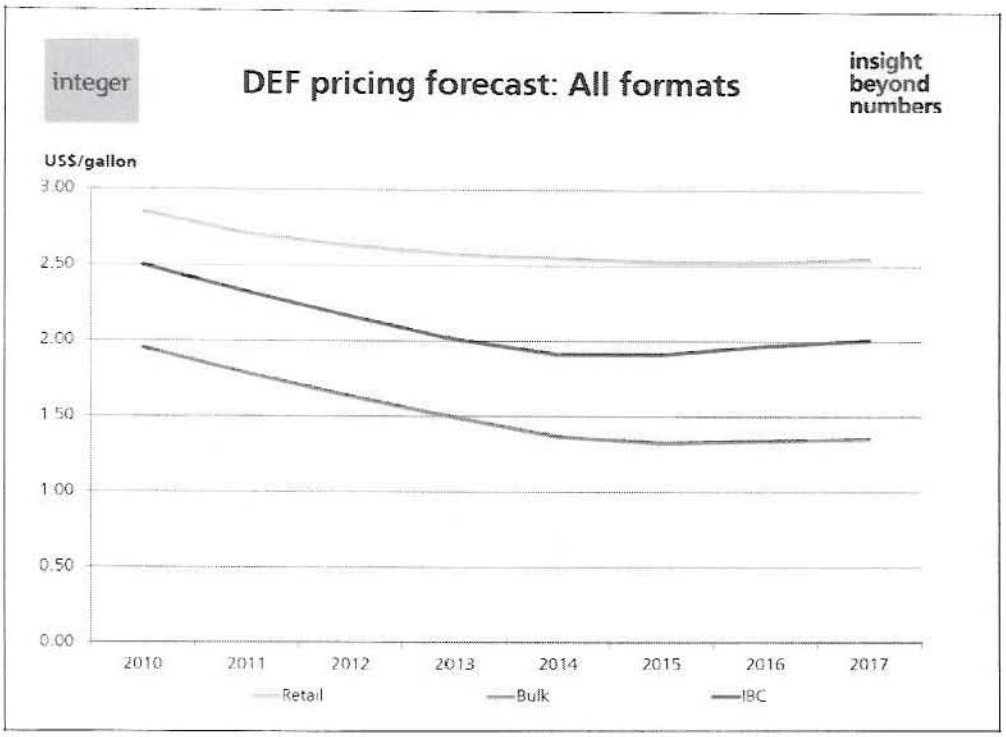
- Cummins expects the Interim Final Rule to be vacated by the D.C. Circuit. In the meantime, no new certificates using NCPs should be granted based on that rule.
- The Proposed Rule should be withdrawn because none of EPA's own regulatory criteria for the availability of NCPs has been met. NCPs are not authorized, and NCPs should not be issued. For the same reasons, as discussed above, the Interim Final Rule is unlawful.
- If EPA decides to issue a certificate of conformity to Navistar for an engine meeting the 0.20 g/hp-hr NOx standard, EPA should not proceed with the final rule and should not issue any additional certificates with NCPs under the Interim Final Rule.

If EPA does issue a final NCP rule:

- The proposed NCPs are too low to eliminate the competitive disadvantage to compliant manufactures and must be adjusted significantly upward consistent with these comments.
- EPA must use an NCP baseline engine that reflects the true benefit of optimizing DEF and fuel consumption and hardware.
- NCPs should account for all aspects of the cost of compliance including fuel, DEF, hardware, warranty, down time, development and capital costs.
- EPA must include appropriate fuel economy improvements (e.g., 2%) and a DEF/diesel price ratio of 40% to accurately account for the fuel to DEF optimization.
- EPA should raise the NCPs to $8,100 for heavy heavy-duty engines and $2,600 for medium heavy-duty engines so that compliance is not penalized compared to noncompliance.
- EPA must increase NCPs so that compliant manufacturers are not compelled by market forces to use penalties in lieu of meeting stringent emission standards. .
- EPA should set 2010 as the first year for the NCPs.
- The final NCP rule should express the upper limit to two significant digits in the regulatory text, *i.e.*, as "0.50 grams per brake horsepower-hour."
- EPA should include the total life cycle cost for all future years in NCP calculations.
- EPA should not pursue establishing alternative nonmonetary NCPs.

DEF price forecast

Prepared for Cummins – January 27th, 2011



Source: Integer Research

Disclaimer: The information contained in this price forecast has been provided to Cummins and is expressed in nominal dollars. Whilst every effort has been made by Integer Research to ensure the accuracy of this price forecast, the content would have changed in line with market developments over the course of 2011. In no event will Integer be liable for any loss or damage arising from the use of this data.