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Nathaniel J. Davis, Sr.,

Deputy Secretary.

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ENVIRONMENTAL PROTECTION AGENCY

[FRL–9616–1]

Control of Emissions From New Highway Vehicles and Engines; Approval of New Scheduled Maintenance for Selective Catalytic Reduction Technologies

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of approval.

SUMMARY: This notice announces that EPA has granted certain diesel vehicle and engine manufacturers' requests for approval of emission-related maintenance and scheduled maintenance intervals for replenishment of reducing agent in connection with their use of selective catalytic reduction (SCR) technologies. EPA's approval pertains to the use of SCR with 2011 and later model year (MY) diesel-fueled light-duty vehicles and light-duty trucks along with medium-duty passenger vehicles and chassis-certified diesel vehicles up to 14,000 pounds gross vehicle weight (GVW) and 2012 and later MY heavy-duty diesel engines.

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SUPPLEMENTARY INFORMATION:

I. Background

EPA adopted new emission standards for light-duty vehicles on February 10, 2000.[1] At that time, EPA established an emission standard of 0.07 grams per mile for each manufacturer's average full life NO_X emissions of its vehicles in each model year. For heavy-duty vehicles and engines, EPA published a rule setting stringent new requirements on January 18, 2001.[2] Among other requirements, the diesel engine NO_X emission standard was set at 0.20 grams per brake horsepower-hour (g/bhp-hr), to be phased-in between the 2007 and 2010 model years.

Diesel vehicle and engine manufacturers began planning to meet those requirements by optimizing engine designs for low emissions and adding high-efficiency aftertreatment systems. Manufacturers examined the use of several different types of NO_X reduction technologies, including NO_X absorbers, exhaust gas recirculation, and selective catalytic reduction (SCR). SCR systems use a nitrogen-containing reducing agent that usually contains urea and is known as diesel exhaust fluid (DEF). The DEF is injected into the exhaust gas upstream of a catalyst. For continued functioning of the systems, the reducing agent needs to be replenished periodically by refilling the DEF tank.

Maintenance performed on vehicles, engines, subsystems, or components used to determine exhaust, evaporative, or refueling emission deterioration factors is classified as either emission-related or non-emission-related and scheduled or un-scheduled. Any emission-related scheduled maintenance must be technologically necessary to ensure in-use compliance with the emission standards. Manufacturers must demonstrate to EPA that all of the emission-related maintenance to be performed is technologically necessary and must be approved prior to being performed or being included in maintenance instructions provided to purchasers. 40 CFR 86.094–25(b)(3), 86.094–25(b)(4), 86.1834–01(b)(3) and 86.1834–01(b)(4) establish minimum allowable maintenance intervals for various emission-related technologies. EPA determined that emission-related maintenance for the specified technologies at intervals shorter than those listed in paragraphs (b)(3) and (b)(4) are not technologically necessary, except as provided for in paragraphs (b)(7). Paragraphs (b)(7) of those regulatory sections allows manufacturers to request new scheduled maintenance and maintenance intervals or a change to existing scheduled maintenance interval, including an interval shorter than that prescribed in paragraphs (b)(3) and (b)(4). For light-duty, medium-duty, and heavy-duty diesel-cycle engines, emission-related maintenance for certain emission-related components cannot occur before 100,000 miles of use.[3] Thereafter, emission-related maintenance cannot again occur before 100,000 mile intervals for light heavy-duty engines, or before 150,000 mile intervals for medium and heavy heavy-duty engines.[4]

Pursuant to 40 CFR 86.1834–01(b)(7), a manufacturer must submit a request to EPA for approval of any new scheduled maintenance that it wishes to perform during durability determination and recommend to purchasers. New scheduled maintenance is maintenance that did not exist prior to the 1980 model year (such as DEF refills), including that which is the direct result of the implementation of new technology not found in production prior to the 1980 model year (such as SCR technology). In their approval requests to EPA, manufacturers are required to submit a variety of information, including a recommendation as to the maintenance category (*i.e.,* emission-related or non-emission-related, and critical or non-critical). If the suggested maintenance is emission-related, manufacturers must indicate the maximum feasible maintenance interval. Manufacturers must also provide detailed evidence, data, or other substantiation supporting the need for the new scheduled maintenance, the categorization of such maintenance, and the suggested interval, if the maintenance is emission-related.

If EPA approves a request for new scheduled maintenance, the Agency then designates that maintenance as emission-related or non-emission-related. For emission-related maintenance, EPA will further designate that maintenance as critical or non-critical. A designation of critical maintenance will be made if the component receiving the maintenance meets the regulatory definition of critical emission-related component in 40 CFR 86.1834–01(b)(6). Critical emission-related components include catalytic converters. 40 CFR 86.1834–01(b)(6) requires that critical emission-related maintenance must have a reasonable likelihood of being performed in use, as shown by the manufacturer.[5] Examples of

[1] 65 FR 6734 (February 10, 2000).

[2] 66 FR 5002 (January 18, 2001).

[3] 40 CFR 86.1834–01(b)(4)(ii) and 40 CFR 86.004–25(b)(4)(iii).

[4] *Id.*

[5] 40 CFR 86.094(b)(6)(ii) and 86.1834–01(b)(6)(ii). Both sections present the following conditions as acceptable of having a reasonable likelihood that the maintenance item will be performed in-use:

(A) Data are presented which establish for the Administrator a connection between emissions and vehicle performance such that as emissions increase due to lack of maintenance, vehicle performance will simultaneously deteriorate to a point unacceptable for typical driving.

(B) Survey data are submitted which adequately demonstrate to the Administrator that, at an 80 percent confidence level, 80 percent of such engines already have this critical maintenance item performed in-use at the recommended interval(s)

demonstrations that maintenance will have a reasonable likelihood of being performed in use include: Data establishing that a vehicle's engine performance will deteriorate to an unacceptable point due to poor emissions performance, survey data demonstrating an eighty percent confidence level that maintenance is in fact performed in use, and installation of a clearly displayed signal system to alert drivers that maintenance is required. When approving a new scheduled maintenance request, EPA also establishes a technologically necessary maintenance interval, based on the evidence submitted by industry and any other information available to the Agency.

In 2007, EPA issued guidance indicating how the above-described regulatory requirements for allowable maintenance could impact EPA certification decisions regarding implementation of SCR technologies for light-duty and heavy-duty diesel vehicles and engines.[6] That guidance announced that EPA would consider service operations performed on SCR systems to be critical emission-related scheduled maintenance. We stated our belief that because catalysts are listed in the (b)(3) and (b)(4) provisions as critical emission-related components, and lack of replenishing agent renders SCR catalysts inoperative, SCR system maintenance would meet the definition of critical emission-related maintenance. Therefore, allowable maintenance requirements would apply to SCR systems, including SCR catalysts, reducing agent, reducing agent storage tanks, dosing valves, and all lines and hoses. Additionally, because manufacturers indicated that packaging constraints would prevent them from being able to equip their vehicles with reducing agent storage tanks of sufficient size to allow reducing agent replenishment to comply with the general maintenance intervals of 100,000 or 150,000 miles, EPA clarified that manufacturers would likely need to request a change to the scheduled maintenance interval pursuant to the (b)(7) provision.

In that same 2007 guidance, EPA also stated that an SCR system utilizing a reducing agent that needs to be periodically replenished could be an adjustable parameter as set forth in 40 CFR 86.094–22(e)(1) and 86.1833–01(a)(1). Those regulatory provisions establish the requirements for determining the physically adjustable ranges of parameters, and EPA's 2007 guidance addressed its determination under the regulations that operation without DEF is within the scope of such ranges. EPA's 2007 guidance also provided industry-wide notice that SCR system designs and information submitted by manufacturers during certification could be used to provide EPA with assurance that DEF levels will remain at proper ranges during the operation of their vehicles and engines while in use.[7]

II. Previous Model Year Approval of New Scheduled Maintenance for SCR Systems

In 2009, EPA approved manufacturer-specific and industry-wide new scheduled maintenance interval requests for diesel-cycle motor vehicles and motor vehicle engines equipped with SCR systems.[8] At that time, EPA stated that:

> * * * SCR systems are a new type of technology designed to meet the newest emission standards and the DEF refill intervals represent a new type of scheduled maintenance; therefore, EPA believes that manufacturers may request from EPA the ability to perform the new scheduled maintenance of DEF refills. Requests from manufacturers for new scheduled maintenance intervals must include: (1) Detailed evidence supporting the need for the maintenance requested and (2) supporting data or other substantiation for the recommended maintenance category and for the interval suggested for the emission maintenance. Any emission-related maintenance must be technologically necessary to assure in-use compliance with the emission standards since minimum service intervals are established in part to ensure that the control of emissions is not compromised by a manufacturer's overly frequent scheduling of emission-related maintenance.

Upon review of industry-wide and manufacturer-specific evidence and supporting data, EPA approved new scheduled maintenance intervals for DEF equal to the scheduled oil change interval for light-duty vehicles and trucks for the 2009 and 2010 model years. For heavy-duty vehicles and engines through the 2011 model year, EPA approved new scheduled maintenance intervals for DEF tanks based on ratios to a given vehicle's fuel capacity. Vocational heavy-duty vehicles (*e.g.,* dump trucks, concrete mixers, refuse trucks, and other centrally-fueled vehicles) were permitted a DEF tank maintenance interval no less than the vehicle's fuel capacity (*i.e.,* a 1:1 ratio of DEF refill to fuel refill). For other heavy-duty vehicles, a longer interval was approved depending upon whether the vehicle was equipped with a DEF level indicator that would be constantly viewable by the operator. For those heavy-duty vehicles with a DEF level indicator, EPA approved a DEF tank refill interval no less than twice the range of the vehicle's fuel capacity (*i.e.,* a 2:1 ratio). For those heavy-duty vehicles without a DEF level indicator, EPA approved a DEF tank refill interval no less than three times the range of the vehicle's fuel capacity (*i.e.,* a 3:1 ratio).

When evaluating the evidence, data, and justifications presented by manufacturers to support their requested intervals, EPA identified as significant the impact a larger sized DEF tank would have on vehicle design and vehicle weight. To merely accommodate the inclusion of a DEF tank into vehicle design, heavy-duty vehicle manufacturers had to redesign their configurations by taking such measures as reducing the number of batteries, designing space-saver configurations,

(C) A clearly displayed visible signal system approved by the Administrator is installed to alert the vehicle driver that maintenance is due. A signal bearing the message ''maintenance needed'' or ''check engine,'', or a similar message approved by the Administrator, shall be actuated at the appropriate mileage point or by component failure. This signal must be continuous while the engine is in operation and not be easily eliminated without performance of the required maintenance. Resetting the signal shall be a required step in the maintenance operation. The method for resetting the signal system shall be approved by the Administrator.

(D) A manufacturer may desire to demonstrate through a survey that a critical maintenance item is likely to be performed without a visible signal on a maintenance item for which there is no prior in-use experience without the signal. To that end, the manufacturer may in a given model year market up to 200 randomly selected vehicles per critical emission-related maintenance item without such visible signals, and monitor the performance of the critical maintenance item by the owners to show compliance with paragraph (b)(6)(ii)(B) of this section. This option is restricted to two consecutive model years and may not be repeated until any previous survey has been completed. If the critical maintenance involves more than one engine family, the sample will be sales weighted to ensure that it is representative of all the families in question.

(E) The manufacturer provides the maintenance free of charge, and clearly informs the customer that the maintenance is free in the instructions provided under § 86.087–38.

(F) Any other method which the Administrator approves as establishing a reasonable likelihood that the critical maintenance will be performed in-use.

[6] U.S. Environmental Protection Agency, CISD 07–07, ''Dear Manufacturer Letter Regarding Certification Procedure for Light-Duty and Heavy-Duty Diesel Vehicles and Heavy-Duty Diesel Engines Using Selective Catalytic Reduction (SCR) Technologies,'' March 27, 2007, *available at: http://iaspub.epa.gov/otaqpub/display_file.jsp?docid=16677&flag=1.*

[7] EPA issued guidance on December 30, 2009. U.S. Environmental Protection Agency, Dear Manufacturer Letter regarding ''Revised Guidance for Certification of Heavy-Duty Diesel Engines Using Selective Catalyst Reduction (SCR)Technologies,'' December 30, 2009, reference number CISD–09–04 (HDDE), *available at http://iaspub.epa.gov/otaqpub/display_file.jsp?docid=20532&flag=1.*

[8] 74 FR 57672 (November 9, 2009).

lengthening frame rails, moving compressed air tanks inside the frame rails, and redesigning fuel tank configurations. Light-duty car and truck manufacturers had similar vehicle design issues related to their inherently space constrained vehicles: they had to choose whether to reduce interior vehicle space or find a place to accommodate a DEF tank in the engine compartment of vehicle's undercarriage. Aside from vehicle design issues, the addition of a large DEF tank onto any given vehicle represents a significant addition of weight to the vehicle. The addition of a significant amount of weight to a given vehicle, in turn, presents its own concerns: added vehicle weight more quickly deteriorates engine performance, and added vehicle weight decreases fuel economy. With those considerations in mind, EPA announced its approval of the requested maintenance intervals:

> After reviewing this data and information, EPA believes that longer refill intervals than those noted above would require larger and heavier DEF tanks, and the design and engineering work performed by manufacturers thus far indicate that the recommended DEF refill intervals noted above approximate the maximum feasible maintenance intervals associated with reasonable DEF tank sizes. The maintenance intervals recommended ensure that the functions and operational efficiency of such vehicles are not overly compromised. Based on this information we believe the intervals noted above are warranted.[9]

EPA's 2009 approval also noted that, ''while not a specific criterion under paragraph (b)(7) of the regulations, because DEF refill maintenance is considered 'critical emission-related maintenance,' paragraph (b)(6) requires that there be a reasonable likelihood that the DEF maintenance refill will be performed in use.'' [10] EPA then noted the number of means available to make such a showing, including a clearly displayed visible signal system or the presentation of supporting data.

III. Current Requests for New Scheduled Maintenance for SCR Systems

A. Light-Duty Requests

1. Alliance of Automobile Manufacturers Request

EPA has received information from the Alliance of Automobile Manufacturers (the ''Alliance''), that requested re-approval of new scheduled maintenance for DEF refilling at service intervals (*i.e.,* oil change intervals) for light-duty vehicles and light-duty trucks (and heavy-duty engines that are chassis-certified for NO_X) equipped with SCR systems.[11] The Alliance presented several reasons why the SCR maintenance interval should be equivalent to the service interval, including: ''vehicles will be designed and equipped to ensure vehicle compliance with emission standards; DEF will be readily available and accessible to drivers; maintenance is likely to be performed; there are engineering constraints on packaging a large DEF tank on light duty vehicles; and there is a significant penalty on fuel economy and performance associated with carrying both a larger DEF tank and the weight of a large amount of DEF.''

With regard to the engineering constraints associated with packaging a large quantity of DEF on light duty vehicles, the Alliance notes that it is impractical to install a DEF tank of sufficient size to achieve a 100,000 mile scheduled maintenance interval. ''Light duty vehicles are constrained in the amount of space that can be dedicated to a DEF tank. In addition to the DEF tank, SCR vehicles must package an SCR catalyst, SCR mixer and DEF dosing and heating mechanisms.'' The Alliance cites an example of a current production vehicle that provides a 6.1 gallon DEF tank to achieve a 10,000 mile change interval ratio tied to the oil change interval. To accommodate a 100,000 mile maintenance requirement would require 60 gallons of DEF and would take approximately 8 cubic feet of space—and would also be almost equivalent to installing 4 extra fuel tanks. ''To reduce the existing usable volume to such an extent would result in an uncompetitive vehicle in terms of usable passenger or cargo volume.''

With regard to the Alliance's concerns regarding the potential for a significant penalty on fuel economy and performance associated with carrying both a larger DEF tank and the weight of a large amount of DEF, they note the simple impracticability for light duty vehicles to carry the weight of a DEF tank sufficient in size to achieve a 100,000 mile maintenance interval. Noting that such a tank could weigh as much as 540 lbs it could affect fuel economy almost as much as 10% on a 3800 lb curb weight vehicle. The Alliance also notes similar handling performance (acceleration, braking, and turning) along with passenger space, cargo carrying and/or towing capacity.

2. Ford Request

EPA has received information from Ford (regarding its chassis-certified vehicles) that is similar to the concerns raised by the Alliance. In addition, Ford notes that by attempting to go to a longer service interval, for example a 16–20 gallon DEF tank to meet a two oil change interval, would not be feasible with the space limitations and performance requirements that are necessary for typical medium-duty vehicle (chassis-certified) design. In addition to the market concerns associated with a loss in fuel capacity, cargo or truck bed space due to a larger DEF tank not being acceptable to its customers, Ford also notes the ''hard-point'' packaging issues with attempting to place a large DEF tank in the engine compartment or in the vehicles undercarriage.[12]

3. Isuzu Request

EPA also received information from Isuzu for its medium-duty vehicle (chassis-certified vehicles with GVW of 8,501 to 10,000 pounds) engine families. Isuzu requested a maintenance interval based on the rate of DEF consumption. Isuzu presented that the DEF consumption rate of 2% the rate of diesel fuel consumption renders it ''impossible'' to equip a vehicle with a DEF tank large enough to operate for the full 120,000 mile maintenance interval without DEF. Isuzu requested its interval based on reasons of technological necessity, including maintenance is likely to be performed on schedule, there is limited space available on vehicles for a large DEF tank, the physical properties of DEF present limitations, and DEF is publicly and readily available to drivers.

B. Heavy-Duty Requests

1. Engine Manufacturers Association Request

The Engine Manufacturers Association (''EMA'') renewed its previous request for maintenance intervals for DEF refill for heavy-duty on-highway diesel fueled engines and vehicles.[13] EMA presents that the

[9] 74 FR 57671, 57674 (November 9, 2009).

[10] *See* 40 CFR 86.1834–01(b)(6)(ii) and 86.094–25(b)(6)(ii).

[11] The Alliance represents BMW Group, Chrysler LLC, Ford Motor Company, General Motors, Jaguar Land Rover, Mazda, Mercedes-Benz, Mitsubishi Motors, Porsche, Toyota, and Volkswagen. EPA also received similar information from Mahindra.

[12] Ford notes the undercarriage is already fully utilized with the engine, exhaust system, catalytic converters, mufflers, fuel tank, etc severely limiting any available space for a DEF tank. Ford also notes that DEF tanks represent a significant weight challenge which affects performance and fuel efficiency. To increase a DEF tank for every 2 oil change interval would increase a tank weight by 72 lbs as one example.

[13] EMA members include AGCO Corporation, American Honda Motor Company, Inc., Briggs & Stratton Corporation, Caterpillar Inc., Chrysler Group LLC, Cummins Inc., Daimler Trucks North America LLC, Deere & Company, DEUTZ Corporation, Dresser Waukesha, Fiat Powertrain

determinations of technological necessity that EPA made in 2009 still apply today for DEF refill intervals.[14] Specifically, EMA believes that ''while the SCR-related urea infrastructure has continued to develop, the space and weight constraints that are inherent to the design and operation of [heavy-duty on-highway] vehicles, and the underlying DEF consumption rate, have not changed. As a result, the need and justification for the previously-approved reduced DEF maintenance intervals also have not changed.'' EMA requests that EPA's previously approved new scheduled maintenance intervals for DEF be extended for the 2012 and later model years.[15]

2. Volvo Request

By letter dated April 28, 2011, Volvo Powertrain North America and Volvo Powertrain Japan (collectively, ''Volvo'') submitted a request that EPA extend its previous approval of alternative scheduled maintenance intervals for DEF tanks used in SCR systems. Volvo believes that the intervals EPA previously approved remain technologically necessary, ''as nothing about the design, constraints or functionality of Volvo vehicles and engines has changed so as to permit the use of larger tanks.'' Volvo further states that ''The inherent nature of vehicle space and weight constraints makes significantly larger DEF tanks infeasible on a practical basis. That said, larger DEF tanks also are not necessary in light of systems Volvo has developed to ensure that vehicle operators refill DEF tanks.'' Volvo states that to ensure efficient and practical operation its trucks are designed in such a way that they necessarily have space and weight constraints. Thus, there are inherent limits on the size of add-on components, such as DEF tanks, that can be installed on the vehicles and such limits are unavoidable. In this context Volvo states that its trucks are designed to operate using DEF at all times and that the size of the DEF tanks, like the vehicle's fuel tank, dictates the vehicle's range of operation. Volvo maintains that the 2:1 ratio remains technologically necessary for model year 2012 engines and vehicles as nothing about the design, constraints or functionality of Volvo vehicles and engines has changed (since the 2009 approval) so as to permit the use of larger tanks. Volvo also presents that it has implemented controls to assure that there is ''more than a 'reasonable likelihood' that the recommended DEF refill intervals will be complied with in-use. Volvo asserts that it has equipped its SCR-based systems with visible warning systems and driver inducements such that vehicle performance will deteriorate to an unacceptable point, in order to compel vehicle operators to refill the DEF tank. Volvo initially developed these strategies in consultation with EPA staff in order to ensure its engines met EPA certification requirements, and has since improved its strategies for current and future model year engines. In its request, Volvo further describes the specific steps it has taken to design its SCR systems to protect against operation of its vehicles without DEF and to prevent SCR system tampering. In addition, Volvo seeks the flexibility to utilize a 1:1 ratio in light of its 40% power reduction (see further clarification below in the SCR Engine Manufacturers request submitted after the Volvo request—EPA assumes this is the flexibility that Volvo is seeking).

3. SCR Engine Manufacturers Request

EPA has also received requests for scheduled maintenance intervals for 2012 and later model years from a group of SCR engine manufacturers (collectively the ''SCR Engine Manufacturers'' [16]) that specifically ask for EPA to approve the use of a 1:1 DEF to fuel ratio for vehicles with a DEF level indicator, in addition to vocational vehicles. The SCR Engine Manufacturers state that such approval is necessary and appropriate to reflect current and anticipated changes in vehicle designs, significant changes in inducement strategies, and the increased availability of DEF since EPA's last approval in 2009.

The SCR Engine Manufacturers note that much of the information required in a (b)(7) petition was confirmed by EPA in its 2009 notice and thus needs no further elaboration. EPA has already concluded that replenishment of DEF is ''technologically necessary'' critical emission-related maintenance, and that the 1:1, 2:1, and 3:1 ratios were ''maximum feasible'' maintenance intervals based on information available in 2009. There has been no change in the need for DEF replenishment or designation of the category of maintenance since 2009. The SCR Engine Manufacturers new petition for a 1:1 DEF interval reflects what is believed to be the ''maximum feasible interval'' based on reasonable tank sizes, given the latest information regarding SCR systems and DEF availability.

Included in the SCR Engine Manufacturers' petition is their position regarding the threshold criteria that EPA should follow for setting a ''technologically necessary maintenance interval.'' They claim that the general maintenance regulations, including the introductory paragraph of (b)(2) which helps frame the established intervals in (b)(3) and (b)(4), provides guidance on what ''technologically necessary'' means when it states that any emission-related maintenance ''must be technologically necessary to assure in-use compliance with the emission standards.'' Thus EPA must first determine whether an interval shorter than the regulatory default is necessary in order to assure in-use compliance. They note that in the 2009 notice EPA specifically addressed the unique nature of liquid DEF replenishment and the need to strike a reasonable balance between conflicting design goals.

Thus, the SCR Engine Manufacturers maintain that the words ''technologically necessary'' are used in two contexts. First, as noted above, (b)(2) requires all maintenance that meets the definition of ''emission-related maintenance'' ''must be technologically necessary to assure in-use compliance with the emission standards.'' Consistent with this provision is (b)(7)(ii) which requires that any alternative interval set by EPA be ''*a* technologically necessary maintenance interval'' (emphasis added). Thus the term ''technologically necessary'' merely describes the

Technologies S.p.A., Ford Motor Company, Hino Motors, Ltd., Isuzu Manufacturing Services of America, Inc., Kohler Company, Komatsu Ltd., Kubota Engine America Corporation, Navistar, Inc., Onan—Cummins Power Generation, PACCAR Inc., Scania CV AB, Tognum America, Inc., Volkswagen of America, Inc., Volvo Powertrain Corporation, Wärtsilä North America, Inc., Yamaha Motor Corporation, and Yanmar America Corporation.

[14] EMA cites from EPA's 2009 FR Notice: ''EPA believes that in light of the existing tight space constraints and the overall desire to maximize cargo-carrying capacity, minimize emissions and meet consumer operation demands, and the built-in DEF tank size buffer to insure DEF refills, that the DEF tank sizes associated with the 2:1 refill and 3:1 intervals are technologically necessary. EPA believes that requiring tank sizes above these ratios will cause increases in space constraints and weight that would not be appropriate for these [HDOH] vehicles. * * * After reviewing this data and information, EPA believes that longer refill intervals than those noted above would require larger and heavier DEF tanks. And the design and engineering work performed by manufacturers thus far indicate that the recommended DEF refill intervals noted above approximate the maximum feasible maintenance interval associated with reasonable DEF tank sizes. The maintenance intervals recommended ensure that the functions and operational efficiency of such vehicles are not overly compromised. Based on this information we believe the intervals noted above are warranted.'' *See* 74 FR at 57674.

[15] EMA expressly states that one of its members—Navistar, Inc.—does not support EMA's request.

[16] This group includes Chrysler Group, LLC, Cummins Inc., Daimler Trucks North America LLC, Detroit Diesel Corporation, Ford Motor Company, Mack Trucks Inc., PACCAR Inc., UD Trucks Corporation, and Volvo Group North America.

category of maintenance that is allowable but not what *the* specific interval must be. Subsequently, the SCR Engine Manufacturers note that once EPA makes this threshold determination (as required in (b)(7)) then the Agency, with a level of discretion, examines the information submitted by the petitioner. Such information includes the petitioner's position on what is the ''maximum feasible maintenance'' including any supporting data or other substantiation for the interval suggested. Rather than looking at the ''maximum level'' that is technologically feasible, the term ''feasible'' requires EPA to look at the overall practicality and reasonableness of a particular proposed interval. The maximum feasible interval is used as a point of reference for EPA to evaluate the reasonableness of the manufacturers' recommended interval. According to the SCR Engine Manufacturers, ''The maximum possible interval for DEF replenishment is established in each case by the total load capacity of the vehicle in question, the space available for a given DEF tank size, the fuel efficiency and greenhouse gas impact of various DEF dosing rates, the desired operating range of the vehicle between fuel and DEF refills, and the impact of extra weight on vehicle performance, safety, and compliance with U.S. Department of Transportation regulatory requirements. DEF tank size must also be balanced against the need to carry cargo, or to enable the vehicle to meet the purpose for which it was built, to determine what is feasible in the most economical way possible while achieving compliance.''

The SCR Engine Manufacturers suggest that as EPA performs its case-by-case analysis, the likelihood of the maintenance being performed in-use is the most important factor in establishing the precise maintenance interval. EPA explained that ''minimum service intervals are established in part to ensure that the control of emissions is not compromised by a manufacturer's overly frequent scheduling of emission-related maintenance.'' [17] They also state that EPA explained in its 2009 notice that while the likelihood of maintenance being performed in-use was a specific criteria under (b)(6), it was also a factor that was ''important to note'' with regard to EPA's (b)(7) findings. Further, EPA then concluded that it was reasonable to base the DEF refilling event on diesel refueling intervals due to DEF infrastructure developed at diesel refueling stations.

EPA has also received information from the SCR Engine Manufacturers indicating that EPA should set the minimum required DEF refill interval at an interval equal to the vehicle's fuel capacity (i.e., a 1:1 ratio) for all heavy duty engines.[18] They claim that this shorter maintenance interval is ''necessary and appropriate to reflect current and anticipated changes in vehicle designs, significant changes in inducement strategies, and the increased availability of DEF.'' They note that certification practices of the EPA regarding inducement practices for SCR-equipped engines make it ''essentially impossible for an SCR vehicle to operate without regular DEF replenishment.'' They state that the severity of inducements related to DEF levels (e.g. severe reduction in engine power and/or vehicle speed) is ''extraordinary and must be taken into account'' when EPA is determining appropriate maintenance intervals. They state that ''in light of these severe inducements, it is reasonable to expect that a driver with a 1:1 tank ratio will operate under a firm discipline that the DEF tank must be refilled every time the fuel tanks are filled, as opposed to a driver with a 2:1 or greater tank ratio who may become accustomed to filling the DEF tank only when necessary, and is therefore more likely to rely on gauge levels, warnings, and inducements to trigger refills.''

The SCR Engine Manufacturers also state that EPA's promulgation of new standards regulating greenhouse gases increase the size and weight restraints associated with DEF tank size.

> EPA has announced new [greenhouse gas] standards for HDOH trucks, and manufacturers have moved to voluntarily increase the fuel efficiency of their vehicles in advance of the effective dates of those regulations. Within these regulations, EPA recognizes the impact of weight savings on fuel efficiency and GHG emissions. In addition, manufacturers have developed innovative new DEF dosing strategies to reduce CO2 emissions. These new strategies may involve increasing the DEF dosing rate. Increasing the DEF dosing rate also makes it more and more difficult to satisfy a 2:1 tank size ratio without increasing the size of the DEF tank above the size EPA previously considered the maximum reasonable size. For this reason, if the application of the 1:1 tank ratio is not expanded, EPA will effectively be mandating larger DEF tanks, with their accompanying weight increase, in order to accommodate technology advancements developed to reduce CO2 emissions—tanks that are larger than the tanks EPA determined to be the maximum reasonably required in 2009. In addition, this could inadvertently cause manufacturers to restrict application of the most fuel efficient engines to vehicles that have reduced range between fuel and DEF refills, such that they will be unattractive to the line-haul fleets that consume the most fuel.

The commenters elaborated that:

> To meet the next round of GHG reduction requirements, some manufacturers expect to increase DEF dosing by as much as 100% over current levels. These increased levels of dosing will require a corresponding increase in DEF tank capacity and size to meet the existing 2:1 tank ratio requirements. For example, increasing DEF dosing by 40% on average would require an increase in DEF tank size of approximately 40% (depending on how much extra capacity was included in the tanks used in previous model years). The shape, size and location of DEF tanks on a truck frame are constrained by a number of factors including: the need to place the tank below the filler-neck; the need for clearance from other components such as fuel tanks, battery boxes, air tanks, diesel particulate filters, and the drive axle and wheels; the need for gravity feed; body installation requirements; clear-back-of-cab requirements; weight distribution requirements; bridge formula and related axle placement issues; and fuel capacity/driving range demands.

They state that another consequence of the greenhouse gas regulations is more attention to improved aerodynamics and weight reduction, which are harmed by the need for a 2:1 DEF tank size requirement. They claim that EPA should allow manufacturers to use all available options to increase fuel economy and meet greenhouse gas standards. They state the possible harm of allowing shorter maintenance intervals is minimal, given the severe negative inducements associated with failure to replenish the DEF tank.

4. Navistar's Opposition to Renewed Requests

EPA has received information from Navistar expressing its opposition to any extension of EPA's previously approved DEF refill intervals. Navistar maintains that the touchstone of allowable maintenance is whether it is reasonably likely that the maintenance will be performed. To this point, it states that EPA's own certification guidance ensures that maintenance will not occur, or at least not for lengthy periods of time. It also states that EPA's inducements to cause drivers to replenish DEF do not work and, and by definition, ensure that maintenance will not occur.[19] Separately, Navistar

[17] EPA made this statement in its 2009 Notice, *see* 74 FR at 57673.

[18] Letters dated August 18, 2011 and September 27, 2011 to Karl Simon, EPA, Director, Compliance and Innovative Strategies Division from R. Latane Montague, Hogan Lovells.

[19] Navistar throughout its comments returns to its theme that EPA's certification scheme allows DEF

contends that the previously approved intervals are not ''technologically necessary'' under EPA's regulations. The purpose of EPA's maintenance regulations is to reduce the amount of driver attention emissions systems require in order to ensure that certified engines comply with emission standards on the road. Navistar claims that the Clean Air Act (CAA) and EPA's regulations require that SCR engine manufacturers make efforts to improve the durability of their driver-dependent emission control systems after MY 2009. Navistar points to EPA's statement from the 2009 approval (''expectation that SCR-related technologies and the urea infrastructure will continue to develop and mature.''), as evidence that EPA must require continuous improvement.[20] Navistar states that ''other SCR technology is now available that offers exponentially longer maintenance ranges, weighs less and conserves fuel more.'' Navistar maintains that EPA's approved maintenance for liquid, urea-based SCR is not about ''technological necessity''. SCR engine manufacturers can easily quadruple the refill interval with little or no effort. They also suggest that EPA cannot legally accept SCR engine manufacturers' lack of effort and extend the same illegal DEF-replacement maintenance intervals for future model years. ''Because other SCR technology is proven to be available with a maintenance interval in the range of 35,000 to 45,000 miles, EPA's own allowable maintenance regulations require that liquid, urea-based SCR meet that same benchmark.''

Navistar also chooses to contrast liquid, urea-based SCR systems with other emission control technologies to suggest that the maintenance interval tied with DEF refills is unnecessarily short They note EPA's approval of new scheduled maintenance for exhaust recirculation valves at 67,500 miles.[21] Navistar states that EPA's basis for defining ''technologically necessary'' has always been ''the longest interval that any manufacturer recommend(s).'' [22] Lastly, Navistar notes that EPA is well aware that they have developed for production and introduced other SCR technology (i.e. EGNR) that provides a maintenance interval in the range of 35,000 to upwards of 45,000 miles.

refills to be deferred for lengthy periods of time. As such, Navistar maintains that EPA has illegally amended its allowable maintenance regulations to eliminate the requirement that maintenance be shown as likely to occur. Similarly, Navistar points to EPA's 2001 rulemaking and maintains that EPA ''concluded its maintenance inducements do not create a reasonable likelihood that the maintenance will be performed. (See 2011 Rule at 5053 (finding no ''adequate safeguards in place to ensure the [DEF] is used throughout the life of the vehicle.'')

[20] Navistar maintains that SCR engine makers could have substantially increased the 2009–2011 DEF replacement intervals by doubling the size of the DEF tank and decreasing urea consumption by half.

[21] 73 FR 79089 (December 24, 2008).

[22] 45 FR 4136, 4141 (January 21, 1980).

[23] 74 FR 57671 (November 9, 2009).

IV. Discussion

As set forth above, EPA in its 2007 guidance states that SCR system maintenance meets the regulatory definition of critical emission-related maintenance. EPA has further clarified that allowable maintenance requirements apply to SCR systems, including SCR catalysts, reducing agent, reducing agent storage tanks, dosing valves, and all lines and hoses. Additionally, because manufacturers indicated that packaging constraints would prevent them from being able to equip their vehicles with reducing agent storage tanks of sufficient size to allow reducing agent replenishment to comply with required maintenance intervals of 100,000 or 150,000 miles, EPA clarified that manufacturers would likely need to request a change to the scheduled maintenance interval pursuant to the (b)(7) provision.

Also set forth above, manufacturers have in fact requested such changes for more frequent scheduled maintenance to accommodate DEF refilling events for previous, current, and future model years. When EPA reviewed those manufacturer requests in 2009, it determined that maintenance associated with refill of DEF tanks was new scheduled maintenance and that the manufacturer-requested maintenance request and scheduled maintenance intervals were appropriate and announced that determination in the **Federal Register**.[23] The broad-level considerations EPA evaluated when considering the maintenance interval requests were the space and weight constraints presented by incorporating a DEF tank into vehicle design, as well as the impact a DEF tank's inclusion could have on engine performance. In our 2009 **Federal Register** notice, we concluded that the requested intervals were appropriate because we determined that manufacturer-recommended DEF refill intervals approximated the maximum feasible maintenance intervals associated with reasonable DEF tank sizes. We also concluded that the maintenance intervals recommended ensure that the functions and operational efficiency of such vehicles are not overly compromised.

A. Light-Duty Requests

As EPA explained in its 2009 notice, automobile manufacturers have stated it takes approximately an 8 gallon DEF tank to ensure that DEF will last for the length of a typical oil change interval. Assuming an oil change interval of 10,000 miles, a DEF tank size of approximately 80 gallons would be required to meet a 100,000 mile DEF refill maintenance interval. Even a 16–20 gallon DEF tank (to meet a 2 oil change interval) would interfere with the space that is necessary for typical light-duty vehicle design and transportation needs of the consumer. Interior cabin volume and cargo space are highly valued attributes in light-duty vehicles and trucks. Manufacturers have historically strived to optimize these attributes, even to the point of switching a vehicle from rear-wheel drive to front-wheel drive to gain the extra interior cabin space taken up by where the drive shaft tunnel existed, or switching the size of the spare tire from a conventional sized tire to a small temporary tire to gain additional trunk space. Thus any significant interior, cargo or trunk space used to store a DEF tank would be unacceptable to customers. There are also packaging concerns with placing a large DEF tank in the engine compartment or in the vehicles undercarriage. Most vehicle undercarriages are already crowded with the engine, exhaust system, including catalytic converters and mufflers, fuel tank, etc. limiting any available space for a DEF tank.

In addition to the inherently space constrained areas on the vehicle to place both fuel tanks and DEF tanks (an additional 8 gallon tank represents a very significant demand for space) the addition of the weight associated with the DEF represents significant concerns (*e.g.* performance and efficient operation) on the operation of the vehicle. For example, assuming a density of 9 lb/gallon, an 8 gallon DEF tank represents an additional 72 lbs on a vehicle already looking to optimize performance. Adding additional DEF tank size to even accommodate a two-oil change interval is not feasible or practical given these weight constraints. A requirement for a larger DEF tank may also have an adverse effect on the ability of a manufacturer to meet greenhouse gas emission standards and fuel economy standards.

Presently, no manufacturer has presented any indication that things have changed in any material fashion that would allow for the installation of

larger DEF tanks and/or less frequent DEF refilling intervals on light duty vehicles and trucks. More importantly, EPA is aware of no technological advances in this area and believes that none are likely to occur in the near future. The space and weight constraints presented by inclusion of a DEF tank into vehicle design are inherent. Forcing manufacturers to install larger DEF tanks would not only be impractical for manufacturers, it would also present utility constraints for consumers, drivers, and operators. Therefore, alternative maintenance intervals remain technologically necessary for refilling DEF tanks used on SCR systems.

EPA notes that the DEF refill maintenance interval being equivalent to and occurring with the oil change interval is a fairly long interval (e.g. 7,500 to 12,500 miles) for light-duty vehicles and trucks and is not likely to result in overly frequent maintenance under typical vehicle driving. EPA also believes that an adequate DEF supply will be available to perform the DEF refills at the stated intervals. EPA believes it important to also consider when, where and how often vehicle owners or operators are most likely to perform the DEF refill maintenance. For light-duty vehicles and light-duty trucks, EPA believes the requested DEF refill interval's association with the oil change interval is appropriate given the likelihood of DEF availability at service stations and the likelihood that DEF refill would occur during such service.

Recognizing that alternative maintenance intervals for DEF refilling remain technologically necessary due to space and weight constraints, EPA believes that the above-described alternative maintenance intervals requested by light-duty vehicle manufacturers are appropriate.

B. Heavy-Duty Requests

EPA continues to believe it is reasonable to base the DEF refilling event on diesel refueling intervals given that it is likely that the DEF refill maintenance would be undertaken at the time of fuel refill due to DEF infrastructure developed at diesel refueling stations. EPA agrees with manufacturers that the DEF refilling intervals requested by EMA, as a threshold matter, are ''technologically necessary.'' EPA knows of no SCR technology that is currently available that is yet capable of attaining higher mileage without a DEF refill. Although Navistar maintains that EPA is aware of its ''EGNR'' technology that it has ''developed for production and introduced'' that provides a maintenance interval in the range of 35,000 to upwards of 45,000 miles, Navistar presents no further evidence regarding this technology. Navistar has presented no evidence that such technology is currently available in the marketplace and can meet all requirements of the Clean Air Act and the regulations promulgated thereunder. EPA knows of no application for certification of engines using such technology; nor have any engines using such technology on heavy-duty engines been introduced within the United States. In any case, such technology would be different technology than the DEF-based SCR technology being used by current SCR manufacturers. If engine families using such EGNR technology become established in the marketplace and can meet all of the requirements in EPA's regulations, then it might be appropriate to revisit this issue, although the fact that such technology is substantially different from DEF-based SCR would be relevant for determining whether the establishment of this technology is relevant to the establishment of maintenance intervals for DEF-based SCR.

For vocational vehicles such as dump trucks, concrete mixers, refuse trucks and similar typically centrally-fueled applications, EPA believes the DEF tank refill interval should equal the range (in miles or hours) of the vehicle operation that is no less that the vehicle's fuel capacity (*i.e.,* a 1:1 ratio). For all other vehicles, EPA believes the DEF tank refill interval must provide a range of vehicle operation that is no less than twice the range of vehicle's fuel capacity (*i.e.,* a 2:1 ratio).[24] As EPA has noted previously, assuming that 25,000 gallons of diesel fuel were consumed to reach a 150,000 mile interval (the interval applicable to catalyst maintenance for heavy-duty engines), and assuming a 3% DEF consumption rate, 750 gallons of DEF weighing approximately 6,750 pounds would be required to meet a 150,000 mile maintenance interval for DEF refill. A line-haul truck is allowed a maximum gross vehicle weight of 85,000 pounds of which approximately 45,000 pounds is for cargo carrying. A DEF tank of this size would reduce the cargo-carrying capacity by 15%. Another example from the line-haul industry suggests that a DEF tank size of over 900 gallons would be needed to reach the 150,000 mile interval for a common highway vehicle with a diesel fuel capacity of 200 gallons and achieving 6.5 miles per gallon fuel efficiency. Similarly, a medium heavy-duty engine would require 375 gallons of DEF weighing 3,275 lbs to meet a 150,000 mile interval. EPA believes that such tank sizes are clearly not reasonably feasible in light of the weight and space demands and constraints on heavy-duty trucks and the consumer demand for as much cargo-carrying capacity as possible.[25]

The Agency also believes that intervals that are not as long as 150,000 miles but are longer than 2:1 would require DEF tanks that are too large or too heavy to be feasibly incorporated into vehicles. Available data show that heavy-duty engines equipped with SCR-based systems will consume DEF at a rate that is approximately 2%-4% of the rate of diesel fuel consumption. Because of inherent space and weight constraints in the configuration and efficient operation of heavy-duty vehicles, there are size limits on the DEF tanks. Currently, there are truck weight limits that manufacturers must address when making adding or modifying truck designs. EPA expects and believes that manufacturers are taking significant and appropriate steps in order to install reasonably sized DEF tanks to achieve the DEF refills intervals noted. For example, manufacturers are taking such steps as reducing the number of batteries on vehicles despite customer demands or designing space saver configurations, in some instances extending an already very limited frame rail distance to incorporate the DEF tanks and SCR systems, moving compressed air tanks inside the frame rails, redesigning fuel tank configurations at significant costs, and otherwise working with significant size and weight constraints to incorporate DEF tanks. EPA was provided with examples of the consequences of requiring heavy-duty vehicles to accommodate a DEF refill interval of 5:1, and the information provided to the Agency strongly suggested that great compromises would be required in cost, weight and utility of vehicles. Increased

[24] As SCR-equipped vehicles uniformly have a constantly viewable DEF level indicator, EPA is not including a DEF tank refill interval equal to no less than three times the range of the vehicle's fuel capacity (*i.e.,* a 3:1 ratio) for vehicles without such an indicator.

[25] Navistar states, at page 5 of its comments, that ''[d]eviation from 'minimum' maintenance is rare and intended * * * to be temporary. As noted above, EPA has found that DEF refill is a new type of maintenance and is not fairly considered as part of the maintenance of the catalyst covered under (b)(4). In any case, it is clearly of a different type than normal physical maintenance of an emission-related part and EPA must make its determination of maintenance interval based on the particular maintenance being applied. Even Navistar's comments do not suggest that 150,000 miles would be an appropriate maintenance interval for DEF refill.

tank sizes and weights on the magnitude of 150 to 325 lbs. would be required and in some cases diesel fuel volumes would need to be reduced. The extra weight associated with the DEF required to meet the 2:1 refill intervals represents a significant challenge to manufacturers seeking to meet both weight and size requirements for their vehicle designs. In addition, requiring a longer DEF refill interval may result in increased greenhouse gases and decreased fuel economy. EPA believes that in light of the existing tight space constraints and the overall desire to maximize cargo-carrying capacity to minimize emissions and meet consumer operational demands, and the built-in DEF tank size buffer to ensure DEF refills, that the proposed DEF tank sizes are technologically necessary and are also reasonable and appropriate. EPA believes that requiring tank sizes above these ratios will cause increases in space constraints and weight that would not be appropriate for these vehicles. Similarly, EMA notes that under its request, manufacturers would employ the 1:1 refilling ratio for only a small number of vocational applications and those vehicle applications have very limited vehicle space available to house surplus DEF. Such applications (e.g., a garbage truck, concrete mixer, beverage truck, or airport refueler) will also be refueled daily at central locations. At approximately 0.134 ft^3 per gallon, any extra DEF would displace significant space available to vehicle components and subsystems on both the vocational trucks at the 1:1 refill interval as well as the 2:1 vehicles.

In its comments, Navistar suggests that a longer DEF refill maintenance interval in the range of 35,000 to 45,000 miles should be approved. As noted above, one of Navistar's justifications for this longer interval is the claim that other technology is available that would need a maintenance interval no shorter than this. However, as discussed, EPA has no evidence that such technology is actually available at this time, nor does EPA believe that the availability of this other technology would necessarily impact the maintenance interval needed for DEF-based SCR.

Navistar also argues that engine manufacturers using SCR should have made efforts to increase DEF-refill intervals since 2009 and that it is ''certainly feasible'' for SCR systems to meet such a range. Although Navistar maintains that SCR engine makers can easily quadruple the refill interval with little or no effort, Navistar suggests one way to reach this interval is to double DEF tank size, and Navistar makes no effort to present evidence depicting where such enlarged DEF tanks can reasonably be located or the effects on such tanks on operational efficiency. In addition, in determining the minimum maintenance interval for DEF, Navistar suggests that manufacturers can double maintenance intervals by lowering engine-out emissions, which would reduce the DEF dosing frequency and in turn extend the refill interval for a fixed DEF tank size. The Agency reviewed the potential for engine manufacturers to lower engine-out NOx through in-cylinder control techniques such as injection timing retard and exhaust gas recirculation (EGR). It is clear that lowering engine-out NOx will directly lower the quantity of DEF that is needed to meet the NOx standard and hence conceptually might extend the DEF refill interval. However, as documented in the EPA rulemaking that set a Nonconformance Penalty (NCP) for the 2004 NOx standards, for the relevant range of NOx control (around 2 g/bhp-hr NOx engine out) and these specific in-cylinder NOx control technologies, each one gram of NOx reduction is expected to result in a 5 percent increase in fuel consumption.[26] It can also be estimated that the DEF consumption rate is approximately one percent of fuel consumption per one gram of NOx reduction. Since the increase in fuel consumption to reduce NOx by one gram is approximately five times higher than the increase in DEF consumption to treat that same one gram of NOx, it is clear that reducing engine-out NOx in order to extend the DEF refill interval would require an increase in the fuel tank size five times that of the volume savings in the DEF tank size in order to keep the same refueling interval. In other words, reducing engine-out NOx in order to extend the DEF refill interval while keeping the same diesel refueling interval would cause the fuel tank to grow larger necessitating a reduction in the DEF tank volume at a ratio of 5:1. Since that increased fuel tank size would then necessitate a smaller DEF tank, the resulting service interval would be shortened not lengthened.

It could be argued that there's no need to increase fuel tank size in response to higher fuel consumption rates because operators can simply refuel at greater frequencies. To this point, it is important to note that the effective operating range of a vehicle on a single tank of fuel is a key design parameter that determines the mission capability of a vehicle. For example, refuse trucks are designed with appropriate fuel capacity to operate over residential and commercial customer routes and have enough reserve driving range to then allow delivery of payload to a landfill often in remote locations. If a manufacturer maintained fuel tank size and increased the frequency at which the trucks must refuel, these trucks may not be able to accomplish their intended mission without making additional stops for fuel. Fueling stations may not be directly located along the remote route to some landfills, necessitating unplanned trip deviations. At the very least, these trucks would be impaired in the ability to accomplish their mission. Similarly, line-haul trucks are designed with necessary fuel capacity to deliver freight over significant interstate distances while minimizing the need for refueling stops. Increasing the frequency at which the trucks must refuel compromises the ability to accomplish their mission. Increasing the frequency of refueling stops poses a serious negative consequence to the end user of these trucks given their use in commercial applications where the time to accomplish a mission is business critical. EPA does not believe its allowable maintenance provisions are intended to drive this type of impact.

Navistar also suggests that SCR engine makers are legally required to make efforts to improve the time between maintenance for their SCR systems. However, the regulations do not require this, and EPA must review the technological necessity of maintenance intervals based on the existing factual circumstances. Current circumstances do not indicate that a larger maintenance interval is appropriate. While EPA's statement made in the 2009 notice indicates that EPA will continue to monitor the evolution of SCR systems along with urea infrastructure to determine whether the frequency of DEF refills can be adjusted, this does not imply that adjustment is necessary or appropriate, or in which direction such adjustment would go. In addition, regarding Navistar's reference to a 1980 EPA rulemaking regarding EPA's consideration of the longest interval that any manufacturer recommends, while EPA does look at such information, that interval does not necessarily become the interval determined under (b)(7). In some instances EPA may set an even more frequent interval and in others the Agency may set a less frequent interval; EPA's determination of what is a feasible interval for an engine family or an industry is based on a number of

[26] ''Final Technical Support Document: Nonconformance Penalties for 2004 Highway Heavy Duty Diesel Engines'', EPA420–R–02–021, August 2002.

factors including manufacturer(s) recommended intervals, any physical or technological constraints, burdens that may be placed on the operator and what are reasonable expectations of durability from an operator's perspective, among other factors.

After reviewing this data and information, EPA believes that longer refill intervals than those noted above would require larger and heavier DEF tanks, and the design and engineering work performed by manufacturers thus far indicate that the recommended DEF refill intervals noted above approximates the maximum feasible maintenance intervals associated with reasonable DEF tank sizes, given the substantial negative consequences of longer DEF refill interval requirements. The maintenance intervals recommended ensure that the functions and operational efficiency of such vehicles are not overly compromised. Based on this information we believe the intervals noted above are warranted.

EPA is not approving a 1:1 DEF maintenance interval across the heavy-duty engine class at this time. EPA notes that manufacturers have been meeting a 2:1 ratio for DEF tank size for the past two years and the commenters have not yet provided sufficient evidence that this ratio will be infeasible in the future. Moreover, the information EPA has received to date has not shown that any change in the maintenance interval is necessary or appropriate throughout the heavy-duty engine category, rather than for particular applications, or that a refill interval as low as 1:1, rather than 1.8:1 or 1.5:1, is necessary or appropriate. EPA recognizes that the implementation of the future standards for greenhouse gases, beginning as early as the 2013 model year, may have some implications for this issue, but the SCR Engine Manufacturers have not shown that these standards, which are phased in and are not applicable in the 2012 model year, will cause the 2:1 refill interval to be infeasible across the industry, and certainly not in the 2012 model year. While EPA agrees that the warnings and inducements in place for failure to replenish DEF will restrict the ability of operators to run without DEF, and have made operation without DEF virtually unheard of, a DEF tank ratio of 1:1 will increase the likelihood that operators will need to make more frequent stops to replenish DEF, and possibly may need to stop solely to replenish DEF, which may place a greater burden on the operator in terms of the frequency of DEF refills.

EPA also notes that the regulations allow any manufacturer to petition EPA under the ''paragraph (b)(7) process'' for a shorter maintenance interval for a particular engine family or application than that approved for the industry if the manufacturer can show that a shorter interval is the maximum feasible interval necessary for the particular engine or vehicle configuration being certified.

Navistar and the SCR Engine Manufacturers suggest, respectively, that the ''likelihood of the maintenance being performed in-use'' is the touchstone of allowable maintenance, or is the most important factor in establishing the precise maintenance interval. At the outset, EPA believes it is important to note the context of the term ''reasonable likelihood of being performed in-use'' within paragraph (b)(6)(ii). For critical emission-related maintenance (including critical emission-related maintenance under paragraph (b)(6)(i), as well as such maintenance as determined by EPA under (b)(7)), manufacturers are required to show such likelihood prior to performance of such maintenance on durability test vehicles. Manufacturers can satisfy this requirement by meeting one of the specified conditions in paragraphs (b)(6)(ii) (A) through (F). Paragraph (b)(7) does not specify any additional showing required of the manufacturer should an alternative maintenance interval for emission-related critical maintenance be approved. Thus, if a manufacturer can show compliance with one of the specified conditions in (b)(6)(ii), the manufacturer has met the regulatory requirement to show a ''reasonable likelihood of [the maintenance] being performed in-use'' as required under paragraph (b)(7). As noted in the 2009 notice, SCR engine manufacturers (or vehicle manufacturers) are using a clearly displayed visible signal system approved by EPA, meeting the requirements of (b)(6)(ii)(C). In addition, SCR engine manufacturers are going beyond the minimum requirements of (b)(6)(ii) and are designing, and are expected by EPA to design (under the adjustable parameter regulatory provisions) their systems to include inducements that will adequately trigger the operators to refill the DEF tanks by reducing vehicle performance to a point unacceptable for typical driving, which would meet the requirements of (b)(6)(ii)(A).[27] Section (b)(7) does not include an affirmative requirement on the petitioner to demonstrate nor on EPA to find a likelihood of maintenance being performed beyond that which is clearly and specifically prescribe at (b)(6). Indeed, although EPA ''noted'' the likelihood of performance in its 2009 notice, EPA did so in order to provide the regulated community with a complete picture of how the allowable maintenance provisions should be read together and how they complement each other. In addition, EPA notes that the determination of what is maximally feasible under (b)(7) does not require, or in fact include, a consideration of the inducements (as described above). EPA nevertheless believes that such inducements clearly and sufficiently provide the necessary demonstration of likelihood of maintenance.

Conversely, with respect to the arguments from the SCR Engine Manufacturers, the fact that maintenance is likely to occur does not affect the determination of what is the appropriate ''technologically necessary maintenance interval.'' While the likelihood of maintenance and the technological necessity of regular maintenance are both required elements under (b)(7), and the desire to increase the likelihood of maintenance may inform the particular form of the maintenance interval (i.e. having DEF refill maintenance be at the same time as oil change), the two requirements are separate and distinct. The ''technologically necessary maintenance interval'' requirement is motivated by a desire to minimize the amount of emission-related maintenance, which is distinct from the need to make sure that such maintenance is likely to occur. As noted, the SCR Engine Manufacturers have not shown that the 1:1 maintenance interval is ''technologically necessary.'' Therefore, while EPA agrees that the DEF refill maintenance is likely to occur in use, the 1:1 interval does not meet the requirements of (b)(7).

V. Approval of New Scheduled Maintenance for SCR Systems

A. Light-Duty Approval

For the reasons set forth above, EPA finds it appropriate to approve new scheduled maintenance intervals for DEF refill equal to the scheduled oil change interval for all light-duty vehicles and light-duty trucks, medium duty vehicles and other chassis certified vehicles up to 14,000 pounds for 2011 and later model years.

B. Heavy-Duty Approval

For the reasons set forth above, EPA again approves new scheduled maintenance intervals for DEF based on ratios to a given vehicle's fuel capacity for engine certified heavy-duty engines and vehicles for 2012 and later model years. Vocational heavy-duty vehicles

[27] *See* EPA's draft guidance at 76 FR 32886 (June 7, 2011).

(*e.g.,* dump trucks, concrete mixers, refuse trucks, and other centrally-fueled vehicles) are permitted a DEF tank maintenance interval no less than the vehicle's fuel capacity (*i.e.,* a 1:1 ratio of DEF refill to fuel refill). For all other heavy-duty vehicles, EPA approves a DEF tank refill interval no less than twice the range of the vehicle's fuel capacity (*i.e.,* a 2:1 ratio).

C. Reasonable Likelihood of Maintenance Being Performed In Use

As stated above, because DEF refills are considered ''critical emission-related maintenance,'' manufacturers must ''show the reasonable likelihood of such maintenance being performed in use.'' 40 CFR 86.094–25(b)(6)(ii) and 86.1834(b)(6)(ii) provide a number of means by which manufacturers may demonstrate such a reasonable likelihood. Among those means of demonstration are visible signal systems to alert drivers and operators that maintenance is needed, or data demonstrating that drivers or operators are induced to perform maintenance. EPA intends to review specific manufacturer certification applications in order to review whether these regulatory requirements are met.

D. Applicability

The Agency, as stated above, has approved alternative maintenance requests to ensure the proper functioning of SCR systems by allowing an appropriately frequent refilling of DEF tanks. We approve these requests for all future model years. EPA expressly reserves its ability to review this approval at any time in the future, should any technological advances be made that would allow for more or less frequent DEF refilling or otherwise call this approval into question.

VI. Procedures for Manufacturer Objections

Any manufacturer may request a hearing on this determination. The request must be in writing and include a statement specifying the manufacturer's objections to this determination, and data in support of such objections. If, after review of the manufacturer's objections and supporting data, we find that the request raises a substantial factual issue, we shall provide the manufacturer with a hearing in accordance with 40 CFR 86.1853–01 with respect to such issue.

Dated: December 23, 2011.

Gina McCarthy,

Assistant Administrator for Air and Radiation.

[FR Doc. 2011–33842 Filed 1–4–12; 8:45 am]

BILLING CODE–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–9615–9]

Control of Emissions From New Nonroad Compression-Ignition Engines: Approval of New Scheduled Maintenance for Selective Catalytic Reduction Technologies

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: This notice announces that EPA has granted manufacturers new emission-related scheduled maintenance and maintenance intervals for the replenishment of the nitrogen-containing reducing agent for selective catalytic reduction (SCR) technologies used with nonroad compression-ignition (NRCI) engines for 2011 and later model years. Replenishment of reducing agent for SCR technologies is considered critical emission-related maintenance.

FOR FURTHER INFORMATION CONTACT: David Dickinson, Compliance Division, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW., (405J), Washington, DC 20460. Telephone: (202) 343–9256. Email address: *Dickinson.David@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. Background

EPA adopted new emission standards for NRCI engines on June 29, 2004.[1] We expect that many manufacturers will use SCR systems to meet the final Tier IV NO_X reduction requirements for their diesel engines. SCR systems use a nitrogen-containing reducing agent that usually contains urea and is known as diesel exhaust fluid (DEF). The DEF is injected into the exhaust gas upstream of a catalyst and requires periodic replenishment (maintenance) by refilling the DEF tank.

NRCI engine manufacturers are required to provide written instructions for properly maintaining and using the engine, including the emission control system, to purchasers of new engines. These maintenance instructions, including the hours associated with the maintenance intervals, also apply to the engine during its service accumulation for emission testing purposes.

Maintenance performed on NRCI engines is classified as critical emission-related maintenance if it includes any adjustment, cleaning, repair, or replacement of critical emission-related components. As set forth at 40 CFR 1039.125(a)(1), 1039.125(a)(2), and 1039.125(a)(3), a manufacturer may schedule critical emission-related maintenance on these types of components if certain conditions are met, including a demonstration that the maintenance is reasonably likely to be done at the recommended intervals, and depending upon the size of the engine and the type of emission-related component, an EPA-prescribed minimum hour maintenance interval. For example, a manufacturer of engines below 130 kW may not schedule maintenance more frequently than 3,000 hours for catalytic converters and if the engines are at or above 130 kW then a manufacturer may not schedule the catalytic converter maintenance more frequently than 4,500 hours.

In addition, should a manufacturer desire a new or shorter scheduled maintenance interval (that it wishes to recommend to purchasers and perform during service accumulation on emission-data engines) not found under § 1039.125(a)(2) and 1039.125(a)(3), and instead utilize § 1039.125(a)(5), then the manufacturer must submit a request to EPA for approval. A request for a shorter maintenance interval includes new scheduled maintenance on emission-related components that were not in widespread use with NRCI engines before 2011. Requests from manufacturers for new scheduled maintenance intervals must include: (1) A description of the proposed maintenance step, (2) the recommended maximum feasible interval for this maintenance, (3) the rationale with supporting evidence to support the need for the maintenance at the recommended interval, and (4) a demonstration that the maintenance will be done at the recommended interval on in-use engines.

In considering requests for new scheduled maintenance EPA will evaluate the information provided to EPA and any other available information to establish alternate specifications for maintenance intervals as deemed appropriate.

EPA believes the existing allowable scheduled maintenance hour intervals applicable to catalytic converters are generally applicable to SCR systems which contain a catalyst, but that SCR systems are a new type of technology and that DEF refills are a new type of

[1] 69 FR 38958 (June 29, 2004).