UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

In the Matter of: SPARTAN DIESEL TECHNOLOGIES, LLC, Respondent.	Docket No. CAA-HQ-2017-8362

BUSINESS CONFIDENTIALITY AND SETTLEMENT MATERIAL ASSERTED

Portions of the Appendix of Complainant's Statement in Support of Issuance of a Penalty ("Statement") contain material claimed as confidential business information ("CBI") by Respondent, Spartan Diesel Technologies, LLC ("Spartan"). Therefore, a redacted version and an unredacted version of the Statement and the Appendix have been filed with the Hearing Clerk.

The materials redacted as potential CBI are contained in the Appendix to the Statement at Attachment 2, at enclosure, Attachment 3 at pp. 4-6, and Attachment 5 at pp. 4 -10.

If you have any questions, please contact David Alexander (202) 564-2109, or at alexander.david@epa.gov.

REDACTED VERSION

Potential Confidential Business Information Redacted
Potential Settlement Materials Redacted

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

In the Matter of: SPARTAN DIESEL TECHNOLOGIES, LLC, Respondent	Docket No. CAA-HQ-2017-8362

STATEMENT IN SUPPORT OF ISSUANCE OF A PENALTY

Introduction

1. On September 7, 2018, the Presiding Officer ordered the Director of the Air Enforcement Division ("Complainant") of the United States Environmental Protection Agency's ("EPA's") Office of Enforcement and Compliance Assurance to submit: (a) a copy of the full Investigation Summary Report for Spartan Diesel Technologies, Inc., dated November 7, 2014, prepared for EPA by Eastern Research Group, Inc., or at least pages 8 through 29 thereof; and (b) a statement explaining the likelihood that the emissions from the vehicles or engines on which each of the Subject Components have been installed may exceed certified levels or applicable standards. Complainant hereby submits the information and statement in accordance with the September 7, 2018 Order.

2. The Investigation Summary Report, through and including its Appendix C, is attached to this Statement as Attachment 1 ("Report").[1] As discussed in further detail below, the Subject Components in this matter are materially identical and offer the user a range of

[1] Appendices D, E and F this Report, which largely contain the confidential business information of Ford Motor Company ("Ford"), have been withheld, as we would not be able to produce them to Respondent.

horsepower enhancement modes (sometimes referred to as "tunes" or "calibrations"). While EPA has certain emissions data for two of the horsepower enhancement modes available on one of the Subject Components, EPA does not have any certification test data for either of the Subject Components. Nonetheless, Complainant asserts that the use of "Major" egregiousness for calculation of the civil penalty for every violative Subject Component is appropriate in this matter.

3. Under The Clean Air Act, Mobile Source Civil Penalty Policy, Title II of the Clean Air Act, Vehicle and Engine Emissions Certification Requirements (January 2009) ("Penalty Policy") (https:\\www.epa.gov\sites\production\files\documents\vehicleengine-penalty-policy_0.pdf) (last visited September 16, 2018), "the most egregiousness (sic) category of violations, 'Major,' applies to violations where excess emissions are likely to occur" or that are "expected to result in increased emissions" such as where emission control devices are missing. Penalty Policy at 13. Violations are also "Major" where "vehicles or engines are uncertified and there is no information about the emissions from these vehicles or engines..." *Id.*

4. Here, every single Subject Component is designed and intended to allow an end-user to operate a vehicle after physically removing or rendering inoperable emissions control components, such as a vehicle's diesel particulate filter ("DPF"), exhaust gas recirculation ("EGR") and other emissions control devices, and doing so increases emissions of one or more of the regulated pollutants particulate matter ("PM"), oxides of Nitrogen ("NOx"), and carbon monoxide ("CO").

5. Secondly, EPA's limited emissions testing of a Subject Component demonstrates that the tested Subject Component does in fact increase the tested vehicle's emissions when

operated in the highest available horsepower calibration for both the "DPF Off" and the "DPF On" modes, thereby resulting in excess emissions as compared to the emissions from the same vehicle when operated in the original condition specified by the manufacturer without the Subject Component installed. Attachment 1 Report.

6. Thirdly, based on good engineering judgment, and as supported by the emissions testing performed on a vehicle with a Subject Component installed, each Subject Component when operated in any of the available DPF Off modes will result in an increase in a vehicle's emissions over the regulatory emissions standards for NOx and PM since all such modes disable and allow the removal of a vehicle's emissions control equipment. Declaration of Brent Ruminski included as Attachment 2 ("Declaration") at para. 27, 30.

7. Fourthly, based on good engineering judgment, operation of the Subject Components in any of the DPF On (emissions equipment present) modes could have an adverse impact on vehicle emissions, thereby resulting in excess emissions of one or more regulated pollutants as compared to the emissions from the same vehicle when operated in the original condition specified by the manufacturer without the Subject Component installed. This is because even the DPF On modes change the fueling strategy and other engine parameters that are critical elements of design relied upon by the manufacturer to, among other things, control emissions. Attachment 2 Declaration at para. 25, 31, 32, 34.

8. Finally, Respondent has no emissions testing to demonstrate that its Subject Components do not cause excess emissions, and instead has admitted that the Subject Components were designed for "competition racing use only" and therefore testing for the "the impact on a vehicle's emissions [was] not…performed." Spartan Diesel Technologies, LLC Initial Response to Request for Information Under § 208(a) of the Clean Air Act, 42

U.S.C. § 7542(a) (May 13, 2013), included as Attachment 3 ("May 13, 2013 Response"), at 6.

9. The facts here readily exceed the Penalty Policy's thresholds for treating the violations as "Major." Therefore, Complainant requests that the Presiding Officer issue an order requiring Respondent to pay a civil penalty of $4,154,805.

Documents and Statements Ordered by The Presiding Officer

10. Investigation Summary Report: Complainant attaches the Investigation Summary Report, Spartan Diesel Technologies, Inc. dated November 07, 2014, prepared by Eastern Research Group, Inc. as Attachment 1.

11. Applicable Emission Standards and Ford's Certified Emission Levels: The Subject Components were designed and marketed for use with Model Year 2008 through 2012 Ford diesel F250, F350, F450 and F550 trucks. Thus, Complainant attaches documentation from EPA's current and legacy certification databases (VERIFY and Filemaker Pro) of the applicable emission standards and Ford's certified emission levels for these vehicles.[2] Attachment 4. Additionally, the Declaration of Brent Ruminski lists the emission standards and certified levels of the applicable Ford vehicles. Attachment 2 Declaration at para. 17, 27, 30.

12. In her order, the Presiding Officer requests a detailed explanation, and any documents in support, "as to whether there is any significant distinction among the different Subject Components and types of installation or operation…that may result in the level of

[2] The attached documents comprise printouts from EPA's legacy filemaker pro database and EPA's current VERIFY database for each relevant engine family. The first sets of documents are from the filemaker pro database and the manufacturer's certification levels are found on section 19 for each engine family. The remaining documents are from the Verify database and columns labeled "certification level" and "standard value" contain the relevant information. Ford did not certify Model Year 2010 F-series trucks, so no documents pertaining to that model year are attached.

emissions resulting from the installation being merely 'likely to be similar to emission from certified vehicles or engines' as described in the Penalty Policy" and whether the test results for the emissions equipment present calibration scenario in the Investigation Summary Report show "emissions exceed certified emission levels or applicable standards."

13. Distinction Between Subject Components: In its original request for information to Respondent, EPA requested Respondent provide a description of several components under investigation and an explanation of how the components operate. Respondent's responses for the two Subject Components at issue[3] provided to the Agency are largely identical. *See* Spartan Diesel Technologies, LLC Supplemental Response to Request for Information Under § 208(a) of the Clean Air Act, 42 U.S.C. § 7542(a) (June 13, 2013) included as Attachment 5 at 5-6 ("Supplemental Response"). Specifically, Respondent described both tuners as a "small touch screen console capable of reading, monitoring, and logging J2534/OBDII Vehicle data on both Ford SCP and CAN (ISO) vehicle communication networks" *Id.* Both devices are capable of flash programming on SCP, CAN, and ISO-CAN networks with the only difference being "Standard CAN flash programming is used in the 6.4L Powerstroke applications" and "ISO- CAN flash programming is used in the 6.4L Powerstroke applications." *Id.* All other descriptions regarding how the Subject Components operate the emissions-compliant tuning and the race/competition tuning are identical. *Id.; see also* Attachment 5 Supplemental Response at Enclosure B and Enclosure C (advertisements for Spartan Phalanx tuners and Installation and Operation Instructions for the Subject Components).

[3] The Spartan Phalanx Flash Console 6.4L tuner for Model Year 2008 to 2010 Ford diesel F250-F550 trucks, and the Spartan Phalanx Flash Console 6.7L tuner for Model Year 2011 to 2012 Ford diesel F250-F550 trucks.

14. Distinction Between Operational Modes: Based on the information submitted by Spartan, each Subject Component has several operational modes that purportedly provide an increase in horsepower through use of the Subject Component. Specifically, the Spartan 6.4L tuner comes preloaded with the following modes (i.e., "tunes"): On-Road (DPF ON) 40HP, 75HP, 125HP, 150HP; and Race (DPF OFF) 40HP, 75HP, 125HP, 150HP, 175HP, 210HP, 250HP, 275HP, 300HP, 310HP, and 350HP. Attachment 5 Supplemental Response at Enclosure C, Installation and Operation Instructions. The Spartan 6.7L tuner comes preloaded with the following tunes: DPF On 25HP, 90HP, 50HP, 125HP; and Race 40HP, 80HP, 120HP, 165HP, and 200HP. *Id.* Based on documentation submitted by Respondent, the "On-Road (DPF ON) Tuning [is] "to be used [sic] competition racing use only applications, with the factory DPF (Diesel Particulate Filter) and DOC (Diesel Oxidation Catalyst; otherwise known as catalytic converter) still in place" and the "Race Tuning (DPF OFF) Tuning [is] to be used STRICTLY for competition racing use applications…" and the "tunes are to be installed if your factory DPF and/or DOC is going to be removed after installing the tunes." *Id.* Complainant has no additional information or testing explaining the difference between the operational modes.

15. Likelihood of Exceedance of Certified Emissions Levels: The Presiding Officer requests an explanation of whether the test results for the emissions equipment present calibration scenario in the Investigation Summary Report show emissions exceeding certified levels or applicable standards, warranting a "Major" egregiousness level, and whether a particular installation or operation of the Subject Components may result in levels of emissions similar to certified vehicles or engines, warranting a "Moderate" egregiousness. At issue in this case are Subject Components designed to be used with

Model Year 2008 to 2012 Ford diesel trucks. To obtain certificates of conformity for these trucks, the manufacturer demonstrated that test vehicles met EPA emission standards using tests specified at 40 C.F.R. § 1066.801(c)(1) ("certification testing"). Certification testing is a prescribed set of tests, performed in an emissions testing laboratory, the results of which are combined according to a prescribed method. Notably, such certification testing includes a required "complete cold start test." 40 C.F.R. § 1066.801(c)(1)(i). *See also* Figure 1 of 40 C.F.R. § 1066.801 - FTP test sequence, at "cold start exhaust test."

16. As explained in the Declaration, and in the Investigation Summary Report, EPA tested a Model Year 2011, 6.7 Liter Ford F-350 truck. Neither the testing of the Model Year 2011, 6.7 Liter Ford F-350 truck when equipped with the Spartan 6.7L tuner, nor the "baseline" testing of that vehicle without a tuner installed, included a "cold start" phase of testing. Thus, although the testing conducted by EPA is informative in demonstrating that emissions of regulated pollutants increase when operating a vehicle modified with a Subject Component over the emissions that result from operation of an unmodified vehicle (i.e., the "baseline" testing), the testing does not constitute certification testing. Attachment 2 Declaration para. 20, 24, 25, 31; Attachment 1 Report at 15; 40 C.F.R. § 1066.801(c)(1)(i). Therefore, the test results summarized in Table 10 of the Investigation Summary Report (and elsewhere in the Report) cannot be validly compared to the certified emissions levels or regulatory standards.

17. Although Complainant does not have certification testing for the Subject Components (and is not required, under the Penalty Policy, to have such testing as discussed below), Complainant asserts that, good engineering judgment, as supported by emission testing,

leaves no doubt that a vehicle operated with a Subject Component in any of the DPF Off modes would fail to meet the relevant emission standards. Attachment 2 Declaration at para. 27, 30. Furthermore, the Declaration shows that even vehicles with the Subject Components installed and operated in the DPF On modes could have an adverse impact on vehicle emissions, thereby resulting in excess emissions of one or more regulated pollutants as compared to the emissions from the same vehicle when operated in the original condition as built by the manufacturer without the Subject Component installed. This is because even the DPF On modes change critical elements of design such as fuel injection timing, quantity and rail pressure, relied upon by the manufacturer to, among other things, control emissions. Attachment 2 Declaration at para. 25, 31, 32, 34.

18. In summary, the emissions testing conducted by Complainant, documented in the Investigation Summary Report (Attachment 2), does not constitute certification testing and therefore cannot show whether, or the degree to which, the emissions from a vehicle operated with a Subject Component exceed certified levels or applicable standards. Nevertheless, as discussed further below, Complainant asserts that an egregiousness level of "Major" is warranted under the Penalty Policy based on the likelihood of excess emissions from these Subject Components.

An Egregiousness of "Major" is Warranted for All of the Violations at Issue

19. The Penalty Policy focuses on the "potential harm" of excess emissions and applies "Major" egregiousness to "violations where excess emissions are likely to occur" or that are "expected to result in increased emissions" such as vehicles and engines with missing or defective aftertreatment devices (e.g. catalytic converters) or "most other emission control devices." Penalty Policy at 13.

20. The proper analysis of the potential emission consequences resulting from the operation of the Subject Components should be focused on the potential for, or likelihood of, excess emissions based on a "worst case" or most polluting mode available. The concept of "worst case" testing is imbedded throughout EPA's vehicle and engine certification and testing programs so that the real-world use of the vehicle does not result in substantially higher emissions than would be otherwise represented. For example, EPA's certification program requires that the test "...vehicle configuration shall be selected which is expected to be worst-case for exhaust emission compliance on candidate in-use vehicles, considering all exhaust emission constituents, all exhaust test procedures, and the potential impact of air conditioning on test results." 40 C.F.R § 86.1828-01(a). See also 40 C.F.R. §§ 86-000-24(b) and § 86.096-24(b)(3)(ii)-(iii) (manufacturers must select vehicles with features indicating that they have the highest emission levels); § 86.1844-01(g)(1) (the certification application must include a basis for deeming tested emissions and durability vehicles to be the worst case).

21. Furthermore, under EPA's voluntary aftermarket part certification program "...vehicle configurations used for emission testing and durability demonstration [must] represent worst case with respect to emissions of all those configurations for which the aftermarket part is being certified." 40 C.F.R. § 2115(a)(ix). In addition, "...use of a certified part [must] *not cause a substantial increase to vehicle emissions in any normal driving mode [even those modes] not represented during certification or compliance testing.*" 40 C.F.R. § 85-2115(a)(xiv) (emphasis added). *See also* 40 C.F.R. § 85-2114(c)(6) (the durability demonstration vehicle must represent the worst case of all vehicles for which the aftermarket part is to be certified).

22. Here, Respondent itself has asserted that the Subject Components are "designed for competition racing use only." Attachment 3 May 13, 2013 Response at 6; Attachment 5 Supplemental Response at Enclosure C (tuner instruction and installation manuals with universal race disclaimers). Thus, assessing the potential emissions impacts of the Subject Components in their DPF Off modes is consistent with the intended use of the Subject Components as well as the concept of assessing the "worst case" scenario under EPA's mobile source program. Good engineering judgment, as supported by test data, leaves no doubt that the Subject Components operated in any of the DPF Off modes would result in a substantial increase to vehicle emissions and cause the vehicle to exceed the regulatory emissions standards for NOx and PM since all such modes disable and allow removal of a vehicle's emissions control equipment. Attachment 2 Declaration at para. 27, 30.

23. In her Order, the Presiding Officer requested Complainant to explain in detail, with any documents in support, the extent to which the penalties for the violations at issue should represent installations of Subject Components with a "delete pipe" or emissions control equipment removed or ineffective, and to the extent to which the penalties should represent installations with emissions control equipment present or effective. In response, Complainant respectfully asserts, as detailed above, that penalties should reflect the "worst case" mode of the Subject Components. Here, the Subject Components are in their "worst case" mode when a user employs the "DPF Off" features of the Subject Components, and is thereby able to remove emissions aftertreatment systems like filters and catalysts. Whether the user selects to also install a "straight pipe" (in order to route

engine emissions to the rear of the vehicle) would have no further impact on the amount of emissions to the ambient air.

24. The Penalty Policy does not require that Complainant have certification test data, or any test data, in order to assess the potential for excess emissions or egregiousness. In fact, the Penalty Policy explicitly states that violations should be classified as "Major" if there is uncertainty about the egregiousness classification, and also where "vehicles or engines are uncertified and there is no information about the emissions from these vehicles or engines..." Penalty Policy at 13. Furthermore, the Penalty Policy states "... it may be appropriate to limit evidence a violator can use to demonstrate the emissions of vehicles or engines to that which is in existence *at the time that the violation was committed.*" (emphasis added) *Id.* Thus, even in the absence of any test data, a classification of the violations as "Major" would be appropriate here.

25. Under its Interim Tampering Enforcement Policy, Memorandum 1A ("Memo 1A") Complainant has long maintained that "[u]se of a nonoriginal equipment aftermarket part or system as an add-on, auxiliary, augmenting, or secondary part or system" will generally not be the subject of EPA enforcement if there is a "reasonable basis" for knowing that use of such part will not adversely affect emissions performance. Memo 1A (June 25, 1974), (https://www.epa.gov/sites/production/files/documents/tamper-memo1a.pdf) (last visited September 15, 2018) at section B(1)(b). A "reasonable basis for knowing that a given act [or part] will not adversely affect emissions performance exists if...emissions tests...have been performed...showing that the act [or part] does not cause [ ] vehicles or engines to fail to meet applicable emission standards for their useful lives. *Id.* at section B(3)(b). Under Memo 1A, an aftermarket parts manufacturer "should

have available the data from tests, including where, when, how and by whom the tests were conducted should EPA request it." *Id.* at section C(2). Where manufacturers have such information, Memo 1A provides that the EPA will generally exercise its enforcement discretion and take no enforcement. EPA previously requested that Respondent identify any test of the Subject Components that "measure the impact of the component on motor vehicle emissions, or that measure the impact of the component on a vehicle's emission control devices or elements of design." Attachment 3 May 13, 2013 Response at 6. In response, Spartan represented that "no such tests have been performed." *Id.* Spartan further asserted that its tuners are "...designed for competition racing use only...[and] [t]hus the impact on a vehicle's emissions is not a specification for which testing is performed." *Id.*

26. Consistent with the Penalty Policy, and based upon Respondent's representations regarding the design and potential of its products, and Respondent's consequent lack of any emissions testing of those products, Complainant respectfully submits that an application of "Major" egregiousness is appropriate when calculating the appropriate penalty for the violative Spartan Phalanx tuners.

27. Therefore, Complainant respectfully requests that the Presiding Officer Order Respondent to pay the proposed penalty of $4,154,805, as based on a "major" egregiousness level and consistent with the calculus set forth in Complainant's Motion for Default.

Respectfully Submitted,

9/28/18

Date

David E. Alexander, Attorney Adviser
Air Enforcement Division
Office of Civil Enforcement
Office of Enforcement and Compliance Assurance

1200 Pennsylvania Ave., N.W.
William J. Clinton Federal Building
Room 1111B, Mailcode 2242A
Washington, DC 20460
(202) 564-2109
Alexander.David@epa.gov

David Alexander is authorized to receive service relating to this proceeding.

CERTIFICATE OF SERVICE

I certify that the original and one copy of the foregoing STATEMENT IN SUPPORT OF ISSUANCE OF A PENALTY, *In the Matter of Spartan Diesel Technologies, LLC.*, dated, September 28, 2018, was filed under seal this day by hand delivery with the EPA Office of Administrative Law Judges at the address listed below, with a copy for public disclosure filed electronically at the website provided therefor:

U.S. Environmental Protection Agency
Office of Administrative Law Judges
Ronald Reagan Building, Rm. M1200
1300 Pennsylvania Ave., N.W.
Washington, DC 20460

I certify that I sent by United States Postal Service one copy, and one redacted copy, of the foregoing Statement to the following addresses officially registered to Spartan Diesel Technologies, LLC (first three addresses) or at which a mailing has been accepted.

Matthew Geouge, Registered Agent
Spartan Diesel Technologies, LLC
518 South Allen Rd.
Flat Rock, NC 28731-9447 :

Matthew Geouge, Manager
Spartan Diesel Technologies, LLC
578 Upward Rd Suite 7
Flat Rock, NC 28731

Matthew Geouge, Member
Spartan Diesel Technologies, LLC
328 Trenholm Road
Hendersonville, NC 28739

Matthew Geouge, Manager and Registered Agent
Spartan Diesel Technologies
107 Education Dr., Flat Rock, NC 28731

9/28/18
Date

David E. Alexander, Attorney Adviser
Air Enforcement Division
Office of Civil Enforcement
Office of Enforcement and Compliance Assurance

1200 Pennsylvania Ave., N.W.
William J. Clinton Federal Building
Room 1111B, Mailcode 2242A
Washington, DC 20460
(202) 564-2109
alexander.david@epa.gov

ATTACHMENT 1

Investigation Summary Report

Spartan Diesel Technologies, Inc.

November 7, 2014

Investigation Summary Report

Spartan Diesel Technologies, Inc.

November 07, 2014

Submitted to:

U.S. ENVIRONMENTAL PROTECTION AGENCY
William Jefferson Clinton Building, 1200 Pennsylvania Ave., NW,
Washington, DC 20004

Submitted by:

Eastern Research Group, Inc.
14555 Avion Parkway, Suite 200
Chantilly, VA 20151

EPA Contract No. EP-W-12-007
EPA WA-1-1

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EXECUTIVE SUMMARY

In December 2013, a compliance inspection team comprised of staff from EPA and EPA's contractor, Eastern Research Group, Inc. (ERG) conducted emissions tests of the Spartan Diesel Technologies (Spartan) 6.7L Phalanx diesel engine tuner. This report summarizes EPA's investigation of the engine control module (ECM) tuner sold by Spartan which included conducting emissions testing with a Spartan tuner installed on a Ford F-350 test vehicle with a 6.7 Liter Ford Powerstroke turbo diesel engine. The test results confirm that the tuner alters the engine's operational design and increase regulated exhaust emissions of the vehicles on which they are installed. Further, the manufacturer of these tuners has not provided EPA any emissions test results demonstrating that these tuning devices do not adversely affect emissions.

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I. INTRODUCTION

A compliance inspection team comprising staff from EPA and EPA's contractor, ERG, investigated Spartan for manufacturing and selling potential defeat devices for on-highway engines. The investigation included purchasing one of Spartan's engine computer module (ECM) tuning devices, evaluating calibration modifications, installing tuner calibrations on a test vehicle using the tuner, and performing emissions testing. ERG and EPA traveled to Ford Motor Company (Ford) the week of 2 December 2013 to conduct emission testing on a Ford F-350 test vehicle. The purpose of this testing was to identify which engine controls are altered by each tuner and how use of these tuners, along with defeat devices designed to physically bypass the emission control devices, affect emissions of regulated pollutants.

EPA Representatives:	Anne Wick, MSEB, EPA Headquarters Anthony Miller, MSEB, EPA Headquarters David Alexander, MSEB, EPA Headquarters
EPA Contractors:	Brent Ruminski, ERG Michael Sabisch, ERG Alan Stanard, ERG Andrew Loll, ERG
Ford Representatives:	Mark Kobetis, Ford

This report is organized as follows:

- Section II provides the background on Spartan and the purpose of this investigation.
- Section III describes the Spartan 6.7L Phalanx tuner and Flo-Pro aftertreatment delete pipe purchased by ERG as evidence during this investigation.
- Section IV provides descriptions of the test vehicle and procedures followed during emission testing at Ford.
- Section V provides the results of emissions testing at Ford including OBD and live engine data evaluation results.
- Appendix A contains photographs taken during the investigation. Photographs are referenced in the report as Photograph [#].
- Appendix B contains a memorandum documenting ERG's purchase of the Spartan tuner referred to as the 6.7L Phalanx in this report.
- Appendix C contains communication with Spartan for activating the 6.7L Phalanx tuner.
- Appendix D is a memorandum summarizing Bosch's analysis of the 6.7L Phalanx emission equipment-present calibration modifications.
- Appendix E is a table containing a chronological order of emissions testing activities performed by ERG, EPA, and Ford.
- Appendix F contains emails documenting miscellaneous investigation information.

II. BACKGROUND

Spartan offers two different models of their ECM tuner for use with on-highway heavy-duty diesel engines. This includes the 6.7L Phalanx tuner designed for the 6.7 Liter Ford Powerstroke diesel engine found in Model Year 2010 and newer Ford F Series trucks. Spartan also offers the 6.4L Phalanx tuner

designed for the 6.4 Liter Powerstroke diesel engine diesel engine found in Model Year 2008 through 2010 Ford F Series trucks. EPA focused this investigation on the 6.7L Phalanx tuner. Spartan advertises these devices to increase performance and fuel economy. To date, Spartan has not submitted any documentation to EPA of completed emissions testing demonstrating that these tuning devices do not adversely affect emissions.

For this investigation, EPA was primarily concerned with investigating the following:

- *Emissions equipment-present calibrations*: Determining what engine parameters these types of calibrations alter and if these alterations adversely affect emissions.
- *Emissions equipment-removed calibrations*: Determining if each tuner is able to render inoperative or bypass emission control devices such as exhaust gas recirculation (EGR), selective catalytic reduction (SCR), oxidation catalyst (OC), diesel particulate filter (DPF) and devices involved in engine control. This includes determining what engine parameters these types of calibrations alter and if these alterations adversely affect emissions. More specifically, this includes determining whether the tuners:
    - Disable or alter functions of the ECM and OBD to allow the engine to operate after the user physically removes the emission control devices (applies to OC, SCR, and DPF); and
    - Disable or alters functions of the ECM and OBD to defeat (i.e., electronically turn off) the EGR system without physically removing the EGR system.[1]

III. PURCHASE OF ECM TUNER AND AFTERTREATMENT DELETE PIPE

ERG purchased a 6.7L Phalanx Spartan as a typical customer. Later, with the assistance of EPA and Ford, ERG performed emissions testing with this tuner on a test vehicle. See Sections IV and V for emissions testing procedures and results, respectively. ERG also acquired an aftertreatment delete pipe (i.e., straight pipe) to support the investigation. The following subsections include the information listed below.

- Section III.A documents ERG's purchase 6.7L Phalanx ECM tuner. This ECM tuner was later tested on a Ford F-350 with a 6.7 Liter Ford Powerstroke diesel engine the week of 2 December 2013.
- Section III.B documents ERG's purchase of a Flo-Pro aftertreatment delete pipe (i.e., straight pipe) used to test emissions equipment-removed calibrations on the Ford F-350.

Once received, ERG handled the tuners as evidence, completed chain-of-custody forms for each upon receipt, and properly maintained the documentation and evidence throughout the investigation.

A. 6.7L Phalanx

On 13 September 2013, ERG purchased the Spartan 6.7L Phalanx tuner through Rudy's Diesel Performance website.[2] The memorandum in Appendix B describes the purchasing process. Photograph [1] shows the Spartan tuner out of the box as received by ERG on 19 September 2013. Photographs [2] and [3] show the product description and the serial number as 018914130513Q. The Spartan company name and tuner model name (i.e., Phalanx) are not printed anywhere on the box, tuner, or instruction manual. The only company name observed on the product is Drew Technologies, Inc and the model name

[1] As determined by ERG during this investigation, this may or may not require the user to unplug wiring to the EGR valve depending on the tuner.
[2] More information on Rudy's Diesel Performance is available online at: www.rudysdiesel.com.

is the DashDAQ-XL. However, Spartan's website clearly names their tuners as the 6.4L Phalanx and 6.7L Phalanx.
At the time of purchase, the Spartan 6.7L Phalanx tuner ERG purchased was compatible with the Model Years 2011 and newer 6.7 Liter Ford Powerstroke diesel engine. The 6.7 Powerstroke is typically installed in Model Years 2011 and newer offered by Ford in their F-250 models and larger (e.g., F-350, F-450). A different version of the Spartan Phalanx was available that is compatible with the 6.4 Liter Powerstroke. The 6.4 Liter Powerstroke engine is typically installed on Model Years 2008 to 2010 Ford truck models F-250 and larger.[3]

B. Flo-Pro Aftertreatment Delete Pipe

ERG originally ordered a Flo-Pro aftertreatment delete pipe with the Part Number 857 NB for the Ford 6.7 Liter Ford Powerstroke from USA Performance Exhaust[4] located in Butte, Montana. ERG purchased this delete pipe to evaluate the Spartan 6.7L Phalanx emission equipment-removed calibration on the test vehicle at Ford the week of 2 December 2013.

The aftertreatment delete pipe received the week of testing was Flo-Pro Part Number 837 NB, which is the Ford 6.4 Liter Powerstroke model, instead of Part Number 857 NB that ERG ordered on the website for the 6.7 Liter Ford Powerstroke model. Photograph [4] shows the box received from USA Performance. Photograph [5] shows the document received with the aftertreatment delete pipe verifying that it is the incorrect Part Number 837 NB. ERG also confirmed it was the incorrect part by measuring the full length of the aftertreatment delete pipe. It was approximately one foot shorter than the stock bolt-on aftertreatment system.

ERG researched local performance shops in the Detroit area that Flo-Pro lists as certified dealers and identified Wolf Diesel Performance located at 396555 Willow Road, New Boston, Michigan. ERG called Wolf Diesel Performance on 3 December 2013 and ordered a Part Number 857NB aftertreatment delete pipe with overnight shipping. ERG returned the incorrect aftertreatment delete pipe to USA Performance and later received a full refund from the company.

On 4 December 2013, ERG received a call from a Wolf Diesel Performance[5] representative stating that the system arrived at their location. At that time, the representative requested that ERG pick up the system at Jimmy John's Gourmet Sandwiches located at 22211 West Road, Woodhaven, Michigan. When the contact met ERG and EPA in the parking lot, the contact was able to swipe a credit card for a payment of $255 to a PNC business account and immediately emailed a receipt to ERG. The Wolf Diesel Performance representative noted that he wanted to meet at Jimmy John's because his family owns the restaurant and he had to begin a work shift. He also stated that he typically ships parts to his customers for future reference. ERG and EPA arrived back at Ford in the afternoon of 4 December 2013 with the Flo-Pro 857 NB aftertreatment delete pipe.

Photograph [6] shows the box containing the Flo-Pro aftertreatment delete pipe as received by Wolf Diesel Performance. Photograph [7] shows the Flo-Pro aftertreatment delete pipe out of the box. This is a two piece system and contains no bungs.[6] The two main pipes have Part Numbers 31112NB and 31114NB. Photograph [8] shows that Wolf Diesel Performance's distributer is called Thunder Diesel

[3] During the purchase process, there was some confusion on whether the tuner could be used on the 6.7 or 6.4 Liter Ford Powerstroke. The receipt ERG received indicated the tuner was for a 6.4 Liter. ERG called a sales representative at Spartan who indicated the desired tuner could be used on the 6.7 Liter. Upon receipt, ERG confirmed the tuner that was received could be used on the 6.7 Liter. The representative also indicated that the device could allow an EGR/DPF delete.
[4] USA Performance Exhaust's website is: http://www.usaperformanceexhaust.com/home.
[5] Wolf Diesel Performance does not have a website.
[6] The bungs in the OEM exhaust pipe are threaded holes for sensors.

located at 1835 Highway 201 South Spur, Mountain Home, Arkansas. It also shows that Wolf Diesel Performance had the distributer ship the unit to 18282 Huron River Drive, New Boston, Michigan instead of the address reported on Flo-Pro's website for Wolf Diesel Performance previously mentioned.

IV. EMISSIONS TESTING DOCUMENTATION

Ford agreed to provide EPA with a test vehicle and conduct testing to measure emissions and engine operating data when calibrations from the 6.7L Phalanx are installed. ERG and EPA traveled to Ford's testing facility in Allen Park, Michigan the week of 2 December 2013 to test the Spartan tuner. Ford performed testing and ERG installed the calibrations. The following two subsections describe the test vehicles that Ford provided for testing along with the procedures used to complete testing.

A. Test Vehicles

Table 1 provides a detailed description of the test vehicle Ford provided. Ford provided a Model Year 2011 F-350 with a 6.7 Liter Ford Powerstroke engine. Photographs [9] through [15] show the test vehicle at the time of the testing. The test vehicle was OBD II compliant and certified to meet model year 2011 emissions standards for complete[7] heavy-duty vehicles (40 CFR 86.1816-05 and 86.1816-08).

Table 1. Test Vehicle Description at Ford

Parameter	Testing at Ford
Make	Ford
Chassis manufacturer	Ford Motor Company
Chassis model	F-350
Chassis model year	2011
Engine manufacturer	Ford Motor Company
Engine model year	2011
EPA engine family	BFMXD06.771C
Engine configuration	V-8
Engine size (liters)	6.7
VIN	1FT8W3CT6BEA00289
Odometer beginning of testing	33,933 miles
Aftertreatment mileage	~4,000 miles
Emissions equipment	Charge air cooler (CAC), turbo charger (TC), exhaust gas recirculation (EGR), oxidation catalyst (OC), period trap oxidizer (PTOX)[a], direct diesel injection (DDI), heated oxygen sensor (HO2S), selective catalytic reduction (SCR)

a – This system contains the DPF.

Table 2 shows the emissions standard, certification level, additive deterioration factors (DF), and engine adjustment factor (EAF) for the engine in the Ford test vehicle based on certification testing. The tables show the standards for nitrous oxides (NO_x), particulate matter (PM), carbon monoxide (CO), and non-methane hydrocarbon (NMHC).

[7] A complete vehicle is one that requires no further manufacturing operations to perform its intended function and is a functioning vehicle that has the primary load carrying device or container (or equivalent equipment) attached or that is designed to pull a trailer (40 CFR 86.085-20).

- DF is a factor that represents the increase in emissions over the life of a vehicle. Specifically, this is the increase between certification testing, when the aftertreatment has only been used for approximately 4,000 miles, and the end of the useful life of the aftertreatment system. The applicable emission standards define the useful life for both engine families tested as 11 years or 120,000 miles. Engine manufactures must add the DF to the measured emissions when determining the official certification level.
- Upward EAF is an additional factor added to the measured emissions to determine certification levels when regeneration does not occur during the testing. This factor accounts for excess emissions during DPF regeneration. [8]
- Certification level is the measured emissions after all DFs and EAFs are added to the measured emissions for certifications. The certification level must be less than the certified standard.
- Certified standard is the applicable standard under 40 CFR Part 86 that the certification level must meet.

Table 2. Certification Emission Levels and Standards for Engine Family BFMXD06.771C Tested at Ford using the Spartan 6.7L Phalanx

Constituent	Emission Result (g/mi)	Additive DF (g/mi)	Upward EAF (g/mi)	Certification Level (g/mi)[a]	Certified Standard (g/mi)[b]
NO_x	0.2900	0.0000	0.0200	0.3000	0.4
PM	0.0040	0.0070	0.0000	0.0100	0.02
CO	0.3100	0.2300	0.0100	0.6000	8.1
NMHC	0.0174	0.0334	0.0001	0.0510	0.23

Source: All data is available on EPA's website at: http://www.epa.gov/otaq/crttst.htm.
a – Certified emissions levels for this engine family at the end of the useful life after applying appropriate DF and EAFs to the raw emission test results using an FTP75 test cycle.
b – Emissions standards this engine family is required to meet at the end of the useful life after applying appropriate DF and EAFs to the raw emission test results using an FTP75 test cycle.

B. Testing Procedures

The following subsections describe the test procedures Ford, EPA, and ERG followed during emissions testing:

- Section IV.B.1 describes tuner calibration installation and emission control device removal;
- Section IV.B.2 describes obtaining OBD data;
- Section IV.B.3 describes obtaining live engine data; and
- Section IV.B.4 describes test cycle selection and procedures.

Table 3 summarizes the matrix of tests completed for each tuner calibration. Ford completed one baseline test on the F-350 prior to the week of 2 December 2013 on 26 November 2013 prior to ERG's and EPA's arrival at the testing facility. In addition, Ford completed a second baseline test after the week of 2 December 2013. Ford stated that DPF regeneration occurred on the test vehicle prior to the initial tests

[8] When regeneration does occur during the testing Manufactures must add downward EAFs which are negative numbers to account for the excess emissions during regeneration. Table 2 only shows upward EAFs because no regeneration occurred during any of EPA's testing in this investigation. More information on engine adjustment factors is available online at: http://www.epa.gov/otaq/highway-diesel/workshop/420f04022.pdf.

such that regeneration would not occur during the actual emission tests or baseline tests. ERG and EPA confirmed that no regeneration occurred during any of the emission tests.

Table 3. Chassis Dynamometer Test Matrix for Testing at Ford

Test	Baseline	Emissions Equipment-present	Emissions Equipment-Removed
LA4	11/26/2013	12/2/2013	12/5/2013
US06	1/3/2014	12/4/2013	--[a]

a – Due to limited access to the test cell, this test was not performed.

The following describes the general procedure followed for each tuner calibration and test. Table 14 in Appendix E provides a more detailed order of procedures completed.

1. ERG obtained the calibration identifications (Cal ID), calibration verification numbers (CVNs), the status of the malfunction indicator light (MIL), and any diagnostic trouble codes (DTC) from the ECM with the existing calibration installed. See Section IV.B.2 for more information on what these parameters are and how ERG obtained them. ERG started the engine momentarily at the beginning of this step to allow the ECM to detect DTCs and to recalculate the CVN.
2. ERG installed the calibration to be tested using the tuner. See Section IV.B.1 for the detailed procedures ERG followed for each tuner and calibration installation.
3. ERG obtained the new Cal ID, CVN, MIL status, and any DTCs from the ECM with the calibration installed. See Section IV.B.2 for more information on what these parameters are and how ERG obtained them. When possible, ERG started the engine momentarily at the beginning of this step to allow the ECM to detect DTCs and to recalculate the CVN.
4. Ford connected their ECM data logging equipment to the vehicle to obtain live engine data parameters over time during the testing. See Section IV.B.3 for detailed procedures related to the ECM data logger.
5. Ford performed one of the desired test procedures described in Section IV.B.4.b. See Section IV.B.4.a for more details on the underlying test cycles included in these test procedures.

Testing of emissions equipment-removed calibrations required installation of an aftertreatment delete pipe. The installation process for this part that Ford installed is described in Section IV.B.1.b.

1. Defeat Device Installation

The purchased Spartan tuner came preloaded with multiple calibrations. For the purpose of this investigation, ERG categorized calibrations into one of two categories:

- Emissions equipment-present – These calibrations modify engine data maps to alter engine operating parameters (e.g., injection timing, fuel injection quantities). These calibrations do not allow removal of certain emission control devices.
- Emissions equipment-removed – These calibrations allow the alteration and/or removal of emission control devices in addition to the functions performed by emissions equipment-present calibrations.[9]

The following subsections describe how ERG installed the two types of calibrations listed above using the 6.7L Phalanx Spartan tuner. In addition, the installation process followed for removing or physically

[9] This includes calibrations that disable functions of the OBD that would otherwise prevent the engine from running if a vehicle owner was to tamper with an emission control device. This also includes calibrations that electronically disable the function of entire emission control system without physically removing the system.

disabling emission control devices (e.g., EGR, DPF, SCR) prior to emission equipment–removed calibration testing is described.

a. Spartan Tuner

After powering on the Spartan tuner, shown in Photograph [16], the user is immediately prompted to agree to the "off-road" disclaimer shown in Photograph [17]. The main menu has several icons including "load tune" and "load stock" as shown in Photograph [18]. ERG used these two menu options to install preloaded calibrations to the ECM and return in to stock, respectively. As received, the Spartan tuner showed no preloaded tunes available for install. As directed in the installation manual, ERG completed the following steps to activate the Spartan 6.7L Phalanx tuner:

1. Set up an account on Spartan's website and entered detailed information about the vehicle[10]
2. Sent an email to Spartan with a signed license agreement
3. Copied an index file received from Spartan via email after completing Steps 1 and 2 to the tuner's memory card

Appendix C provides emails and screenshots documenting each step described above. ERG placed the memory card back into the tuner. Once the memory card was inserted into the tuner containing the index file, the following preloaded tunes for the 6.7 Liter Ford Powerstroke engine were available in the tuner's "load tune" menu:

- 25HP DPF On Cab & Chassis Only;
- 90 HP DPF On Cab & Chassis Only;
- 50 HP DPF On;
- 125HP DPF On;
- 40 HP DPF Off;
- 80 HP DPF Off;
- 120HP DPF Off;
- 165HP DPF Off; and
- 200HP DPF Off War Hammer Race.

For emissions equipment-present testing, ERG installed the "125 DPF On" calibration as shown in Photograph [19]. The tuner does not allow the user to input any other options after selecting the calibration to install.

For emissions equipment-removed testing, ERG selected the "200HP DPF Off War Hammer Race" calibration as shown in Photograph [20]. The tuner does not allow the user to input any other options after selecting the calibration to install.

b. Emission Control Device Removal

The Spartan's instructions for disabling the EGR and aftertreatment system were vague. On 3 December 2013, ERG called Spartan technical support and asked if it was necessary to unplug sensors for the EGR and aftertreatment system. The Spartan representative instructed ERG to leave all electronic EGR sensors plugged in and stated that when a "DPF off" tune is selected, the calibration automatically turns off the EGR valve. The Spartan representative also stated that the sensors in the aftertreatment system should be left plugged in and secured in another fashion assuming the aftertreatment delete kit (i.e., straight pipe) has no bungs.

[10] The detailed information included tuner serial number, vehicle model year, vehicle model, transmission type (automatic), gear ratio, tire size, manufacturer date, engine strategy code, and transmission strategy code.

Prior to emission equipment-removed testing, Ford installed the Flo-Pro aftertreatment delete pipe onto the test vehicle in the garage located in the testing facility. Photographs [7] and [21] show the Flo-Pro aftertreatment delete pipe out of the box and installed on the vehicle, respectively. Ford removed the original equipment manufacturer (OEM) bolt-on exhaust section that included the OC, SCR, and DPF (in order from upstream to downstream). Photograph [13] shows the stock aftertreatment system that Ford removed and replaced for this portion of the testing. As instructed by the Spartan representative on 3 December 2013, Ford left all aftertreatment sensors plugged in and secured under the vehicle. These sensors included:

- Three EGT sensors;
- One pressure sensor;
- One NO_x sensor; and
- One urea injector.

After successfully installing the aftertreatment delete kit and the Spartan emission equipment-removed calibration, Ford performed a transmission relearn on a nearby highway.[11] Due to logistics, this was the only opportunity to perform a transmission relearn during the entire testing week. However, Ford suggested that not performing a transmission relearn would not affect emissions performance but may cause some "harsh" shifting in the early phase of testing after the transmission is recalibrated. The Spartan 6.7L Phalanx tuner automatically calibrates the transmission and does not provide the user the option to calibrate the transmission during the installation process.

EPA used this transmission relearn as an opportunity to demonstrate the Spartan tuner is capable of altering the OBD in a way that allows the vehicle to operate without any aftertreatment system. Photographs [22] and [23] show black smoke the vehicle generated from a hard acceleration during the transmission relearn.

2. OBD Scan Tool Data Procedure

After each installation of the new calibrations (i.e., stock and modified), ERG immediately removed the tuner, connected an OBD II scan tool to the OBD II data link connector (DLC) on the test vehicle, and obtained data including DTCs, status of the MIL, Cal ID, and CVN. ERG used an AutoXray ® 4000 OBD II scan tool. ERG obtained this information during the testing process immediately:

- Before installing a new calibration using the tuner;
- After installing a new calibration using the tuner and before the emissions test;
- After completing each emission test; and
- After returning the ECM calibration to stock after each test.

The following describes each one of the parameters ERG recorded during testing. Section V.A summarizes the observations.

- Cal ID – The Cal ID represents the software version, which includes the engine data maps. A new calibration installation may or may not result in a new Cal ID depending on the tuner.
- CVN – The CVN is the result of a 'check-sum' calculation performed by the OBD system using the engine data maps as inputs. If the data values have not been changed or corrupted, the CVN will always provide the same sum for a given Cal ID. If the ECM has been corrupted or any calibration values have been modified, the CVN calculation will generate an incorrect 'sum'. ERG used this as the ultimate indicator that the tuner installed a new calibration between each test.

[11] Manufacturers recommend a transmission relearn whenever a transmission is recalibrated. A transmission relearn consists of a series of aggressive and non-aggressive accelerations.

- DTCs – DTCs are codes that indicate a fault has been detected in one of the engine or emission systems. DTCs specifically indicate what system the fault was identified.
- MIL – The MIL, also known as the check engine light, is a symbol located near the odometer. The MIL indicator is amber (yellow) in color and should be illuminated for the first five seconds after the ignition key is turned on to show that the MIL light is working properly. After startup, the light is only illuminated when a malfunction is detected following the detection of DTCs. The MIL activates when monitored operating parameters indicate an engine component is malfunctioning to the point that the vehicle may be exceeding its applicable emission standards by certain thresholds.

3. Live Engine Data Logging Procedure

During testing, Ford logged live engine operational data. After testing, ERG used the data to evaluate operating parameters that may affect emissions such as fuel injection timing, EGR flow, fueling rates, fresh air flow, and calculated air-to-fuel ratio (AFR). ERG compared live operating data streams observed with the tested Spartan calibrations to live operating data streams observed with stock calibrations (i.e., baseline). The following two subsections describe how the live data was obtained, what live data streams were recorded, and how ERG analyzed them. Section V.B provides the results of ERG's analysis.

Ford logged live engine data by connecting a data logger into the OBD II DLC after ERG installed the new calibration and removed the tuner from the vehicle. The data logger activates when the vehicle engine speed (i.e., RPM) increases from zero after the engine is turned on. Ford set the data logger to record data at a rate of 1 hertz or one data point per second. The list of parameters recorded are below (units are noted parenthetically). Ford selected the parameters to record prior to ERG and EPA's arrival for testing the week of 2 December 2013. Ford provided ERG all of the recorded data after testing.

Parameter List

- Time (ms)
- RPM (RPM)
- Rel Pedal Angle (%)
- Vehicle Speed (MPH)
- Fresh Air Flow Mass (mg/hub)
- ASMOD EGR rate (%)
- Engine Coolant Temp (deg F)
- Inlet Air/Air Charge Temp (deg F)
- Engine Oil Temp (def F)
- EGR Valve Position (%)
- Engine Torque (Nm)
- Temp Downstream of DPF (deg C)
- Filter Restriction (hPa/(m^3/s))
- Percent Soot Load Regenerated (%)
- Condition of DPF (1 to 7)
- Regen Enable State (value)
- Engine Coordinator State (value)
- Exhaust Back Pressure (hPa)
- Post 1 Fuel Quantity (mg/hub)

Parameter List (Continued)

- Tailpipe NO_x Sensor (ppm)
- UREA Command (mg/sec)
- Mass Fuel Desired (mg/hub)
- Engine Operating Mode (value)
- Throttle Angle (%)
- Low Temp Coolant Temp (deg C)
- Desired EGR Rate (%)
- UREA Tank Level (L)
- Rail_stCtlLoop* (RAM)
- Rail_stCPC* (RAM)
- Regen Request (value)
- Temp Upstream of DPF (deg C)
- Temp Upstream of DOC (deg C)
- IMAP (hPa)
- Temp Downstream of DOC (deg C)
- NH3 Stored in SCR (gm)
- Trans Gear Commanded (value)
- Exh Pressure Upstream of DPF (hPa)
- Distance Between Regens (miles)

- Post 2 Fuel Quantity (mg/hub)

ERG analyzed engine parameters that can potentially affect emissions performance if altered from the designed operating range including:

- EGR (%);
- Total urea consumption;
- Total fuel consumption; and
- Cumulative AFR.

ERG calculated ranges, medians, and cumulative averages/totals for these parameters using Microsoft Excel. For all calculations, ERG excluded all data points logged before the vehicle speed increased from zero at the beginning of testing and all data points after the vehicle speed reached zero at the end of the testing. This was done because the data logger often started logging data immediately after engine start up and not when the actual test cycle commenced (i.e., the vehicle was put into drive). By eliminating the excess data before the vehicle moved and after the vehicle stopped, ERG was able to compare data sets on an equivalent basis (e.g., same length of time).

a. EGR

ERG evaluated the data stream called "ASMOD EGR rate" in order to investigate if the tuner disables the EGR system function. The "ASMOD EGR rate" data stream represents the recirculated exhaust gas flow as a percentage of total intake volume. The ECM calculates this data stream by converting the measured delta pressure to mass flow rate downstream of the EGR cooler just prior to the engine intake. The ECM uses the fresh air and/or total intake mass flow rate to convert this mass flow rate to a percentage of total intake volume.

Ideally, ERG would use the actual EGR valve position data stream, but the Spartan emissions equipment-present calibration defaulted this data stream to zero. Ford confirmed that the ASMD EGR rate provides a valid measurement for approximate EGR flow (see Appendix F).

b. Urea consumption

ERG evaluated the data stream called "Urea Command" in order to investigate if the tuners disable the SCR system function. The "urea command" data streams represent instantaneous urea consumption in mg per second. ERG used Equation 1 to convert the instantaneous rate to cumulative urea consumption for each test.

Equation 1

$$Cumulative\ Urea\ (mg) = \sum \boldsymbol{Urea_{Inst}} \left(\frac{mg}{second}\right) \times \Delta \boldsymbol{Time}$$

Note: Bold values in the equations are data streams as reported in the raw engine data.

c. Cumulative Average AFR and Total Fuel Consumption

ERG used several individual data streams to calculate the cumulative AFR. ERG analyzed AFR because any increase or decrease in AFR from stock will potentially affect emissions. As described below, this included the calculation of cumulative fuel consumption and fresh air flow. ERG specifically evaluated fuel consumption in this report because we expected the tuning devices to alter the fueling rates as opposed to fresh air rates. In addition, a significant increase in AFR is an indicator that the EGR has been turned off because the volume within the cylinder that is typically displaced by recirculated exhaust gas is replaced with fresh air.

Although the raw data did include instantaneous air and fuel flow rates necessary to calculate instantaneous AFR, ERG did not analyze instantaneous AFRs due to potential time lag differences between air and fuel rates.[12] Instead, ERG integrated the instantaneous fuel mass rate ($Fuel_{inst}$) and instantaneous intake air mass flow (Fresh Air_{inst}) across each time increment (ΔTime) to calculate the cumulative air and fuel flow for the entire test cycle and then subsequently calculated the cumulative average AFR. The raw data reported fuel and air flow rate in units of mass per stroke which required conversion to mass per unit time using other data reported. ERG used Equation 2 and Equation 3 to convert the reported fuel and fresh air mass per stroke to cumulative values respectively. These equations convert the reported mass per stroke to mass per unit time and then integrate the instantaneous mass flow rate to calculate the cumulative values for each test cycle. Equation 4 calculates the cumulative AFR using the results from Equation 2 and Equation 3.

Equation 2

$$\begin{aligned} &Cumulative\ Fuel\ (mg) \\ &= \sum \boldsymbol{RPM_{inst}} \left(\frac{revoltions}{ms}\right) \times \boldsymbol{Fuel_{inst}} \left(\frac{mg}{stroke}\right) \times \left(\frac{2\pi}{revolution}\right) \times \left(\frac{180\ degrees}{\pi}\right) \\ &\times \left(\frac{1\ stroke}{720\ degrees/cylinder}\right) \times 8\ (cylinders)\ \times \boldsymbol{\Delta Time} \end{aligned}$$

Equation 3

$$\begin{aligned} &Cumulative\ Air\ (mg) \\ &= \sum \boldsymbol{RPM_{inst}} \left(\frac{revoltions}{ms}\right) \times \boldsymbol{Fresh\ Air_{inst}} \left(\frac{mg}{stroke}\right) \times \left(\frac{2\pi}{revolution}\right) \times \left(\frac{180\ degrees}{\pi}\right) \\ &\times \left(\frac{1\ stroke}{720\ degrees/cylinder}\right) \times 8\ (cylinders)\ \times \boldsymbol{\Delta Time} \end{aligned}$$

Equation 4

$$Cumulative\ AFR\ (kg{:}\,kg) = \frac{Cumulative\ Air\ (kg)}{Cumulative\ Fuel\ (kg)}$$

4. Test Cycle Selection and Test Procedure

EPA's goal for this testing was to evaluate the relative change in emissions from the test vehicle when using modified calibrations installed using the Spartan tuner compared to the stock calibration (i.e., baseline). EPA did not use the FTP75 certification test cycle which incorporates a "cold start" engine operation. Emission levels may vary more significantly during cold start conditions and also require a 12 hour "cold soak" period between tests. Instead, Ford recommended running consecutive test cycles to complete each test in order to compare "hot start" emission levels for each tuner calibration. This allowed the testing to be completed in the limited time available without the need for an extended cold soak period between each test required for cold start. Running consecutive test cycles ensured that at the beginning of the valid test cycle (i.e., the last consecutive test cycle in a test procedure), the vehicle operating conditions (e.g., aftertreatment system temperature, engine oil temperature, coolant temperature) are always the same; thus, providing comparable results test.

The following subsections describe the test cycles performed for the purpose of analyzing the effect of each tuner calibration followed by the specific procedures performed at Ford, respectively. Results from testing are described later in Section 0. Testing was completed using the LA4 and US06 test cycles.

- Section IV.B.4.a describes each test cycle (LA4 and US06) in detail.

[12] A very small time lag (less than a second) can cause an inaccurate instantaneous AFR.

- Section IV.B.4.b describes the specific procedures EPA, ERG, and Ford used to run tests on each tuner calibration at the Ford testing facility the week of 2 December 2013.

a. Test Cycle Descriptions

Table 4 describes the LA4 and US06 test cycles in terms of distance, time, and number of phases within a single test cycle. All information provided in this section about test cycles is publically available on EPA's website.[13]

- LA4: The LA4 test cycle, also known as the Urban Dynamometer Driving Schedule, is designed to mirror city driving conditions simulating frequent starts and stops. The LA4 test cycle has the same speed trace as the FTP72 cycle described in 40 CFR Part 86 Appendixes I (a). Ford stated that the difference between the LA4 test cycle and the FTP72 test cycle is that the FTP72 test cycle requires a 12 hour "cold soak" at 75 degrees Fahrenheit prior to testing.[14] Figure 1 shows the speed trace of a single LA4 test cycle. As shown in Figure 1 and Table 4, each LA4 test cycle has two phases. It is important to note that Ford referred to the LA4 as the FTP4-74. For the purpose of this report, ERG used "LA4" instead of FTP4-74.
- US06: The US06 test cycle, also known as the Supplemental Federal Test Procedure (SFTP), addresses the shortcomings with the Urban Dynamometer Driving Schedule (LA4). It captures aggressive, high speed and/or high acceleration driving behavior, rapid speed fluctuations, and driving behavior following startup. Figure 2 shows the speed trace of a single US06 test cycle which is available in 40 CFR Part 86 Appendixes I (g).

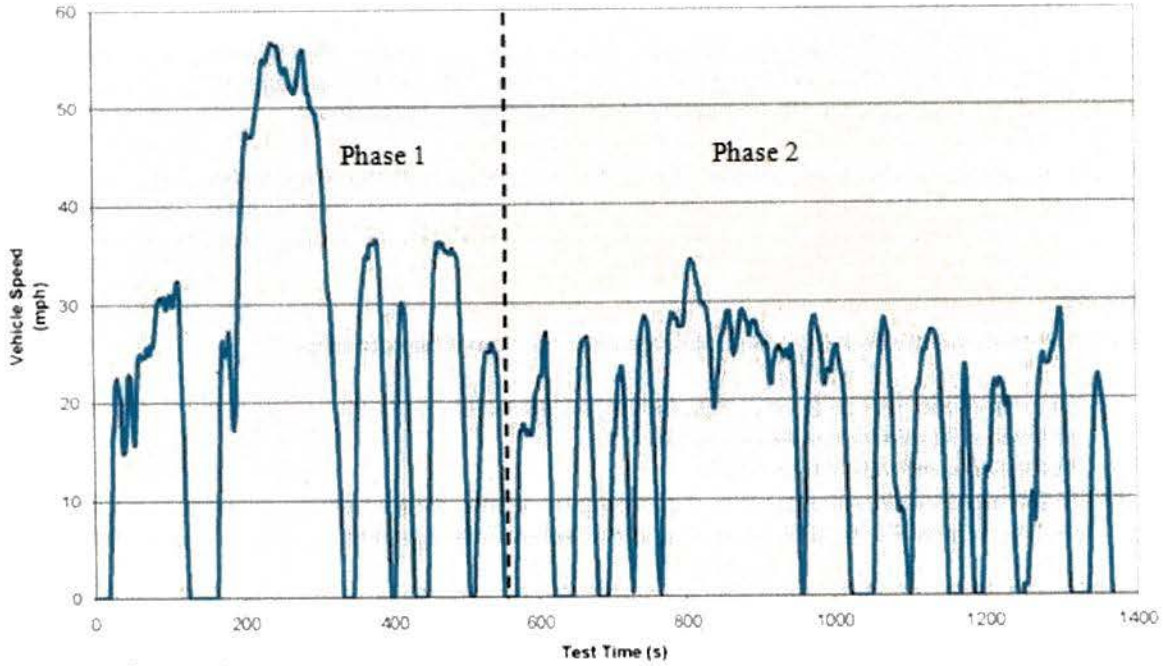
Table 4. LA4 and US06 Test Cycle Descriptions

Test Cycle	Description	Test Cycle Breakdown		
		Phase #	Distance (miles)	Time (seconds)
LA4	Normal city driving	Phase 1 ("cold start")[a]	3.6	505
		Phase 2 ("stabilization phase")	3.9	867
		Total test cycle	7.5	1,372
US06	Hard city and highway driving	Only 1 phase	8.0	600

a – Although this is typically described as a "cold start", it was actually a hot start by the last consecutive LA4 test cycle during each LA4 test at Ford.

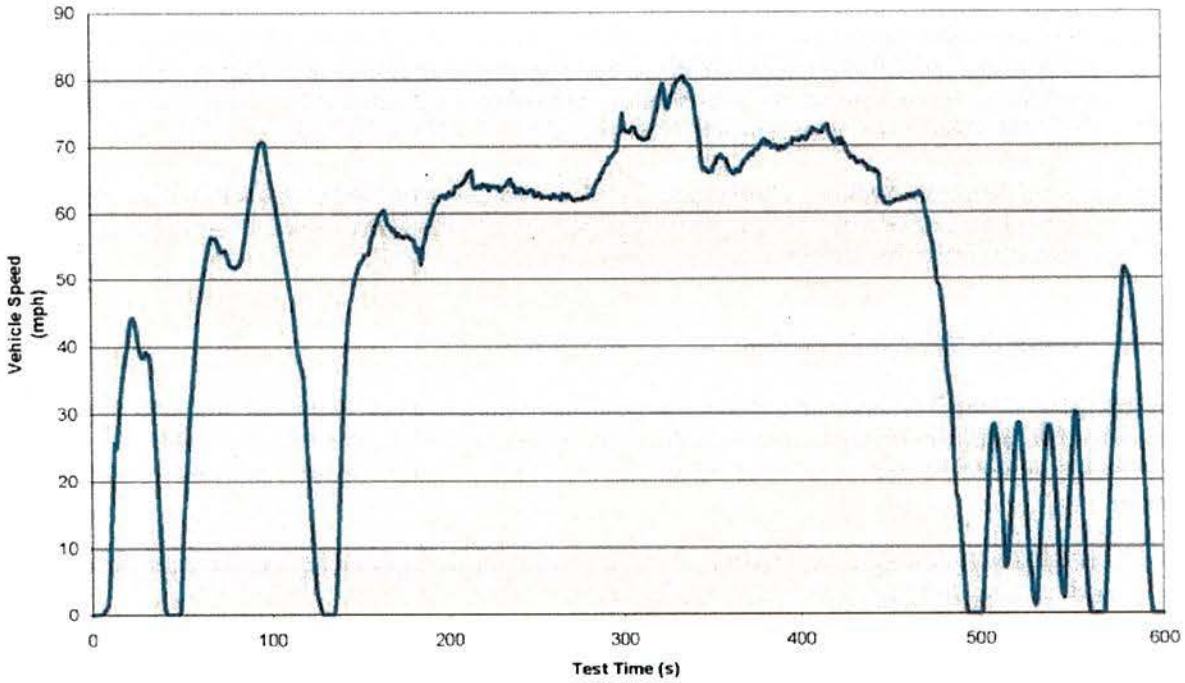
[13] Available online at: http://www.epa.gov/nvfel/testing/dynamometer.htm.

[14] The FTP75 and the FTP72 are two variations of the EPA Urban Dynamometer Driving Schedule. The FTP75 is the successor of the FTP72 and is derived from the FTP72 by adding a third 505 second phase to the test cycle that is identical to the first phase of FTP72. The FTP75 is also described in 40 CFR Part 86 Appendix I (a). Ford verified that the difference between the FTP (72 and 75) and the LA4 is that the FTP certification test cycles require a 12-hour cold soak in a 75°F room prior to running the test which would have limited the number of tests Ford and EPA could run the week of testing (see Appendix F).



Source: EPA (OTAQ)[15]

Figure 1. One LA4 Test Cycle Speed Trace



Source: EPA (OTAQ)[16]

Figure 2. US06 Test Cycle Speed Trace

[15] Available online at: http://www.epa.gov/nvfel/testing/dynamometer.htm.
[16] Available online at: http://www.epa.gov/nvfel/testing/dynamometer.htm.

b. Test Procedures at Ford

Emissions results were only obtained using the LA4 and US06 test cycles. The following describes the procedures followed for each. Note: Asterisks indicate results ERG used for evaluating how each calibration affected engine operation in Section V.B and emissions in Section 0.

For each test, Ford used the same dynamometer calibration settings including an inertia of 11,000 pounds, "Road Load A" of 53.79 pounds, "Road Load B" of -0.6331 pounds, and "Road Load C" of 0.05883. Each test Ford performed used the same fuel identified as "DIES_720-A" in the raw result files.

LA4 Tests

For each calibration tested on the LA4, Ford completed the following procedure:

1. Performed one LA4 test cycle when the engine was cold
2. Allowed a 10 minute engine off period
3. Performed a second LA4 test cycle
4. Performed a third LA4 test cycle. A short engine-on idle period occurred between Steps 3 and 4 above, as specified in the FTP speed trace, at the end and beginning of each LA4 test cycle.*

As recommended by Ford, ERG only used the third LA4 test cycle result as the valid result for comparing results in Section V.B. This ensures that the vehicle's engine and emission control devices were at "steady state" operating temperature at the beginning of each third and valid test.

US06 Tests

For each calibration tested on the US06, Ford completed the following procedure:

1. Performed one US06 test cycle.
2. Performed a second consecutive US06 test cycle immediately after Step 1. This inherently included a short engine-on idle period following the first US06 test cycle in Step 1, as specified in the US06 speed trace, at the end and beginning of each US06 test cycle.*

ERG only used the result from this second cycle for evaluating how each calibration affected emissions in Section 0. This ensures that the vehicle's engine and emission control devices were at "steady state" operating temperature at the beginning of each second and valid test cycle.

V. EMISSIONS TESTING RESULTS

The following subsections summarize the results and observations from the emissions testing at Ford including OBD data observations, analysis of live engine data, and measured emissions. Table 5 summarizes some of the key functions of the Spartan 6.7L Phalanx tuner that ERG confirmed during this testing.

- Section V.A describes observations of general diagnostic information reported through the OBD before and after tuner calibration installation;
- Section V.B describes Bosch's analysis of the modifications made by the Spartan tuner in the emissions equipment-present calibration;
- Section V.C describes ERG's analysis of live engine data obtained during the testing; and
- Section 0 describes the measured emissions results.

Table 5. Summary of Spartan 6.7L Phalanx Tuner Capabilities

Parameter	Comment
Number of vehicles tuner can be installed on	One, unless a second license is purchased
Capable of defeating EGR when EGR system is not physically removed?	Yes
Capable of defeating EGR when EGR system is physically removed?	Yes
Capable of defeating aftertreatment system when physically removed?	Yes

A. OBD Scan Tool Data Observations

As described in Section IV.B.2, before and after installation of each Spartan calibration, ERG immediately removed the tuner, connected an OBD II scan tool[17] to the OBD II DLC on the test vehicle, and obtained vehicle data. ERG observed DTCs, the status of the MIL, Cal ID[18], and CVN. [19] After each emissions test, ERG returned the ECM to stock and observed the same data streams. Table 6 shows the data obtained through the OBD DLC after each set of tests. It is important to note that when a tuner is unplugged, the most recent calibration remains installed on the ECM along with any software modifications.

1. Cal ID and CVN

Observations in Table 6 show that the Spartan tuner altered the Cal ID name when installing a modified calibration. Additionally, the observed CVN changed from the stock CVN after installing all Spartan calibrations confirming that the tuner modified engine data maps in some way. For all calibrations, the observed Cal ID and CVN matched the certified values after returning the ECM to stock, verifying that the each tuner successfully returns the ECM to its stock calibration with no obvious trace of modification.

2. DTCs and MIL

Observations in Table 6 show that:

- Emission equipment-present calibrations: For both tuners, after installing emissions equipment-present calibrations and starting the engine, the OBD II scan tool reported the MIL as "off" and no DTCs were present. Ford verified that none of the emissions equipment-present calibrations should have triggered a DTC or the MIL.

- Emission equipment-removed calibrations: Ford stated that with the aftertreatment systems removed, the OBD should immediately trigger DTCs, illuminate the MIL, and derate the engine if started with a stock calibration. After each of the emissions equipment-removed calibrations were installed, no DTCs were triggered and the MIL status was always "off" indicating that all tuners deliberately disable functions of the OBD.

[17] The OBD scan tool was an AutoXray ® 4000.
[18] The Cal ID represents the software version, which includes the engine data maps.
[19] The CVN is the result of a 'check-sum' calculation performed by the OBD system using the engine data maps as inputs. If the data values have not been changed or corrupted, the CVN will always provide the same sum for a given Cal ID. If the ECM has been modified or corrupted any of the calibration values, the CVN calculation will generate an incorrect 'sum'.

Table 6. OBD Scan Tool Observations During Emissions Testing at Ford with Spartan 6.7L Phalanx Tuner

Calibration	MIL Status	DTC Count	Cal ID 1 (Calibration Name)	Cal ID 2 (Cal ID)	CVN 1	CVN 2
Stock[a]	Off	0	DDBN3C3.H32	BC3A-14D609-AD[20]	33EC57FE	183EA76D
Emissions Equipment-Present[b]	Off	0	SPRTENG.H32	BC3A-12B533-AD	1B828E73	183EA76D
Returned to Stock[c]	Off	0	DDBN3C3.H32	BC3A-14D609-AD[20]	33EC57FE	183EA76D
Emissions Equipment-Removed[d]	Off	0	SPRTENG.H32	BC3A-12B533-AD	C50A6DD6	183EA76D
Returned to Stock[e]	Off[f]	0	DDBN3C3.H32	BC3A-14D609-AD[20]	33EC57FE	183EA76D

A –This OBD data was observed prior to any testing. Ford verbally confirmed the week of 2 December 2013 these are the stock CVNs for these Cal IDs.
b – This OBD data was observed after each ECM was calibrated to the emissions equipment-present calibration.
c – This OBD data was observed after each ECM was returned to its stock calibration immediately after emissions equipment-present testing.
d – This OBD data was observed after each ECM was calibrated to the emissions equipment-removed calibration.
e – This OBD data was observed after each ECM was returned to its stock calibration immediately after emissions equipment-removed testing.
f – To prevent potential engine damage, ERG did not start the engine at this time because the ECM was returned to stock and the aftertreatment system was still removed. According to Ford, starting the engine with the stock ECM would result in engine derating.

[20] The stock ECM Ford provided had two calibrations: Cal ID 1: BC3A – 14C204-FAA and Cal ID 2: DDBN3C3.H32. However, EPA's scan tool read the first calibration slightly different as BC3A-14D609-AD. For the purpose of this testing, ERG assumed BC3A-14D609-AD is equivalent to the stock calibration reported by Ford. The second observed calibration matched the second calibration reported by Ford: DDBN3C3.H32.

B. Evaluation of Spartan Calibration Modifications

On 6 December 2013, ERG left the Spartan emissions equipment-present calibration installed on the ECM of the Ford F-350 (with a 6.7 Liter Ford Powerstroke engine) that ERG, EPA, and Ford tested. Bosch, Ford's ECM supplier, compared the stock calibration file against the Spartan calibration file using OEM proprietary software. Appendix D provides the raw results as reported to ERG by Ford after the testing.

Table 7 summarizes the engine data map parameters that the Spartan tuner calibration altered as reported by Bosch. Asterisks indicate parameters that are of concern in respect to emissions. In addition to observing the alterations to data maps described in Table 7, Bosch/Ford also observed changes to data stream label names in the calibration. Appendix D also provides a complete list of the data streams where the label name was altered.

Table 7. Summary of Spartan Pro Emissions equipment-present Calibration File Compare by Bosch

Parameter	Observed Changes in Calibration
Fuel quantity*	Increases
Rail pressure*	Increases
Smoke limit*	Allows lower air-to-fuel-ratio (fuel rich)
Fuel injection timing*	Advanced timing by 5 degrees at higher torque demands
Compoent protection[a]	Increased T3 limit from 800 to 900 DegC
Driver demand	Moved to upper bounds
Disable codes	VID Block
Max engine speed	Moved from 3,800 to 4,000
Engine protect	Moved torque and fuel to max allowed
Max vehicle speed	Moved to max allowed

Source – Provided by Ford/Bosch (Appendix D)
* - indicate parameters that are of concern in respect to emissions.
a - The summary ERG received from Ford reported "Compoent" but it was likely meant to be "component".

C. Live Engine Data

Table 8 summarizes observed changes in live engine data streams during emission tests in comparison to the baseline tests by tuner and calibration type. Table 9 presents the values ERG calculated for the live engine data logged by Ford for each Spartan calibration type compared to baseline. Due to the lack of duplicate tests, ERG was unable to determine typical repeatability/variability for these data streams. Despite having no duplicate data logger results, it is reasonable that some of the changes observed in Table 9 are statistically measureable. These changes are highlighted red in Table 8 and Table 9. It is possible that the other changes in Table 8 and Table 9 are also statistically measureable, but there are no duplicate results to confirm. These changes are highlighted yellow in Table 8 and Table 9.

Table 8. Summary of Live Engine Data Observations at Ford Directly Related to Emissions

Calibration Type	Observed Changes
Emissions equipment-present	• Fuel injection timing advanced[a]
	• Urea consumption increased
Emissions equipment-removed	• EGR eliminated • Urea consumption eliminated • Cumulative AFR increased significantly because of elimination of EGR
	• Fuel consumption decreased

Red – Large changes from baseline (based on engineering judgment)
Yellow – Potential changes from baseline (based on engineering judgment)
a – Live fuel injection timing data was not recorded by Ford or analyzed by ERG. However, Bosch, Ford's ECM supplier, analyzed the Spartan emissions equipment-present calibration engine maps as explained in Section V.B. Bosch's analysis confirmed that fuel injection timing is advanced by 5 degrees at higher torque demands.

Table 9. Results of ERG's Analysis of Live Engine Data Recorded by Ford Directly Related to Emissions

Parameter	Value Type	Baseline	Emissions Equipment-Present	Emissions Equipment-Removed
EGR Air System Model (%)	Range	0 – 54	2 – 55	0 - 20
	Median	37	38	0
Urea (g)	Total	17	22	0
Fuel (kg)	Total	1.72	1.72	1.52
AFR (kg/kg)	Cum. Average	30	31	55

Red – Large changes from baseline (based on engineering judgment)
Yellow – Potential changes from baseline (based on engineering judgment)

D. Measured Emissions Results

The following sections summarize the results from emissions testing at Ford's testing facility using an engine dynamometer the week of 2 December 2013. Ford measured NO_x, PM, CO, NMHC, and fuel economy for each the two Spartan calibrations on the US06 and LA4 tests. For CO and NO_x, Ford provided both system out (SO) values, which represents tailpipe emissions, and engine out (EO) values, which represents emissions prior to aftertreatment. Ford was able to estimate the EO emissions by inserting a probe immediately downstream of the turbo charger, prior to aftertreatment. EO results represent modal measurements and SO results represent bag measurements. EO values were not measured for PM and NMHC or when emission equipment was removed because the section of the exhaust system that contained the probe was removed in order to install the aftertreatment delete pipe.

The emissions results are organized in the following two subsections as follows:

- Section V.D.1 provide the results from the baseline LA4 test, emissions equipment-removed LA4 test, and emissions equipment-present LA4 test; and
- Section V.D.2 provides the results from the duplicate baseline US06 tests, emissions equipment-removed US06 test, and emissions equipment-present US06 test.

1. LA4 Test Results

Ford conducted one LA4 test for both Spartan calibrations in addition to one baseline LA4 test. Table 10 present the test results for NO_x, PM, CO, NMHC, and fuel economy for the LA4 tests categorized calibration type.

Red highlighted results – The red highlighted results shown in Table 10 are large increases over the baseline results. This includes all measured emissions for all tuners when emissions equipment was removed ranging from approximately 4,000 to 114,000 percent. The statistical significance of these increases was not determined since replicate emissions measurements during LA4 testing were not available.

Yellow highlighted result – The yellow highlighted results shown in Table 10 are all potential increases measured over the baseline result and include any increase over baseline. The statistical significance of these increases was not determined since duplicate test results or historical variability data for the LA4 test cycle with this engine family are not available.

Table 10. LA4 Test Results for Model Year 2011 6.7 Liter Ford Powerstroke at Ford with the Spartan 6.7L Phalanx

Test Scenario	EO NOx		SO NOx		SO NMHC		EO CO		SO CO		PM		Fuel Economy	
	Result (g/mi)	% Diff[a]	Result (g/mi)	% Diff[a]	Result (g/mi)	% Diff[a]	Result (g/mi)	% Diff[a]	Result (g/mi)	% Diff[a]	Result (g/mi)	% Diff[a]	Result (mpg)	% Diff[a]
Baseline	1.036	--	0.0303	--	0.0005	--	5.384	--	0.0255	--	0.0017	--	13.16	--
Equip-Present[b]	1.087	5	0.0579	91	0.0005	0	5.035	-6	0.0269	5	0.0025	47	13.54	3
Equip-Removed[c]	--[d]	--[d]	10.5344	34,667	0.5678	113,460	--[d]	--[d]	3.3177	12,911	0.0649	3,718	14.58	11

EO – Engine out
SO – System Out (tailpipe)
Red – Large increase from baseline (based on engineering judgment)
Yellow – Potential increase from baseline (any increase)
a – Percent difference of the result compared to baseline (or stock OEM). Negative values represent decreases. Positive values represent increases.
b –Emissions equipment-present calibration
c –Emissions equipment-removed calibration
d – No EO data was available when emission equipment was removed.

2. US06 Test Results

Ford conducted one US06 test for the Spartan emissions equipment–present calibration in addition to two (i.e., duplicate) baseline US06 tests with a stock calibration. This section is further divided into two parts:

- Section V.D.2.a summarizes all test results with the tuners installed compared to baseline test results; and
- Section V.D.2.b summarizes the duplicate baseline test results and how ERG used them to identify which results were measureable in Section V.D.2.a.

a. US06 Test Results

Table 11 present results for NO_x, PM, CO, NMHC, and fuel economy for the US06 tests.

Red highlighted results – The red highlighted results shown in Table 11 are statistically significant increases over the mean baseline result. These results include the EO and SO CO. For the purpose of US06 test results only, ERG classified these results as significant using the statistical analysis described in Section V.D.2.b. Specifically, ERG determined red highlighted results using Equation 8 in Section V.D.2.b and the more conservative assumption that variability increases relative to the measured test result magnitude (i.e., log scale).[21]

Yellow highlighted result – The yellow highlighted PM result for the emission equipment-present calibration shown in Table 11 is a potential increase over the mean baseline PM result. ERG classified this result as such using the statistical analysis described in Section V.D.2.b. Specifically, ERG determined yellow highlighted results using Equation 8 in Section V.D.2.b and the less conservative assumption that variability does not increase relative to the measured test result magnitude (i.e., absolute scale).[22]

[21] The assumption that variability increases relative to the measured test result magnitude was made by conducting this statistical analysis on the natural logs of the measured emissions values.
[22] Conducting this statistical analysis on a regular (i.e., non-log) scale is less conservative and assumes that variability of measurements does not increase relative to the measured result.

Table 11. US06 Test Results for Model Year 2011 6.7 Liter Ford Powerstroke at Ford with the Spartan 6.7L Phalanx

	EO NOx		SO NOx		SO NMHC		EO CO		SO CO		PM		Fuel Economy	
Test Scenario	**Result (g/mi)**	**% Diff[c]**	**Result (g/mi)**	**% Diff[c]**	**Result (g/mi)**	**% Diff[c]**	**Result (g/mi)**	**% Diff[c]**	**Result (g/mi)**	**% Diff[c]**	**Result (g/mi)**	**% Diff[c]**	**Result (mpg)**	**% Diff[c]**
Mean baseline[a]	3.621	--	1.6053	--	0.0060	--	2.823	--	0.0096	--	0.0012	--	12.06	--
Equip-Present[b]	3.118	-14	1.2191	-24	0.0012	-80	4.205	49 (8.6)[e]	0.4550	4,664 (111)[e]	0.0072[d]	526 (5.0)[e]	12.14	1

EO – Engine Out

SO – System Out (tailpipe)

Red – Statistically significant increase from baseline using Equation 8 (see Section V.D.2.b) and the assumption that variability increases on a log scale in respect to the measured test result magnitude (i.e., log scale).

Yellow – Potential increase from baseline using Equation 8 (see Section V.D.2.b) and the assumption that variability does not increase in respect to the measured test result magnitude (i.e., absolute scale).

a – This is the mean value of the two duplicate US06 baseline tests. See Section V.D.2.b for more information.

b –Emissions equipment-present calibration

c – Percent difference of the result compared to baseline (or stock OEM). Negative values represent decreases. Positive values represent increases.

d –As described in Section IV.B, Ford stated the results from second consecutive US06 test cycle during each US06 test should be considered the valid result. Due to a procedural reporting error, this test result was inadvertently reported as the Phase 1 result rather than the Phase 2 result. However, Ford confirmed after the testing that this test result was, in fact, for Phase 2 (see Appendix F).

e – Values in parenthesis represent the increase in terms of number of standard deviations over the mean baseline result. Additional statistical data for duplicate baseline tests are shown in V.D.2.b.

b. Duplicate US06 Baseline Test Results

Replicate measurements can be used to estimate the statistical significance of differences in the emissions measurements as a consequence of modifying the stock calibration through the use of the tuners. Ideally, replicate measurements would be made for both the baseline and the modified configurations. However, due to logistics, replicate test results were only obtained for the US06 baseline test with the stock calibration and not when the ECMs were modified using the tuners. Therefore, variability is unknown when the ECMs were in a "tuned" state.

An alternative approach to collecting actual replicate measurements for the modified calibrations is to make an assumption about how the variability is related to the magnitude of the observed measurement. Two options that may be used include: 1) assume the magnitude of the measurement variability is the same for all configurations regardless of the measured value (absolute variability), and 2) assume the magnitude of the measurement variability increases as the magnitude of emissions increases (relative variability). ERG analyzed the significance of US06 test results using both options:

- Option 1: ERG classified a measured result in Table 11 as a potential increase from baseline (yellow highlight in Table 11) if it passes the statistical test described below without using a natural log scale. This is less conservative than option 2 and assumes that variability of measurements does not increase relative to the measured result. For example, this assumes that the 0.004 grams per mile standard deviation for CO calculated for the baseline US06 test would be exactly the same on the US06 test when the ECM is calibrated with one of the tuners despite the fact that the measured CO increased by up to 7,000 percent over baseline.
- Option 2: As explained in Section V.D.2.a, ERG only classified a measured US06 test result as a significant increase from baseline (red highlight in Table 11) if it passed the statistical test described below on a natural log scale. On a natural log scale, the criterion for determining if an increase is statistically significant becomes more stringent. Conducting this statistical analysis on a log scale conservatively assumes that the variability of measurements increases relative to the measured result.

ERG used the statistical test called the "one-sided t-test"[23] to determine if the measured increase is statistically greater than the mean baseline. For each measured parameter, ERG completed the following procedure:

1. ERG used Equation 5 to calculate the relative percent difference of the base results. Note that this value is not used in any subsequent calculations and is shown for context.
2. ERG used Equation 6 to calculate the standard deviation of the baseline results. For this analysis, the number of samples (n) is equal to 2. The t value ($t_{0.95}$) is equal to 6.314 for a sample size of 2.[24]
3. ERG used Equation 7 to calculate a criterion, defined as μ, based on the number of baseline samples and the standard deviation of the mean baseline results.
4. ERG determined if Equation 8 was true using the measured test result with the tuner installed (m_i) and the calculated criterion for significance (μ) using the duplicate baseline results. If the result of Equation 8 was true, ERG determined that the measured test result was statistically greater than the mean baseline test result. These results are shown in Table 11 as red or yellow highlights.

[23] Test procedure from National Bureau of Standard's *Experimental Statistics* (August 1, 1963).

[24] It is important to note that as the number of samples increases $t_{0.95}$ becomes less stringent. For example, if the number of duplicate test results increases from two to three, $t_{0.95}$ decreases from 6.314 to 2.920.

Equation 5

$$Relative\ Percent\ Difference = \frac{|x_1 - x_2|}{\bar{x}}$$

Equation 6

$$SD = \sqrt{\frac{\Sigma\,(x_i - \bar{x})^2}{(n-1)}}$$

Equation 7

$$\mu = t_{0.95} \times \frac{SD_i}{\sqrt{n}}$$

Equation 8

$$m_i - \bar{x} > \mu$$

Where:
μ = criterion for significance
$t_{0.95}$ = t value for 95 percent confidence
n = number of duplicate baseline results
SD_i = Standard deviation of the duplicate baseline results for each parameter
x_1 = 1st baseline result
x_2 = 2nd baseline result
x_i = individual baseline result
$\bar{x}$ = the mean baseline result
m_i = measured parameter result of sample "i" with tuner calibration installed (these results are tabulated in Table 11)

Table 12 provides the results for the two US06 baseline tests in grams per mile along with the calculated mean, the standard deviation of the two US06 baseline test results, and the standard deviation of the baseline results. To allow an examination of significant differences under the assumption that variability increases relative to the measured result, Table 13 provides the same statistics as Table 12 on a natural log scale.

Table 12 Results for Duplicate US06 Baseline Tests (Absolute Scale)

Parameter	X_1, 1st US06 Baseline Test Result (g/mile[a])	X_2, 2nd US06 Baseline Test Result (g/mile[a])	Relative Percent Difference (%)	$\bar{x}$, Mean US06 Baseline Test Result (g/mile[a])	SD_i, Standard Deviation of Duplicate Test Results (g/mile[a])	μ, Criterion for Significance (g/mile[a])
EO NOx	3.461	3.781	9%	3.621	0.2263	1.010
SO NOx	1.556	1.655	6%	1.605	0.0701	0.3129
SO NMHC	0.0068	0.0051	29%	0.0060	0.0012	0.0054
EO CO	2.937	2.709	8%	2.823	0.1612	0.7198
SO CO	0.0067	0.0124	60%	0.0096	0.0040	0.0180
SO PM	0.0003	0.0020	148%	0.0012	0.0012	0.0054
Fuel Economy (mpg)	12.17	11.94	2%	12.06	0.1650	0.7368

a – Unless otherwise noted.

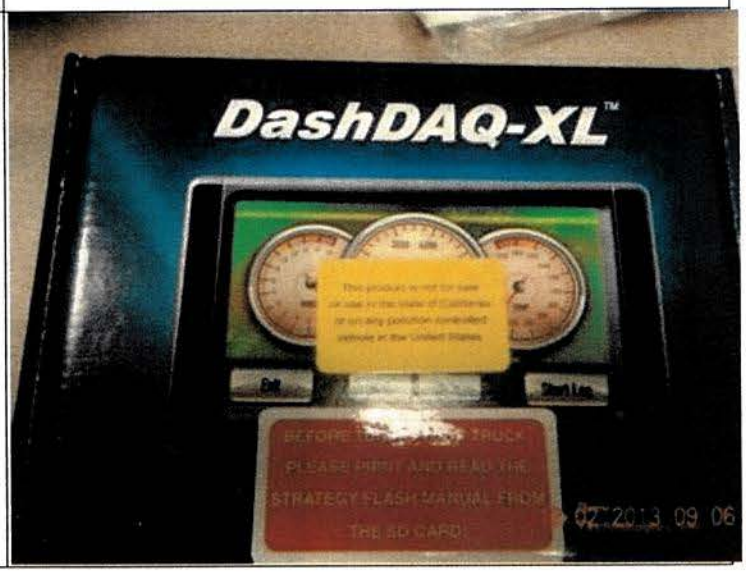
Table 13. Results for Duplicate US06 Baseline Tests (Log Scale)

Parameter	X_1, Log of 1st US06 Baseline Test Result (g/mile[a])	X_2, Log of 2nd US06 Baseline Test Result (g/mile[a])	Relative Percent Difference (%)	$\bar{x}$, Mean US06 Baseline Test Result (g/mile[a])	SD_i, Standard Deviation of Duplicate Test Results (g/mile[a])	μ, Criterion for Significance (g/mile[a])
EO NOx	1.242	1.330	7%	1.286	0.0625	0.2792
SO NOx	0.4419	0.5037	13%	0.4728	0.0437	0.1950
SO NMHC	-4.991	-5.279	6%	-5.135	0.2034	0.9082
EO CO	1.077	0.9966	8%	1.037	0.0571	0.2551
SO CO	-5.006	-4.390	13%	-4.698	0.4353	1.943
SO PM	-8.112	-6.215	26%	-7.163	1.342	5.989
Fuel Economy (mpg)	2.500	2.480	1%	2.490	0.0137	0.0611

a – Unless otherwise noted.

APPENDIX A
PHOTOGRAPH LOG

PHOTOGRAPH #: 1	
TAKEN BY: A. Stanard	**SITE LOCATION:** ERG Austin, Texas Office
DATE TAKEN: 9/19/2013	
COMMENTS: Spartan Phalanx tuner box as received from Rudy's Diesel.	

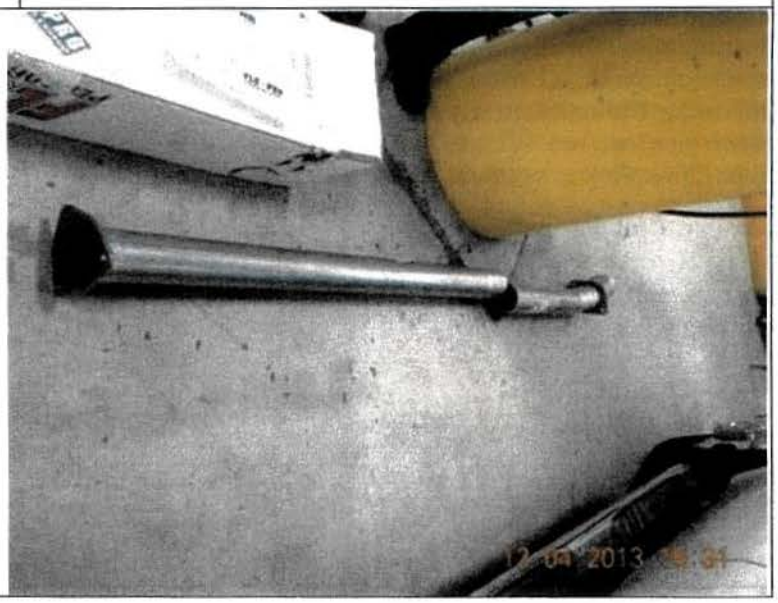
PHOTOGRAPH #: 2	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Front of the Spartan Phalanx box showing several disclaimers.	

PHOTOGRAPH #: 3	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Label observed on the Spartan Phalanx box exterior showing the unit serial number.	

PHOTOGRAPH #: 4	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Flo-Pro aftertreatment delete kit as received from USA Performance at Ford Testing Facility.	

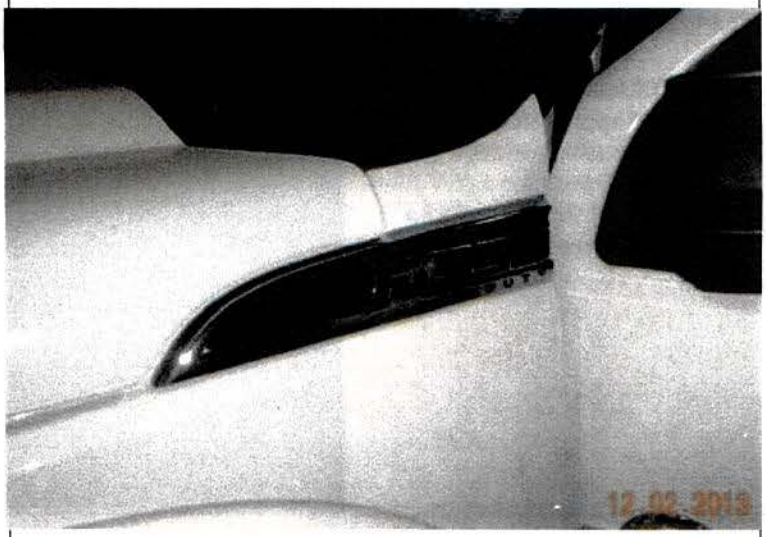
PHOTOGRAPH #: 5	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Label on the Flo-Pro aftertreatment delete kit received from USA Performance indicating that the aftertreatment delete pipe received is for the 6.4 Liter Powerstroke, not the 6.7 Liter.	

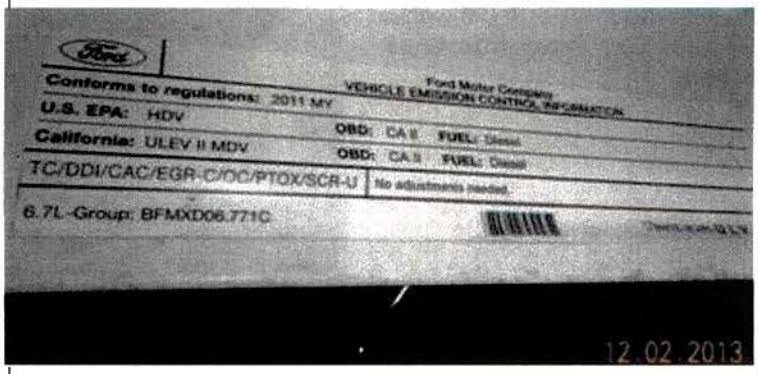
PHOTOGRAPH #: 6	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Flo-Pro aftertreatment delete kit as received from Wolf Diesel Performance.	

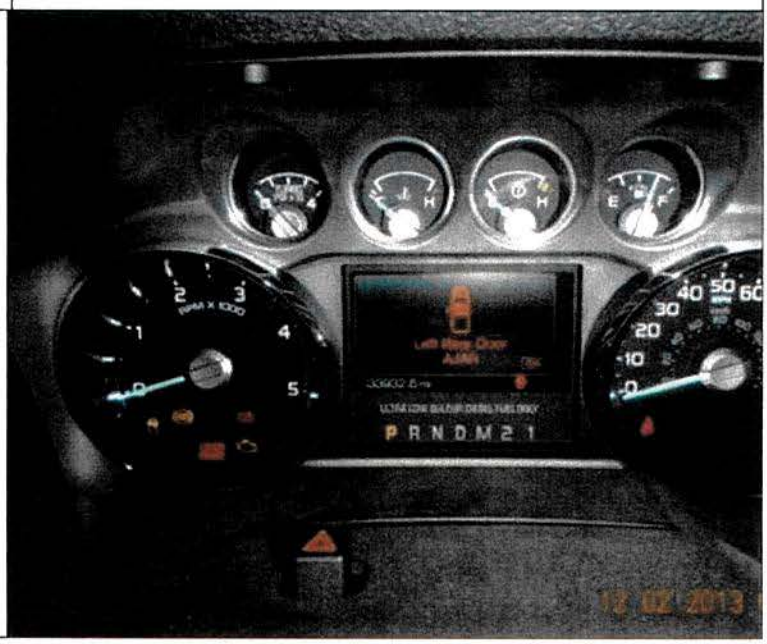
PHOTOGRAPH #: 7	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Flo-Pro aftertreatment delete kit out of the box.	

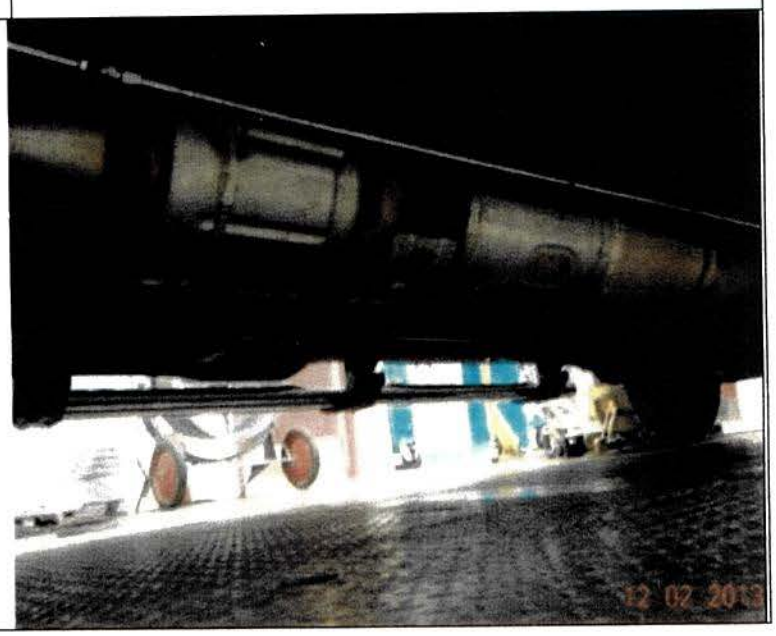
PHOTOGRAPH #: 8	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Label observed on the Flo-Pro box exterior showing Wolf Diesel Performance and the original supplier, Thunder Diesel, located in Mountain Home, Arkansas.	

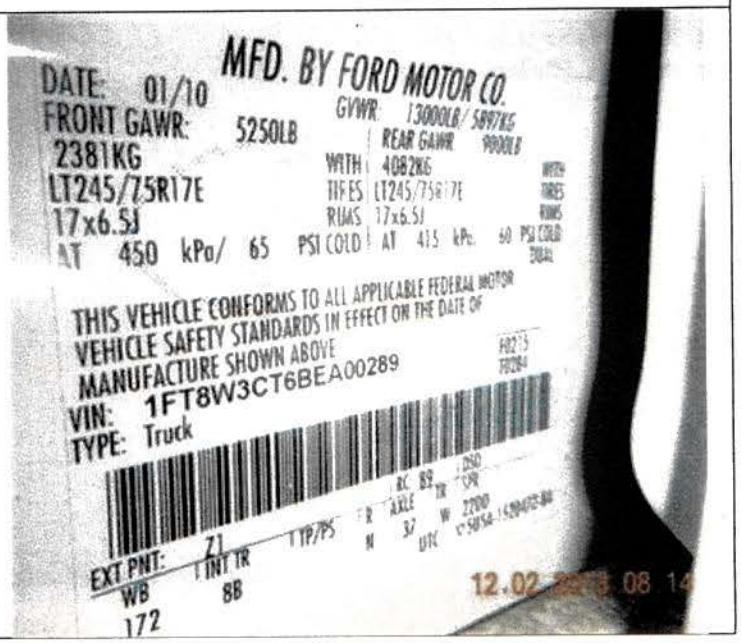
PHOTOGRAPH #: 9	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Overview of the test vehicle at Ford on the dynamometer (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine).	

PHOTOGRAPH #: 10	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Close up of the test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine) showing the chassis model.	

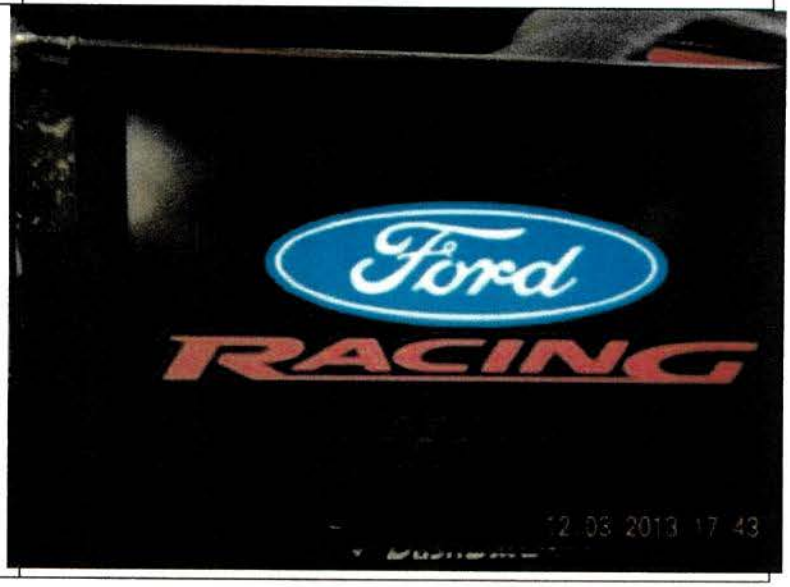
PHOTOGRAPH #:	11
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Vehicle emission control information (VECI) label on test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine).	

PHOTOGRAPH #:	12
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Odometer reading on test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine) prior to any testing. 33,932.6 miles. Note: Ford stated that the actual vehicle had approximately 34,000 miles but the aftertreatment system had only been used for 4,000 miles prior to testing. Ford installed a new aftertreatment system prior to testing.	

PHOTOGRAPH #: 13	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: OEM after treatment system on test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine). The system includes three catalysts: OC (left), SCR (middle), and DPF (right).	

PHOTOGRAPH #: 14	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Label on the vehicle chassis on the test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine).	

PHOTOGRAPH #:	15
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: VIN of test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine) visible through the bottom of the front windshield.	

PHOTOGRAPH #:	16
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/3/2013	
COMMENTS: Screen shot of the Spartan 6.7L Phalanx turning on.	

PHOTOGRAPH #: 17	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Screen shot of Spartan 6.7L Phalanx showing "off-road" disclaimer that appears immediately after turning on the device.	

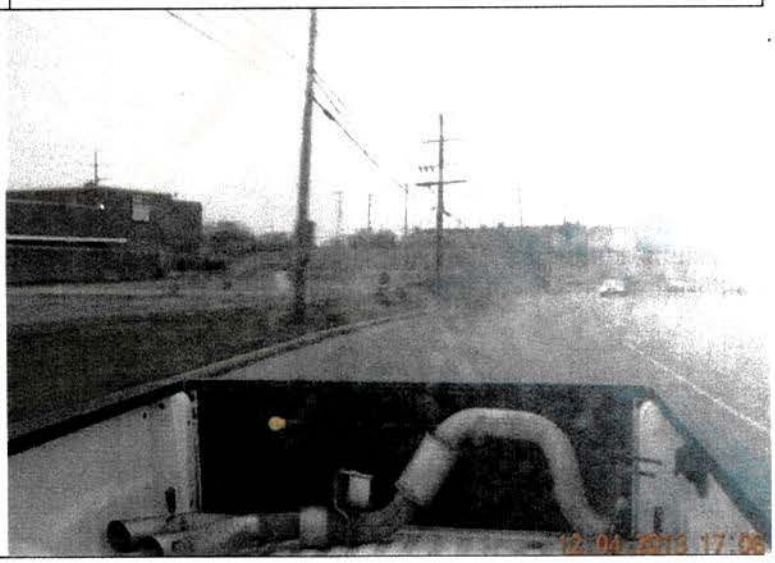
PHOTOGRAPH #: 18	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Main menu options on the Spartan 6.7L Phalanx.	

PHOTOGRAPH #: 19	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/2/2013	
COMMENTS: Screen shot of the Spartan 6.7L Phalanx showing the calibration selected for emission equipment-present testing.	

PHOTOGRAPH #: 20	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Screen shot of the Spartan 6.7L Phalanx showing the calibration selected for emission equipment-removed testing. ERG installed this calibration on 4 December 2013, the day prior to testing. It was installed immediately before Ford installed the Flo-Pro aftertreatment delete kit on 4 December 2013.	

PHOTOGRAPH #: 21	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Flo-Pro aftertreatment delete pipe installed onto the test vehicle at Ford (2011 F-350 with a 6.7 Liter Ford Powerstroke diesel engine) prior to conducting emission equipment-removed testing for the Spartan emissions equipment-removed calibration.	

PHOTOGRAPH #: 22	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Black smoke generated by test vehicle after installing the Flo-Pro aftertreatment delete kit and an emission equipment-removed calibration using the Spartan 6.7L Phalanx tuner.	

PHOTOGRAPH #: 23	
TAKEN BY: B. Ruminski	**SITE LOCATION:** Ford Testing Facility
DATE TAKEN: 12/4/2013	
COMMENTS: Black smoke generated by test vehicle after installing the Flo-Pro aftertreatment delete kit and an emission equipment-removed calibration using the Spartan 6.7L Phalanx tuner.	

APPENDIX B
SPARTAN TUNER PURCHASE MEMORANDUM

ERG

MEMORANDUM

TO: Anne Wick, US EPA

FROM: Alan Stanard, ERG

SUBJECT: Summary of purchase of Spartan Phalanx Tuner

DATE: September 30, 2013

Research, Communication and Purchase of Spartan Tuner

Under Contract #EP-W-12-007 Technical Direction 45, EPA directed ERG to research and purchase a Spartan Phalanx Diesel Tuner that was advertised as having exhaust gas recirculation (EGR)/diesel particulate filter (DPF) delete features. ERG identified three companies that indicated they sold the Phalanx Tuner on their websites: Rudy's Diesel Performance (www.rudysdiesel.com), Xtreme Diesel Power (http://www.xtremediesel.com), and Performance Truck Products (performancetruckproducts.com). EPA indicated that ERG should choose a Phalanx Tuner that would work with a MY 2011- MY 2014 Ford F-250 or F-350 with a 6.7 L engine. The websites of all three retailers offered the Phalanx for the 6.7 L Ford at prices within two percent of each other.

Communication with Supplier

EPA directed ERG that Rudy's Diesel was the preferred vendor for this unit. ERG called Rudy's and asked the sales representative a few questions about the tuner and the purchase process. The representative indicated that the device could allow an EGR/DPF delete. A VIN would not be needed at the time of purchase, but the tuner would permanently associate with the truck it was first installed on. In order to install the unit on another truck, the user would need to purchase another license from Spartan Tuners.

Purchase of Tuner

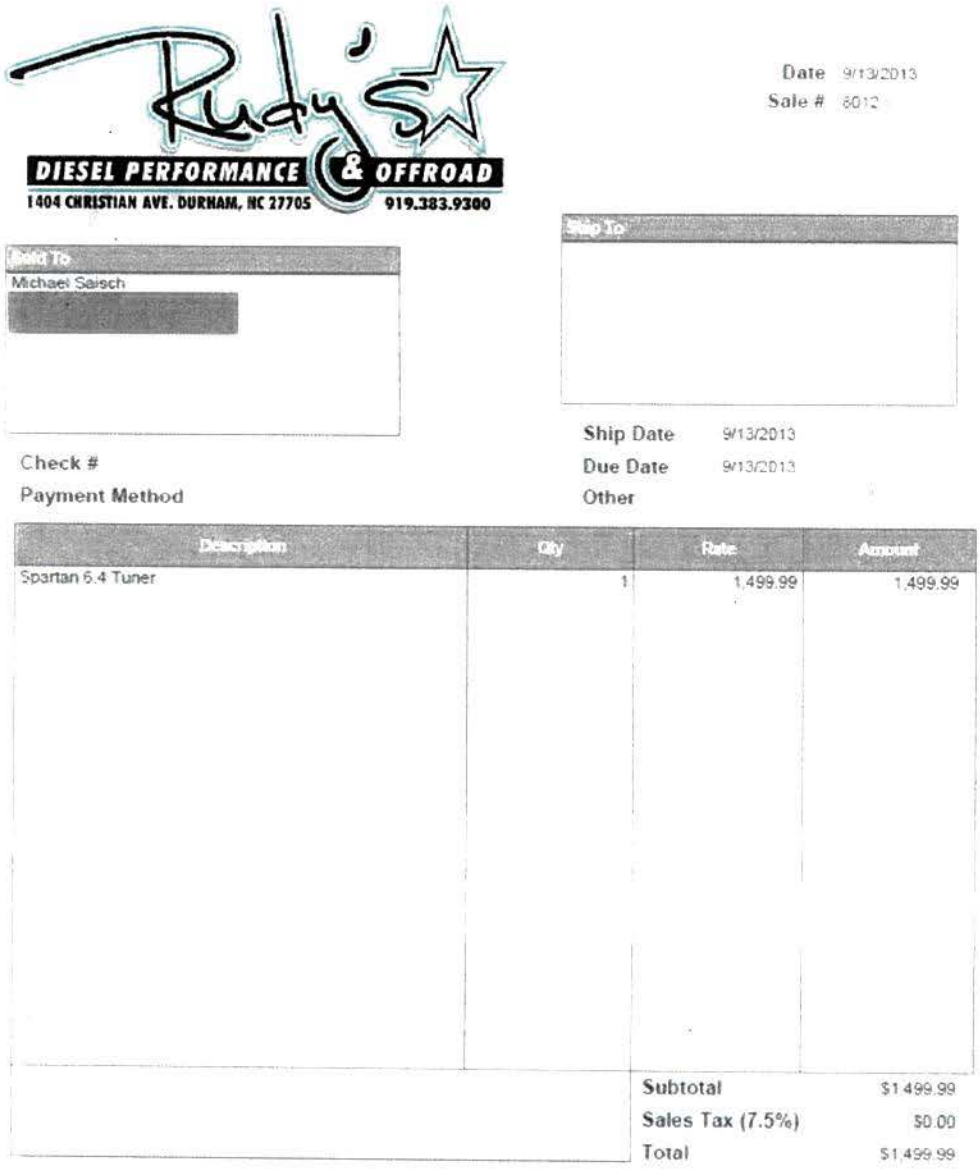
Figure 1 shows the page for the Phalanx Tuner on the Rudy's Website. Note that there are five pull-down menus that include optional extras to be purchased with the tuner. The last two options for EGR Cooler Delete/EGT Probe Mount and Mounting Solution cannot be declined by the user as a result of the way the menus are designed.

Figure 2 shows the screen capture displayed after selecting to buy the Spartan Tuner and includes the two forced optional extras (EGR Cooler Delete and EGT Probe Mount). ERG did not want to incur the extra expense of these devices give that they may not be beneficial to EPA, and so chose to order the tuner via telephone. Via the telephone, the sales representative did not require the purchase of the optional extras. ERG ordered the tuner on September 13, 2013.

The total purchase price without the optional extras was $1,499.99. The sales receipt was received promptly from Rudy's Performance and is presented in Figure 3. Note that there was some confusion on the part of the sales representative on whether the tuner was for the 6.7 L Ford or the 6.4 L Ford. ERG clearly indicated that the desired tuner was for the 6.7 L vehicle, but the sales receipt still indicated that the tuner would be for the 6.4 L vehicle. Upon receipt, ERG confirmed the tuner that was received was for the 6.7 L vehicle.

Figure 1. Screen Capture of the Spartan Phalanx Offered for Sale on the Rudy's Website

Figure 2. Screen Capture from the Rudy's Website after Adding the Spartan Phalanx to Cart



Rudy's DIESEL PERFORMANCE & OFFROAD
1404 CHRISTIAN AVE. DURHAM, NC 27705 919.383.9300

Date 9/13/2013
Sale # 6012

Sold To
Michael Saisch
[redacted]

Ship To

Ship Date 9/13/2013
Due Date 9/13/2013
Other

Check #
Payment Method

Description	Qty	Rate	Amount
Spartan 6.4 Tuner	1	1,499.99	1,499.99

Subtotal	$1,499.99
Sales Tax (7.5%)	$0.00
Total	$1,499.99

Figure 3. Sales Receipt of Spartan Phalanx from Rudy's Performance after Phone Order

Receipt of Tuner

ERG received the tuner on September 19, 2013. The hardware for the unit was a Drew Technologies DashDAQ, and the unit arrived in the original DashDAQ box. The contents of the box are shown in Figure 4. The serial number of the unit was 018914130513Q. This appears to be the DashDAQ serial number, not a number given by Spartan. It is unclear what the relationship between Spartan and Drew Technologies is. It is likely that Spartan purchases DashDAQ units either 'blank' or with minimal programming from Drew Technologies and then installs the software and/or programming that performs the diesel tuning function.

The unit that was received was the model that ERG intended to order for the 6.7 L Ford, so the sales receipt contained a typographical error that was probably related to the confusion of the sales representative at the time of the order. The memory card installed in the tuner contained a number of tuning files as well as a brief manual on how to unlock the tuner for a given truck and how to install the tuning files. The documentation indicated that the unit is not fully functional when received by the purchaser. According to the manual, the VIN and owner information must be sent to Spartan for them to allow the user to register/unlock the tuner. This process is not exactly consistent with the discussions that ERG had with the Rudy's representative over the phone. The representative had originally said that the tuner would be mated to the first truck that it was installed in, and made the process of unlocking the tuner and mating to the VIN of the desired truck sound automatic. The manual also mentions that if the purchaser wants to install the tuner on a second truck, another license must be purchased from Spartan before this can be done.

Figure 4. Contents of the Spartan Tuner Box upon Delivery

APPENDIX C
COMMUNICATION WITH SPARTAN FOR TUNER ACTIVATION

Brent Ruminski - Fwd: 6.7L DashDAQ 18914 Level 1 License Mike Sabisch

From: Brent Ruminski
To: Sabisch, Michael
Subject: Fwd: 6.7L DashDAQ 18914 Level 1 License Mike Sabisch

>>> Michael Sabisch 11/27/2013 12:41 PM >>>

>>> <tech@spartandieseltech.com> 11/27/2013 10:09 AM >>>
Before loading a tune on your truck, be sure to have a battery charger connected to one of your batteries. Just set it on trickle charge.

Also please make sure you have followed the instructions on page 3 of the Strategy Flash Manual 67:

DPF DELETE TUNE FILES MUST BE INSTALLED PRIOR TO INSTALLING DPF DELETE EXHAUST COMPONENTS. FAILURE TO INSTALL NEEDED DPF DELETE TUNING BEFORE REMOVING THESE COMPONENTS CAN LEAVE YOUR VEHICLE STRANDED

Index File:

Download the attached file (indexfile.idx) to your computer, then copy to the tuning files folder on the sd card. Do not change the name of the file. If you do you will NOT be able to load a tune on your truck.

Stock File:

Download the attached file to your computer (ESA_PB_STK_ZIP example name), uncompress and copy to the stock files folder on the sd card. The actual stock file will be a .stk file when copied to the stock files folder on the sd card. Size of the uncompressed file will be 4.25 MB (4,461,388 bytes)

The American service-member wrote a check made payable to the United States of America for the amount of UP TO AND INCLUDING MY LIFE. Thank a Soldier, Airmen, Sailor, Marine or Coast Guardsmen for their sacrifices on your behalf.

Mick @ Spartan

Please reply back to this email if you have additional questions. This way I will have your original email available to view.

Registration

SPARTAN
DIESEL TECHNOLOGIES
Hendersonville, NC (828) 606-3263
www.SpartanDieselTech.com

RACE USE DISCLAIMER AND LIABILITY WAIVER

This product is designed for competition racing use only. Use on State and Federal Highways is a violation of the EPA Clean Air Act. The Clean Air Act can be found at http://www.epa.gov/air/caa/. This document contains in detail what are considered to be violations of the CAA and corresponding penalties for failure to obey and should be read in full before signing this disclaimer and/or installing this off-road, race use only product. Ensuring that all emissions, noise/sound, and speed/use related laws are followed is the responsibility of the Buyer(s). Installation and use of this product indicates that this disclaimer has been read, acknowledged, and understood fully by both the Buyer(s) and Installer(s).

The Buyer(s) assume all associated risk of the purchase and/or use of this product. "Spartan Diesel Technologies" assumes no responsibility of any personal injury, death, or property damage associated with the use of this competition racing use-only product. The Buyer(s) assume all responsibility of ensuring that all applicable speed and safety restrictions are followed during the use of this product. This includes staying within speed limits of tire rating, engine speed restrictions, and legal competition racing use of the vehicle and associated product. The above is regardless of capabilities enabled by use of any "Spartan Diesel Technologies" product. All local, state, and federal laws and ordinances must be adhered during the use of the product. Determining the nature of these laws and ordinances is the exclusive responsibility of the Buyer(s).

Manufacturer Limited Vehicle Warranties should be referenced before installation and use of this product. "Spartan Diesel Technologies" shall not be held responsible for voidance of any Manufacturer Warranties. The vehicle manufacturer is to be referenced directly by the Buyer(s) to determine what is or is not permissible under the Manufacturer's Limited Warranty. The Buyer(s) assume all possible damages and associated costs in the situation of Manufacturer Warranty voidance.

Installation, service, and use are solely the responsibility of the Buyer(s) and Installer(s) of the given product. "Spartan Diesel Technologies" assumes no liability for personal injury or property damage due to misuse, mis-installation, or improper service of the product. The Buyer(s) and Installer(s) assume all responsibility of ensuring that all proper instructions for installation and use are followed. This product is capable of the following:

1. Making the vehicle incompliant with Local, State and Federal emissions regulations.

II. Making the vehicle capable of generating vehicle speeds unsafe for driving conditions.

III. Making the vehicle capable of generating conditions exceeding safe vehicle speeds based on mechanical condition of the vehicle, such as tire speed ratings.

IV. Making the vehicle capable of exceeding mechanical limits of engine speed, power output, and mechanical stress upon the powertrain, driveline, chassis, and body of the vehicle.

V. Producing power and torque output requiring superior driving skills and techniques in order to be safely applied.

It is the sole responsibility of the Buyer(s) and User(s) of this product to be aware of these additional capabilities and adjust the installation and use of the product accordingly. All other warranties, express or implied, are not applicable for the purchase and use of this product. Failure of the product due to misuse or mis-installation is specifically excluded from the Limited Warranty of this product. "Spartan Diesel Technologies" will not be held liable for indirect, incidental and/or consequential damages caused by the purchase, installation, and/or use of the product.

Signature of this disclaimer and waiver is necessary in order to receive tunes/calibrations from Spartan Diesel Technologies to enable use of our DPF Delete 6.4 Liter, or 6.7 Liter Ford Products.

Signature of this disclaimer and waiver implies that the Buyer(s) and all potential User(s) have read, understood, and accepted the contents and responsibilities of both the said disclaimer and Federal EPA Clean Air Act linked and referenced herein.

PRINT NAME OF BUYER [redacted]

ADDRESS OF BUYER [redacted]

CONTACT TELEPHONE [redacted]

CITY, START, ZIP CODE [redacted]

EMAIL ADDRESS [redacted]

TUNER SERIAL NUMBER [redacted]

SIGNATURE OF BUYER [redacted]

Home
Tuning Devices
Performance Graphs
Compare Us
Online Catalog
Frequently Asked Questions
Race Use Disclaimer and Liability Waiver
Forums
Contact Us

Authorized Spartan Dealers

Logout

Hits:

Online Status:	ONLINE
Member Since:	3 months ago
Last Online:	Now
Last Updated:	3 months ago
Connections:	

Contact Info

First Name:	[redacted]
Last Name:	
Address:	
City, State, ZIP:	
Phone1:	
Phone2:	
Tuner Serial:	
Tuner Level:	
Tuner Purchased From:	
Year Model:	
VIN:	[redacted]
Engine Type:	
Engine Strategy:	
Trans Strategy:	
6.4 L Tunes:	
Spartan Disclaimer 10-03-12?	Yes
6.7 L Tunes:	
Truck Model:	
Two or Four Wheel drive:	
Trans Type:	
Cab Type:	
Bed Length:	
Single Rear or Duallie:	
Traction Control Equipped:	Yes
Truck Build Date:	
Gear Ratio:	
Tire Size:	
Intake/Filter Type:	
HP Aftermarket Items:	
Any Additional Details:	

User Menu
Logout
My Tunes and Files
My Details
Update Tuner
Spartan Default Configuration Files

Show cart

ATTACHMENT 2

Declaration of Brent Ruminski

Contains Confidential Business Information (CBI)

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE ADMINISTRATIVE LAW JUDGES

In the Matter of:	)	
	)	
Spartan Diesel Technologies, LLC,	)	Docket No. CAA-HQ-2017-8362
	)	
Respondent	)	

DECLARATION OF BRENT RUMINSKI

I, BRENT RUMINSKI, declare and state as follows:

1. The statements made in this declaration are based on my personal knowledge gained through my education, my professional experience in the field of energy engineering and environmental consulting, my experience conducting motor vehicle environmental compliance and enforcement inspections with or on behalf of the Environmental Protection Agency ("EPA"), my experience conducting motor vehicle emission testing for several EPA enforcement matters, including the enforcement matter concerning Spartan Diesel Technologies, LLC ("Spartan"), and my review of documents specifically related to this enforcement matter concerning Spartan.
2. I am currently employed as an Energy Engineer with Eastern Research Group, Inc. ("ERG") and am based out of ERG's Chantilly, Virginia office located at 14555 Avion Parkway, Suite 200. I have held this position since August 2011. Previously, I was employed as an engineer by TMS Consulting, Inc., from June 2009 to July 2011.
3. Since 2012, I have served as the project lead for multiple EPA Mobile Source Enforcement contract projects supporting EPA's Vehicle and Engine Enforcement Branch ("VEEB"). The VEEB is responsible for enforcing the mobile source provisions of the Clean Air Act. In my role as the contract task lead, I am primarily responsible for supporting VEEB enforcement projects including aftermarket vehicle defeat device and tampering inspections and investigations, vehicle

and engine inspection trainings, and projects involving vehicle and engine testing.

4. I was awarded a B.S. degree from The Pennsylvania State University in 2011, with a major in Energy Engineering.

5. I have been a credentialed EPA Clean Air Act vehicle and engine inspector since 2013 and have conducted over 190 inspections. Over 150 of these inspections involved inspecting highway diesel engines for evidence of aftermarket defeat devices and tampering.

6. I have also provided training to over 150 government employees from EPA headquarters and regional offices, as well as state agencies, on how to conduct defeat device and tampering inspections.

7. I have also completed training courses conducted by the Society of Automotive Engineers ("SAE") on (i) Acquiring and Analyzing Data from Sensors and In-Vehicle Networks (#C0522); (ii) Introduction to Powertrain Calibration Engineering (#PD331346ON); and (iii) Fundamentals of Catalytic Converter Integration for Emission Control (#WB1142).

8. I have led support activities for EPA's investigation of over ten (10) automotive aftermarket companies concerning the manufacturing of potential defeat devices, specifically, electronic control modules ("ECM") tuners that modify engine calibrations for increased power and fuel economy on highway diesel and gasoline engines including light-duty and heavy-duty classes.

9. As part of the support activities for EPA's investigations discussed above, I helped manage four separate dynamometer testing events to measure how vehicle tailpipe emissions are affected using aftermarket ECM tuners, following various test procedures developed and used by EPA for such purpose. The testing involved using a chassis dynamometer, which is one of the methods for operating a vehicle for emissions testing, and used a constant volume sampling system, which gathers actual emissions for quantification by laboratory equipment. My role included providing support for all four testing events, including installing/uninstalling aftermarket "tuners" that include software designed to modify the calibrations of ECMs, documenting ECM calibration

changes made by the tuners by using an on-board diagnostic ("OBD") scan tool and data loggers, as well as analyzing the detected calibration changes. I have also analyzed the results of these testing events for EPA and have provided EPA technical opinions concerning the potential excess emissions of pollutants that can occur from installation and use of such tuners on motor vehicles.

10. In addition to the testing events involving aftermarket tuners discussed above, I have also helped design test plans for EPA investigations involving original equipment manufacturer defeat devices, and have analyzed and provided technical opinions about the results of such tests for the EPA.

11. One of the four tuner testing events discussed above involved a tuner manufactured and sold by Spartan that is the subject of the EPA administrative complaint filed in the Spartan enforcement matter. This testing event is the subject of the ERG report I helped prepare entitled "Investigation Summary Report, Spartan Diesel Technologies, Inc," dated November 7, 2014 ("Spartan Test Report").

12. I have reviewed and am familiar with the EPA certificates of conformity ("COCs") issued for model year 2008 through 2010 6.4L Powerstroke Diesel Ford F series trucks and the model year 2011 and newer 6.7L Powerstroke Diesel Ford F series trucks. I have also reviewed and am familiar with the pollutant emission standards and regulations applicable to these motor vehicles and engines.

13. In December 2013, a compliance inspection team comprised of myself, other staff of ERG, and staff from EPA, conducted emissions tests of Spartan's 6.7L Phalanx diesel engine tuner. I participated in conducting the procedures of this testing. The Spartan Test Report summarizes the EPA and ERG's investigation of this tuner's effect on pollutant emissions when installed and operated on a Ford F-350 test vehicle with a 6.7 Liter Ford Powerstroke turbo diesel engine.

14. The investigation included purchasing a Spartan 6.7L Phalanx diesel engine tuner, evaluating the calibration modifications that this tuner can make to an ECM's programming, installing the tuner's calibration modifications on a test vehicle using the tuner, and performing emission testing. ERG and EPA travelled to Ford Motor Company's test facility the week of December 2, 2013 to conduct emission testing on a 2011 model year Ford F-350 test vehicle. The purpose of this testing was to identify which engine controls are altered by the tuner and how the use of this tuner, along with defeat devices designed to physically bypass the emission control devices, affect emissions of regulated pollutants.

15. The Spartan tuner we tested included the following pre-loaded tunes:

    a. 25 HP DPF On Cab & Chassis Only;

    b. 90HP DPF On Cab & Chassis Only;

    c. 50 HP DPF On;

    d. 125 HP DPF On;

    e. 40 HP DPF Off;

    f. 80 HP DPF Off;

    g. 120 HP DPF Off;

    h. 165 HP DPF Off;

    i. 200 HP DPF Off War Hammer

16. Spartan produces two different models of their ECM tuner for use with on-highway heavy-duty diesel engines: the 6.7L Phalanx tuner designed for the 6.7 Liter Ford Powerstroke diesel engine found in Model Year 2010 and newer Ford F Series trucks; and the 6.4L Phalanx tuner designed for the 6.4 Liter Powerstroke diesel engine found in Model Year 2008 through 2010 Ford F Series trucks.

17. In December 2013, ERG tested, for EPA, a 2011 Ford F-350 with a 6.7 Liter "Powerstroke" diesel engine. A description of the test vehicle is provided in Table 1 of the Spartan Test Report

at page 8. The EPA engine family of the test vehicle is BFMXD06.771C, which is the 2011 Model Year F-350 Powerstroke produced by Ford. The certified configuration of the 2011 Model Year F-350 Powerstroke includes emission control devices (Exhaust Gas Recirculation ("EGR"), Diesel Oxidation Catalyst ("DOC"), Diesel Particulate Filter ("DPF"), and Selective Catalyst Reduction ("SCR")), as well as engine calibration controls such as precise fueling specifications and limits for fuel injection mass, fuel injection duration, fuel injection pressure, and fuel injection timing that affect engine emissions. Table 2 of the Spartan Test Report at page 9 identifies the applicable emission standards for specific pollutants for Engine Family BFMXD06.711C, reproduced below:

Constituent Pollutant	**Applicable Emission Standard for Engine Family BFMXD06.771C (g/mi)**
Nitrogen Oxides ("NOx")	0.4
Particulate Matter ("PM")	0.02
Carbon Monoxide ("CO")	8.1
Non-Methane Hydrocarbons ("NMHC")	0.23

18. As part of the test procedures, two "baseline" tests were conducted of the test vehicle in its stock configuration without any installation of any programs, or "tunes" included in the Spartan tuner. The baseline tests were conducted using the LA4 test procedure (also known as FTP74) and US06 test procedure, respectively. *See* Spartan Test Report at pages 9-10. The same vehicle using the LA4 test procedure with the Spartan Tuner installed using the tune named "200HP DPF Off War Hammer Race" (hereinafter referred to as "DPF-Off Tune"). *See* Spartan Test Report at pages 10-11. As part of the test of the DPF-Off Tune LA4 test procedure, we had to remove the DOC, DPF, and SCR from the test vehicle, in accordance with Spartan's tuner user instructions, as the DPF-Off Tune specifically cannot operate without these emission control devices removed from the vehicle. Therefore, we removed these emission control devices and

installed a Flo-Pro aftertreatment delete pipe on the test vehicle (to allow the test vehicle's exhaust system to function without the emission control devices) prior to testing the vehicle with the DPF-Off Tune installed. *See* Spartan Test Report at pages 11-12. The DPF-Off Tune test scenario is referred to as the "Equip-Removed" test scenario in the Spartan Test Report.

19. Finally, the test procedures included two tests of the test vehicle with all emission control devices still intact on the vehicle with the Spartan tuner installed using the tune named "125 HP DPF On" (hereinafter referred to as "DPF-On Tune") installed. In a document EPA received from Spartan, "*CBI_spartan technical support for onroad 2015-10-01-163134.pdf*," Spartan states that its DPF-On tunes modify th[redacted] *See* Enclosure. The two tests of the DPF-On Tune were conducted using the LA4 and US06 test cycle procedures, respectively. The DPF-On Tune test scenario is referred to as the "Equip-Present" scenario in the Spartan Test Report.

20. The LA4 and US06 test cycles are described at page 16-17 of the Spartan Test Report. The LA4 test procedure, also known as the Urban Dynamometer Driving Schedule, is designed to mirror city driving conditions simulating frequent starts and stops. The LA4 test procedure included "hot start" of the engine. The US06 test cycle, also known as the Supplemental Federal Test Procedure (SFTP), addresses the shortcomings with the LA4. It captures aggressive, high speed and/or high acceleration driving behavior, rapid speed fluctuations, and driving behavior following startup. These two test cycles are different than the test cycle required to establish certification of emission standards as part of the COC requirements under the regulations for the test vehicle we were using, the FTP75 test cycle. The FTP75 test cycle is different primarily because it includes a "cold start" condition. We did not use the FTP75 test cycle because it requires a 12 hour "cold soak" period between tests. Ford recommended running consecutive hot

start test cycles to compare "hot start" emission levels for each tuner calibration. This allowed the testing to be completed in the limited time available without the need for an extended cold soak period between each test required for the cold start. Running consecutive test cycles ensured that at the beginning of the valid test cycle (i.e., the last consecutive test cycle in a test procedure), the vehicle operating conditions (e.g., aftertreatment system temperature, engine oil temperature, coolant temperature) are always the same; thus, providing comparable test results.

21. Because diesel engine pollutant emissions are typically higher after a cold start than after a hot start, the results from a hot start LA4 are expected to be lower than the results that would be expected from a FTP75 test.

22. After the tests were performed, ERG left the DPF-On Tune installed in the test vehicle, and then Bosch, Ford's ECM supplier, compared the stock calibration file against the DPF-On Tune calibration file using OEM proprietary software. Table 7, at page 21 of the Spartan Test Report summarizes the changes to the ECM stock calibration caused by the DPF-On Tune and the corresponding changes to engine and fueling operation parameters. Notably, The DPF-On Tune causes an engine's fuel injection timing to advance, which is commonly understood in the industry and academia to increase NOx emissions from a diesel engine. Also, Bosch/Ford found the DPF-On Tune to modify other calibration parameters such as fuel quantity (increased), fuel rail pressure (increased), smoke limit (lower air-to-fuel ratio, otherwise known as "fuel rich," allowed), and exhaust component protection threshold (threshold increased, meaning level of protection decreased), all of which are parameters for concern in respect to emission control.

23. The emission test results are summarized in Tables 10 and 11 of the Spartan Test Report, at pages 24 and 26, respectively. As shown in Table 10, the emission test results for the Equip-Remove scenario indicate emissions significantly higher than the test vehicle's baseline level for NOx, NMHC, CO, and PM, as reproduced below:

Pollutant	Test Results on the LA4 (i.e., FTP74) Test Cycle (grams per mile)		
	Baseline	Spartan[a] (EGR, DOC, DPF, SCR disabled)	Times Increase (Rounded)
NOx	0.0303	10.5344	350
NMHC	0.0005	0.5678	1,100
CO	0.0255	3.3177	130
PM	0.0017	0.0649	40

24. The test results for the DPF-Off Tune in Paragraph 23 cannot be compared to applicable exhaust emission standards because those test results were on the LA4 test procedure and compliance with the applicable standards is to be based under EPA regulations using the FTP75 test procedure, which we did not run. However, based on the test results shown in Paragraph 23 and the fact that the DPF-Off Tune disables EGR, DOC, DPF, and SCR, which are critical emission control devices necessary to achieve the applicable emission standards, it is my opinion that the DPF-Off Tune would undoubtably cause NOx and PM to exceed the applicable standards if a full certification test were performed on the test vehicle. Moreover, given all other DPF-Off tunes in the 6.7L Spartan tuner disable EGR, DOC, DPF, and SCR, it is my opinion that all other such tunes would undoubtably cause NOx and PM to exceed the applicable emission standards if a full certification test was performed with such tunes installed.

25. As shown in Table 10 of the Spartan Test Report, the LA4 test results with the DPF-On Tune (Equip-Present) show increases of NOx, CO, and PM above the test vehicle's baseline level. Note that these results cannot be compared to applicable exhaust standards because they were for the LA4 test procedure and the applicable exhaust standards for our test vehicle are to be demonstrated under the regulations using the cold start FTP75 test procedure which we did not perform. In Table 11 of the Spartan Test Report, the test results of the US06 DPF-On (Equip-Present) show increases of CO and PM above the test vehicle's baseline level. It is reasonable to

expect different emission results from the LA4 and US06 test cycles because each test simulates different driving conditions, and the engine/fueling operation calibration is going to behave differently depending upon the driving condition, with different emission consequences.

26. Also, of note, during the testing we investigated the effect of the Spartan Tuner on the test vehicle's EGR and OBD system. The DPF-Off Tune turned off the EGR system, an emission control device critical to NOx emission control. With respect to the OBD system, no engine check light went on and no diagnostic trouble codes ("DTCs") were recorded after the EGR system shut off as would have occurred had the OBD system properly functioned. *See* Table 6 of the Spartan Test Report. Also, after the SCR emission control device was disabled and removed, no engine check light went on or DTC recorded as would have occurred with a properly-functioning OBD. *See* Table 9 of the Spartan Test Report. This confirms that the tuner turned off the functions of the EGR and SCR systems, and the OBD detection of proper operation of those systems.

27. The Spartan Tuner tested is designed for and compatible with all 6.7 Liter Powerstroke engine families. All other existing engine families of MY 2011 and later 6.7 Liter Powerstrokes are equipped with identical emission control devices (EGR, DOC, DPF, SCR) and the same general engine design. The applicable emission standards for all other 6.7 Powerstroke engine families are similar to the test vehicle's engine family and are shown in the table below. Based on the our DPF-Off test results and the fact that all DPF-Off tunes disable EGR, DOC, DPF, and SCR on 6.7 Liter Powerstroke engines, I would expect, based on good engineering judgment, similar test results for all other 6.7 Liter Powerstroke engine families to the test results reflected in the Spartan Test Report. Specifically, it is my opinion that any of Spartan's DPF-off 6.7 Liter tunes would undoubtably cause NOx and PM to exceed the applicable standards if full certification tests were performed on those engine families.

Engine Family	Cert Level	Federal Useful Life Emission Standard	Units	Percent Change Above Certified Level Before Exceedance of Standard
BFMXD06.761A	0.2	0.2	g/mi	0%
BFMXD06.771C	0.4	0.4	g/mi	0%
CFMXD06.761A	0.2	0.2	g/mi	0%
CFMXD06.771C	0.2	0.4	g/mi	100%
DFMXD06.761A	0.2	0.2	g/mi	0%
DFMXD06.771C	0.3	0.4	g/mi	33%
BFMXH06.7A24	0.1	0.2	g/bhp-hr	100%
BFMXH06.7B23	0.1	0.2	g/bhp-hr	100%
CFMXH06.7A24	0.1	0.2	g/bhp-hr	100%
CFMXH06.7B23	0.1	0.2	g/bhp-hr	100%
CFMXH06.7A24	0.1	0.2	g/bhp-hr	100%
DFMXH06.7B23	0.1	0.2	g/bhp-hr	100%

28. The Spartan 6.4 Liter tuner includes DPF-OFF options as stated in Spartan's response to Question 4c in *SDT LLC Supplemental Response to Request for Information [6-13-13].pdf. See* Attachment 5 to *Complainant's Statement in Support of Issuance of a Penalty*. These DPF-OFF options disable EGR, DPF, and DOC systems.

29. All 6.4 Liter Powerstroke (2008-2010 model year range) were certified with EGR, DOC, and DPF. In contrast to the 6.7 Liter Powerstroke tested by EPA/ERG (and all other 6.7 Liter Powerstrokes), the 6.4 Liter Powerstroke is not equipped with SCR as certified by Ford. The newer 6.7L Powerstrokes are equipped with SCRs to meet tightened NOx standards applicable for MY 2011 and later. Otherwise, the pre-MY 2011 6.4 Liter Powerstrokes and the 2011 and later 6.7 Liter Powerstrokes have similar engine sizes, designs, power, and vehicle applications (i.e., Ford pickup trucks).

30. Based on good engineering judgment, the similarity between 6.4L Powerstrokes and 6.7L Powerstrokes, and our DPF-Off Tune results on the 6.7 Liter Powerstroke, I would expect that, if tested, the Spartan 6.4L DPF-Off tunes would cause NOx and PM emissions to increase above

the applicable Family Emission Limits ("FELs")[1] and above levels that would otherwise be emitted by a 6.4L Powerstroke in its stock configuration. The FELs that apply to the 6.4L Powerstroke engine families are as follows:

Engine Family	Certified NOx Level by OEM	NOx Family Emission Limit (FEL)	Units	Percent Change Above Certified Level Before Exceedance of FEL
9NVXH06.4AGA	1	1	g/bhp-hr	0%
9NVXH06.4AGB	0.95	0.95	g/bhp-hr	0%
9NVXH06.4AGC	0.95	0.95	g/bhp-hr	0%
9NVXH06.4AEA	2.35	2.5	g/bhp-hr	6%
8NVXH06.4AGB	0.96	0.99	g/bhp-hr	3%
8NVXH06.4AGA	1	1.14	g/bhp-hr	14%
8NVXH06.4AGC	0.96	1.14	g/bhp-hr	19%
9NVXH06.4AGA	1	1	g/bhp-hr	0%

31. We did not test the Spartan Tuner for 6.7 Liter Powerstrokes using the cold start FTP 75 test cycle required to be conducted as part of EPA COC application process to establish whether an engine family meets emission standards. However, I have witnessed multiple instances of full certification testing (i.e. cold start FTP75 testing) of 6.7 Liter Powerstrokes, equipped with EGR, DOC, DPF, and SCR, in investigations involving DPF-On tunes made by two other tuner manufacturers which were similar to Spartan's DPF-On tunes in that they modify emissions-sensitive engine/fueling calibrations such as fuel timing, fuel injection pressure, and fuel injection quantity for the purpose of increasing engine power and torque. In total, I've witnessed 8 cold FTP 75 test cycles with DPF-on type tunes installed from these other manufacturers. As expected, in all cases, these type of calibration changes designed to increase power and torque on

[1] Family emission limit (FEL) means an emission level declared by the manufacturer to serve in place of an otherwise applicable emission standard under the averaging, banking, and trading program. When a manufacturer is averaging, FELs for a specific engine family may be lower or higher than exhaust standards as long as the average emission level for all of the manufacture's engines meet the applicable exhaust standard. Banking provisions allow a manufacturer to certify to an FEL below a standard in one model year, in order to bank credits for future model years. When manufactures use FELs to certify engines, the engines must not exceed the FEL at the end of the engine's useful life similar to the exhaust standards.

the 6.7 Liter Powerstroke, caused tailpipe NO_x to increase by at least 26 percent and up to 175 percent, even with EGR/DOC/DPF/SCR fully intact and operational. In no case was the SCR system able to compensate to prevent tailpipe NO_x emissions from increasing.

32. We did not test any Spartan DPF-On tunes on the 6.7L tuner with purported horsepower enhancement below 125 horsepower. However, these other DPF-On tunes change the fueling strategy and other engine parameters that affect control of emissions. Therefore, based on good engineering judgment, I would expect that these other DPF-On tunes could adversely affect emissions of one or more regulated pollutants. [redacted] (see Enclosure), which I find unlikely to be true based on my prior experience testing DPF-On type tunes from other manufactures, as stated in paragraph 31 above.

33. Spartan states that the calibration changes made by the 6.4 L Powerstroke are similar to the 6.7 L Powerstroke for DPF-On tunes. *See* Enclosure, footnote on page 1.

34. Given the similarity between 6.4L Powerstrokes and 6.7L Powerstrokes and [redacted] I would expect, based on good engineering judgment, that the pollutant emission levels observed from a 6.4L Powerstroke after installation of a Spartan 6.4L DPF-On tune could adversely affect emissions. This judgment is also based on the fact that the 6.4 Liter was not certified with SCR which eliminates any possibility that increased NOx emissions can be "cleaned up" by SCR to offset tailpipe emissions.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed on: 9/28/18 By: [signature]

Brent Ruminski
Energy Engineer
Eastern Research Group, Inc.
14555 Avion Parkway Ste. 200
Chantilly, VA 20151

ENCLOSURE

Morgan Lewis

Morgan, Lewis & Bockius LLP
355 South Grand Avenue
Suite 4400
Los Angeles, CA 90071-3106
Tel. +1.213.680.6400
Fax: +1.213.680.6499
www.morganlewis.com

Rick R. Rothman
Partner
+1.213.680.6590
rick.rothman@morganlewis.com

September 17, 2015

Via Federal Express

CONTAINS TRADE SECRETS AND CONFIDENTIAL BUSINESS INFORMATION

David E. Alexander, Attorney
U.S. Environmental Protection Agency
Air Enforcement Division (Mailcode 2242-A)
1200 Pennsylvania Ave. (WJC South Rm. 1111-B)
Washington, DC 20044

Re: Spartan Diesel Technologies, LLC–Technical Memo

Dear Mr. Alexander:

On behalf of Spartan Diesel Technologies, LLC ("Spartan"), I am enclosing two copies of a technical memorandum relating to the use of the Spartan tuner on Ford trucks where emissions control devices are not removed. We are submitting this memo in accordance with our discussions on August 26, 2015, and we look forward to continuing to work with EPA to resolve any issues related to the NOV.

As we discussed, putting aside the race use aspects for a moment, Spartan would like to work with EPA to establish a framework under which a version of the tuner would meet EPA's expectations for compliance, including emissions compliance requirements established and administered by EPA for on-road vehicles. The enclosed memo provides technical details regarding the functionality and operation methods implemented in the performance calibrations developed by Spartan that are intended to be used with stock emissions controls in place.

Spartan provides this technical memorandum and the related information in the spirit of cooperation. Please note that the written descriptions, analyses, and accompanying documents provided by Spartan in connection with this submission contain confidential, proprietary, trade secret, and/or highly sensitive information. With the exception of references to unmodified Original Equipment Manufacturer Engine Control Unit calibrations, this information is confidential and proprietary to Spartan; it is not information we provide publicly nor is

it publicly available and we are seeking, until further notice, all appropriate protections under Section 208(c) of the Clean Air Act, 42 U.S.C. § 7542, and 40 C.F.R. Part 2, subpart B. Disclosure of any of this information would almost certainly result in substantial harmful effects on Spartan's competitive position. Since the duration of time for which this confidential and proprietary information will provide economic value to Spartan is unknown, we request that EPA treat this information as confidential business information under 40 C.F.R. Part 2, subpart B and employ all appropriate confidential business information and/or trade secret protections until Spartan provides notice that such protections are no longer necessary. Pursuant to 40 C.F.R. Part 2, subpart B, confidential business records and trade secrets are exempt from disclosure by EPA. Under 40 C.F.R. § 2.104, EPA should delete exempt confidential information from the remainder of any report or other document released publicly, and withhold this exempt information from disclosure if a Freedom of Information Act request is made. Spartan requests that EPA provide notice of any claim for information or documents that have been identified as confidential or trade secret, and requests an opportunity to further document the exempt status of the documents or information, if necessary, prior to any EPA decision to publicly release such documents.

We trust EPA will treat this information as sensitive, confidential information. If you have any questions or wish to discuss these issues in more detail, please feel free to contact me.

Sincerely,

Rick R. Rothman

Enclosures

CONFIDENTIAL MATERIAL PURPOSELY OMITTED

ATTACHMENT 3

Spartan Initial §208 Response

May 13, 2013

BINGHAM

Rick R. Rothman
Direct Phone: +1.213.680.6590
Direct Fax: +1.213.830.8790
rick.rothman@bingham.com

May 13, 2013

Confidential

Via Electronic Mail & Overnight Delivery

Anne Wick
Air Enforcement Division
U.S. Environmental Protection Agency
Ariel Rios South Building, Room 1111 B
1200 Pennsylvania Avenue, NW
Washington, DC 20004

Re: Spartan Diesel Technologies, LLC Initial Response to Request for Information Under § 208(a) of the Clean Air Act, 42 U.S.C. § 7542(a)

Ms. Wick:

This letter provides the first response of Spartan Diesel Technologies, LLC ("Spartan") to the Request for Information dated April 11, 2013 that the U.S. Environmental Protection Agency ("EPA") sent to Spartan regarding items manufactured and sold by Spartan from January 2009 through the present (the "Request for Information").

Bingham McCutchen LLP
Suite 4000
355 South Grand Avenue
Los Angeles, CA
90071-3106

+1.213.680.6400
+1.213.680.6499
bingham.com

The Timing and Scope of Spartan's Response

Thank you for your consideration of our request for additional time and your agreement to extend the time to respond to Request No. 4. As I described in an e-mail to you on April 25, 2013, the scope of information sought by EPA through Request No. 4 on Attachment B and its multiple subparts necessitates an information gathering, review and production effort that will require more than the 30 days EPA initially provided. In your e-mail dated May 2, 2013, EPA approved Spartan's request for a 30-day extension to June 13, 2013 for responding to Request No. 4 provided that, by May 13th, Spartan give: (1) responses to Requests No. 1-3 and 5-6 listed on Attachment B of the Request for Information; and (2) a copy of its response to "the California subpoena, to the extent that it exists."

With this letter, Spartan responds to Requests No. 1-3 and 5-6 listed on Attachment B of the Request for Information. Spartan is also enclosing, as "Enclosure A," a copy of its response dated May 31, 2012 to correspondence from the California Air Resources Board.

Spartan further clarifies that it is only responding to the Request for Information to the extent EPA seeks information or documents dated on or after September 28, 2010, when Spartan came into existence. To confirm the date on which Spartan was formed, Spartan is enclosing a copy of its State of North Carolina, Department of the Secretary of State, Limited Liability Company Articles of Organization effective September 28, 2010, as "Enclosure B." As we have discussed, "Spartan Diesel Technologies" was a d/b/a for an individual proprietor (who remains involved in Spartan) before Spartan was formed.

If Spartan discovers additional information or documents that contain information responsive to Requests No. 1-3 and 5-6, Spartan will, to the extent necessary and appropriate, supplement its response.

General Objections to the Request for Information

Spartan asserts the following general objections to the Request for Information, which is unduly burdensome and unreasonably broad, exceeds EPA's statutory authority, is insufficiently definite and specific, and is not reasonably relevant to the matter properly under inquiry. *See U.S. v. Morton Salt Co.* 338 U.S. 632, 652 (1950); *F.T.C. v. Texaco*, 555 F.2d 862, 882 (D.C. Cir. 1977).

1. Spartan has made and continues to make a good faith effort to identify information responsive to the Request for Information. Spartan expressly and without qualification reserves the right to amend or supplement its response, including to provide additional documents.

2. Spartan objects to the Request for Information as overbroad and unduly burdensome to the extent EPA seeks wide-ranging information and documents regarding manufacturing, installations, sales and offers for sale over a large geographic area for a period of more than 4 years.

3. Spartan objects to the Request for Information to the extent EPA seeks information or documents that pre-date Spartan's formation on September 28, 2010, including information and documents on events that may have taken place before Spartan's formation.

4. Spartan objects to the Request for Information as not authorized by law to the extent EPA seeks information that is not necessary for EPA "to determine whether the manufacturer or other person has acted or is acting in compliance with" parts A and C of Title II of the Clean Air Act, 42 U.S.C. § 7542(a).

5. Spartan objects to the Request for Information as overbroad and unduly burdensome to the extent EPA seeks production of "any" or "all" information, data, or documents "regarding" or "related to" Spartan's business. Despite this objection, Spartan will provide a response covering a reasonable scope for each such request.

6. Spartan objects to the Request for Information to the extent EPA seeks information, documents, or information about documents not in Spartan's possession, custody, or control.

7. Spartan objects to the Request for Information to the extent EPA seeks privileged information, including documents and information protected by the attorney-client privilege, work product doctrine, or other applicable protection. Despite this objection, Spartan will provide non-privileged documents responsive to each such request. To the extent any privileged documents are responsive to the Request for Information, Spartan will also provide a privilege log identifying documents protected by the attorney-client privilege and/or work product doctrine. Any inadvertent disclosure by Spartan of privileged or otherwise protected material shall not be construed to constitute a waiver of applicable privileges or protections.

8. Spartan objects to the Request for Information to the extent EPA seeks the production of documents and information already in EPA's possession. Spartan further objects to the Request for Information to the extent EPA seeks information or documents Spartan has already submitted to the State of North Carolina or which are otherwise as accessible to EPA as they are to Spartan.

9. Spartan objects to the Instructions on Attachment C to the Request for Information as imposing unduly burdensome and unreasonably broad obligations on Spartan. Spartan further objects to Instruction No. 2 as unduly burdensome and unreasonably broad to the extent EPA seeks to require Spartan to "identify any source that either possesses or is likely to possess" information not available to Spartan or not in Spartan's possession, custody, or control. Spartan also objects to Instruction No. 5 to the extent that EPA seeks to require Spartan to reproduce documents and information already submitted to EPA.

10. Spartan's production of documents does not represent or act as an admission by Spartan that the contents of all documents produced by Spartan are true, correct, or accurate, nor does it act to authenticate such documents for the purposes of admissibility in any administrative or judicial proceeding.

Objections and Responses to Specific Requests for Information

Spartan asserts the following objections to the specific requests in the Request for Information. Spartan also offers the following narrative responses to Requests No. 1-3 and 5-6 on Attachment B of the Request for Information.

1. **Identify each component, element of design, device or part (component) manufactured, installed, sold or offered for sale by Spartan during the period January 2009 through the present that changes, affects, bypasses, or simulates the operation of a motor vehicle's diesel particulate filter (DPF) system, exhaust gas recirculation (EGR) system, or any sensors or signals related to these**

CONFIDENTIAL MATERIAL PURPOSELY OMITTED

Subject to and without waiving its objections, Spartan's inventory of the six components identified in response to Request Nos. 1-3 has been and is currently being stored and offered for sale by Spartan at a single location:

Spartan Diesel Technologies, LLC
578 Upward Rd, Suite 7
Flat Rock, NC 28731

Very truly yours,

Rick R Rothman

Rick R. Rothman

Enclosures

Enclosure A – Response of Spartan Diesel Technologies, LLC dated May 31, 2012 to correspondence from the California Air Resources Board

Enclosure B – State of North Carolina, Department of the Secretary of State, Limited Liability Company Articles of Organization effective September 28, 2010

BINGHAM

Enclosure A

Beijing
Boston
Frankfurt
Hartford
Hong Kong
London
Los Angeles
New York
Orange County
San Francisco
Santa Monica
Silicon Valley
Tokyo
Washington

Bingham McCutchen LLP
Suite 4400
355 South Grand Avenue
Los Angeles, CA
90071-3106

T +1 213 680 6400
F +1 213 680 6499
bingham.com

THERON E. MULLINAX, JR.
T. MATTHEW MULLINAX

MULLINAX LAW FIRM
ATTORNEYS AND COUNSELORS AT LAW
322 SOUTH KING STREET
HENDERSONVILLE, NORTH CAROLINA 28792
PHONE: (828) 697-6630
FAX: (828) 693-6588

EMAIL: MLF@mullinaxlawfirm.com

MAILING ADDRESS:
P. O. BOX 2648
HENDERSONVILLE, NC
28793-2648

May 31, 2012

Air Resources Board
Attn: Lisa Brown
Senior Staff Counsel
P.O. Box 2815
Sacramento, CA 95812

Re: Spartan Diesel Technologies, LLC
Preservation of Evidence In the Matter of the Investigation of Spartan Diesel Technologies, LLC

Dear Ms. Brown:

I am local counsel for Matthew Geouge, Member/Manager of Spartan Diesel Technologies, LLC, a North Carolina Limited Liability Company. The purpose of this correspondence is to respond to your March 29, 2012 correspondence to Spartan Diesel Technologies, LLC and to inquire into your department's jurisdiction over this North Carolina Limited Liability Company. I understand that you have requested the company's business records covering a period from January 1, 2009 through December 31, 2011.

The jurisdictional concern appears to be the lack of any business of any type being conducted by Spartan Diesel Technologies, LLC for a period of more than three years within the State of California. After receipt of a letter of instruction to cease selling its products in the State of California in excess of three years ago, Spartan Diesel Technologies, LLC has not sold any product whatsoever in the State of California. The company's website and product labeling clearly indicate that its products are not to be sold in the State of California and dealers are expressly instructed that the products are not to be re-sold in California.

In light of these factors, Spartan Diesel Technologies, LLC has concerns over providing its private, business records for a period of three years to an governmental entity lacking proper jurisdiction to request copies of said records. Without the requisite contacts to the State of California, Spartan Diesel Technologies, LLC questions the authority of the Air Resources Board to submit such an expansive request.

Please provide this office indication of such jursidictional authority based upon the known actions of Spartan Diesel Technologies, LLC and it shall retain California counsel to provide the requested documentation and assist in any necessary defense.

Yours Truly,

T. Matthew Mullinax

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Enclosure B

Beijing
Boston
Frankfurt
Hartford
Hong Kong
Lexington (GSC)
London
Los Angeles
New York
Orange County
San Francisco
Santa Monica
Silicon Valley
Tokyo
Washington

Bingham McCutchen LLP
Suite 4200
355 South Grand Avenue
Los Angeles, CA
90071-3106

T +1.213.680.6400
F +1.213.680.6499
bingham.com

C201027000587

SOSID: 1168828
Date Filed: 9/28/2010 8:06:00 AM
Elaine F. Marshall
North Carolina Secretary of State
C201027000587

State of North Carolina
Department of the Secretary of State

Limited Liability Company
ARTICLES OF ORGANIZATION

Pursuant to §57C-2-20 of the General Statutes of North Carolina, the undersigned does hereby submit these Articles of Organization for the purpose of forming a limited liability company.

1. The name of the limited liability company is: Spartan Diesel Technologies, LLC

2. If the limited liability company is to dissolve by a specific date, the latest date on which the limited liability company is to dissolve: (*If no date for dissolution is specified, there shall be no limit on the duration of the limited liability company.*) no limit on duration

3. The name and address of each person executing these articles of organization is as follows: (*State whether each person is executing these articles of organization in the capacity of a member, organizer or both. Note: This document must be signed by all persons listed here.*)
Matthew Geouge-Member/Organizer
328 Trenholm Road
Hendersonville, NC 28739

4. The street address and county of the initial registered office of the limited liability company is:

Number and Street 328 Trenholm Road

City, State, Zip Code Hendersonville, NC 28739 County Henderson

5. The mailing address, ***if different from the street address,*** of the initial registered office is:
same as above

6. The name of the initial registered agent is: Mattthew Geouge

7. Principal office information: (*Select either a or b.*)

a. ☑ The limited liability company has a principal office.

The street address and county of the principal office of the limited liability company is:

Number and Street 328 Trenholm Road
City, State, Zip Code Hendersonville, NC 28739 County Henderson

The mailing address, ***if different from the street address***, of the principal office of the corporation is:

same as above

b. ☐ The limited liability company does not have a principal office.

8. Check one of the following:

✓ (i) ***Member-managed LLC***: all members by virtue of their status as members shall be managers of this limited liability company.

_____(ii) ***Manager-managed LLC***: except as provided by N.C.G.S. Section 57C-3-20(a), the members of this limited liability company shall not be managers by virtue of their status as members.

9. Any other provisions which the limited liability company elects to include are attached.

10. These articles will be effective upon filing, unless a date and/or time is specified:
effective upon filing

This is the 26th day of April, 2010.

Spartan Diesel Technologies, LLC

Matthew Geouge

Signature

Matthew Geouge-Member/Organizer

Type or Print Name and Title

NOTES.

1. **Filing fee is $125. This document must be filed with the Secretary of State.**

CORPORATIONS DIVISION P.O. Box 29622 RALEIGH, NC 27626-0622
(Revised January 2002) *(Form L-01)*

Instructions for Filing

Elaine F. Marshall
Secretary

North Carolina
DEPARTMENT OF THE SECRETARY OF STATE
PO Box 29622 Raleigh, NC 27626-0622 (919)807-2000

Date: 10/5/2010

Click here to
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Corporation Names

Name	Name Type
NC SPARTAN DIESEL TECHNOLOGIES, LLC	LEGAL

Limited Liability Company Information

SOSID:	1168828
Status:	Current-Active
Effective Date:	9/28/2010
Dissolution Date:	
Annual Report Due Date:	
Citizenship:	DOMESTIC
State of Inc.:	NC
Duration:	PERPETUAL

Registered Agent

Agent Name:	GEOUGE, MATTHEW
Office Address:	328 TRENHOLM ROAD HENDERSONVILLE NC 28739
Mailing Address:	328 TRENHOLM ROAD HENDERSONVILLE NC 28739

Principal Office

Office Address:	328 TRENHOLM ROAD HENDERSONVILLE NC 28739
Mailing Address:	328 TRENHOLM ROAD HENDERSONVILLE NC 28739

Officers

ATTACHMENT 4

Filemaker Pro and Verify Database Records:

of Certified Levels of Ford F-Series Trucks

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check S

RDeadwyler, 2/25/09 (Stage 1 Review PERSON & DATE)	2/17/2010 (Date Received)
(Open field)	2/25/2010 (Certificate Status)
Jason Gumbs (Reviewer)	2/25/2010 (Printed to AA)
(Email to processor)	2/25/2010 (Sent to Database)
FMX-ONHWY-11-03 (CERT #)	Lg35473 (CATALOG #)

Large Engine Database
Test Info

Ford Motor Company | 2011 | BFMXH06.7A24 | New Submission

3. TEST DATA SET: 1
4. Engine Code: BFA17N05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: B00103
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 2800

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)-(2)
13. Special Test Device: ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- ◉ CCEs routed into the air inlet system
- ○ CCEs routed into the exhaust upstream of aftertreatment
- ○ CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 10/8/2009

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.04			2.584
OXIDE OF NITROGEN	0.12			1.000
PARTICULATE	0.000			0.000
FORMALDEHYDE	0.0009			1.610
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	594			

18. Adjustment Factors

DPF

	EFL	EFH	UAF	DAF
HC/OMHCE	0.001	0.012	0.000	-0.011
CARBON MONOXIDE	0.039	0.223	0.001	-0.185
OXIDE OF NITROGEN	0.119	0.770	0.004	-0.647
PARTICULATE	0.000	0.029	0.000	-0.028

Frequency: 0.006

NOx Adsorber, etc

Strategy

EFL	EFH	UAF	DAF

Frequency

Factor

Factor

19. Certification Levels
(Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.1					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE	0.001					
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check S

RDeadwyler, 2/25/09	2/17/2010
Stage 1 Review PERSON & DATE	Date Received
	2/25/2010
Open field	Certificate Status
Jason Gumbs	2/25/2010
Reviewer	Printed to AA
	2/25/2010
Email to processor	Sent to Database
FMX-ONHWY-11-01	Lg35473
CERT #	CATALOG #

Large Engine Database
Test Info

Ford Motor Company | 2011 | BFMXH06.7A24 | Correction

3. TEST DATA SET: 1
4. Engine Code: BFA17N05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: B00103
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 2800

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)-(2)
13. Special Test Device: ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- ◉ CCEs routed into the air inlet system
- ○ CCEs routed into the exhaust upstream of aftertreatment
- ○ CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 10/8/2009

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.04			2.584
OXIDE OF NITROGEN	0.12			1.000
PARTICULATE	0.000			0.000
FORMALDEHYDE	0.0009			1.610
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	594			

18. Adjustment Factors

DPF

	EFL	EFH	UAF	DAF
HC/OMHCE	0.001	0.012	0.000	-0.011
CARBON MONOXIDE	0.039	0.223	0.001	-0.185
OXIDE OF NITROGEN	0.119	0.770	0.004	-0.647
PARTICULATE	0.000	0.029	0.000	-0.028

Frequency: 0.006

NOx Adsorber, etc

Strategy

EFL	EFH	UAF	DAF

Frequency

Factor

Factor

19. Certification Levels
(Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.1					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE	0.001					
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check S

RDeadwyler, 2/25/09 (Stage 1 Review PERSON & DATE)	2/17/2010 (Date Received)
(Open field)	2/25/2010 (Certificate Status)
Jason Gumbs (Reviewer)	2/25/2010 (Printed to AA)
(Email to processor)	2/25/2010 (Sent to Database)
FMX-ONHWY-11-02 (CERT #)	Lg35474 (CATALOG #)

Large Engine Database
Test Info

Ford Motor Company | 2011 | BFMXH06.7B23 | New Submission

3. TEST DATA SET: 1
4. Engine Code: BFA17M05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: B00103
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 2800

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)-(2)
13. Special Test Device: ☐ Yes
14. Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- ◉ CCEs routed into the air inlet system
- ○ CCEs routed into the exhaust upstream of aftertreatment
- ○ CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 10/8/2009

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.04			2.584
OXIDE OF NITROGEN	0.12			1.000
PARTICULATE	0.000			0.000
FORMALDEHYDE				
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	594			

NOx Adsorber, etc

18. Adjustment Factors

	DPF EFL	DPF EFH	DPF UAF	DPF DAF	Strategy EFL	Strategy EFH	Strategy UAF	Strategy DAF
HC/OMHCE	0.001	0.012	0.000	-0.011				
CARBON MONOXIDE	0.039	0.223	0.001	-0.185				
OXIDE OF NITROGEN	0.119	0.770	0.004	-0.647				
PARTICULATE	0.000	0.029	0.000	-0.028				
Frequency	0.006				Frequency			

Factor Factor

19. Certification Levels
(Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.1					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE						
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check S

RDeadwyler, 6/9/11	6/3/2011
Stage 1 Review PERSON & DATE	Date Received
	6/15/2011
Open field	Certificate Status
Jason Gumbs	6/15/2011
Reviewer	Printed to AA
	6/15/2011
Email to processor	Sent to Database
FMX-ONHWY-12-01	Lg36762
CERT #	CATALOG #

Large Engine Database
Test Info

Ford Motor Company | 2012 | CFMXH06.7A24 | New Submission

3. TEST DATA SET: 4
4. Engine Code: BFA17N05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: B00103
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 1600

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)(2) Table
13. Special Test Device: ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- ◉ CCEs routed into the air inlet system
- ○ CCEs routed into the exhaust upstream of aftertreatment
- ○ CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 6/14/2010

	Test 1	Test 2	Test 3
HC/OMHCE			
NMHC/OMNMHCE	0.00		
HC + NOx			
CARBON MONOXIDE	0.10		
OXIDE OF NITROGEN	0.11		
PARTICULATE	0.001		
FORMALDEHYDE	0.0014		
ACCEL (%opacity)			
LUG (Gen) (%opacity)			
PEAK (%opacity)			
IDLE CO %			
CO2	605		

17. Deterioration Factors

1.000
2.620
1.000
0.000
1.340

18. Adjustment Factors

DPF

	EFL	EFH	UAF	DAF
HC/OMHCE	0.002	0.018	0.000	-0.016
CARBON MONOXIDE	0.103	0.544	0.005	-0.435
OXIDE OF NITROGEN	0.110	0.629	0.006	-0.513
PARTICULATE	0.001	0.018	0.000	-0.017
Frequency	0.0112			

NOx Adsorber, etc

Strategy

EFL	EFH	UAF	DAF
Frequency			

Factor

Factor

19. Certification Levels
(Rounded Test Results)

Units-- g/bHp- --Units

				STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.3					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE	0.002					
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check S

RDeadwyler, 6/9/11	6/3/2011
Stage 1 Review PERSON & DATE	Date Received
	6/15/2011
Open field	Certificate Status
Jason Gumbs	6/15/2011
Reviewer	Printed to AA
	6/15/2011
Email to processor	Sent to Database
FMX-ONHWY-12-02	Lg36763
CERT #	CATALOG #

Large Engine Database
Test Info

Ford Motor Company | 2012 | CFMXH06.7B23 | New Submission

3. TEST DATA SET: 4
4. Engine Code: BFA17M05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: B00103
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 1600

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)(2) Table
13. Special Test Device ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- ◉ CCEs routed into the air inlet system
- ○ CCEs routed into the exhaust upstream of aftertreatment
- ○ CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 6/14/2010

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.10			2.620
OXIDE OF NITROGEN	0.11			1.000
PARTICULATE	0.001			0.000
FORMALDEHYDE				
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	605			

18. Adjustment Factors

	DPF EFL	DPF EFH	DPF UAF	DPF DAF	NOx Adsorber, etc Strategy EFL	EFH	UAF	DAF
HC/OMHCE	0.002	0.018	0.000	-0.016				
CARBON MONOXIDE	0.103	0.544	0.005	-0.435				
OXIDE OF NITROGEN	0.110	0.629	0.006	-0.513				
PARTICULATE	0.001	0.018	0.000	-0.017				
Frequency	0.0112				Frequency			

Factor

Factor

19. Certification Levels
(Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.3					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE						
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check S

RDeadwyler, 7/11/12 (Stage 1 Review PERSON & DATE)	6/25/2012 (Date Received)
(Open field)	10/12/2012 (Certificate Status)
Jay Smith (Reviewer)	10/12/2012 (Printed to AA)
(Email to processor)	10/12/2012 (Sent to Database)
FMX-ONHWY-13-07 (CERT #)	Lg36962 (CATALOG #)

Large Engine Database
Test Info

Ford Motor Company | 2013 | DFMXH06.7A24 | New Submission

3. TEST DATA SET: 1
4. Engine Code: DFA17N05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: XBBP3924
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 1600

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)(2) Table
13. Special Test Device: ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- (●) CCEs routed into the air inlet system
- ( ) CCEs routed into the exhaust upstream of aftertreatment
- ( ) CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 12/8/2011

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.28			2.620
OXIDE OF NITROGEN	0.13			1.000
PARTICULATE	0.000			0.000
FORMALDEHYDE	0.0029			1.340
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	567			

NOx Adsorber, etc

18. Adjustment Factors

	DPF EFL	DPF EFH	DPF UAF	DPF DAF	Strategy EFL	Strategy EFH	Strategy UAF	Strategy DAF
HC/OMHCE	0.002	0.048	0.000	-0.046				
CARBON MONOXIDE	0.281	0.763	0.003	-0.482				
OXIDE OF NITROGEN	0.132	0.724	0.004	-0.592				
PARTICULATE	0.000	0.000	0.000	0.000				
Frequency	0.0063				Frequency			

Factor Factor

19. Certification Levels
(Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.7					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE	0.004					
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check

RDeadwyler, 11/8/12	10/13/2012
Stage 1 Review PERSON & DATE	Date Received
I do not have a statement of	
Open field	Certificate Status
Jay Smith	
Reviewer	Printed to AA
	11/9/2012
Email to processor	Sent to Database
FMX-ONHWY-13-07	Lg37025
CERT #	CATALOG #

Large Engine Database
Test Info

Ford Motor Company | 2013 | DFMXH06.7A24 | New Submission

3. TEST DATA SET: 1
4. Engine Code: DFA17N05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: XBBP3924
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 1600

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)(2) Table
13. Special Test Device: ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- (●) CCEs routed into the air inlet system
- ( ) CCEs routed into the exhaust upstream of aftertreatment
- ( ) CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 12/8/2011

	Test 1	Test 2	Test 3
HC/OMHCE			
NMHC/OMNMHCE	0.00		
HC + NOx			
CARBON MONOXIDE	0.28		
OXIDE OF NITROGEN	0.13		
PARTICULATE	0.000		
FORMALDEHYDE	0.0029		
ACCEL (%opacity)			
LUG (Gen) (%opacity)			
PEAK (%opacity)			
IDLE CO %			
CO2	567		

17. Deterioration Factors

1.000
2.620
1.000
0.000
1.340

18. Adjustment Factors

DPF

	EFL	EFH	UAF	DAF
HC/OMHCE	0.002	0.048	0.000	-0.046
CARBON MONOXIDE	0.281	0.763	0.003	-0.482
OXIDE OF NITROGEN	0.132	0.724	0.004	-0.592
PARTICULATE	0.000	0.000	0.000	0.000

Frequency: 0.0063

NOx Adsorber, etc

Strategy

EFL	EFH	UAF	DAF

Frequency

Factor

Factor

19. Certification Levels
(Rounded Test Results)

Units-- g/bHp- --Units

				STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.7					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE	0.004					
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

RDeadwyler, 7/11/12	6/25/2012
Stage 1 Review PERSON & DATE	Date Received
	10/11/2012
Open field	Certificate Status
Jay Smith	10/11/2012
Reviewer	Printed to AA
	10/11/2012
Email to processor	Sent to Database
FMX-ONHWY-13-08	Lg36963
CERT #	CATALOG #

Large Engine Database
Test Info

Ford Motor Company | 2013 | DFMXH06.7B23 | New Submission

3. TEST DATA SET: 1
4. Engine Code: DFA17M05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: XBBP3924
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 1600

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)(2) Table
13. Special Test Device ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- ◉ **CCEs routed into the air inlet system**
- ○ **CCEs routed into the exhaust upstream of aftertreatment**
- ○ **CCEs measured separately from exhaust emissions**

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 12/8/2011

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.28			2.620
OXIDE OF NITROGEN	0.13			1.000
PARTICULATE	0.000			0.000
FORMALDEHYDE	0.0029			1.340
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	567			

18. Adjustment Factors

	DPF EFL	DPF EFH	DPF UAF	DPF DAF	NOx Adsorber, etc Strategy EFL	EFH	UAF	DAF
HC/OMHCE	0.002	0.048	0.000	-0.046				
CARBON MONOXIDE	0.281	0.763	0.003	-0.482				
OXIDE OF NITROGEN	0.132	0.724	0.004	-0.592				
PARTICULATE	0.000	0.000	0.000	0.000				
Frequency	0.0063				Frequency			

Factor

Factor

19. Certification Levels
(Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs	
HC/OMHCE							
NMHC/OMNMHCE	0.0						
HC + NOx							
CARBON MONOXIDE	0.7						
OXIDE OF NITROGEN	0.1						
PARTICULATE	0.00						
FORMALDEHYDE	0.004						
ACCEL (%opacity)							
LUG (Gen) (%opacity)							
PEAK (%opacity)							
IDLE CO%							

Summary | Family Info | Test Info | Supp. Test | Part Info | Model Info | GHG | Tech Desc | Certificate | Check

RDeadwyler, 11/8/12	10/11/2012
Stage 1 Review PERSON & DATE	Date Received
I do not have a statement of	
Open field	Certificate Status
Jay Smith	
Reviewer	Printed to AA
	11/9/2012
Email to processor	Sent to Database
FMX-ONHWY-13-08	Lg37024
CERT #	CATALOG #

Large Engine Database
Test Info

Ford Motor Company | 2013 | DFMXH06.7B23 | New Submission

3. TEST DATA SET: 1
4. Engine Code: DFA17M05
5. Engine Model: 4V F-Series
6. Displacement(s) (cid Or Liters): 6.7L
7. Engine I.d. Number: XBBP3924
8. Rated HP @ Rated RPM: 300 @ 2800
9. Torque (ft-lb) @ Engine RPM: 660 @ 1600

10. WAIVERs:

CO	PM	SMOKE	IDLE CO
NA	NA	Yes	NA

11. COLD START: Yes
12. Certification Fuel: Diesel (Part 86.1313-2007(b)(2) Table
13. Special Test Device ☐ Yes
14 Test Procedure: On-Hwy Diesel

15. Crankcase emissions (CCEs)
- (●) CCEs routed into the air inlet system
- ( ) CCEs routed into the exhaust upstream of aftertreatment
- ( ) CCEs measured separately from exhaust emissions

If the CCEs are measured separately list them in the tech. description (item 13) and account for them in the test results listed below.

16. Official Results

Date: 12/8/2011

	Test 1	Test 2	Test 3	17. Deterioration Factors
HC/OMHCE				
NMHC/OMNMHCE	0.00			1.000
HC + NOx				
CARBON MONOXIDE	0.28			2.620
OXIDE OF NITROGEN	0.13			1.000
PARTICULATE	0.000			0.000
FORMALDEHYDE	0.0029			1.340
ACCEL (%opacity)				
LUG (Gen) (%opacity)				
PEAK (%opacity)				
IDLE CO %				
CO2	567			

18. Adjustment Factors

DPF

	EFL	EFH	UAF	DAF
HC/OMHCE	0.002	0.048	0.000	-0.046
CARBON MONOXIDE	0.281	0.763	0.003	-0.482
OXIDE OF NITROGEN	0.132	0.724	0.004	-0.592
PARTICULATE	0.000	0.000	0.000	0.000

Frequency 0.0063

NOx Adsorber, etc

Strategy

EFL	EFH	UAF	DAF

Frequency

Factor Factor

19. Certification Levels (Rounded Test Results)

	Units-- g/bHp- --Units			STDs g/BHP-hr	STDs g/kW-hr	FELs
HC/OMHCE						
NMHC/OMNMHCE	0.0					
HC + NOx						
CARBON MONOXIDE	0.7					
OXIDE OF NITROGEN	0.1					
PARTICULATE	0.00					
FORMALDEHYDE	0.004					
ACCEL (%opacity)						
LUG (Gen) (%opacity)						
PEAK (%opacity)						
IDLE CO%						

Model Year 2011

BFMXD06.771C (Federal HD chassis Class 3 GVW 10001-14000)

Emission Standards	Useful Life	NMOG	CO	NOX	HCHO	PM
HDV2 (Federal)	120K	0.230	8.1	0.4	0.040	0.02

Test Number BFMXR91000399
Exhaust/Evaporative Test Number Link --
Test Date 2010-01-06
Vehicle Class HDV2 (Federal HD chassis Class 3 GVW 10001-14000) MDV7 (Cal LEV 2/3 MDV GVW 10001-14000)

Test Procedure 2 - CVS 75 and later (w/o can. load)
Test Fuel Type 19 - Federal Cert Diesel 7-15 PPM Sulfi
Fuel Diesel
DF Type Mfr Determined

Cert Region	Useful Life	Standard Level	Emission Name	Rounded Result	Multiplicative DF	Additive DF	Certification Level	Standard Value	Criteria Pollutant Pass/Fail Indicator	RAF	NMOG/NMHC Ratio	Diesel Adjustment Factor
California + CAA Section 177 states	120,000 miles	California LEV-II ULEV	CO (Carbon Monoxide)	0.31	--	0.23	0.6	7.3	Pass	--	--	0.01 UP
California + CAA Section 177 states	120,000 miles	California LEV-II ULEV	NMOG (Non-methane organic gas)	0.016	--	0.0334	0.05	0.167	Pass	--	1	0.0001 UP
California + CAA Section 177 states	120,000 miles	California LEV-II ULEV	NOX (Nitrogen Oxide)	0.35	--	0	0.4	0.4	Pass	--	--	0.02 UP
California + CAA Section 177 states	120,000 miles	California LEV-II ULEV	PM (Particulate Matter)	0.001	--	0.007	0.01	0.06	Pass	--	--	0 UP
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	CO (Carbon Monoxide)	0.31	--	0.23	0.6	8.1	Pass	--	--	0.01 UP
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	HC-NM (Non-methane Hydrocarbon)	0.016	--	0.0334	0.05	0.230	Pass	--	--	0.0001 UP
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	NOX (Nitrogen Oxide)	0.35	--	0	0.4	0.4	Pass	--	--	0.02 UP
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	PM (Particulate Matter)	0.001	--	0.007	0.01	0.02	Pass	--	--	0 UP

Certified Models Information

Carline Mfr Code	Division Code	Carline Code and Name	Certification Region Code	Drive System	Trans Type
FMX	Ford - 1	350 - F450 4X4 PICKUP DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	350 - F450 4X4 PICKUP DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic

BFMXD06.761A (Federal HD chassis Class 2b GVW 8501-10000)

Emission Standards	Useful Life	NMOG	CO	NOX	HCHO	PM
HDV1 (Federal)	120K	0.195	7.3	0.2	0.032	0.02

Test Number BFMX10011536
Exhaust/Evaporative Test Number Link --
Test Date 2010-09-10
Vehicle Class HDV1 (Federal HD chassis Class 2b GVW 8501-10000), MDV6 (Cal LEV 2/3 MDV GVW 8501-10000)

Test Procedure 2 - CVS 75 and later (w/o can. load)
Test Fuel Type 19 - Federal Cert Diesel 7-15 PPM Sulfur
Fuel Diesel
DF Type Mfr Determined

Cert Region	Useful Life	Standard Level	Emission Name	Rounded Result	Multiplicative DF	Additive DF	Certification Level	Standard Value	Criteria Pollutant Pass/Fail Indicator	RAF	NMOG/NMHC Ratio	Diesel Adjustment Factor
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	CO (Carbon Monoxide)	0.35	--	0.21	0.6	7.3	Pass	--	--	0.01 UP
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	HC-NM (Non-methane Hydrocarbon)	0.0328	--	0.0192	0.053	0.195	Pass	--	--	0.0011 UP
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	HCHO (Formaldehyde)	0.0042	--	0	0.004	0.032	Pass	--	--	0.0001 UP
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	NOX (Nitrogen Oxide)	0.12	--	0.05	0.2	0.2	Pass	--	--	0.01 UP
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	PM (Particulate Matter)	0.005	--	0.005	0.01	0.02	Pass	--	--	-0.0001 UP

Test Group Information

Manufacturer	Ford Motor Company	**Test Group**
Model Year	2011	**Evaporative / Refu**
GHG Exempt Status	N/A	

Certified Models Information

Carline Mfr Code	Division Code	Carline Code and Name	Certification Region Code	Drive System	Trans Type
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	325 - F250 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	324 - F250 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	330 - F250 PICKUP 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	324 - F250 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	315 - F250 PICKUP 2WD Diesel	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	330 - F250 PICKUP 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	315 - F250 PICKUP 2WD Diesel	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	325 - F250 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic

Model Year 2012

CFMXD06.771C (Federal HD chassis Class 3 GVW 10001-14000)

Emission Standards	Useful Life	NMOG	CO	NOX	HCHO	PM
HDV2 (Federal)	120K	0.230	8.1	0.4	0.040	0.02

Test Procedure 2 - CVS 75 and later (w/o can. load)

Vehicle ID / Configuration	BFA1-6.7-J-005 / 1	**Test Proced**
Test Number	BFMX10011537	**Test Fuel Ty**
Exhaust/Evaporative Test Number Link	--	**Fuel**
Test Date	2010-09-10	**DF Type**
Vehicle Class	HDV2 (Federal HD chassis Class 3 GVW 10001-14000), MDV7 (Cal. LEV 2/3 MDV GVW 10001-14000)	

Cert Region	Useful Life	Standard Level	Emission Name	Rounded Result	Multiplicative DF	Additive DF	Certification Level	Standard Value	Criteria Pollutant Pass/Fail Indicator
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	CO (Carbon Monoxide)	0.33	--	0.23	0.6	8.1	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	HC-NM (Non-methane Hydrocarbon)	0.0226	--	0.0334	0.056	0.230	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	HCHO (Formaldehyde)	0.0035	--	0.0004	0.004	0.040	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	NOX (Nitrogen Oxide)	0.23	--	0	0.2	0.4	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	PM (Particulate Matter)	0.003	--	0.007	0.01	0.02	Pass

Test Group Information

Manufacturer	Ford Motor Company	**Test Group**
Model Year	2012	**Evaporative / Refu**
GHG Exempt Status	N/A	

Certified Models Information

Carline Mfr Code	Division Code	Carline Code and Name	Certification Region Code	Drive System	Trans Type
FMX	Ford - 1	390 - F350 2WD DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	350 - F450 4X4 PICKUP DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	350 - F450 4X4 PICKUP DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic

CFMXD06.761A (Federal HD chassis Class 2b GVW 8501-10000)

Emission Standards	Useful Life	NMOG	CO	NOX	HCHO	PM
HDV1 (Federal)	120K	0.195	7.3	0.2	0.032	0.02

Test Procedure 2 - CVS 75 and later (w/o can. load)

Vehicle ID / Configuration	BFA1-6.7-J-008 / 1	
Test Number	BFMX10011536	**Test Procedı**
Exhaust/Evaporative Test Number Link	--	**Test Fuel Ty**
Test Date	2010-09-10	**Fuel**
Vehicle Class	HDV1 (Federal HD chassis Class 2b GVW 8501-10000), MDV6 (Cal. LEV 2/3 MDV GVW 8501-10000)	**DF Type**

Cert Region	Useful Life	Standard Level	Emission Name	Rounded Result	Multiplicative DF	Additive DF	Certification Level	Standard Value	Criteria Pollutant Pass/Fail Indicator
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	CO (Carbon Monoxide)	0.35	--	0.21	0.6	7.3	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	HC-NM (Non-methane Hydrocarbon)	0.0328	--	0.0192	0.053	0.195	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	HCHO (Formaldehyde)	0.0042	--	0	0.004	0.032	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	NOX (Nitrogen Oxide)	0.12	--	0.05	0.2	0.2	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	PM (Particulate Matter)	0.005	--	0.005	0.01	0.02	Pass

Test Group Information

Manufacturer	Ford Motor Company	**Test Group**
Model Year	2012	**Evaporative / Refu**
GHG Exempt Status	N/A	

Certified Models Information

Carline Mfr Code	Division Code	Carline Code and Name	Certification Region Code	Drive System	Trans Type
FMX	Ford - 1	330 - F250 PICKUP 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	330 - F250 PICKUP 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	315 - F250 PICKUP 2WD Diesel	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	324 - F250 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	325 - F250 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	315 - F250 PICKUP 2WD Diesel	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	325 - F250 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	324 - F250 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic

Model Year 2013

DFMXD06.771C (Federal HD chassis Class 3 GVW 10001-14000)

Emission Standards	Useful Life	NMOG	CO	NOX	HCHO	PM
HDV2 (Federal)	120K	0.230	8.1	0.4	0.040	0.02

Test Procedure 2 - CVS 75 and later (w/o can. load)

Vehicle ID / Configuration	DFA1-6.7-J-314 / 0	
Test Number	DFMX10022130	**Test Procedu**
Exhaust/Evaporative Test Number Link	--	**Test Fuel Typ**
Test Date	2012-07-26	**Fuel**
Vehicle Class	HDV2 (Federal HD chassis Class 3 GVW 10001-14000), MDV7 (Cal. LEV 2/3 MDV GVW 10001-14000)	**DF Type**

Cert Region	Useful Life	Standard Level	Emission Name	Rounded Result	Multiplicative DF	Additive DF	Certification Level	Standard Value	Criteria Pollutant Pass/Fail Indicator
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	CO (Carbon Monoxide)	0.63	--	0.23	0.9	8.1	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	CREE (Carbon-Related Exhaust Emissions)	812	--	0	812	999.99	--
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	HC-NM (Non-methane Hydrocarbon)	0.0557	--	0.0334	0.089	0.230	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	HCHO (Formaldehyde)	0.0059	--	0.0004	0.006	0.040	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	NOX (Nitrogen Oxide)	0.3	--	0	0.3	0.4	Pass
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	OPT-CREE (Optional Carbon-Related Exhaust Emissions)	816	--	0	816	999.99	--
Federal	120,000 miles	HDV2 (Federal HD chassis Class 3 GVW 10001-14000)	PM (Particulate Matter)	0.008	--	0.007	0.02	0.02	Pass

Test Group Information

Manufacturer	Ford Motor Company	**Test Group**
Model Year	2013	**Evaporative / Refu**
GHG Exempt Status	Not Exempt	

Certified Models Information

Carline Mfr Code	Division Code	Carline Code and Name	Certification Region Code	Drive System	Trans Type
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	350 - F450 4X4 PICKUP DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	350 - F450 4X4 PICKUP DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic

DFMXD06.761A (Federal HD chassis Class 2b GVW 8501-10000)

Emission Standards	Useful Life	NMOG	CO	NOX	HCHO	PM
HDV1 (Federal)	120K	0.195	7.3	0.2	0.032	0.02

Test Procedure 2 - CVS 75 and later (w/o can. load)

Vehicle ID / Configuration	DFA1.6 7-J-316 / 0	**Test Procedu**
Test Number	DFMX91001457	**Test Fuel Ty**
Exhaust/Evaporative Test Number Link	--	**Fuel**
Test Date	2012-06-01	**DF Type**
Vehicle Class	HDV1 (Federal HD chassis Class 2b GVW 8501-10000), MDV6 (Cal LEV 2/3 MDV GVW 8501-10000)	

Cert Region	Useful Life	Standard Level	Emission Name	Rounded Result	Multiplicative DF	Additive DF	Certification Level	Standard Value	Criteria Pollutant Pass/Fail Indicator
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	CO (Carbon Monoxide)	0.53	--	0.33	0.8	7.3	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	CREE (Carbon-Related Exhaust Emissions)	783	--	0	783	999.99	--
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	HC-NM (Non-methane Hydrocarbon)	0.0656	--	0.0441	0.109	0.195	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	NOX (Nitrogen Oxide)	0.16	--	0.05	0.2	0.2	Pass
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	OPT-CREE (Optional Carbon-Related Exhaust Emissions)	787	--	0	787	999.99	--
Federal	120,000 miles	HDV1 (Federal HD chassis Class 2b GVW 8501-10000)	PM (Particulate Matter)	0.001	--	0.005	0.01	0.02	Pass

Test Group Information

Manufacturer	Ford Motor Company	**Test Group**
Model Year	2013	**Evaporative / Refu**
GHG Exempt Status	Not Exempt	

Certified Models Information

Carline Mfr Code	Division Code	Carline Code and Name	Certification Region Code	Drive System	Trans Type
FMX	Ford - 1	330 - F250 PICKUP 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	330 - F250 PICKUP 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	325 - F250 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	325 - F250 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	326 - F350 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	315 - F250 PICKUP 2WD Diesel	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	390 - F350 2WD DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	Federal	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	324 - F250 2WD BED DELETE DIESEL	Federal	2-Wheel Drive, Rear	Semi-Automatic

FMX	Ford - 1	390 - F350 2WD DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	315 - F250 PICKUP 2WD Diesel	Federal	2-Wheel Drive, Rear	Semi-Automatic
FMX	Ford - 1	327 - F350 4WD BED DELETE DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	392 - F350 4WD DIESEL	California + CAA Section 177 states	Part-time 4-Wheel Drive	Semi-Automatic
FMX	Ford - 1	324 - F250 2WD BED DELETE DIESEL	California + CAA Section 177 states	2-Wheel Drive, Rear	Semi-Automatic

ATTACHMENT 5

Spartan Supplemental §208 Response

June 13, 2013

BINGHAM

Rick R. Rothman
Direct Phone: +1.213.680.6590
Direct Fax: +1.213.830.8790
rick.rothman@bingham.com

June 13, 2013

Confidential

Via Electronic Mail & Overnight Delivery

Anne Wick
Air Enforcement Division
U.S. Environmental Protection Agency
Ariel Rios South Building, Room 1111 B
1200 Pennsylvania Avenue, NW
Washington, DC 20004

Re: Spartan Diesel Technologies, LLC Supplemental Response to Request for Information Under § 208(a) of the Clean Air Act, 42 U.S.C. § 7542(a)

Ms. Wick:

This letter provides the supplemental response of Spartan Diesel Technologies, LLC ("Spartan") to the Request for Information by the U.S. Environmental Protection Agency ("EPA") dated April 11, 2013 (the "Request for Information").

Timing and Scope of Spartan's Supplemental Response

On May 13, 2013, Spartan provided its initial responses to Request Nos. 1-3 and 5-6 from the Request for Information. Spartan also included: (i) a copy of its response to correspondence from the California Air Resources Board; and (ii) Spartan's Limited Liability Company Articles of Organization from the North Carolina Secretary of State. For reference, Spartan's prior responses are enclosed as Enclosure A.

With this letter, Spartan also responds to Request No. 4. This response is provided in accordance with the extension of time to respond that you confirmed in your e-mail dated May 2, 2013. Spartan again clarifies that it is only responding to the Request for Information to the extent EPA seeks information or documents dated on or after September 28, 2010, when Spartan came into existence.[1] Spartan further clarifies that it did not commence its operations and sales until January 1, 2011. Accordingly, Spartan is providing responsive information for the period beginning on January 1, 2011 and ending on April 30, 2013.

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Frankfurt
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Hong Kong
Lexington (GSC)
London
Los Angeles
New York
Orange County
San Francisco
Santa Monica
Silicon Valley
Tokyo
Washington

Bingham McCutchen LLP
Suite 4400
355 South Grand Avenue
Los Angeles, CA
90071-3106

+1.213.680.6400
+1.213.680.6499
bingham.com

[1] Information in Enclosure A confirms when Spartan was formed.

If Spartan discovers additional information or documents containing information that are responsive to the Request for Information, Spartan will, to the extent necessary and appropriate, supplement its responses.

General Objections to the Request for Information

Spartan asserts the following general objections to the Request for Information, which is unduly burdensome and unreasonably broad, exceeds EPA's statutory authority, is insufficiently definite and specific, and is not reasonably relevant to the matter properly under inquiry. *See U.S. v. Morton Salt Co.* 338 U.S. 632, 652 (1950); *F.T.C. v. Texaco*, 555 F.2d 862, 882 (D.C. Cir. 1977).

1. Spartan has made and continues to make a good faith effort to identify information responsive to the Request for Information. Spartan expressly and without qualification reserves the right to amend or supplement its response, including to provide additional documents.

2. Spartan objects to the Request for Information as overbroad and unduly burdensome to the extent EPA seeks wide-ranging information and documents regarding manufacturing, installations, sales and offers for sale over a large geographic area for a period of more than 4 years.

3. Spartan objects to any implication by EPA that Spartan is a "manufacturer," as all of the components identified by Spartan in response to the Request for Information are manufactured by third parties, not Spartan.

4. Spartan objects to the Request for Information to the extent EPA seeks information or documents that pre-date Spartan's formation on September 28, 2010, including information and documents on events that may have taken place before Spartan's formation.

5. Spartan objects to the Request for Information to the extent EPA seeks information or documents that pre-date Spartan's operations and sales, which commenced on January 1, 2011.

6. Spartan objects to EPA's use of the phrase "through the present" as vague and ambiguous. Spartan is providing responsive documentation for the period beginning on January 1, 2011 and ending on April 30, 2013.

7. Spartan objects to the Request for Information as not authorized by law to the extent EPA seeks information that is not necessary for EPA "to determine whether the manufacturer or other person has acted or is acting in compliance with" parts A and C of Title II of the Clean Air Act, 42 U.S.C. § 7542(a).

8. Spartan objects to the Request for Information as overbroad and unduly burdensome to the extent EPA seeks production of "any" or "all" information, data, or documents "regarding" or "related to" Spartan's business. Despite this objection, Spartan will provide a response covering a reasonable scope for each such request.

9. Spartan objects to the Request for Information to the extent EPA seeks information, documents, or information about documents not in Spartan's possession, custody, or control.

10. Spartan objects to the Request for Information to the extent EPA seeks privileged information, including documents and information protected by the attorney-client privilege, work product doctrine, or other applicable protection. Despite this objection, Spartan will provide non-privileged documents responsive to each such request. To the extent any privileged documents are responsive to the Request for Information, Spartan will also provide a privilege log identifying documents protected by the attorney-client privilege and/or work product doctrine. Any inadvertent disclosure by Spartan of privileged or otherwise protected material shall not be construed to constitute a waiver of applicable privileges or protections.

11. Spartan objects to the Request for Information to the extent EPA seeks the production of documents and information already in EPA's possession. Spartan further objects to the Request for Information to the extent EPA seeks information or documents Spartan has already submitted to the State of North Carolina or which are otherwise as accessible to EPA as they are to Spartan.

12. Spartan objects to the Instructions on Attachment C to the Request for Information as imposing unduly burdensome and unreasonably broad obligations on Spartan. Spartan further objects to Instruction No. 2 as unduly burdensome and unreasonably broad to the extent EPA seeks to require Spartan to "identify any source that either possesses or is likely to possess" information not available to Spartan or not in Spartan's possession, custody, or control. Spartan also objects to Instruction No. 5 to the extent that EPA seeks to require Spartan to reproduce documents and information already submitted to EPA.

13 Spartan's production of documents does not represent or act as an admission by Spartan that the contents of all documents produced by Spartan are true, correct, or accurate, nor does it act to authenticate such documents for the purposes of admissibility in any administrative or judicial proceeding.

Objections and Responses to Request No. 4

Spartan incorporates by reference the General Objections stated above and Spartan's additional objections to Requests Nos. 1-3 in Spartan's Initial Response to Request for

Information Under § 208(a) of the Clean Air Act, 42 U.S.C. § 7542(a) dated May 13, 2013 (*see* Enclosure A).

[redacted]

CONFIDENTIAL MATERIAL PURPOSELY OMITTED

i. Copies of receipts for the total quantity of the component sold by Spartan to consumers during each year from January 2009 through the present; and

Subject to and without waiving its objections, Spartan is enclosing, as Enclosure E, responsive documentation for the period beginning on January 1, 2011 and ending on April 30, 2013.

j. For parts sold to an individual customer in quantities of 5 or more units (Distributors), the quantity that was sold to each Distributor during each year: from January 2009 through the present; the name, address, contact persons and phone number of each Distributor; and whether the Distributor marketed the component under the Spartan brand name.

Spartan objects to this Request as overbroad, unduly burdensome, vague and ambiguous to the extent EPA defines the term "distributor" to broadly include any "individual customer" who purchased components "in quantities of 5 or more units." Spartan has some individual customers who may purchase five or more items for those customers' individual use – but not for resale. By definition, "distributors" are those entities that purchase components in order to resell them to their own customers. Spartan is therefore providing information only on such known distributors rather than on individual customers who may have purchased five or more items from Spartan. Spartan also objects to this Request as overbroad and unduly burdensome to the extent EPA seeks to have Spartan break down its sales to distributors by year, as that would require Spartan to review a prohibitive amount of individual invoices.

Subject to and without waiving its objections, Spartan is enclosing, as Enclosure F, responsive documentation for the period beginning on January 1, 2011 and ending on April 30, 2013.

Very truly yours,

Rick Rothman p.p.

Rick R. Rothman

Enclosures

Enclosure A – Letter from R. Rothman to A. Wick, EPA, Spartan Diesel Technologies, LLC Initial Response to Request for Information Under § 208(a) of the Clean Air Act, 42 U.S.C. § 7542(a) (May 13, 2013)

Enclosure B – Advertisements

Enclosure C – Installation and Operation Instructions for each Component Listed in Response to Request 4(a)

Enclosure D – Purchases by Spartan

Enclosure E – Sales by Item Summaries for 2011, 2012, and 2013

Enclosure F – List of Distributors and Total Sales to Each

Enclosure B

Advertisements

SPARTAN
DIESEL TECHNOLOGIES

Introducing the Spartan Phalanx – Delivering the most powerful Diesel tuning thru the most advanced dashboard display.

Technology Beyond Performance
www.spartandieseltech.com

Powering the world's fastest Ford 6.4L trucks with full custom engine and transmission tuning

TUNING FOR:
- Towing
- Power
- Fuel Economy
- Drag Racing
- Sled Pulling
- Dyno Competition

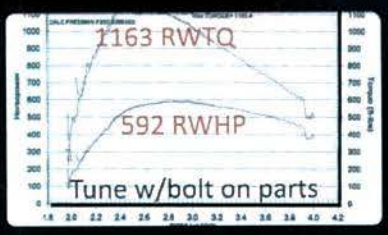
POWER LEVELS
- 40HP
- 75HP
- 120HP
- 150HP
- 175HP

Monitor EGT, Boost, Fuel Economy, Power, and hundreds of OBD2 sensors.

Customize your own digital gauges, audio alerts, and perform advanced diagnostics

Enjoy MP3/Digital Video Player and optional GPS navigation

Flash tuning supports Ford 6.4L, 6.0L, 7.3L Diesel. Monitor works on all OBD2 vehicles.



Available at the following distributors (full dealer list available on website)

Street Diesel Performance	Rudy's Performance Parts	Coy's Diesel Specialties	Dirty Diesel Customs
Connecticut	North Carolina	Louisana	Canada
860-250-6082	866-757-6537	225-505-9355	403-346-2282

SPARTAN
DIESEL TECHNOLOGIES

Flash Tune your new 6.7L Ford Diesel

Increase Power with new tunes

Save Fuel with economy tuning

Improve Towing with more torque

Harness the 6.7's Full Potential

Spartan is proud to be the first to offer engine and transmission tuning for your Ford 6.7L diesel Whether you want to show your friends blistering power and torque, get better fuel economy, or just improve your new truck, we have the right solution for you.

Spartan Tuning is for Ford 6.7L, 6.4L, and 6.0L Diesels.

Available at the following distributors (full dealer list available on website)

Xtreme Diesel Performance (XDP) New Jersey 888-DIESEL4	River City Diesel Illinois 309-699-2488	Street Diesel Performance Connecticut 860-250-6082	Rudy's Diesel Performance North Carolina 866-757-6537	Rock and Roll Offroad Texas 877-765-8774	Rip It Customs Canada 780-449-3900

www.spartandieseltech.com

Anne Wick, U.S. Environmental Protection Agency
June 13, 2013

Enclosure C

Installation and Operation Instructions for each Component Listed in Response to Request 4(a)

BEFORE TUNING YOU TRUCK FILL OUT THE ATTACHED RACE USE DISCLAIMER & LIABILITY WAVER. BE SURE TO WRITE REGISTRATION SOMEWHERE ON THE BOARDER OF THE DISCLAIMER. FAX TO US AT 828-692-9968, OR SCAN AND ATTACH TO AN EMAIL AND SEND TO: sales@spartandieseltech.com

TUNER REGISTRATION

To register your tuner send the following info to sales@spartandieseltech.com

Name, DashDAQ Serial #, and who you purchased your tuner from.

We will not be able to provide technical support, until we have a signed disclaimer from you. DEALER DISCLAIMERS WILL NOT BE ACCEPTED.

DO NOT **INSTALL ANY DPF DELETE EXHAUST COMPONENTS UNTIL THESE INSTRUCTIONS HAVE BEEN READ COMPLETELY. DPF DELETE TUNE FILES MUST BE INSTALLED PRIOR TO INSTALLING DPF DELETE EXHAUST COMPONENTS.** ***FAILURE TO INSTALL NEEDED DPF DELETE TUNING BEFORE REMOVING THESE COMPONENTS CAN LEAVE YOUR VEHICLE STRANDED*** **UNTIL THE TUNES ARE INSTALLED AND CAN CAUSE DAMAGE TO YOUR VEHICLE AND ENGINE.**

PLEASE CONNECT A BATTERY CHARGER TO YOUR TRUCK PRIOR TO LOADING ANY TUNE. IT DOESN'T MATTER WHICH ONE AND SET IT ON TRICKLE CHARGE.

SPARTAN
DIESEL TECHNOLOGIES
Hendersonville, NC (828) 606-3263
www.SpartanDieselTech.com

RACE USE DISCLAIMER AND LIABILITY WAIVER

This product is designed for competition racing use only. Use on State and Federal Highways is a violation of the EPA Clean Air Act. The Clean Air Act can be found at http://www.epa.gov/air/caa/. This document contains in detail what are considered to be violations of the CAA and corresponding penalties for failure to obey and should be read in full before signing this disclaimer and/or installing this off-road, race use only product. Ensuring that all emissions, noise/sound, and speed/use related laws are followed is the responsibility of the Buyer(s). Installation and use of this product indicates that this disclaimer has been read, acknowledged, and understood fully by both the Buyer(s) and Installer(s).

The Buyer(s) assume all associated risk of the purchase and/or use of this product. "Spartan Diesel Technologies" assumes no responsibility of any personal injury, death, or property damage associated with the use of this competition racing use-only product. The Buyer(s) assume all responsibility of ensuring that all applicable speed and safety restrictions are followed during the use of this product. This includes staying within speed limits of tire rating, engine speed restrictions, and legal competition racing use of the vehicle and associated product. The above is regardless of capabilities enabled by use of any "Spartan Diesel Technologies" product. All local, state, and federal laws and ordinances must be adhered during the use of the product. Determining the nature of these laws and ordinances is the exclusive responsibility of the Buyer(s).

Manufacturer Limited Vehicle Warranties should be referenced before installation and use of this product. "Spartan Diesel Technologies" shall not be held responsible for voidance of any Manufacturer Warranties. The vehicle manufacturer is to be referenced directly by the Buyer(s) to determine what is or is not permissible under the Manufacturer's Limited Warranty. The Buyer(s) assume all possible damages and associated costs in the situation of Manufacturer Warranty voidance.

Installation, service, and use are solely the responsibility of the Buyer(s) and Installer(s) of the given product. "Spartan Diesel Technologies" assumes no liability for personal injury or property damage due to misuse, mis-installation, or improper service of the product. The Buyer(s) and Installer(s) assume all responsibility of ensuring that all proper instructions for installation and use are followed. This product is capable of the following:

I. Making the vehicle incompliant with Local, State and Federal emissions regulations.

II. Making the vehicle capable of generating vehicle speeds unsafe for driving

conditions.

III. Making the vehicle capable of generating conditions exceeding safe vehicle speeds based on mechanical condition of the vehicle, such as tire speed ratings.

IV. Making the vehicle capable of exceeding mechanical limits of engine speed, power output, and mechanical stress upon the powertrain, driveline, chassis, and body of the vehicle.

V. Producing power and torque output requiring superior driving skills and techniques in order to be safely applied.

It is the sole responsibility of the Buyer(s) and User(s) of this product to be aware of these additional capabilities and adjust the installation and use of the product accordingly. All other warranties, express or implied, are not applicable for the purchase and use of this product. Failure of the product due to misuse or mis-installation is specifically excluded from the Limited Warranty of this product. "Spartan Diesel Technologies" will not be held liable for indirect, incidental and/or consequential damages caused by the purchase, installation, and/or use of the product.

Signature of this disclaimer and waiver is necessary in order to receive tunes/calibrations from Spartan Diesel Technologies to enable use of our DPF Delete 6.4 Liter, or 6.7 Liter Ford Products.

Signature of this disclaimer and waiver implies that the Buyer(s) and all potential User(s) have read, understood, and accepted the contents and responsibilities of both the said disclaimer and Federal EPA Clean Air Act linked and referenced herein.

PRINT NAME OF BUYER	**ADDRESS OF BUYER**
CONTACT TELEPHONE	**CITY, START, ZIP CODE**
EMAIL ADDRESS	**TUNER SERIAL NUMBER**

SIGNATURE OF BUYER

SPARTAN
DIESEL TECHNOLOGIES
Hendersonville, NC (828) 606-3263
www.SpartanDieselTech.com

Website Setup and Basics

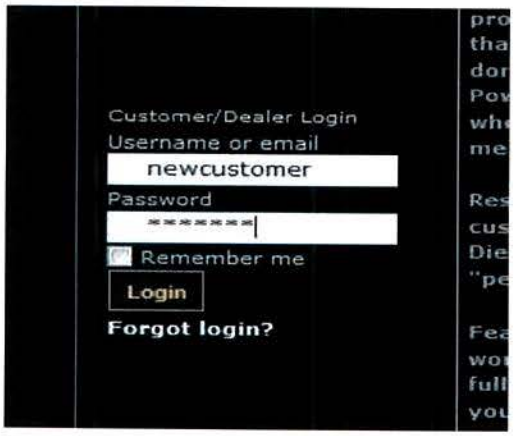
Our 6.4L Powerstroke products now come preloaded with the following tunes for automatic transmission trucks:

40HP On-Road (DPF On) 75HP On-Road (DPF On) 125HP On-Road (DPF On)
150HP On-Road (DPF On) 40HP Race (DPF OFF) 75HP Race (DPF OFF)
125HP Race (DPF OFF) 150HP Race (DPF OFF) 175HP Race (DPF OFF)
210HP Race (DPF OFF) 250HP Race (DPF OFF) 275HP Race (DPF OFF)
300HP Race (DPF OFF) 310HP Race (DPF OFF) 350HP Race (DPF OFF)

*****NOTE*** For trucks with manual transmissions you will need to email your vin# and strategy code to us after registering your tuner. Please specify if you need regular, or egr delete tunes. Send your request to: tech@spartandieseltech.com**

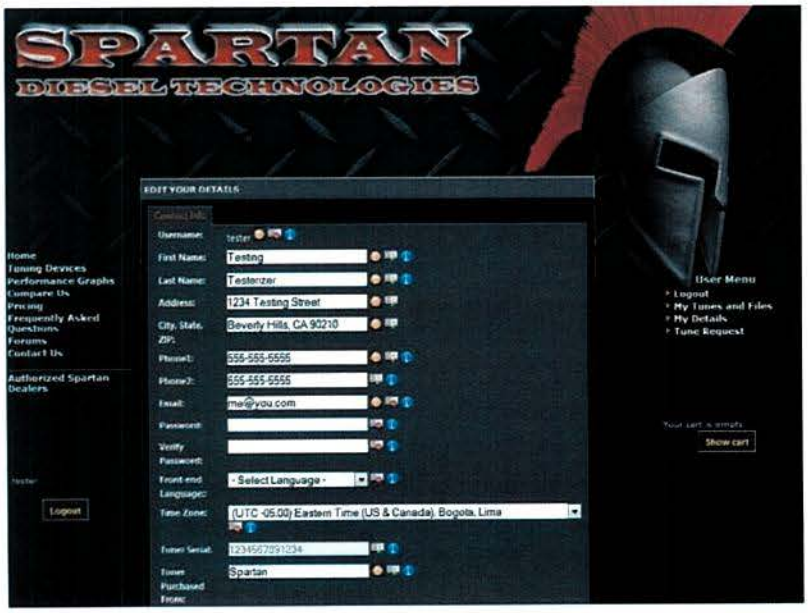
The following files are available for manual transmissions trucks:

40HP Race (DPF OFF) 75HP Race (DPF OFF) 125HP Race (DPF OFF) 150HP Race (DPF OFF)
210HP Race (DPF OFF) 250HP Race (DPF OFF) 275HP Race (DPF OFF)
310HP Race (DPF OFF)



Upon receiving this product, please log into our site at www.spartandieseltech.com, using the "Customer/Dealer Login" form found on the main page of our site. Please use the "username" and "password" that we provided when you registered your tuner with us.

Directions will be provided in the email on how to confirm and activate your account.



A confirmation email will be sent to the email address you provide to us at time of purchase. Directions will be provided in the email on how to confirm and activate your account.

Once logged in, you will be required to provide specific information about your vehicle. Select "My Details" under the "User Menu" on the right side of the page, then "Edit", and "Update Your Profile". You must fill out all required fields with the correct information. The "VIN" and "Strategy" information can be found by plugging your Phalanx Console into your vehicle. Power the console unit on. From "Gauges", select "Exit". Next select "Tuning". Now select "Vehicle Info" and then follow the directions on the screen. **This information is required for technical support- tech support cannot be provided until this profile is filled out completely.**

profile is filled out completely.

Your strategy code will look something like **8C3A-14C204-HCA 8C3A-14C337-CH**. Your engine strategy code is **8C3A-14C204-HCA**, and you transmission strategy code is **8C3A-14C337-CH**. When entering the info on the website be sure to include the dashes between the numbers and letters.

We highly recommend all new users visit our web site and forum for assistance and detailed instructions at http://spartandieseltech.com/index.php/frequently-asked-questions/5-tech-support , and technical support forum www.spartandieseltech.com/forum . Both provides a wealth of information about gauges, monitor configurations, custom tune file downloads, and many other helpful subjects.

Previous customers please note- it is no longer necessary to use the "tune request" function of your profile, since our products are now pre-loaded with tuning.

Tuning Installation

To begin the tuning process, visit the "Tuning" menu of the Phalanx console with the console plugged into the vehicle. (The vehicle diagnostic port is located under the dash on the driver's side). Click on the "Load Tune" function. The console will then prompt on-screen key-on/key-off instructions to retrieve your vehicle's calibration information- **do not start the vehicle during this process**. Once complete, a list of available tune files will appear (these can be scrolled through using the left and right arrows at the top of the screen). Please choose the tune you wish to install accordingly- make sure that the correct DPF setting is chosen for your application.

On-Road (DPF ON) Tuning- to be used competition racing use only applications, with the factory DPF (Diesel Particulate Filter) and DOC (Diesel Oxidation Catalyst; otherwise known as catalytic converter) still in place. If you have not removed any exhaust components, these are the settings you will need to use.

Race Tuning (DPF OFF) Tuning- to be used STRICTLY for competition racing use applications (please reference your copy of the signed Liability/Race Use Disclaimer for legal details). These tunes are to be installed if your factory DPF and/or DOC is going to be removed after installing the tunes.

Installing racing only tuning with the DPF in place will cause DPF and engine damage; Installing on-road tuning with the DPF removed will place the vehicle in constant regeneration (filter cleaning mode) and will excessively overfuel- causing an excess of white exhaust smoke and eventual engine damage. Please choose carefully; if you aren't sure as to which needs to be installed in your application, contact our tech support department.

Once the proper tune file has been chosen, the console will begin backing up your stock file, then installing the chosen tune file. The stock file backup is done automatically and requires no intervention. The first "flash" of the vehicle will take 32 minutes to back up the stock file and download your new tune file. **Do NOT unplug or shut down the Phalanx console during the file loading process, and do NOT turn the ignition switch/key off for any reason until the file is complete. Doing so will destroy the vehicle computers, leaving the truck inoperable until towed to a Ford dealership for computer module replacement- damage from this is NOT warrantable by Spartan or Ford-** SO DO NOT TURN THE KEY OFF DURING DOWNLOAD, PERIOD.

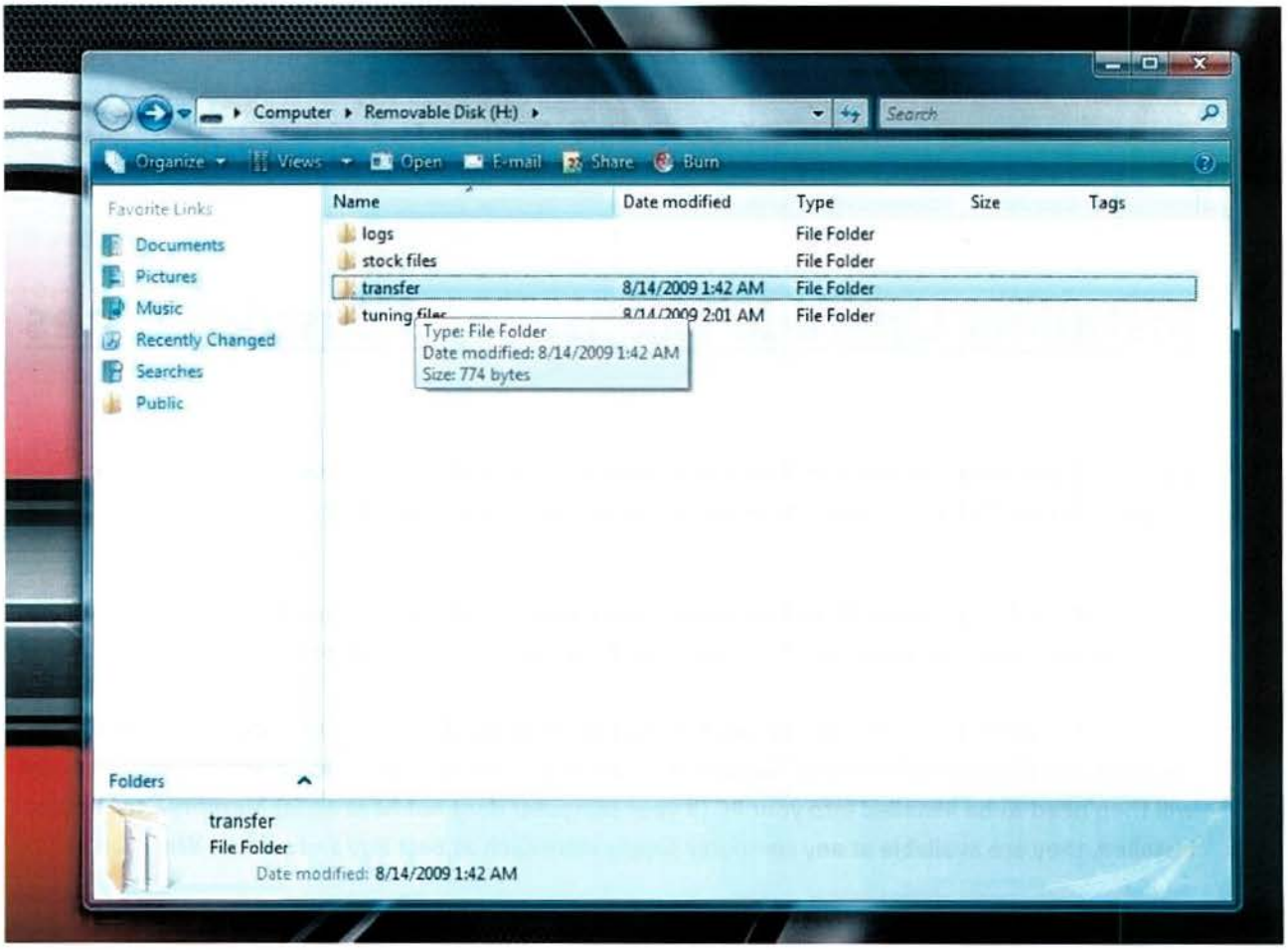
Installing Upgrade Licenses and Custom Tunes

If you have purchased an upgrade license to acquire the tcm tunes, the license file will need to be installed to your Phalanx Console for those files to become active and usable.

Once purchased, the license file will either be downloadable from the "My tune and Files" area of your customer profile on our website, or sent via email if purchased from an authorized dealer.

Once downloaded to your PC, the file needs to be copied to the SD memory card located in the slot on the right side of your flash console. Remove the card by pushing in slightly, and it will pop out. The card will then need to be installed into your PC (if your computer does not have an SD Memory Card reader installed, they are available at any computer supply store such as Best Buy and even at Wal-Mart).

When the card is installed into your PC, choose the option from the pop-up menu "Open folder to view files".



Drag the downloaded license file from your PC into the "transfer" folder shown above. After moving, you should see the license file listed by double-clicking on the "transfer" folder to open it.

Once placed onto the SD memory card, reinstall the card into your flash console with the console unplugged. Then the license can be installed by using the "command" function inside the tuning menu, or by going to "Setup", then "SD Card", then "Install", then "License" and selecting the needed license. The console should confirm installation of the license with a message that says "License Installed Successfully"- once this is complete the extra tunes associated with the license level you purchased will be available in the "Load Tunes" menu for installation into your vehicle.

Any custom files (written specifically for your truck, i.e. for hardware modifications, ect.) delivered will be downloaded in an identical manner, except placed into the "tuning files" folder. Once located there, they will be accessible via the "Load Tunes" menu like all others

Gauge Configuration

Your Phalanx Flash console comes pre-set with our recommended monitoring options.
Only one step is required to bring the monitoring functions online and viewable.

With the console plugged into the vehicle, and the vehicle either "keyed" on or running, select the "Find Signals" button within the setup menu. This will identify all monitor able signals on your vehicle.

Instructions for gauge customization are available on the Update Software disc included with your tuner, and on our forums and Drew Technologies' website at www.spartandieseltech.com/forum and www.dashdaq.com respectively. A full list of signal definitions is also available on both sites. Below is a quick "run through" of the most commonly used acronyms-

EGRTA, "Exhaust Gas Recirculation Temperature A" in the Ford Specific list = Pre-Turbo EGT
MGP, "Manifold Gauge Pressure" in the Ford Specific list = Boost
ECT, "Engine Coolant Temperature" = Standard engine temperature (coolant)
EOT, "Engine Oil Temperature"= Temperature of engine oil after oil cooler
FRP, "Fuel Rail Pressure" in Ford Specific and Generic OBDII lists = High Pressure Fuel System Pressure
IAT1, "Intake Air Temperature 1" = Air Temperature at Mass Air Flow Sensor (near air filter)
IAT2, "Intake Air Temperature 2" = Manifold Air Temperature, after intercooler
FRT, "Fuel Rail Temperature" = Temperature of fuel return to high pressure fuel system

EGR Delete Files, Manual Transmissions, and other notes

Please note if you need egr delete tunes for trucks with automatic transmissions, you will need to download them from our website after registering your tuner with us. These files are designed for use with any aftermarket EGR Delete/Removal kit, and will work with any brand of EGR delete that removes the EGR cooler, EGR Valve, EGR throttle plate, and other EGR-related components. The purpose of these tunes is to eliminate any diagnostic trouble codes and cruise control inhibition caused by removal of the EGR system. If your truck has the EGR removed, please choose the appropriate delete tune for the HP level you want to use.

Vehicles equipped with the 6-Speed manual transmission will not automatically identify tune files. Please send an email to tech@spartandieseltech.com containing the following info so we can write your tune. Subject line of the email should be Manual 6.4L Tunes

Name

DashDAQ serial #

Who the unit was purchased from

Vin # and strategy code

Please specify if you need regular, or egr delete tunes

Also note that some files are labeled as "el". These tunes are designed for later-model MY2009 and MY2010 trucks (or any 6.4) equipped with 3.55 ratio differential gears. Use of these tunes is not mandatory, but users with 3.55-geared trucks will find shifting and lockup to be most optimal with them.

Thanks,
6.4L Calibration Team
Spartan Diesel Technologies

This page between component instructions intentionally left blank.

BEFORE TUNING YOU TRUCK FILL OUT THE ATTACHED RACE USE DISCLAIMER & LIABILITY WAVER. BE SURE TO WRITE REGISTRATION SOMEWHERE ON THE BOARDER OF THE DISCLAIMER. FAX TO US AT 828-692-9968, OR SCAN AND ATTACH TO AN EMAIL AND SEND TO: sales@spartandieseltech.com

TUNER REGISTRATION

To register your tuner send the following info to sales@spartandieseltech.com

Name, DashDAQ Serial #, and who you purchased your tuner from.

We will not be able to provide technical support, or register you tuner until we have a signed disclaimer from you. DEALER DISCLAIMERS WILL NOT BE ACCEPTED.

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PLEASE CONNECT A BATTERY CHARGER TO YOUR TRUCK PRIOR TO LOADING ANY TUNE. IT DOESN'T MATTER WHICH ONE AND SET IT ON TRICKLE CHARGE.

Unlocking your 6.7L Tuner

In order to unlock the tuning functions on your 6.7L tuner, please read the directions in the following pages concerning how to list your truck's information on the Spartan website.

Once this is complete, please email the following information to sales@spartandieseltech.com, with the email subject header as "6.7 Tuner Unlock".

Customer Name
Tuner Serial Number
Vehicle VIN
Vehicle Strategy (see instructions for how to read this from the truck)

Your email will be responded to with the needed "index file" to unlock all of the tuning functions of your Phalanx unit, along with a stock file used to return your vehicle back to stock once the tuner is removed. Instructions for installing both of these will be included in the email.

We require the email, in conjunction with the data stored on our website, to ensure that we always have your truck's information available to fully support both your truck and tuner, and that the data is correct. That information is a crucial part of the way we deliver proper stock files back to our customers, which is critical in the event you need to remove your tuner for warranty work.

For more information on why this is necessary, and how this process helps to protect your vehicle's warranty, please visit our website.

If you have any questions or need help with this process, just call or email us.

SPARTAN
DIESEL TECHNOLOGIES
Hendersonville, NC (828) 606-3263
www.SpartanDieselTech.com

RACE USE DISCLAIMER AND LIABILITY WAIVER

This product is designed for competition racing use only. Use on State and Federal Highways is a violation of the EPA Clean Air Act. The Clean Air Act can be found at http://www.epa.gov/air/caa/. This document contains in detail what are considered to be violations of the CAA and corresponding penalties for failure to obey and should be read in full before signing this disclaimer and/or installing this off-road, race use only product. Ensuring that all emissions, noise/sound, and speed/use related laws are followed is the responsibility of the Buyer(s). Installation and use of this product indicates that this disclaimer has been read, acknowledged, and understood fully by both the Buyer(s) and Installer(s).

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I. Making the vehicle incompliant with Local, State and Federal emissions regulations.

II. Making the vehicle capable of generating vehicle speeds unsafe for driving conditions.

III. Making the vehicle capable of generating conditions exceeding safe vehicle speeds based on mechanical condition of the vehicle, such as tire speed ratings.

IV. Making the vehicle capable of exceeding mechanical limits of engine speed, power output, and mechanical stress upon the powertrain, driveline, chassis, and body of the vehicle.

V. Producing power and torque output requiring superior driving skills and techniques in order to be safely applied.

It is the sole responsibility of the Buyer(s) and User(s) of this product to be aware of these additional capabilities and adjust the installation and use of the product accordingly. All other warranties, express or implied, are not applicable for the purchase and use of this product. Failure of the product due to misuse or mis-installation is specifically excluded from the Limited Warranty of this product. "Spartan Diesel Technologies" will not be held liable for indirect, incidental and/or consequential damages caused by the purchase, installation, and/or use of the product.

Signature of this disclaimer and waiver is necessary in order to receive tunes/calibrations from Spartan Diesel Technologies to enable use of our DPF Delete 6.4 Liter, or 6.7 Liter Ford Products.

Signature of this disclaimer and waiver implies that the Buyer(s) and all potential User(s) have read, understood, and accepted the contents and responsibilities of both the said disclaimer and Federal EPA Clean Air Act linked and referenced herein.

PRINT NAME OF BUYER	**ADDRESS OF BUYER**
CONTACT TELEPHONE	**CITY, START, ZIP CODE**
EMAIL ADDRESS	**TUNER SERIAL NUMBER**

SIGNATURE OF BUYER

Pre-Turbo EGT's

Due to the fact that the 6.7L truck does not have a pre-turbo EGT sensor installed from the factory, a simple EGT reading via the Phalanx/DashDAQ is not possible without other associated hardware.

Our recommended method of properly reading Pre-Turbo exhaust gas temperatures is via one of two different kits available from **Sean @ Street Diesel Performance**.

"EGT Sensor Relocation Kit" Part# 67EGT
This is a pair of plates that install easily to remove one EGR feed pipe and allow one of the factory exhaust EGT sensors removed from the exhaust under the truck (12x1.25mm thread) to be relocated into the center of the engine, right side exhaust manifold to read pre turbo EGT. The sensor shared the same plugs making this a simple way to read EGT preturbo with drilling.

Benefits- Easiest kit to install
Drawbacks- Does not remove the full EGR system

" EGT Relocation and EGR Removal Kit" Part# 67SCOOLERD
This is a full cooler delete to remove everything from the topside of the right side engine valve cover. Including in the kit is all the blockoff plates, brackets and hardware to remove all EGR cooler and electronics. Also included for the Spartan tuners is a coolant pipe to relocate the water temp sensor from the EGR coolers. This sensor is used to monitor the water temp for the intercooler cooling system which is a unique feature of the Spartan tuner.
Benefits- Removes full EGR system; helps lower intercooler temperatures and gives a cleaner under-hood appearance.
Drawbacks- Slightly more involved and time-consuming installation.

Both kits are compatible with ONLY DPF-OFF tuning. Purchase and installation is not a necessity, but it is highly recommended.

SPARTAN
DIESEL TECHNOLOGIES
Hendersonville, NC (828) 606-3263
www.SpartanDieselTech.com

Website Setup and Basics

Our 6.7L Powerstroke products now come preloaded with the following tunes:

(25HP DPF ON - 90 DPF ON Cab & Chassis Only)
50HP DPF ON - 125 DPF ON
40HP RACE - 80HP RACE - 120HP RACE
165HP RACE & *200HP RACE*

Upon receiving this product, please log into our site at www.spartandieseltech.com, using the "Customer/Dealer Login" form found on the main page of our site. Please use the "username" and "password" that we provided when you registered your tuner with us.

Directions will be provided in the email on how to confirm and activate your account.

Once logged in, you will be required to provide specific information about your vehicle. Select "My Details" under the "User Menu" on the right side of the page, then "Edit", and "Update Your Profile". You must fill out all required fields with the correct information. The "VIN" and "Strategy" information can be found by plugging your Phalanx Console into your vehicle. Power the console unit on. From "Gauges", select "Exit". Next select "Tuning". Now select "Vehicle Info" and then follow the directions on the screen. **This information is required for technical support- tech support cannot be provided until this profile is filled out completely.**

Your strategy code will look something like **BC3A-14C204-ESA BC3A-14C337-CH**. Your engine strategy code is **BC3A-14C204-ESA**, and you transmission strategy code is **BC3A-14C337-CH**. When entering the info on the website be sure to include the dashes between the numbers and letters.

We highly recommend all new users visit our web site and forum for assistance and detailed instructions at http://spartandieseltech.com/index.php/frequently-asked-questions/5-tech-support , and technical support forum www.spartandieseltech.com/forum . Both provides a wealth of information about gauges, monitor configurations, custom tune file downloads, and many other helpful subjects.

Tuning Installation

To begin the tuning process, visit the "Tuning" menu of the Phalanx console with the console plugged into the vehicle. (The vehicle diagnostic port is located under the dash on the driver's side). Click on the "Load Tune" function. The console will then prompt on-screen key-on/key-off instructions to retrieve your vehicle's calibration information- **do not start the vehicle during this process**. Once complete, a list of available tune files will appear (these can be scrolled through using the left and right arrows at the top of the screen). Please choose the tune you wish to install accordingly- make sure that the correct DPF setting is chosen for your application.

On-Road (DPF ON) Tuning- to be used for on-road applications, with the factory DPF (Diesel Particulate Filter) , DOC (Diesel Oxidation Catalyst; otherwise known as catalytic converter), SCR (Selective Catalyst Reductant) and DEF (Diesel Exhaust Fluid) still in place. If you have not removed any exhaust

components, these are the settings you will need to use.

Race Tuning- to be used STRICTLY for competition racing use only applications (please reference your copy of the signed Liability/Race Use Disclaimer for legal details). These tunes are to be installed if your factory DPF, DOC, SCR, and DEF is going to be removed after installing the tunes.

Installing racing only tuning with the DPF in place will cause DPF and engine damage; Installing on-road tuning with the DPF removed will place the vehicle in constant regeneration (filter cleaning mode) and will excessively overfuel- causing an excess of white exhaust smoke and eventual engine damage. Please choose carefully; if you aren't sure as to which needs to be installed in your application, contact our tech support department.

The first "flash" of the vehicle will take 19 minutes to back up the stock file and download your new tune file. **Do NOT unplug or shut down the Phalanx console during the file loading process, and do NOT turn the ignition switch/key off for any reason until the file is complete. Doing so may damage the vehicle computers, leaving the truck inoperable until towed to a Ford dealership for computer module replacement- damage from this is NOT warrantable by Spartan or Ford-** **SO DO NOT TURN THE KEY OFF DURING DOWNLOAD, PERIOD.**

Custom Tunes

All units are currently shipped with all available tunes. Custom file are written on an individual basic and must be purchased through Spartan.

Any custom files (written specifically for your truck, ie for hardware modifications, ect.) will be emailed to you. Just follow the instructions that are emailed to you.

Gauge Configuration

Your Phalanx Flash console comes pre-set with our recommended monitoring options.
Only one step is required to bring the monitoring functions online and viewable.

With the console plugged into the vehicle, and the vehicle either "keyed" on or running, select the "Find Signals" button within the setup menu. This will identify all monitorable signals on your vehicle.

Instructions for gauge customization are available on the Update Software disc included with your tuner, and on our forums and Drew Technologies' website at www.spartandieseltech.com/forum and www.dashdaq.com respectively. A full list of signal definitions is also available on both sites.

Thanks,
6.7L Calibration Team
Spartan Diesel Technologies

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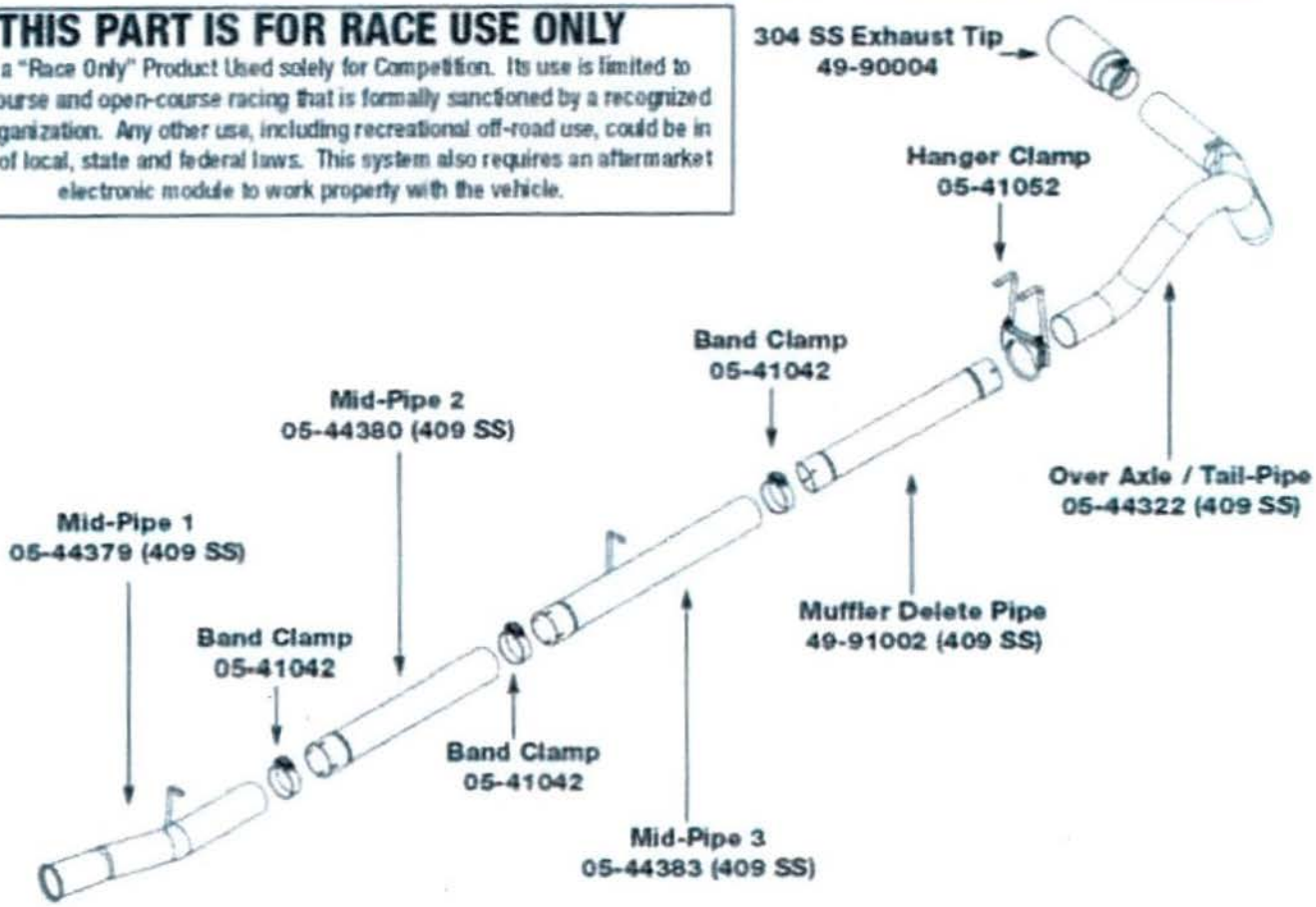
INSTALLATION INSTRUCTIONS

MAKE: FORD
MODEL: POWER STROKE
YEAR: 2008-2010
ENGINE: V8-6.4L (td)
WHEELBASE: 156" to 172"

4" Turbo-Back
49-43030 (409SS)

THIS PART IS FOR RACE USE ONLY

This is a "Race Only" Product Used solely for Competition. Its use is limited to closed-course and open-course racing that is formally sanctioned by a recognized racing organization. Any other use, including recreational off-road use, could be in violation of local, state and federal laws. This system also requires an aftermarket electronic module to work properly with the vehicle.



Step 1: **(Read instructions prior to installation)** Remove your stock exhaust from the rear of your truck working your way forward. It may be necessary to remove front crossmember for turbo down pipe removal. Take caution not to damage the factory isolation mount as they will be reused. Disconnect sensors at the connections. Take caution as not to damage any sensors. ***It is recommended to not fully tighten the clamps until the entire system has been installed.***

Step 2: For ease of installation spread the pieces of the exhaust along side of your vehicle according to the diagram shown above.

Step 3: Install mid-pipe 1st, then install mid-pipe 2 and 3 with band clamps. You may need to shorten mid-pipe 3 depending on the wheel-base length. Do not fully tighten.

Step 4: Install the muffler delete pipe using the two clamps indicated.

Step 5: Utilizing the factory isolation mounts now install over axle/tail-pipe.

Step 6: Adjust for alignment and tighten all connections. Your installation is now complete. It is recommended to re-tighten all exhaust components after the first 50-100 miles.

NOTE:
- aFe recommends that the tailpipe be at least **1/2"-1"** away from any body panels to avoid heat related body damage. **Tighten and secure.**

Caution: *Allow time for your vehicle to cool down prior to installation. When working on or under your vehicle proceed with caution. Exhaust systems reach high temperatures and may cause serious burns. Wear protective safety equipment; eye goggles and gloves to ensure a safe installation.* ***aFe recommends professional installation on our products.***

Updated: 10-2010 (06-85373)

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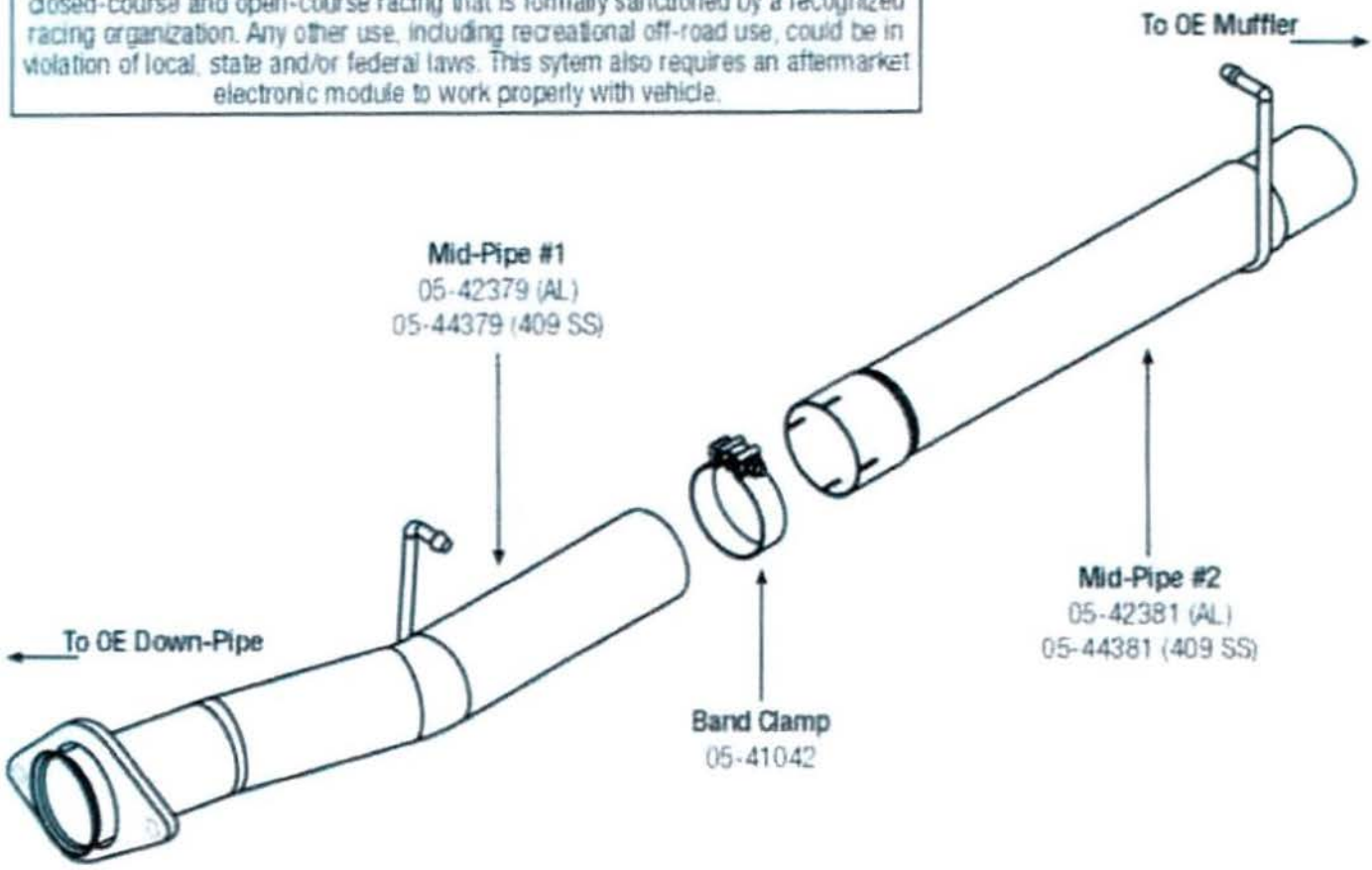
INSTALLATION INSTRUCTIONS

MAKE: FORD
MODEL: POWER STROKE
YEAR: 2008-2010
ENGINE: V8-6.4L (td)
WHEELBASE: 156" to 172"

4" Race Pipe
49-03010 (AL)
49-43031 (409 SS)

THIS PART IS RACE USE ONLY

This is a "Race Only" product used solely for competition. It's use is limited to closed-course and open-course racing that is formally sanctioned by a recognized racing organization. Any other use, including recreational off-road use, could be in violation of local, state and/or federal laws. This sytem also requires an aftermarket electronic module to work properly with vehicle.



Step 1: (Read Instructions prior to installation) Disconnect sensors at the connections. Take caution as not to damage any sensors. Remove CAT/DPF section of your trucks exhaust working your way forward. Take caution not to damage the factory isolation mounts as they will be reused. **It is recommended to not fully tighten the clamps until the entire system has been installed.**

Step 2: For faster installation spread the pieces of the exhaust along side of your vehicle according to the diagram shown.

Step 3: Attach mid-pipe #1 first using supplied nuts and bolts to OE turbo down-pipe, then install mid-pipe #2 with the supplied band clamp between mid-pipe #1 and OE pipe attached to OE muffler.

Step 4: Adjust for alignment and tighten all connections. Your installation is now complete. It is recommended to re-tighten all exhaust components after the first 50-100 miles.

NOTES:

- aFe recommends that the tailpipe be at least 1/2"-1" away from any body panels to avoid heat related body damage. **Tighten and secure.**
- Controller/Programmers are required to operate this system.

Caution: Allow time for your vehicle to cool down prior to installation. When working on or under your vehicle proceed with caution. Exhaust systems reach high temperatures and may cause serious burns. Wear protective safety equipment, eye goggles and gloves to ensure a safe installation. **aFe recommends professional installation on our products.**

06-83371
Updated: November 2011

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INSTALLATION INSTRUCTIONS

MAKE: FORD
MODEL: POWER STROKE
YEAR: 2011
ENGINE: V8-6.7L (td)
WHEELBASE: 141" to 172"

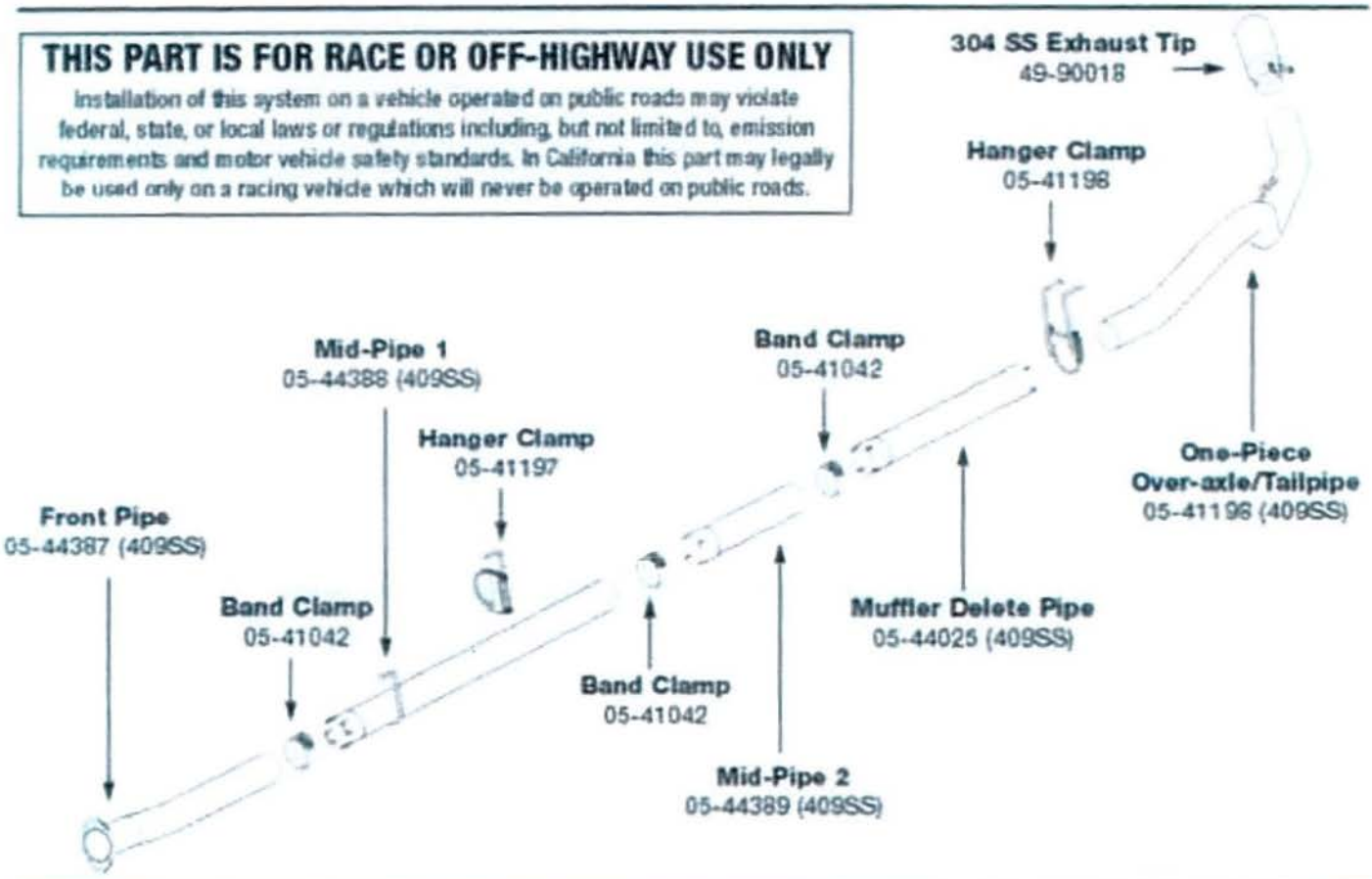
4" DPF-Delete

(With Muffler Delete Pipe)

49-43035 (409SS)

THIS PART IS FOR RACE OR OFF-HIGHWAY USE ONLY

Installation of this system on a vehicle operated on public roads may violate federal, state, or local laws or regulations including, but not limited to, emission requirements and motor vehicle safety standards. In California this part may legally be used only on a racing vehicle which will never be operated on public roads.



Step 1: **(Read instructions prior to installation)** Remove your stock exhaust from the rear of your truck working your way forward. Take caution not to damage the factory isolation mounts as they will be reused. Disconnect sensors at the connections. Take caution as not to damage any sensors. ***It is recommended to not fully tighten the clamps until the entire system has been installed.***

Step 2: For ease of installation spread the pieces of the exhaust along side of your vehicle according to the diagram shown above.

Step 3: Install front pipe 1 first, then install the mid-pipes 1 and 2 with the band clamps and hanger clamp. You may need to shorten mid-pipe 2 depending on the wheelbase length. Do not fully tighten.

Step 4: Install the muffler delete pipe using the two clamps indicated. Do not fully tighten.

Step 5: Utilizing the factory isolation mounts now install over-axle/tail-pipe.

Step 6: Adjust for alignment, install exhaust tip and tighten all connections. Your installation is now complete. It is recommended to re-tighten all exhaust components after the first 50-100 miles.

Step 7: Install the urea injector bracket between the frame and hanger mount. It is not necessary to remove the hanger mount. Use the original injector mounting nuts. DO NOT OVER TIGHTEN!

NOTE:

- aFe recommends that the tailpipe be at least **1/2"-1"** away from any body panels to avoid heat related body damage. **Tighten and secure.**

Caution: *Allow time for your vehicle to cool down prior to installation. When working on or under your vehicle proceed with caution. Exhaust systems reach high temperatures and may cause serious burns. Wear protective safety equipment; eye goggles and gloves to ensure a safe installation.* ***aFe recommends professional installation on our products.***

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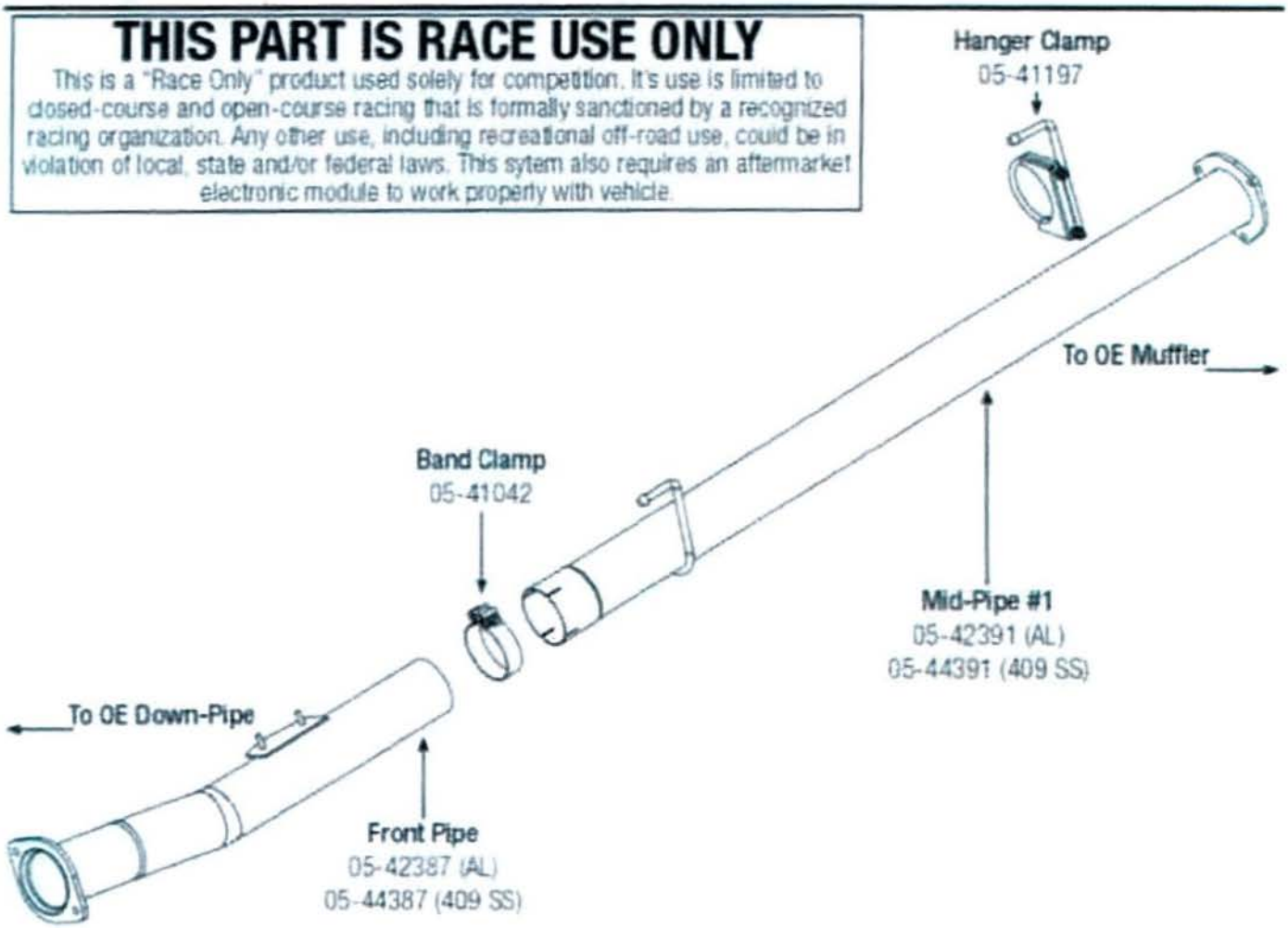
INSTALLATION INSTRUCTIONS

MAKE: FORD
MODEL: POWER STROKE
YEAR: 2011-2012
ENGINE: V8-6.7L (td)
WHEELBASE: All Except Cab & Chassis

4" Race Pipe
49-03012 (AL)
49-43036 (409 SS)

THIS PART IS RACE USE ONLY

This is a "Race Only" product used solely for competition. It's use is limited to closed-course and open-course racing that is formally sanctioned by a recognized racing organization. Any other use, including recreational off-road use, could be in violation of local, state and/or federal laws. This sytem also requires an aftermarket electronic module to work properly with vehicle.



Step 1: (Read Instructions prior to installation) Disconnect sensors at the connections. Take caution as not to damage any sensors. Remove CAT/DPF section of your trucks exhaust working your way forward. Take caution not to damage the factory isolation mounts as they will be reused. **It is recommended to not fully tighten the clamps until the entire system has been installed.**

Step 2: For faster installation spread the pieces of the exhaust along side of your vehicle according to the diagram shown.

Step 3: Attach front pipe first using the supplied nuts and bolts to OE turbo down-pipe, then install mid-pipe #1 with the supplied band clamp and hanger clamp.

Step 4: Adjust for alignment and tighten all connections. Your installation is now complete. It is recommended to re-tighten all exhaust components after the first 50-100 miles.

Step 5: Install the urea injector bracket on the support bracket welded to the front pipe. Use the original injector mounting nuts. DO NOT OVER TIGHTEN.

NOTES:

- aFe recommends that the tailpipe be at least 1/2"-1" away from any body panels to avoid heat related body damage. **Tighten and secure.**
- Controller/Programmers are required to operate this system.

Caution: Allow time for your vehicle to cool down prior to installation. When working on or under your vehicle proceed with caution. Exhaust systems reach high temperatures and may cause serious burns. Wear protective safety equipment, eye goggles and gloves to ensure a safe installation. **aFe recommends professional installation on our products.**

04-[illegible]
Updated: December 2011