Written Statement
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American Petroleum Institute
House Science, Space and Technology Hearing on E15 Research
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Good afternoon, my name is Bob Greco and I am Group Director of Downstream and Industry Operations for the American Petroleum Institute (API). Thank you for the opportunity to testify today on the decision by EPA to prematurely grant waivers that allow ethanol blends of up to 15% (E15) in gasoline for a subset of the U.S. light duty vehicle population. API is a national trade association representing over 470 member companies involved in all aspects of the oil and natural gas industry. API members provide the fuels that keep America running.

API supports the continued, appropriate use of ethanol and other renewable fuels to help meet our nation's energy demand. With implementation of the Renewable Fuel Standard (RFS2), biofuels are becoming an increasingly significant part of the transportation fuel mix. E15 constitutes a new transportation fuel. E15 blends increase the oxygen content of gasoline by 50%, well outside the range for which US vehicles and engines have been designed and warranted. E15 also dramatically impacts gasoline service station infrastructure as it is incompatible with most fuel filling equipment. This makes E15 a fuel outside the range for which such equipment has been listed and proven to be safe and compatible and results in conflict with existing worker and public safety laws outlined in OSHA and Fire Codes. For these reasons, it is critically important to evaluate the full range of short- and long-term impacts of increasing the amount of ethanol in gasoline blends on the environment and also on engine and vehicle performance and safety to protect consumers.

In response to the passage of the Energy Independence and Security Act (EISA), the oil and natural gas industry, the auto industry, and other stakeholders, including EPA and DOE, recognized in early 2008 that substantial research was needed in order to assess the impact of higher ethanol blends including the compatibility of ethanol blends above 10% (E10+) with the existing fleet of vehicles and small engines. Through the Coordinating Research Council (CRC), the oil and auto industries developed and funded a comprehensive multi-year testing program, prior to the E15 waiver application. API worked closely with the auto and off-road engine industries and with EPA and DOE to share and coordinate research plans. API is committed to continuing this research into the E10+ issue until sufficient research has been completed to assess the impact of introducing a new fuel in order to protect and consumers and the environment. We believe that EPA prematurely approved the E15 waiver request, and did not wait until this research effort was finished and the results were thoroughly evaluated.

<u>About the Coordinating Research Council</u>

The Coordinating Research Council (CRC) is a non-profit organization, established in 1942, that directs, through committee action, engineering and environmental studies on the interactions of transportation fuels with vehicles and engines. The objective of CRC is to encourage and

promote the arts and sciences by directing scientific cooperative research to develop the best possible combinations of fuels, lubricants, and the equipment in which they are used, and to afford a means of cooperation with the government on matters of national or international interest. Through CRC, professionals in the automotive and in the energy industries collaborate in research and often coordinate with government agencies such as DOE, EPA and others.

Scope of the CRC E10+ Research

As mentioned earlier, key concerns of the auto and oil industries regarding the E15 waivers are fuel compatibility with infrastructure and engines, vehicle performance, and the overriding need for consumer satisfaction and safety. The EPA's desire to prematurely permit more ethanol to be used in conventional vehicles cannot be allowed to harm the investments made by our common customers in safe, reliable and economical vehicular transportation. The oil and auto industries cannot support a premature action that could put consumer satisfaction, safety and the environment at risk. If consumer satisfaction, safety and the environment are compromised, the credibility of future ethanol products and the RFS2 program will be questioned and challenged. *The CRC research has revealed reasons for concern with the use of mid-level blends in gasoline-powered vehicles.* Although several important and fundamental parts of this comprehensive research program remain incomplete to-date, the program is on track and is producing results needed to understand the impacts of E15. As a result, we continue to support the CRC auto/oil industry testing program and have committed funds through its completion.

Attachment 1 shows our anticipated schedule for completion which goes through the end of 2011 and into 2012. We shared this schedule as well as on-going research progress and results with EPA on several occasions prior to EPA making a decision to issue the partial waivers; EPA chose to ignore the CRC research.

The auto and oil industries have contributed close to $14 million towards mid-level blends research over the past several years targeted specifically at fuel compatibility and engine performance issues that could impact consumers. This funding commitment demonstrates our concern and the seriousness with which we view the potential for vehicle and equipment performance issues that could have a negative impact on customer acceptance and, potentially, the environment. DOE funded a Catalyst Durability Study which was targeted at determining effects of mid-level ethanol blends on catalytic converters.

Automakers upgrade their engine designs, fuel systems, and emissions control systems for E85 flex-fuel vehicles in the US. We need to know whether similar upgrades might be needed for mid-level ethanol blends. Accordingly, we are continuing to do research in the following areas:

Evaluation of Engine Durability

This program looks at the effects of mid-level ethanol blends on vehicle engine durability. A key engine part that may be adversely affected by increased ethanol levels is the cylinder head, a part that costs about $3,500 to replace and many engines have two.

Attachment 2 shows preliminary test results. To date, 3 out of 8 vehicles tested failed on E20 and E15. One vehicle that failed on E20 and E15 passed on E0. Additional testing is underway and should be completed in late 2011.

Evaluation of vehicle fuel storage and handling equipment durability

This program studies the effect of mid-level ethanol blends on the durability of parts that come into contact with the liquid fuel. An example is a fuel pump that can cost $500 to replace. Recent recalls of late model vehicles that have experienced issues with 10% ethanol blends highlight concerns with these components. **Attachment 3** shows an example of a problem that can occur with fuel level sensors when exposed to high levels of ethanol. In this particular example, the fuel level sensor experienced a significant open circuit near the "full tank" position. This would result in erratic/false fuel gauge readings for the consumer and could create potential safety problems. This program should be completed by the end of 2011.

On-Board Diagnostics Evaluation

This program looks at the effect of mid-level ethanol blends on the vehicle's On-Board Diagnostic (OBD) system. This computerized system checks the vehicle emission control system to ensure it is working properly. Many states use OBD as part of their in-use monitoring programs to maintain local air quality.

Increased ethanol levels in fuel could trigger MILs (malfunction indicator or "check engine" lights) when no problem exists. Whether the MIL is false or not cannot be determined until the vehicle is checked by a trained mechanic. Conversely, increased ethanol levels in the fuel could prevent MILs from activating when real problems exist.

A report examining the effects of E10 versus E0 and extrapolating the data to E15 & E20 is complete and published. A subsequent assessment using state inspection and maintenance data to determine the potential for mid-level ethanol blends to trigger false MILs also is complete and published. Both reports are publicly available from CRC. These studies showed the need for additional work, and a program to look at individual vehicles is underway and should be completed in 2011.

Evaporative Emissions

This program studies the effects of mid-level ethanol blends on evaporative emissions control system durability. The program is underway and will be completed in 2012. The evaporative emissions system keeps fuel in the car from evaporating into the atmosphere and negatively impacting air quality. A previous test program found that ethanol affected fuel vapor migration through system components. The 2007 Energy Independence and Security Act required this kind of evaporative emissions durability study as a condition for issuing a waiver. We believe EPA did not fulfill this requirement.

As mentioned earlier, the DOE Catalyst Durability Study was designed to determine E15 effects on catalytic converters. Instead of waiting for the CRC test results from the above programs,

EPA improperly used data from the DOE Catalyst Durability program to draw conclusions about E15 related to certain effects for which the DOE Catalyst Durability program clearly was not designed to evaluate. These include, for example, engine durability, vehicle fuel system compatibility and durability, On-Board Diagnostics impacts, and evaporative emissions durability—all areas for which the DOE testing was not designed to provide meaningful results. The CRC research programs in these areas use test procedures that are more realistic for determining the long-term effects of mid-level ethanol blends.

In addition, EPA granted "partial" waivers where some of the vehicles in the fleet can use the higher ethanol blend but not other highway vehicles, motorcycles, larger trucks, or non-road engines. Specifically, only 2001 and newer model year *vehicles* are eligible to use E15. Therefore, 2000 and older model year vehicles *and* other highway vehicles, motorcycles, larger trucks, or non-road engines cannot use E15. By granting "partial" waivers, EPA recognized the issues related to using this fuel. API has serious concerns that EPA's label and misfueling mitigation strategy is premature and should not have been finalized until all vehicle and infrastructure research and testing was completed. While API agrees with EPA that fuel dispensing facilities should be prohibited from selling E15 unless the dispensers at those locations are properly labeled, API continues to have concerns with EPA's final label. Because EPA weakened the final label design from what it originally proposed, the final design is more likely to confuse consumers about which fuels are appropriate for their vehicles and non-road equipment.

Infrastructure Research-- Overview:

US worker and public safety laws require critical safety devices used at retail stations to be proven safe via a certification process by a Nationally Recognized Testing Laboratory and proven compatible via the material compatibility requirements of EPA OUST rules. In 2009, to address the potential need to raise the level of ethanol in gasoline, DOE's National Renewable Energy Laboratory (NREL) and Oak Ridge National Laboratory (ORNL) began testing fuel retail station equipment and materials to determine how the most common equipment sold and used in the existing infrastructure would perform with E15. API also undertook research to test other equipment not covered by the DOE study. NREL contracted with Underwriters Laboratories (UL) to perform functionality testing on legacy and new fuel dispensers (i.e., the gas pump), Stage II vapor recovery systems that recover the gasoline fumes during a vehicles' refueling, and the pumps that are submerged in the underground storage tank. ORNL concentrated on the compatibility of E15 with various materials used to build the pumps (e.g., elastomers, metals and sealant materials). Late in 2010, UL released the results of their work for NREL and, in March 2011, ORNL released their report.

The results of NREL's research indicated that 70% of the used equipment tested and 40% of the new equipment tested yielded non-compliant or inconclusive test results. For example, the meters that measure the amount of fuel being pumped leaked and some of the safety devices that prevent refueling accidents didn't work. API concluded that these results show that there are potentially serious safety concerns for consumers and fuel dispensing facility attendants from dispensing E15 from any equipment that is not specifically listed for its use.

ORNL's testing showed that seals and gaskets will be impacted the most by the switch to E15 and may eventually develop leaks. However, since ORNL did not identify manufacturers with its results, it will be difficult for owners/operators of fuel dispensing facilities to determine if replacement is necessary. This is compounded by the long life of dispenser systems and the wide variety of seals and gaskets used by manufacturers. Therefore, the results of the ORNL report are of use to owner/operators of fuel dispensing facilities only to the extent that manufacturers will advise owners/operators of necessary replacements and make materials decisions in the future. ORNL's testing results did confirm those of NREL that it is not appropriate to assume that E10 equipment is safe to use with E15.

EPA's Office of Underground Storage Tanks (OUST) is focusing on developing protocols to test automatic tank gauges, which are used as the most common method of leak detection, with E10+ and is in the final stages of this development. Future OUST testing and test protocol development for other leak detection systems are contingent on future funding. Without the use of these test protocols and confirmation that any new equipment works with E15, retail station operators will not know if UST's storing E15 are leaking. API has completed two projects (misfueling mitigation measures to address consumer misfueling and a literature review to determine the ability of flame arresters to work with ethanol) and continues a third (functionality testing of Stage I Vapor Recovery equipment and overfill prevention equipment). The Stage I equipment captures the gasoline fumes that would come out of the tank during a delivery of gasoline to the station thus protecting the air and the overfill prevention equipment keeps the tank from being overfilled during the delivery protecting the delivery driver and the underground water sources. API's testing is due to be completed in second quarter of this year. The results will provide data on how well the Stage I and overfill prevention equipment function with E15.

EPA recently released their final guidance on how to determine the compatibility of an underground storage tank (UST) system with the fuel placed in it. The guidelines were intended to provide an alternative approach to prove that an installed UST system is compatible with a fuel that it was not originally certified to store or dispense. However, EPA's new approach does not provide equivalent safety and environmental protection to the original certification because EPA has equated an individual manufacturer's mere claim of compatibility with the certification that is granted from a nationally recognized testing laboratory (NRTL), like UL. If EPA had required manufacturers to provide empirical data on the compatibility of their systems that is substantially similar to the NRTL data, then EPA would have provided equivalent safety and environmental protection.

The following next steps need to be undertaken to fully assess E15 compatibility with fueling infrastructure:

- NREL's testing revealed significant problems with dispenser meter systems leaking at the seals. Retrofit kits for meter systems need to be developed and listed by UL in order to avoid complete dispenser system replacement. Listed kits or replacement dispensers are required by OSHA and Fire Codes.

- A NREL report identifies concerns that the vapor space above the unblended ethanol (E97) stored in underground storage tanks is flammable. By contrast, the vapor space above gasoline is not flammable. These concerns must be addressed before E97 can be stored as a component for blending dispensers. Additionally, no dispensing equipment (for example, blender pumps) is listed for E97.
- Copper piping/tubing was not included in ORNL's testing. Copper is included in many legacy dispenser systems (i.e., gas pumps) and some leak detection equipment. Its compatibility with E15 is unknown and untested.

The EPA should implement final guidance on UST system compatibility through notice and comment rulemaking which would offer much-needed security to UST owners and better achieve Agency objectives. The EPA should acknowledge that a certification by a NRTL is the best indicator of compatibility and safety, is required by federal and state worker and public safety laws, and an NRTL listing should be required for new equipment. However, in the case of "legacy UST system equipment," if there is no such NRTL listing available, then there should be an alternative that is equivalent to the new equipment NRTL listing. Equivalency means that the testing is sufficiently stringent to provide proof of compatibility, and a method to demonstrate safety as required by worker and public safety rules using an independent third-party testing lab or a manufacturer's self-certification of compatibility that is substantiated with appropriate data similar to that used by an NRTL to make such a finding. "Legacy UST system equipment" is defined as retail gasoline station UST system equipment that has been manufactured, installed, or purchased for which a NRTL listing is not available for the fuel that is intended to be stored for resale.

Summary

The auto and oil industries' primary concern regarding an E15 waiver is the overriding need for consumer satisfaction and safety. EPA's desire to allow more ethanol to be used in conventional vehicles cannot be allowed to harm the investments made by our customers in safe, reliable, and economical vehicle transportation. The oil and auto industries cannot support a premature action that could put consumer satisfaction and safety at risk. If consumer satisfaction and safety are compromised, the credibility of not only future ethanol products but the entire RFS2 program will be questioned and challenged. That is why API is supporting a comprehensive auto/oil industry test program through the CRC to determine the effect of mid-level blends on our customers' gasoline-powered vehicles, and this testing has revealed reasons for concern. Important parts of this research program remain incomplete but we are seeing results that demand completion before E15 should be given a green light.

The E15 waiver controversy points to the larger problem with the RFS2 mandates. The amount of biofuels required to be blended is fast approaching the limit of the current vehicle fleet to safely utilize them. Within the next year or so this "blend wall" will be exceeded, and refiners are greatly concerned about complying with an unworkable mandate. API urges Congress to seriously examine this looming issue, and adjust the biofuels mandates so that the biofuels

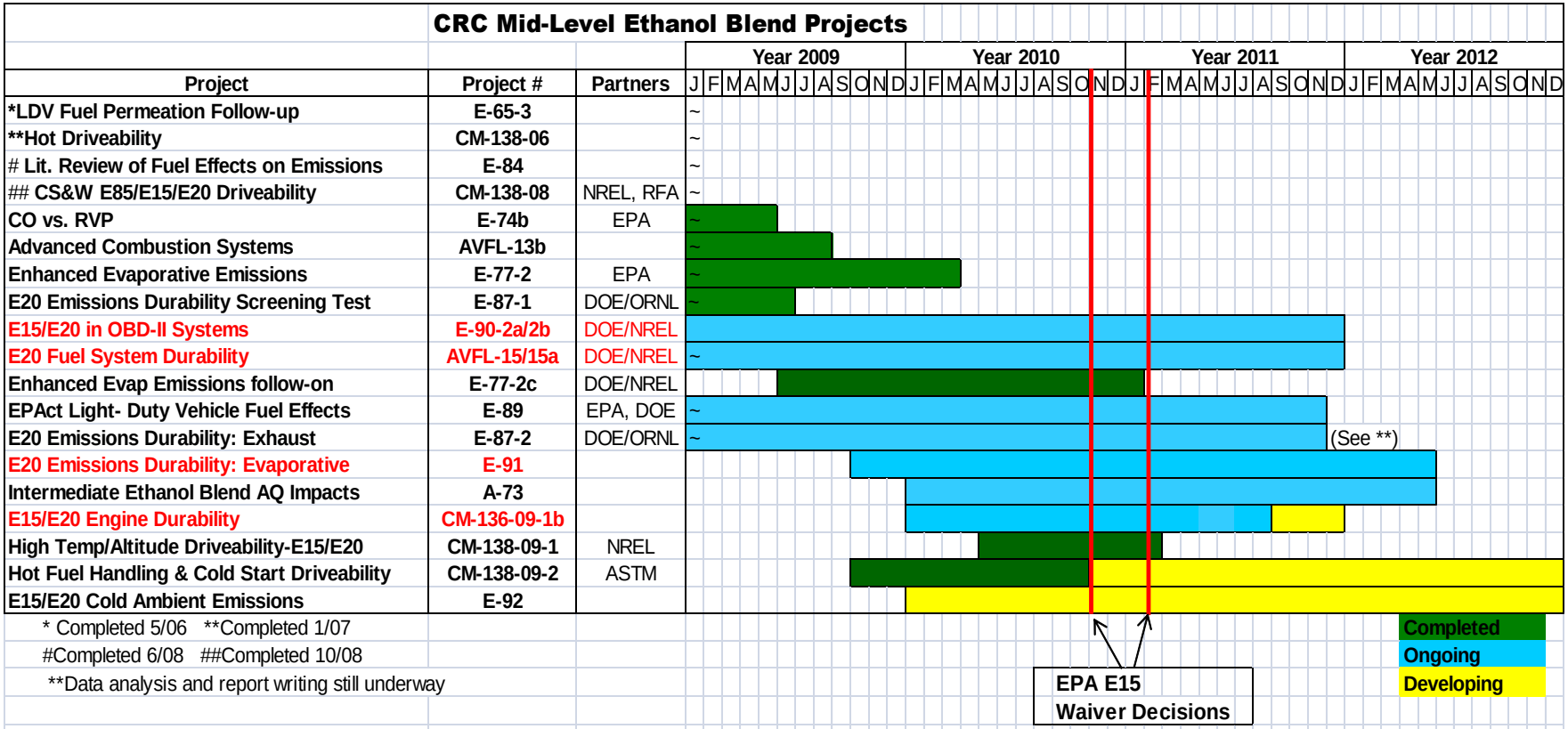
volumes are aligned with the vehicle fleet's capacity to safely utilize them. A premature E15 waiver is not the solution.

Finally, regarding the current fuels retail infrastructure, current federal, state and local regulations and fire codes can and do preclude the use of ethanol blends over 10 percent. Concerns regarding the listing requirements for existing infrastructure as well as this infrastructure's compatibility with ethanol blends over 10 percent should have been resolved before a mid-level ethanol waiver was granted. Not only does the use of unlisted and incompatible equipment represent a significant potential legal liability for retail station owners, it also represents an even larger safety issue as most fuel storage and dispensing equipment have not been properly tested with mid-level blends, putting consumers and the environment at risk. And using existing infrastructure for blends over 10 percent is a violation of worker and public safety laws in OSHA and fire codes. In this regard, EPA should engage with OSHA to understand the full scale of the issues in protecting the worker, the consumer and the environment.

API remains committed to working with the auto industry and other stakeholders on E15 research until sufficient research has been completed to validate the introduction of this new fuel. EPA's partial waiver approval was premature as EPA did not wait until the ongoing research effort was finished and the results were thoroughly evaluated. The oil industry needs a level of confidence in the data that will allow our brands to stand behind a new fuel. Our customers expect nothing less.

Attachment 1

EPA's Decisions Preceded Completion of Needed Research



Red font indicates the most critical projects that need to be completed.

Attachment 2

Engine Durability Testing Status to Date

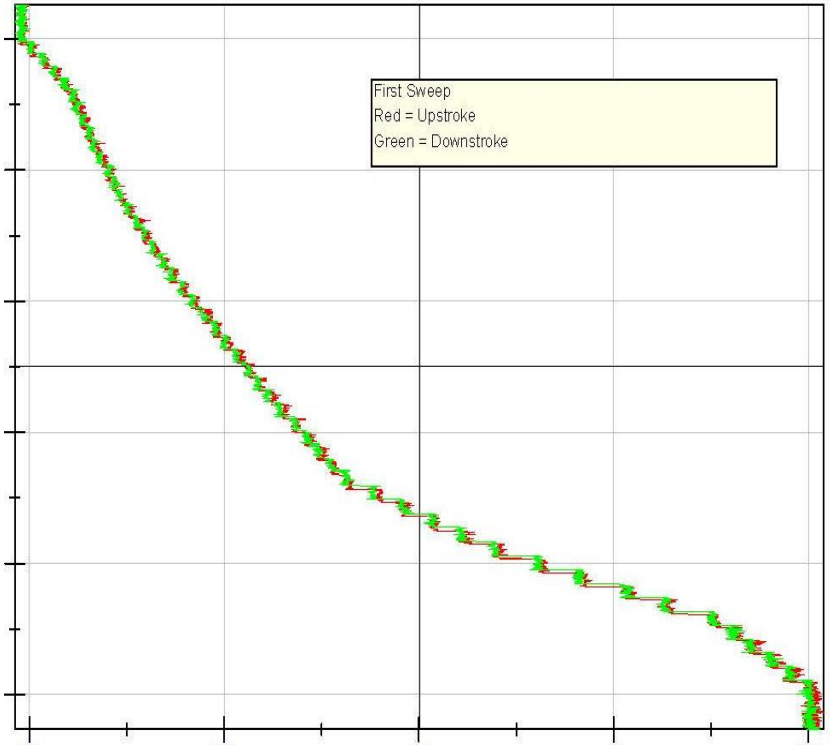
- Engines are tested for 500 hour aging cycles and engine conditions monitored throughout (e.g., cylinder compression, valve wear, valve leakage, etc.)
- Vehicles are then tested to determine if there are any changes including emissions.
- Engines failing on E20 are then tested on E15 and then E0 to isolate the effects to ethanol

Description	E20	E15	E0
Vehicle 1	Passed	Not Req'd	Not Req'd
Vehicle 2	Failed	Failed	Underway
Vehicle 3	Failed	Failed	Passed*
Vehicle 4	Passed	Not Req'd	Not Req'd
Vehicle 5	Passed	Not Req'd	Not Req'd
Vehicle 6	Completed	TBD	TBD
Vehicle 7	Passed	Not Req'd	Not Req'd
Vehicle 8	Failed	Failed*	Planned

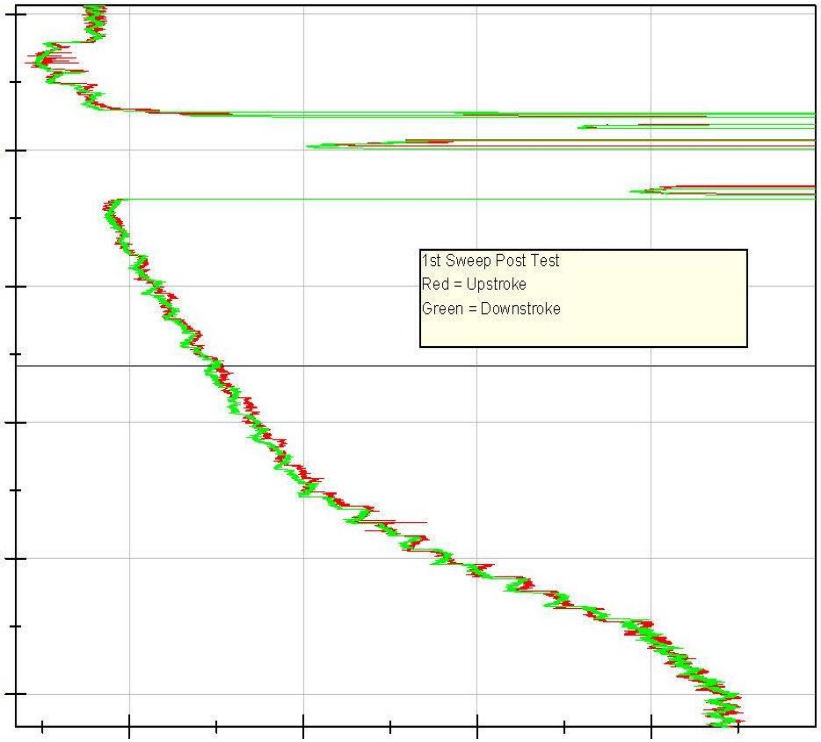
* 1st of 2 vehicles. 2nd vehicle still under test.

Attachment 3

Fuel System Durability Testing Status to Date -- Fuel Level Sender Resistance Testing



Pre-Test



Post- Test E20A

NOTE: This is an example of a fuel level sender which experienced a significant open circuit near the full/top position with E20A. This would result in erratic/false fuel gauge readings for the consumer and create potential safety problems.