Confidential Treatment Requested
July 14, 2015

RESPONSES OF TK HOLDINGS INC. ("TAKATA")
TO QUESTIONS FOR THE RECORD FROM THE
HOUSE ENERGY AND COMMERCE COMMITTEE
SUBCOMMITTEE ON COMMERCE, MANUFACTURING, AND TRADE

Takata is pleased to provide responses to the additional questions for the record issued on June 22, 2015, by the House Energy and Commerce Committee's Subcommittee on Commerce, Manufacturing, and Trade (the "Committee").

The following responses are based on information gathered to-date as part of Takata's ongoing review of facts and documents relating to airbag inflator ruptures undertaken in response to the Special Order of the National Highway Traffic Safety Administration ("NHTSA") of October 30, 2014, and subsequent orders from NHTSA. Takata is in the process of collecting a large volume of data and materials in response to NHTSA's orders, and Takata's review of the facts and records relevant to the Committee's questions is not yet complete. Takata is providing answers based on its current understanding of information and records that are subject to ongoing review. If, upon further review, Takata learns of any records or information inconsistent with the answers or materials provided in response to the following questions, Takata will promptly bring such records or information to the attention of the Committee.

As discussed with the Committee's legal counsel, the information that appears in bold brackets below constitutes sensitive and confidential business information of Takata or of its customers (or, in certain instances, personal information), all of which would be protected from disclosure by executive agencies under 5 U.S.C. § 552b. This designated information has either been granted confidential treatment and protection by NHTSA pursuant to 49 C.F.R. § 512 or is

information that Takata will request be granted such treatment and protection by NHTSA. Takata has identified such confidential information to the Committee and is submitting it for the internal use of the Committee in connection with its examination of airbag inflator issues. The Committee, through its legal counsel, has expressly assured Takata that the information designated as confidential by Takata will be treated and maintained as confidential in accordance with procedures followed by the Committee in connection with previous inquiries involving similar business matters. Under those procedures, the information designated as confidential will not be shared or disclosed outside the Committee, including in a public hearing, without a prior opportunity for Takata to identify particular information that Takata may request be redacted before it is disclosed by the Committee. Takata is submitting the designated information to the Committee in good faith reliance on these assurances.

Responses to Questions of Chairman Burgess

1. ***How many different types of inflators does Takata produce? Can you provide a list of each inflator model made by Takata along with the year, make, and model of the vehicles they are installed in? Please indicate the chemical composition of each inflator propellant as well as any models subject to existing recalls.***

Response:

Takata produces sixteen types of frontal inflators for sale in the United States that contain either the 2004 or 2004L propellant. The table below identifies each inflator model made by Takata, the automobile manufacturer to whom those inflators have been sold to in the United States for installation in automobiles sold in the United States, the propellant contained in each inflator, and which inflators are subject to a recall in the United States. Takata has not provided automobile year and model because that information is not available to Takata and can be obtained from automobile manufacturers.

Inflator Model	OEM	Propellant	Subject to Recall
PSDI	Honda	2004	Yes
PSDI-4	Chrysler	2004	Yes
PSDI-4	Ford	2004	Yes
PSDI-4	Honda	2004	Yes
PSDI-4	Mazda	2004	Yes
PSDI-4K	Honda	2004	Yes
SDI	Ford	2004	No
SDI	GM	2004	No
SDI	Honda	2004	No
SDI	Mazda	2004	No
SDI	Nissan	2004	No
SDI	VW	2004	No
PSDI-5	BMW	2004	No
PSDI-5	Ford	2004	No
PSDI-5	Honda	2004	No
PSDI-5	Mazda	2004	No
PSDI-5	Mercedes	2004	No
PSDI-5	Nissan	2004	No
PSDI-5	Toyota	2004	Yes
PSPI	BMW	2004	Yes
PSPI	Chrysler	2004	Yes
PSPI	Fisker	2004	Yes
PSPI	Ford	2004	Yes
PSPI	Honda	2004	Yes
PSPI	Mazda	2004	Yes
PSPI	Subaru	2004	Yes
PSPI	Tesla	2004	Yes
PSPI-2	BMW	2004	No
PSPI-6C	GM	2004	No
PSPI-6C	Honda	2004	No
PSPI-6C	Mazda	2004	No
PSPI-6C	Nissan	2004	No
PSPI-6C	NUMMI	2004	No
PSPI-6C	Subaru	2004	No
PSPI-6C	Toyota	2004	No
PSPI-L	GM	2004	Yes
PSPI-L	Honda	2004	Yes
PSPI-L	NUMMI	2004	Yes

Inflator Model	OEM	Propellant	Subject to Recall
PSPI-L	Subaru	2004	Yes
PSPI-L	Toyota	2004	Yes
SPI	Chrysler	2004	Yes
SPI	Ford	2004	Yes
SPI	GM	2004	Yes
SPI	Honda	2004	Yes
SPI	Mazda	2004	Yes
SPI	Nissan	2004	Yes
SPI	NUMMI	2004	Yes
SPI	Toyota	2004	Yes
PSDI-X	BMW	2004L	No
PSDI-X	Chrysler	2004L	No
PSDI-X	Fisker	2004L	No
PSDI-X	Ford	2004L	No
PSDI-X	GM	2004L	No
PSDI-X	Honda	2004L	No
PSDI-X	Mercedes	2004L	No
PSDI-X	Nissan	2004L	No
PSDI-X	Tesla	2004L	No
SDI-X	BMW	2004L	No
SDI-X	Chrysler	2004L	No
SDI-X	GM	2004L	Yes
SDI-X	Honda	2004L	No
SDI-X	Mazda	2004L	No
SDI-X	Nissan	2004L	Yes
SDI-X	Spartan	2004L	No
SDI-X	Toyota	2004L	No
PSPI-X	BMW	2004L	Yes
PSPI-X	Honda	2004L	No
PSPI-X	Nissan	2004L	No
SPI-X	BMW	2004L	No
SDP	GM	2004L	No
PDP	Chrysler	2004L	No
PDP	GM	2004L	Yes
PDP	Nissan	2004L	No
PDP	Subaru	2004L	No
PDP	Toyota	2004L	No

The inflator types that are subject to Defect Information Report ("DIR") Nos. 15E-040, 15E-041, 15E-042, and 15E-043 that Takata filed on May 18, 2015 are: PSDI, PSDI-4, PSDI-4K, PSPI, PSPI-L and SPI. Each of these inflators uses the 2004 propellant. **[The chemical composition of the 2004 propellant consists of ammonium nitrate, potassium nitrate, strontium nitrate, BHT (5, 5Bi-1 tetrazole di-ammonium salt), and Clay (sodium bentonite).]** The 2004L propellant is also an ammonium nitrate based propellant, but it contains a different chemical mixture. Inflators that contain the 2004L propellant also contain desiccant.

2. ***Are there any other inflators not identified in the Consent Order that have experienced ruptures in the field or during testing? If so, please provide the name of the inflator and why it was not determined to be defective?***

Response:

The inflator designated SDI-X experienced a rupture in the field as a result of an incorrect inflator component being installed during the manufacturing process. The SDI-X inflators that Takata believes contained the incorrect component were recalled by the respective automobile manufacturer pursuant to Recall Nos. 14V-372 and 14V-668. The inflator designated PDP also experienced a rupture during lot acceptance testing, which is testing performed on inflators during the manufacturing process as part of Takata's ongoing quality assurance programs. The rupture was caused by improper welding by the mechanism responsible for welding the PDP inflator. The inflators that Takata believes were subject to this malfunction were recalled by the automobile manufacturer pursuant to Recall No. 13V-315.

3. ***Are there any other Takata inflators beyond those identified in the Consent Order that have been the basis for a vehicle safety recall in the last six months? If so, why weren't those inflators included in the DIRs?***

Response:

On May 13, 2015, Toyota filed a DIR regarding certain PSDI-5 inflators manufactured by Takata. Takata did not include the PSDI-5 inflator in its DIRs filed on May 18, 2015 because

Takata is not currently aware of any incidents from either its manufacturing process, including related testing, root cause analysis, or from the field that would indicate that PSDI-5 inflators contain propellant that may experience an alteration over time that could potentially lead to over-aggressive combustion in the event of an air bag deployment.

4. ***Are any passenger or driver side airbag inflators more susceptible to moisture intrusion issues or are they both equally susceptible?***

Response:

Takata's testing has indicated that the SPI, PSPI, and PSPI-L passenger-side air bag inflators installed in specific model and model years of automobiles manufactured by certain automobile manufacturers appear to be more susceptible to moisture intrusion issues than other inflators. Takata is still in the process of determining the contributing factors, if any, that may cause these inflator types in those automobile models to be more susceptible to moisture intrusion.

5. ***When did Takata first begin using desiccant in its inflators? What prompted Takata to start including it in its airbag inflator design?***

Response:

Takata began using desiccant in its inflators in mid-2006, when it began manufacturing an inflator with 2004 propellant that would include desiccant. Inflators with the 2004L propellant contain desiccant as part of their design. Takata continually researches ways to improve its products, and it use of desiccant in its inflators was the result of its research and development efforts.

a. Do you intend to stop using and producing inflators that do not have desiccant?

Response:

Takata has continually sought to improve the safety and efficacy of its products. As part of that process, Takata not only engages in substantial research and development internally, but

consults leading industry experts and our automobile manufacturer customers. This process, which is ongoing, has led to the addition of desiccant in many newer inflators and the evaluation of various alternative propellants to phase-stabilized ammonium nitrate ("PSAN").

6. ***Has Takata formed the Independent Quality Assurance panel to audit its operations? When can we expect the audit to be completed and the report issued?***

Response:

Takata formed the Independent Quality Assurance Panel, chaired by former Secretary of Transportation Samuel K. Skinner, to audit its current policies, practices, procedures, structure, and personnel to ensure that Takata's current manufacturing meets best practices for the production of safe inflators, including inflator propellant. Takata is currently unable to provide a timeframe for when the Panel will complete its review and issue a report.

7. ***Mr. Kennedy testified that "ammonium nitrate is certainly a factor in the inflator ruptures." Based on that understanding, has Takata considered using a different propellant formula that does not contain ammonium nitrate at least until a root cause of the ruptures is determined.***

Response:

As explained in Mr. Kennedy's letter to Chairman Burgess and Ranking Member Schakowsky, dated June 8, 2015 (a copy of which is attached as Exhibit A to be incorporated as part of our response to these QFRs), Mr. Kennedy's statement that "ammonium nitrate is certainly a factor in the inflator ruptures" was a reference to the fact that the recent inflator rupture issues involve a complex, multi-factor phenomenon that has occurred in certain ammonium nitrate-based inflators. It was not a suggestion that all ammonium nitrate-based inflators raise safety concerns. Further, Takata uses PSAN in the propellant formulations for its air bag inflators that use the 2004 and 2004L propellants. PSAN is safe for use in air bag inflators, and Takata has full confidence in the safety of its current products that use PSAN propellant, including the replacement inflators it is making in response to the recalls.

As stated in Response No. 5(a), Takata is in the process of evaluating various alternative propellants to PSAN. Furthermore, a significant portion of the inflators that Takata is using as replacement inflators are manufactured by third-party suppliers and do not contain ammonium nitrate.

To the extent that Takata continues to produce inflators using PSAN, Takata is confident in the safety of those inflators for the reasons explained in Response No. 10 below. In addition, Takata's current testing and field experience indicate that it takes several years for any potential rupture issues to develop, if at all, even in the recalled inflators, making new replacement inflators safer than the older inflators they replace. Takata also continues to coordinate with NHTSA to investigate and analyze the ongoing safety of its PSAN-based inflators and is committed to taking the steps necessary to ensure the safety of its products in the future.

8. ***Takata has maintained that ammonium nitrate is safe when properly manufactured and installed but as we have seen over the last 13 years that sounds more like a testing protocol than the real world. Why has it taken so many years for Takata to perfect its manufacturing processes, given that it's known about manufacturing problems with the ammonium nitrate since 2002 and it is still experiencing manufacturing problems today?***

Response:

The propellant manufacturing issues Takata has experienced include an issue with two propellant presses in Takata's propellant-manufacturing facility in Moses Lake, Washington in 2000 and 2001 and an issue at its inflator-producing plant in Monclova, Mexico in 2001 and 2002 that resulted in some propellant wafers potentially being exposed to uncontrolled moisture (ambient humidity) conditions. Both manufacturing issues were addressed by 2002. Takata has not confirmed any other propellant manufacturing issues in connection with its inflators that use PSAN that would comprise the inflator's performance or cause rupturing, but it continues to assess the possibility of such issues.

9. ***Has Takata examined the impact of thermal cycling, humidity exposure, and age decomposition on any of its inflator propellant compounds?***

Response:

[Yes. Takata subjected its 2004 and 2004L propellant compounds to a series of tests to measure the impact of, among other things, thermal cycling, humidity exposure, and age decomposition during the design and development stage. It is also examining those issues in the context of its current root cause testing.]

a. When did it first examine the impact of these factors?

Response:

The tests measuring these factors were conducted early in the process of the propellant development. Takata started conducting these tests for the 2004 propellant in 1998 and for the 2004L propellant in late 2005.

b. Can you provide a complete timeline of any and all testing done by Takata, and/or by an independent testing entity contracted by Takata, on the stability and safety of the propellant compounds used in Takata inflators as it relates to the chronology of reported defective airbag ruptures? Additionally, provide a brief summary on each test as well as the concluding analysis.

Response:

Below is a timeline of testing conducted by Takata and consultants it has worked with relating to inflator rupture issues involving driver-side inflators manufactured between 2000 and 2002:

Date	Event
May 2003	Takata conducted tests to attempt to recreate the rupture of a PSDI-4 inflator in a BMW vehicle in Switzerland. Takata determined that the rupture was caused by the overloading of propellant in the inflator.

Date	Event
May 2005	Takata conducted a visual analysis of photos received from Honda of a PSDI inflator that ruptured in a Honda vehicle in Alabama in May 2004 (Event 0). Takata determined that the event was an anomaly and tentatively concluded that the incident could have been caused by moisture intrusion (potentially because the inflator tape seal was compromised) or by propellant overloading.
June-August 2007	Takata launched an investigation into the causes of three ruptures (Events 1-3) that occurred in PSDI inflators in Honda vehicles between February and August 2007. Based on an analysis conducted by Stork Climax Research Services of a fractured piece from one of the ruptured inflators, Takata tentatively identified the probable root cause of the ruptures as excessive burning pressure. After conducting its own evaluation of the inflators, Takata tentatively concluded that low density at the time of propellant production was unlikely.
September 2007	Takata photographed and conducted CT scans of 43 PSDI modules recovered from salvage yards. Takata conducted deployment tests on 22 of the modules, and those tests indicated no abnormal conditions. Takata dissected the remaining 21 inflators, photographed the parts, and conducted humidity, density and crush strength tests on the extracted wafers. The dissections indicated that propellant moisture and density readings were within specification.
Fall 2007	Takata conducted extensive moisture testing to assess the plausibility of a theory that abnormal moisture exposure to the propellant during production, when combined with thermal cycling as part of normal vehicle operation, could result in increased ruptures. The moisture testing data showed increased aggressive burning with increasing moisture levels and increasing exposure times.
Summer-Fall 2008	Takata conducted tests on approximately 85 field inflators received from Honda, including inflators from the propellant lots that were used in the inflators involved in Events 1-3. Those tests included dissecting the inflators and evaluating the batwing propellant for gloss, hardness, crush/strength, dimensions and density. The tests showed that propellant from the event lots had less gloss, hardness, crush/strength and density. Nineteen inflators from the event lots were deployed, and two of them ruptured.
January-March 2009	Takata began to analyze inflators collected by Honda after Honda issued recall 08V-593. Those inflators contained propellant manufactured in lots near the lots that were recalled in 08V-593 (“surveillance” inflators).
May-June 2009	Takata continued its analysis of surveillance inflators and discovered that certain propellant made on the Stokes press had low density.

Date	Event
September 2009	Takata conducted a more in-depth analysis of the Event 0 rupture that had previously been investigated in May 2005. This included testing whether Event 0 was due to post-manufacturing moisture intrusion caused by a faulty tape seal, and conducting tests (including ballistic tests) on other inflators from the same lot as the inflator involved in Event 0. Takata again concluded that Event 0 was an anomaly.
Fall 2009-Winter 2009-2010	Takata analyzed over 1,000 surveillance inflators recovered through recall 09V-259. Testing showed that inflators from the surveillance range performed properly, but Takata found that propellant produced on the Stokes press after February 28, 2001 had low density (it was previously believed that such propellant was sufficiently dense).
March 2010	The Fraunhofer Institute for Chemical Technology ("Fraunhofer"), which Takata had engaged to test the chemical stability and phase stabilization of 2004 batwing propellant, issued a report containing its findings. Fraunhofer tested the 2004 batwing propellant as well as newly produced propellant. The tests found no significant changes between the recalled propellant and the newly produced propellant.
April 2010	Outside expert Baker Engineering and Risk Consultants, Inc. ("BakerRisk") issued a report outlining its findings on the chemical stability and aging of the 2004 propellant, the 3110 propellant used in the booster, and the AI-1 auto-ignition material used in PSDI and other inflators. The report relied on data from Takata and tests conducted by BakerRisk and other independent experts, including accelerated aging tests, high temperature decomposition tests, and headspace gas tests. BakerRisk concluded that the chemical aging of inflator propellants will not prevent the inflator from functioning properly.
February-April 2012	Takata inspected and evaluated a PSDI inflator that ruptured in a Honda vehicle in Saudi Arabia. Takata found no deficiencies in assembly, no deformation on the booster cap, and no ruptures on crimps or welding. Takata also confirmed that the press compaction load, density, moisture level, and propellant chemistry met specifications. Takata theorized that the rupture was the result of an overloading of propellant, and tested its theory by duplicating the rupture.

Date	Event
April-August 2012	Takata collected, analyzed and tested healthy and recalled inflators from the United States, as well as Israel, Saudi Arabia and Thailand. Those tests showed no excessive moisture, no chemical degradation suggesting destabilized ammonium nitrate, no abnormal internal pressure, and no density level that could cause a rupture. Certain high temperature tests suggested that the high-heat environment was unlikely to be the cause of the Saudi Arabia event. Takata's testing did show that the addition of extra batwing propellant wafers in PSDI inflators resulted in a high rupture rate. Takata concluded the Saudi Arabia rupture was an isolated event due to overloaded propellant during manufacturing. Takata inspected 25,000 inflators by dissection or CT Scan and found one over-pack of propellant.
November 2012	Fraunhofer reported the results of its testing to uncover the root cause of PSDI ruptures. Its three main findings were that: (1) there was no correlation between event propellant lots and smaller BHT particle size; (2) when igniter assemblies from recalled PSDI inflators were subjected to military-grade environmental testing, the 2004 propellant could experience moisture intrusion; and (3) dissection tests revealed that at least one PSDI inflator contained "squeezed" or crushed booster cups, and damage at the igniter assembly.
November 2012	In August 2010, Takata and Honda commissioned Dr. Sanjay Govindjee of the University of California, Berkeley to analyze PSDI ruptures to test the structural strength of inflator housing. The results of Dr. Govindjee's testing was folded into a report by a research team at Penn State University ("PSU"), which had been hired by Takata and Honda in September 2010 to examine ruptures and assess possible root causes. The PSU team reported in November 2012 that, based on their testing, a dynamic burning effect was observed for 2004 propellant under rapid pressurization conditions. Takata disagreed with PSU's conclusion regarding the dynamic burning of the 2004 propellant for various reasons.
January 2013	At Takata's request, Dr. Vigor Yang, Chair of the Daniel Guggenheim School of Aerospace Engineering at Georgia Tech University, produced a report reviewing PSU's testing and reports. Dr. Yang provided his report on January 8, 2013. He concluded that PSU's findings of a dynamic burning characteristic of the 2004 propellant as a cause of the over-pressurization events was unfounded.

Below is a timeline of testing conducted by Takata and consultants it has worked with relating to inflator rupture issues involving passenger-side inflators manufactured between 2000 and 2002:

Date	Event
June 2010	After Takata had investigated four SPI inflators that ruptured in Japan during salvage yard disposal, Nissan and Toyota recalled certain SPI inflators with propellant from Gladiator 1 and 2 presses. Takata believed that the SPI ruptures were a result of inflators having too few propellant wafers combined with vehicle aging. Those inflators had too few propellant wafers as a result of a malfunctioning "height check" test during manufacturing.
October-November 2011	Takata launched an investigation based on ruptures occurring in October and November 2011 involving PSPI inflators with propellant manufactured on the Gladiator 2 press.
April 2012	Takata undertook a series of re-creation tests to try to simulate the failure modes, including moisture/aging effects and temperature cycling, overly aggressive output due to damaged propellant, and bulkhead defects. Those tests did not identify the cause of the high pressure failure mode.
June 2012	Takata conducted replication tests on both healthy and recalled field inflators, but could not reproduce the problem.
May-July 2012	After learning of additional ruptures in SPI and PSPI-L inflators beginning in October 2011, Takata investigated whether the propellant from the inflators could have been exposed to excessive moisture during inflator assembly in Monclova, Mexico. Takata also conducted a series of tests to investigate the possibility of low compaction load (or "press load") during the SPI/PSPI propellant production process. Takata discovered that the Gladiator presses used to make the SPI/PSPI propellant wafers did not consistently use the auto-reject feature designed to reject wafers made with low compaction. During this time, Takata also continued its analysis of event inflators, recreation testing, and testing of healthy inflators recovered from the field. Analysis of healthy PSPI inflators showed that several units manufactured in 2001 had low density and unusual inner pressure during ballistics testing.
November 2012-March 2013	Takata continued its replication tests to analyze changes in density based on different press loads and in combination with thermal cycling. Those tests confirmed that irregular internal pressure and SPI/PSPI inflator ruptures can occur when the propellant wafer is pressed with improper force combined with vehicle aging and environmental conditions.
Spring 2013	Takata conducted replication tests on passenger-side inflators to evaluate the effects of excessive propellant moisture combined with long-term environmental aging. The tests confirmed that excess moisture absorbed by the propellant could lead to overly aggressive combustion and inflator ruptures.

Date	Event
May 2013	Takata hired BakerRisk to evaluate the ability of moisture in a high humidity environment to permeate Takata inflators. In May 2013, BakerRisk produced its report. BakerRisk's analysis was designed to simulate permeation of moisture into PSPI inflators at high temperatures and humidity over a span of 3,000 days. BakerRisk concluded that moisture permeation into the inflator is a slow process, but may occur under high temperature and humidity conditions, and the presence of moisture, combined with temperature cycling, could deteriorate the propellant's strength and affect its ballistic performance when deployed.

Below is a timeline of testing conducted by Takata and consultants it has worked with relating to "Beta" events, *i.e.*, inflator rupture issues that were not covered by the recalls regarding inflators manufactured between 2000 and 2002:

Date	Event
2013	Takata engaged Fraunhofer to evaluate possible ways of water migration into passenger inflators and the subsequent influence of the moisture intrusion on the propellant.
September 2013	Takata and Honda initiated an investigation in response to a PSDI rupture in a Honda vehicle in August 2013. Takata's investigation involved analysis of the event sample, manufacturing records, and testing of healthy parts produced from the same production period (January 2005). Based on its analysis, Takata ruled out insufficient structural strength as a root cause, and determined that the inflator met specifications for density, propellant load, and moisture.
January 2014	Takata's investigation continued by collecting and testing field inflators through live dissection and ballistic tests.
March-April 2014	Takata broadened its investigation in light of ruptures of a PSDI inflator and three PSPI inflators manufactured between 2002 and 2005.
April 2014	In April 2014, Fraunhofer provided reports of its testing of SPI and PSPI inflators and propellants. Fraunhofer tested 61 SPI and PSPI inflators from three climatic regions by dissecting them, subjecting them to military-grade environmental testing, performing test cycles on the o-rings and igniters of certain inflators, performing water absorption/desorption testing, and performing humidity testing and analysis by X-ray diffraction and scanning electron microscopy. These tests showed that inflators had experienced moisture intrusion, and that certain environments and temperature cycling could cause excessive moisture in the propellant.

Date	Event
May-June 2014	Takata continued its testing by analyzing non-deployed inflators recovered from the field to determine the rate of moisture intrusion, the mechanism by which high absolute humidity environments alter the propellant's characteristics, and differences between inflator types.
September 2014	Takata began testing inflators that had been replaced in the course of regional field actions and that had been returned to them from OEMs.
December 2014-January 2015	Takata's testing indicated a strong correlation of lab ruptures in the highest absolute humidity regions, but it informed NHTSA that long term aging and moisture may not be the only contributors to propellant performance change. Takata also noted that certain inflators in certain vehicle models had a greater potential to rupture during testing than similar or identical inflators in other vehicle models.
February 2015	Testing by Takata showed that long-term exposure to persistent high absolute humidity was a clear factor contributing to ruptures, that PSDI-4 and PSDI-4K inflator ruptures in testing and the field are exceedingly rare, and that passenger-side test outcomes vary significantly between automobile manufacturers and vehicle models. A Fraunhofer report identified several potential causes of ruptures, namely manufacturing variability, high temperature, high absolute humidity, the car "built-in" situation, and the resultant rate of moisture ingress/egress into inflators based on the first four factors.

For a discussion of the testing currently being conducted by Takata, please see the response to Ranking Member Schakowsky Question No. 2(a).

10. ***To your knowledge, is a propellant formula with phase-stabilized ammonium nitrate the safest, most stable formula on the market today?***

Response:

To Takata's knowledge, a PSAN propellant is among the safest and most stable formulas available on the market. The chemistry of phase stabilizing ammonium nitrate is well established and well understood, and Takata's, as well as Fraunhofer's, research into the root cause of the inflator ruptures has not shown that those incidents are associated with any measurable loss of phase stabilization of the propellant, even after many years in the field.

In addition, PSAN has distinct advantages over oxidizers used in alternative inflator propellants, including that:

- it is non-toxic;
- it is stable and safe to handle during the manufacturing process;
- it produces far less smoke and particulate matter when the airbag is deployed, so that it is much less irritating to vehicle occupants with respiratory sensitivities; and
- PSAN-based propellants are significantly more efficient than other propellants (*i.e.*, they convert a higher percentage of the solid propellant into gas), which permits Takata to build smaller and lighter inflators, which in turn enables automobile manufacturers to meet government mandates to produce more fuel-efficient vehicles.

11. ***How does Takata ensure that the propellant composition chemically remains phase-stabilized when using a compound containing ammonium nitrate?***

Response:

When manufacturing the 2004 and 2004L propellants, Takata tests the chemicals involved and processes used to create the propellants at every step of the process, and tracks the results of those tests to ensure that the propellant is formed properly. **[To ensure that phase stabilization of ammonium nitrate is achieved, a sample of the chemical mixture is taken, subjected to Differential Scanning Calorimetry, and the following chemical analysis is conducted on that sample mixture:**

Ion Chromatograph (IC)	Insoluble Analysis	Differential Scanning Calorimetry (DSC)	Moisture
18.25% – 19.13% - AN **2.38% – 2.66% - KN** **2.89% - 3.23% - SN**	**(1.27 – 1.40%)**	**(114 – 124 C)** **(127 – 133 C)** **(150 – 154 C)** **(253 – 303 C)**	**(< 0.07%)**

The chemical mixture is used to manufacture the propellant only if the sampled mixture meets all of the requisite control points.] Further, as explained in Response No. 10, the chemistry of PSAN is well established and understood, and Takata's and Fraunhofer's current root cause analysis has not revealed that any inflator rupture is associated with any measurable loss of phase stabilization of the propellant, even after many years in the field.

12. ***What does it mean when an ammonium nitrate based compound has cycled through a phase transformation? What contributing factors would cause a phase transformation in an ammonium nitrate based compound?***

Response:

Ammonium nitrate in its pure form can cycle through a number of solid, crystalline phases during the range of temperatures normally encountered in an automotive environment. To "cycle through a phase change" means that the propellant has been brought to a temperature that favors a different crystalline structure. The different crystalline structure can have a different density associated with it, which causes the propellant to grow or shrink, thus damaging its physical structure. Takata uses PSAN. By phase stabilizing the ammonium nitrate, Takata is able to prevent the propellant from "cycling through a phase change" in normal automotive environments, which in turn prevents the propellant from experiencing structural changes and being damaged.

13. ***Would a phase transformation alter the structure of a propellant containing an ammonium nitrate based compound?***

Response:

A phase transformation of an ammonium nitrate based propellant would potentially alter the structure of the propellant. However, as stated in Response No. 11, because Takata inflators use PSAN, a phase transformation cannot occur in normal automotive temperature environments and Takata has not seen any evidence of such transformation in any field inflators.

a. If so, how would it change the structure of an ammonium nitrate based propellant?

Response:

Phase transformation of an ammonium nitrate based propellant would change the structure of the propellant by reducing or increasing its density and thereby causing the propellant to grow or shrink.

b. Would a structural change of an ammonium nitrate-based propellant alter the intensity in the deployment of an airbag?

Response:

Yes. A structural change in an ammonium nitrate-based propellant can alter the intensity of the deployment.

14. ***Did any tests conducted by Takata show a potential problem of a structural change in ammonium nitrate based propellants due to thermal cycling and humidity exposure?***

Response:

No. **[None of the tests that Takata conducted as part of its design, development, and validation of the 2004 propellant demonstrated the possibility that the propellant could undergo a structural change due to thermal cycling and humidity exposure typical in normal automotive environments.]**

a. If so, would the scope of conducting thermal cycling and moisture exposure testing be comparable to environmental factors such as temperature and humidity?

Response:

Not applicable.

15. ***What testing has Takata done or developed to replicate environmental exposure to inflators over time?***

Response:

As a general matter, during the development and validation process, inflators are subjected to tests designed to replicate environmental exposure over time. For example,

pursuant to validation specifications, inflators are subjected to a variety of hostile environments, including extremes of temperature, vibration, humidity, thermal shock, drop, salt spray and physical shock. The purpose of these testing parameters is to accelerate any degradation processes so that they would occur within a reasonable window of time.

In addition, Takata has attempted to duplicate the propellant condition and performance observed in parts returned from the field, through the application of thermal cycling with and without added moisture. To date, although Takata has been able to create a degradation process that can result in ruptures, it has not been able to duplicate the observed performance characteristics of the propellant returned from the field.

a. If so, what prompted these tests and what length of time was evaluated?

Response:

Testing during the validation process is required by the applicable automobile manufacturer's specifications. Takata has attempted to duplicate the propellant's field condition and performance as part of its ongoing root cause analysis. Takata has tested inflators at 2,000 cycles, which equates to approximately 5,000 hours of cycling. Typical automotive thermal shock cycles are about 30 to 200 cycles.

16. ***Have any automakers requested that Takata stop using ammonium nitrate in the propellant formula of inflators? If so, which ones?***

Response:

One automobile manufacturer has decided that it will not use ammonium nitrate-based inflators for current production. Other automobile manufacturers have indicated that they plan to use other types of inflators in future automobile platforms.

17. ***Do the replacement inflators being installed in vehicles contain the same ammonium nitrate based propellant as the recalled inflators being taken out of the car?***

Response:

With the exception of the inflator designated PSDI-X, the inflators produced by Takata that are currently being used as replacement inflators in the recent recalls contain the 2004 propellant. The PSDI-X inflator uses the 2004L propellant, which has a different chemical composition than the 2004 propellant and includes desiccant. Third-party manufacturers currently supply a significant portion of replacement inflators none of which contain an ammonium nitrate propellant.

a. Is the propellant compound in the new inflators susceptible to phase transformation due to thermal cycling and moisture exposure from humidity? Could this potentially increase the intensity of an inflator deployment causing a rupture?

Response:

No. The propellant contained in the replacement inflators is not susceptible to phase transformation due to thermal cycling and moisture exposure from humidity.

i. If not, why not?

Response:

The replacement inflators all use PSAN, which as discussed in Response Nos. 12 and 13, prevents degradation due to phase transformations.

b. Does Takata intend to use the same ammonium nitrate based compound in future inflator designs? If no, what is different about the propellant compound in the new inflator designs?

Response:

No. Takata does not intend to use the same ammonium nitrate-based compound in future inflator designs. As described in Response No. 7, Takata is evaluating various alternative propellants to PSAN. Takata's research and development of alternative propellant compounds for use in future inflator designs is ongoing.

Responses to Questions of Ranking Member Schakowsky

1. ***A number of recent reports have suggested that Takata's use of ammonium nitrate as a propellant in airbag inflators is at least partly responsible for the explosive nature of the defective airbags. Takata itself has stated that the compound may be one of the factors contributing to airbag ruptures.***

    a. You testified that some automakers have expressed a desire or requested alternative technologies for the replacement inflators. Which automakers have made that request?

Response:

Several automobile manufacturers have considered using inflators manufactured by suppliers other than Takata, in addition to Takata's inflators, for remedy parts in order to complete the recalls as quickly as possible.

b. Please list all suppliers other than Takata that are providing inflators for the replacement kits used for this recall.

Response:

The suppliers, other than Takata, that are currently providing inflators for replacement inflator kits are TRW Automotive, Daicel Corporation and Autoliv.

c. For each supplier other than Takata that is providing inflators for the replacement kits used for this recall, please list the propellant(s) used in the replacement inflators and whether they include desiccant.

Response:

The replacement inflators manufactured by TRW Automotive, Daicel Corporation and Autoliv use a guanidine nitrate based propellant. Daicel adds desiccant to its inflators.

d. Are airbags with desiccant in the propellant mixture any safer? If so, what evidence do you have that they are safer?

Response:

Takata's propellant formulations do not use desiccant in their propellant mixture. Desiccant is added as a discrete component in the inflator assembly. Based on Takata's current

testing, inflators with desiccant added have increased stability after aging, even when moisture is artificially induced before the aging cycle.

2. ***The recall process began last year at the request of the National Highway Traffic Safety Administration (NHTSA) as a regional field action to collect, inspect, test, and investigate both passenger- and driver-side airbag inflators from high absolute humidity regions to determine the root cause of the ruptures. I want to understand more about Takata's testing.***

    a. ***Please describe the testing Takata is currently undertaking to determine the root cause of the inflator ruptures. What tests are being conducted? Where is testing being conducted? What is the lead indicator that there could be a problem? For example, if you open up a 7-year old inflator and see rust or moisture, is that an indicator of a problem?***

Response:

Takata's current testing program involves several different types of testing, including CT scanning, leak testing, live dissection and ballistic testing. All testing is conducted at Takata's testing facility in Armada, Michigan.

CT (Computed Tomography) scanning involves taking X-ray images of inflator samples returned to Takata from automobile manufacturers. CT scanning enables Takata to visualize and measure the interior of the inflator and records digital information and measurements of the inflator. For example, CT scanning allows Takata to measure propellant wafer diameter in the inflator without disassembling the inflator.

Takata is conducting helium leak testing on returned inflators, a test that is also conducted on inflators during the production process. Inflators are placed in a vacuum chamber and tested for the leak rate of helium from the inflator. To ensure proper measurements, a hole is drilled in the inflator to re-introduced helium into it. The hole is then sealed and the inflator is placed in the helium leak machine and evaluated. To date, no significant pattern of leaks has been established, even in inflators from known high-event-frequency populations.

Live dissection tests involve dissecting returned inflators into parts, which allows for

removal and inspection of propellants and other internal components of the inflator. The principal measurements taken during live dissection tests are propellant dimensions and propellant moisture. These tests have demonstrated that inflators show a trend of increasing moisture with increasing absolute humidity and temperature. In addition, Takata conducts Differential Scanning Calorimetry ("DSC") and Ion Chromatography ("IC") tests on a limited number of samples. DSC results indicate the state of phase stabilization, and, to date, no values have been measured that imply a loss of phase stabilization. IC tests indicate the state of the chemistry of the propellants. To date, no values have been measured that imply any ongoing reactions in the propellant system, or any evidence of improper formulation.

Ballistic tests involve placing the inflator in specialized tanks that cause the inflators to deploy, which enables Takata to record whether the inflator ruptures and certain additional data. Ballistic test results show that inflators deploy normally until some undefined threshold is reached. As part of its ballistic testing program, Takata also conducts quench testing, which enables Takata to inspect the condition of propellants after ignition, including the characteristics of propellant wafer break up.

Given the multitude of factors that contribute to ruptured inflators, and the fact that different inflators with similar characteristics do not always act the same, it is difficult to point to a lead indicator of a problem with a particular inflator. However, Takata's testing continues to show that the ingress of moisture into the inflator, which is caused at least in part by long-term exposure to persistent high absolute humidity, is among the leading factors contributing ruptures. Furthermore, that an inflator obtained from the field has some level of moisture and rust is not an indication that there is a problem with that inflator, which would make it susceptible to rupturing.

b. Has the testing revealed any specific amount of time before the inflators are capable of rupture? For example, if I have my inflator replaced today, on June 2, 2015, in how many years should I have it replaced again? Is Takata testing the replacement inflators—either before they are installed into vehicles or sometime after the replacement inflators have been in use—to ensure that they do not have the same problems? If so, please provide a brief summary of the results of that testing. Has evidence of moisture or rust been found in any replacement inflators? If Takata is not testing replacement inflators, why not?

Response:

Takata's current testing has not revealed a specific amount of time before inflators are capable of rupturing, although it has shown that rupturing typically occurs after an inflator has been exposed to high absolute humidity for an extended period of several (7 to more than 12) years, depending on the inflator type and vehicle environment.

Takata does perform testing on replacement inflators to ensure their safety. All inflators manufactured as replacement inflators are covered by product validations. Takata's inflator Engineering, Quality, and Customer Business Unit is responsible for ensuring that each replacement inflator satisfies the requirements and specifications provided by the respective automobile manufacturer customer. In addition to the testing conducted as part of the validation process, all replacement inflators are tested in accordance with Takata's standard quality assurance testing and include helium leak tests, hydroburst, weld seam analysis, and ballistic tests. During the testing process, inflators that do not meet specification or otherwise fail to satisfy testing are not used as replacement inflators. To date Takata has not found any evidence of moisture or rust in replacement inflators.

Pursuant to the Consent Order dated May 18, 2015 between Takata and NHTSA, Takata will submit a plan to NHTSA by July 17, 2015 identifying the testing that Takata plans on conducting on its non-recalled PSAN inflators, including replacement inflators, to determine the service life of those inflators and whether they are susceptible to rupturing.

c. Takata has indicated that one of the reasons the airbags are failing is that testing specifications prescribed by the vehicle manufacturers failed to uncover faults. If that is the case, are the testing specifications for the replacements still a problem? Why wouldn't we expect to see the same problems in 7 or so years?

Response:

During the hearing on June 2, 2015, and at the June 18, 2015 meeting with your staff, Mr. Kennedy discussed the specifications prescribed by automobile manufacturers. Mr. Kennedy clarified his testimony in his letter submitted to the Committee on June 8, 2015. In that letter, which is attached hereto as Exhibit A, Mr. Kennedy clarified that in answering questions regarding Takata's practices in testing inflator products in accordance with the specifications prescribed by automobile manufacturers and the auto industry, he was speaking only in general terms. As a general matter, it is Takata's practice to test and validate new inflator products to meet or exceed the automobile manufacturers' specifications or to seek exceptions from such requirements, as approved by the relevant automobile manufacturer. Mr. Kennedy was not intending to address, and does not have detailed knowledge of, the testing or validation of any specific inflator products, including any exceptions to or variations from particular testing requirements.

While the basic testing specifications of automobile manufacturers have not materially changed, Takata is working with consultants to define an accelerated aging protocol that will duplicate field observations. Once completed, this protocol will be used as a potential tool to verify the susceptibility of currently manufactured inflators to the field concern, and to prevent similar issues in the future.

d. Takata has also indicated that the design of certain vehicles is one of the factors causing the airbags to fail. For example, the way the inflator fits into the steering wheel can allow moisture into the inflator. If that is the case, is that still a problem with the replacement inflators? Why wouldn't we expect to see the same problems in 7 or so years?

Response:

While Takata's current test results indicate that certain passenger inflator designs are subject to a greater likelihood of rupture in certain vehicle models, Takata's investigation of the role played by automobile design and manufacturing is ongoing. Takata's current view is that the rupture problem appears to be related to the cabin temperature characteristics of the automobile, although the issue is still the subject of intensive research. Later model automobiles appear to be generally cooler due to the increased use of solar glass.

e. I am concerned that in 7-12 years, these replacement inflators will have the same problem. Does Takata intend to test the replacement inflators again in seven years or some other future time and not wait until someone has been injured or killed by one of the replacement inflators before investigating the replacement inflators?

Response:

Pursuant to the Consent Order issued by NHTSA on May 18, 2015, and as explained in the DIRs filed by Takata on the same date, Takata will submit to NHTSA by July 17, 2015 a proposed test plan that will outline the testing and analysis that Takata plans on conducting regarding the replacement inflators to determine the service life of such inflators and whether they are susceptible to rupturing.

f. Is Takata testing any other types of inflators—for example PSDI-5 or PSDI-X inflators—to ensure that they do not have the same problems? If so, please provide a brief summary of the results of that testing. Has evidence of moisture or rust been found in any replacement inflators? If Takata is not testing other types of inflators, why not?

Response:

Please see Response No. 2(e).

g. Takata has been consulting with Fraunhofer Institute for Chemical Technology, a research organization in the airbag system industry. What role is Fraunhofer playing in the testing? Is Takata doing its own testing in addition to Fraunhofer's testing?

Response:

Takata has engaged Fraunhofer to assist it in its investigation to determine the root cause(s) of ruptured inflators. In that capacity, Fraunhofer has performed investigation and testing on various inflators returned from the field, inflator subcomponents, and inflator propellant. As described in response to Chairman Burgess's Question 9(b), Takata is also conducting its own testing.

h. What information about the testing and results is Takata sharing with the automakers? How is that information being shared with the automakers and how often is it being shared?

Response:

Takata is sharing its testing and the results of its current root cause analysis with automobile manufactures – and with NHTSA – on a periodic, and as requested, basis.

3. ***Takata has said that the "batwing" shape of the propellant wafer likely contributes to defects in the driver-side inflators.***

a. When does Takata expect to completely stop production of the batwing-style inflators?

Response:

Takata's current expectation is to completely stop production of batwing-style inflators by January 2016.

b. Many people have already had their original driver-side inflators with batwing shaped propellant replaced with "new" batwing-style inflators since June 2014. Will they need to have them replaced again? When do you expect that those replacements will take place?

Response:

Automobile owners who have had their inflators replaced with newer inflators containing batwing-shaped propellant should have their inflators replaced again. As explained in DIR No. 15E-040 filed by Takata on May 18, 2015, Takata proposed that automobile manufacturers

implement a phased remedy program that will determine when these remedy inflators will be replaced. The method and timing for carrying out the recalls is the responsibility of the respective automobile manufacturers, perhaps with input from NHTSA.

c. Please list all recalled inflators that have batwing-shaped propellant wafers.

Response:

The following inflators have batwing-shaped propellant wafers: PSDI, PSDI-4 and PSDI-4K.

d. Are batwing shaped propellants used in any other inflators not subject to the recall? If so, which inflators?

Response:

No. Batwing shaped propellants are not used in any inflators other than those set forth in Response No. 3(c).

e. Are there any batwing shaped wafers in passenger airbags?

Response:

No. Please see Response Nos. 3(c) and 3(d).

f. You testified that there will be consumers that have had their cars' airbags replaced that will have to have it replaced again. You said the airbags that need a second replacement were the PSDIs and the PSDI-4s. Are there others? Please indicate for each whether it is a driver-side or passenger-side airbag.

Response:

In addition to PSDI and PSDI-4 replacement inflators, PSDI-4K replacement inflators will also have to be replaced. All of these inflators are for driver-side air bags.

4. ***You testified that prolonged exposure to high humidity and the age of the unit are factors causing the inflator ruptures. But Takata still does not know the root cause of the defect, leading consumers and the automakers concerned that the replacement inflators are not safe.***

a. Has Takata received any reports of malfunctioning replacement parts?

Response:

No. Takata is not aware of any reports of malfunctioning replacement inflators.

b. For each inflator listed in the four May 18, 2015, Defect Information Reports submitted by Takata, please provide the following:

i. The approximate date by which Takata plans to stop producing that inflator.

Response:

Takata is not currently providing PSDI, PSDI-4, and PSDI-4K to automobile manufacturers for new automobiles. For replacement inflator kits, Takata has ceased producing PSDI and PSDI-4K inflators and expects to cease producing PSDI-4 inflators by January 2016. Takata has not made a decision regarding whether it will cease producing SPI, PSPI and PSPI-L inflators.

ii. By vehicle make, model, and model year, the type of inflator used as a replacement and the manufacturer of that inflator.

Response:

The below table shows the original inflator subject to recall, the inflator being used to replace the original inflator, the manufacturer of the inflator, and the corresponding vehicle make. Takata has not provided the vehicle model and model year because that information is not available to Takata and can be obtained from automobile manufacturers.

Original Inflator	Replacement Inflator	Manufacturer of Replacement Inflator	OEM
PSDI, PSDI-4, PSDI-4K	PSDI-X	Takata	Honda
PSDI, PSDI-4, PSDI-4K	PSDI-5	Takata	Honda
PSDI, PSDI-4, SDI	Autoliv Inflator	Autoliv	Honda
PSDI, PSDI-4, PSDI-4K	PSDI-X	Takata	Ford
PSDI, PSDI-4, PSDI-4K	PSDI-X	Takata	Mazda

Original Inflator	Replacement Inflator	Manufacturer of Replacement Inflator	OEM
PSDI, PSDI-4	TRW Inflator	TRW	Honda
PSDI-4	PSDI-4	Takata	Chrysler
PSDI-4	TRW Inflator	TRW	Chrysler
PSDI-4	PSDI-4	Takata	Ford
PSDI-4	PSDI-4	Takata	Mazda
PSDI-4	PSDI-4	Takata	BMW
SPI	SPI	Takata	Toyota
SPI	SPI	Takata	Chrysler
SPI	SPI	Takata	Subaru
SPI	SPI	Takata	Nissan
SPI	SPI	Takata	Ford
SPI	SPI	Takata	Mitsubishi
SPI	SPI	Takata	Mazda
SPI	SPI	Takata	GM
PSPI, SPI	Daicel Inflator	Daicel	Honda
PSPI	PSPI	Takata	Honda
PSPI	PSPI	Takata	Toyota
PSPI	PSPI	Takata	Chrysler
PSPI	PSPI	Takata	Nissan
PSPI	PSPI	Takata	Ford
PSPI	PSPI	Takata	Mazda
PSPI	PSPI	Takata	Subaru
PSPI	PSPI	Takata	BMW
PSPI-L	PSPI-L	Takata	Honda
PSPI-L	PSPI-L	Takata	Toyota
PSPI-L	PSPI-L	Takata	GM

iii. By vehicle make, model, and model year, the differences between the original inflator and the replacement inflator, including the shape of the propellant, the chemicals used in the propellant(s), and any other distinguishing characteristics.

Response:

For SPI, PSPI and PSPI-L, the design of the replacement inflators manufactured by Takata are the same as the original inflators they are replacing. PSDI, PSDI-4 and PSDI-4K inflators being replaced with Takata parts are being replaced with PSDI-5 or PSDI-X inflators. The PSDI-5 inflator contains 2004 propellant, but it differs from prior inflator models because it has desiccant. The PSDI-X inflator uses the 2004L propellant, which has a different chemical

composition than the 2004 propellant, and also includes desiccant. **[The chemical composition of the 2004 propellant consists of ammonium nitrate, potassium nitrate, strontium nitrate, BHT (5, 5Bi-1 tetrazole di-ammonium salt), and Clay (sodium bentonite). In contrast, the chemical composition of 2004L propellant consists of ammonium nitrate, potassium nitrate, BTA (1 H-tetrazole-5-amine, N-1 H-tetrazol-5-YL-monoammonium salt), synthetic graphite, and M-5 untreated fumed silica.]** Takata cannot provide the differences between replacement inflators manufactured by other suppliers and the original inflators they are replacing.

Other than as indicated above, the replacement inflators do not vary from the inflators they are replacing.

c. Are the replacement airbags being provided to consumers safer than the recalled airbags? If so, what evidence supports this conclusion? If not, why is Takata replacing defective airbags with products that may also be defective?

Response:

The replacement inflators being provided to consumers are safer than the recalled inflators. Currently, more than 50 percent of the replacement inflator kits Takata is supplying in response to the recalls contain inflators made by other suppliers that do not use ammonium nitrate and have no record of defective performance. Takata expects this number to reach approximately 70 percent by the end of March 2016. Additionally, for certain types of inflators in certain vehicle models, Takata is replacing original inflators with its PSAN-based inflators. Because a clear factor in the inflator ruptures is the age of the inflator and long-term exposure to particular environmental conditions over many years, the replacement of older inflators with newly manufactured units delivers a significant added margin of safety, including ample time before any such long-term risk may potentially arise, even in conditions of persistent high heat and absolute humidity. In replacing batwing inflators on the driver side, Takata's replacement

inflators include, in addition to inflators from other suppliers, a newer type of PSAN driver inflator that has not shown a potential risk for rupture after exposure to high heat and absolute humidity and that contains desiccant. On the passenger side, Takata has made improvements to address specific manufacturing issues and other improvements in the production of new inflators, and these improvements also contribute to the added safety of the newly manufactured PSAN replacement inflators.

d. Will Takata replace the replacement inflators in the future if the replacements are found to be unsafe? Will Takata replace the replacement inflators if no root cause is determined? Will Takata replace the replacement inflators if there can be no guarantee that the replacements are safe?

Response:

As noted in the Consent Order and the DIRs, Takata has agreed to conduct ongoing tests of PSAN-based inflators used as replacement parts to determine the appropriate service life of the parts and whether further action may be needed to replace the remedy parts in the future. If the later replacement of these remedy parts is determined to be appropriate, Takata will take the necessary action, in conjunction with the affected automobile manufactures, to complete such replacements well before any potential risk of rupture develops.

e. Are consumers being told whether the replacement inflator installed in their cars are produced by Takata or a competitor? How can consumers find out whether they are getting a replacement manufactured by Takata or a competitor? Can consumers request a replacement inflator manufactured by a competitor?

Response:

Takata does not have knowledge of what information is being told to consumers by automobile manufactures regarding the replacement inflators installed in their automobiles, including whether consumers can find out if they are getting a replacement inflator manufactured by Takata or by another manufacturer, or if consumers can request a replacement inflator from a particular manufacturer. Such information should be sought from the automobile manufactures.

f. Please list all makes and models of vehicles that were subject to the recalls between June 2014 and May 29, 2015 that will need to have the inflators replaced again under the most recent recalls.

Response:

The replacement inflators that will have to be replaced are the PSDI, PSDI-4 and PSDI-4K inflators. Takata does not have information regarding the specific automobiles that have already received a replacement inflator that will have to be replaced. That information can be obtained from the automobile manufacturers.

5. ***The current Takata recall now involves more than 40 million cars from 11 different automakers. In addition to confusion resulting from multiple regional recalls, the sheer volume of vehicles and the complexity of handling a recall across 11 manufacturers has led to substantial consumer uncertainty.***

Response:

Takata notes that, as stated in the DIRs it filed, it estimates that the current recalls may involve approximately 33.8 million inflators, which means that the number of affected automobiles is significantly lower than 40 million, particularly since many of the automobiles in which those inflators were installed are no longer on the road.

a. What specific steps is Takata taking to get recall information directly to consumers? Has Takata set up a website or phone number where consumers can get information about the recall?

Response:

Automobile manufacturers are the only entitles with the ability to determine the identity of affected consumers. Therefore, automobile manufacturers generally control communications with automobile consumers. However, pursuant to the Consent Order, Takata has agreed to submit a plan to NHTSA that will outline the steps that Takata will take, both independently and in concert with the affected automobile manufacturers, to assist the automobile manufacturers in customer outreach, whether by engaging with automobile owners through new and traditional

media, direct contacts with automobile owners, and other innovative means of bringing consumer attention to this safety issue. Takata will prepare this plan as it relates to each of the affected automobile manufacturers without regard to the supplier of the remedy parts. Takata is currently working on preparing this plan, which will likely include at a minimum a website that consumers can visit and a phone number that consumers can call. Takata notes that NHTSA currently has in place a website dedicated to the Takata recalls at www.safercar.gov/rs/takata/index.html.

b. How is Takata working with the automakers to get the most accurate, up-to-date information to their customers?

Response:

Please see Response No. 5(a) above.

c. What specific steps is Takata taking to provide auto dealers with up-to-date information to ensure that dealers are able to answer consumer questions?

Response:

Automobile manufacturers are responsible for coordinating the recalls with their dealers. Takata routinely, and when requested, provides automobile manufacturers with relevant information related to the recalls and Takata's ongoing root cause analysis.

6. ***Consumers can use their VIN numbers to determine if their cars are subject to a recall at safercar.gov. If a person looks up their VIN number, it will show that their car is subject to the recall. But if a person who has already had their Takata inflator replaced, but needed to have it replaced again under recalls announced in May 2015, the website would not show that that person's car is subject to an open recall.***

Further, as an example, a person from Florida who already had their inflator replaced in 2014 as part of the safety improvement campaign/regional recall conducted a VIN-specific search on Honda's website, which showed no open recalls for that car. However, a generic search for the model year and make of the car showed an open recall that included a notice that states: "Even if your vehicle was previously repaired, your vehicle is still covered by this recall and will need to be repaired again.

a. What specific steps is Takata taking to communicate to those consumers who have had their Takata inflators replaced since June 2014 that they need to have their cars repaired again?

Response:

Please see Response No. 5(a) above.

b. How is Takata working with the automakers to get that information to consumers?

Response:

Please see Response No. 5(a) above.

c. What is Takata doing to ensure that consumers in this situation will not ignore future notices thinking they have already had their inflator replaced?

Response:

Please see Response No. 5(a) above.

d. What specific steps is Takata taking to ensure that auto dealers are aware that replacement airbag inflators may need to be replaced again?

Response:

Please see Response No. 5(c) above.

7. ***In your June 8, 2015, letter following up on some issues raised at the hearing, you state that phase-stabilized ammonium nitrate (PSAN) "is safe for use in inflators" and that Takata has "full confidence" in the safety of PSAN inflators, including the replacement parts. However, you also note that Takata is continuing to conduct testing to "determine the appropriate service life of the parts." You also state that Takata will replace the remedy parts if it is "determined to be appropriate."***

a. Do PSAN inflators expire?

Response:

Takata designs its inflators, including its PSAN-based inflators, to comply with all duration specifications developed by automobile manufacturers, which typically require inflators to perform for the expected life of the vehicle. However, pursuant to the Consent Order, Takata will submit a plan to NHTSA that will outline the steps that Takata will take to provide NHTSA with test data regarding the service life and safety of remedy inflators currently being

manufactured by Takata.

b. What is Takata's current understanding of the service life of PSAN inflators?

Response:

Please see Response No. 7(a) above.

c. How will Takata decide whether replacement of the remedy parts is appropriate? How does Takata define "appropriate" in this context?

Response:

Please see Response Nos. 4(d) and 7(a) above. In addition, Takata will, after further testing and engineering analysis and in conjunction with NHTSA and the automobile manufacturers, determine whether replacement of remedy parts is "appropriate" based on all testing data and information available at the time.

*8. **In your June 8, 2015, letter following up on some issues raised at the hearing, you note that if additional testing "shows that these non-desiccated remedy parts should be replaced at some point in the future, [Takata] will act in the interests of public safety to do so."***

a. How will Takata determine if non-desiccated remedy parts should be replaced in the future?

Response:

Please see Response Nos. 4(d) and 7(a) above.

b. What is Takata's current understanding of the service life of the non-desiccated remedy parts?

Response:

Please see Response No. 7(a) above.

c. Please explain what you mean by the "interests of public safety." If the remedy parts are defective, unsafe or problematic in some way, does Takata commit to replacing them?

Response:

Please see Response Nos. 4(d) and 7(a) above. In addition, in his June 8 letter to Chairman Burgess and Ranking Member Schakowsky, Mr. Kennedy's statement that Takata will

act "in the interests of public safety" in light of the results of tests performed on non-desiccated remedy parts meant that Takata will take the steps necessary, based on all information available to it at the time, to support the replacement of all inflators that pose a risk of rupture.

9. ***In your June 8, 2015, letter following up on some issues raised at the hearing, you state that the great majority of the more than 50,000 returned inflators were tested in the last six months. However, the safety improvement campaigns and regional recalls began a year ago.***

a. Why did it take so long for Takata to collect the inflators and test them?

Response:

Takata does not collect inflators. Rather, they are collected directly by the automobile manufacturers and their dealers who replace the consumer's inflator, collect the inflators, and then send them to Takata. Moreover, Takata has been testing inflators returned pursuant to the regional field actions since September 2014.

b. What specific steps did Takata take to collect suspect inflators as quickly as possible?

Response:

Please see Response No. 9(a).

c. How many inflators were tested between June 2014 and January 2015?

Response:

Inflators that were returned as part of the regional safety campaign began to arrive at Takata in early September 2014. Between early September 2014 and January 31, 2015, approximately 11,000 inflators were tested. Takata's testing capacity in September 2014 was about 1,000 inflators per month. Takata dramatically increased its testing capacity to reach the 11,000 per month mark by the end of January. Takata is now testing at a rate more than ten times higher than was possible in September 2014, and will soon be again substantially increasing that number.

10. ***In your June 8, 2015, letter following up on some issues raised at the hearing, you state that in response to questions regarding whether Takata agrees that NHTSA has authority over Takata with regard to recalls, you did not intend to describe Takata's legal position on whether Takata is subject to NHTSA's jurisdiction. However, Takata sent you as its representative to answer questions on its behalf. Accordingly, has Takata changed its legal position from last December and does Takata now agree that NHTSA has statutory authority to require original equipment parts manufacturers like Takata to decide that a safety defect exists and to conduct recalls.***

Response:

Mr. Kennedy testified at the June 2, 2015 hearing as a representative of Takata, not as its lawyer. As he stated during the hearing, he is not a lawyer and he was not qualified to answer the purely legal question of whether Takata is subject to NHTSA's jurisdiction. Nevertheless, Takata continues to believe that only manufacturers of motor vehicles and replacement equipment, and not manufacturers of original equipment such as Takata, are subject to NHTSA's jurisdiction under the plain language of 49 U.S.C. § 30118. Takata nevertheless filed the DIRs on May 18, 2015 as an indication that Takata is not fighting NHTSA and is not resisting taking action in response to the public safety issues raised by the inflator ruptures. Takata has voluntarily agreed with NHTSA to take broad actions, including recommending dramatically expanded recalls, to address the safety concerns involved with the airbag ruptures. Takata also recognizes NHTSA's authority to enforce the commitments Takata has made in the Consent Order.

EXHIBIT A

TK HOLDINGS INC.
2500 Takata Drive
Auburn Hills, MI 48326 USA
Kevin M. Kennedy
Executive Vice President
TEL 248-373-8040
FAX 248-377-2040

June 8, 2015

Hon. Michael C. Burgess, M.D.
Chairman, Subcommittee on Commerce, Manufacturing, and Trade
Committee on Energy and Commerce
United States House of Representatives
2125 Rayburn House Office Building
Washington, D.C. 20515

Hon. Jan Schakowsky
Ranking Member, Subcommittee on Commerce, Manufacturing, and Trade
Committee on Energy and Commerce
United States House of Representatives
2322A Rayburn House Office Building
Washington, D.C. 20515

Re: Hearing on "An Update on the Takata Airbag Ruptures and Recalls," June 2, 2015

Dear Chairman Burgess and Ranking Member Schakowsky:

Thank you again for giving me the opportunity to testify on behalf of Takata at the Subcommittee's June 2 hearing into the recalls involving Takata airbags. Takata shares the Subcommittee's strong commitment to public safety and the goal that every car in America have a safe airbag. All of us at Takata are profoundly sorry for each case where someone has been injured or killed. ***Any failure of an airbag is too many.*** That is why we have agreed with Administrator Rosekind and NHTSA to take broad action in response to the safety concerns raised by airbag ruptures through expanded recalls that go well beyond the scope of the safety risk shown by the extensive testing and research done to date.

We will provide the follow-up information requested by Members of the Subcommittee in the hearing, and we look forward to responding to any post-hearing questions the Subcommittee may have. In the meantime, I am writing to emphasize and clarify several points that came up at the June 2 hearing, in the interest of ensuring that my testimony is clear and the hearing record is complete. To that end, I ask that this letter be made part of the hearing record.

Why does Takata continue to use ammonium nitrate propellant in its airbag inflators?

Many Members of the Subcommittee questioned whether ammonium nitrate is safe for use as a propellant in airbag inflators and wondered why Takata continues to use this chemical in

its inflators, including in remedy parts installed as replacements in some of the recalled vehicles. I want to be sure my testimony is clear and complete on this important point.

Takata uses phase-stabilized ammonium nitrate ("PSAN") in the propellant formulations for many of its airbag inflators. PSAN is safe for use in airbag inflators, and Takata has full confidence in the safety of our current products that use PSAN propellant, including the replacement parts we are making in response to the recalls. The chemistry of phase stabilizing ammonium nitrate is well established and well understood, and our research into the root cause of the inflator ruptures has not shown that they are associated with any measurable loss of phase stabilization of the propellant, even after many years in the field.

PSAN has distinct advantages over other chemicals used in alternative inflator propellants. It is non-toxic; it is stable and safe to handle during the manufacturing process; it produces far less smoke and particulate matter when the airbag is deployed, so that it is much less irritating to vehicle occupants with respiratory sensitivities; and PSAN-based propellants are significantly more efficient than other propellants (converting a higher percentage of the solid propellant into gas), so that PSAN inflators can be smaller and lighter, which has helped automakers meet government mandates to produce more fuel-efficient vehicles. PSAN is competitive in price with most alternative propellant chemicals and not necessarily less expensive; it is not "unbelievably cheap" relative to alternatives, as suggested by the explosives expert from the Missouri University of Science and Technology quoted by Representative Marsha Blackburn (*Congressional Quarterly* transcript of hearing for second panel ("CQ Tr.") at 17). Takata's decision to develop PSAN as an inflator propellant was not driven by cost considerations.

As I explained in my testimony, Takata's testing and analysis of more than 50,000 returned inflators and extensive research involving experts from around the world indicate that the recent inflator rupture issues involve a complex, multi-factor phenomenon that affects an extremely small fraction of older PSAN-based inflators after long-term exposure over many years to conditions of persistent high heat and high absolute humidity, and for certain inflators these issues may also involve potential manufacturing and vehicle-specific factors. When I testified that "ammonium nitrate is certainly a factor in the inflator ruptures" (CQ Tr. 9), I was simply referring to the fact that this multi-factor phenomenon relates to PSAN-based inflators; I was not suggesting that all PSAN inflators raise safety concerns.

As I made clear in my testimony, at the present time, more than 50 percent of the airbag replacement kits Takata is providing in response to the recalls contain inflators made by other suppliers that do not use ammonium nitrate propellant, and we expect that number to reach 70 percent by the end of this year. The use of other suppliers' inflators significantly augments Takata's capacity for production of replacement inflators and also responds to some automakers' desire to use alternative technologies in implementing their recalls.

For certain types of inflators in certain vehicle models, however, there is currently no available alternative to the use of a PSAN-based inflator as the remedy part. Nevertheless, the replacement of the original inflator with a newly made PSAN-based inflator is absolutely the right response to the public safety concerns raised by the inflator ruptures, and doing so provides an important safety benefit.

Because a clear factor in these ruptures is the age of the inflator and long-term exposure to particular environmental conditions over many years, the replacement of older inflators with newly manufactured units delivers a significant added margin of safety, including ample time before any such long-term risk may potentially arise, even in conditions of persistent high heat and absolute humidity. In replacing the batwing inflators on the driver side, Takata's remedy parts include, in addition to inflators from other suppliers, a newer type of PSAN driver inflator that has not shown a potential risk for rupture after exposure to high heat and absolute humidity. On the passenger side, Takata has made improvements to address specific manufacturing issues and other improvements in the production of new inflators, and these improvements also contribute to the added safety of the newly manufactured PSAN replacement inflators.

As we pledged in writing in the Consent Order and the Defect Information Reports ("DIRs") we filed, Takata has agreed with NHTSA to conduct ongoing testing of PSAN-based inflators used as remedy parts, in order to determine the appropriate service life of the parts and whether further action may be needed to replace the remedy parts in the future. You can be assured that if later replacement of these remedy parts is determined to be appropriate, Takata will take the necessary action, in conjunction with the affected automakers, to complete such replacements well before any potential risk of rupture develops.

At the same time, Takata has developed and continues to develop new inflator products for use in both driver airbags and passenger airbags, including updated PSAN-based inflators with desiccant and inflators that do not use ammonium nitrate in the propellant. Takata is working intensively with vehicle manufacturers to validate new inflator products, including for use as remedy parts. Over time, all of our inflators will consist of new products.

Why doesn't Takata add desiccant to all its replacement inflators today?

Members of the Subcommittee also asked why Takata does not add desiccant to all of the inflators currently used as remedy parts. As I have emphasized, we are confident that all of our newly made replacement inflators that use PSAN propellant are safe, whether or not they also include added desiccant. The process of developing and qualifying inflators that are re-engineered, including re-engineering inflators to add desiccant, takes time. Among other things, this process involves testing to establish that the airbag modules equipped with re-engineered inflators will adequately protect vehicle occupants in a crash. The completion of that process requires several months.

We appreciate, Ranking Member Schakowsky, that it may be difficult to understand the strong practical reasons for using non-desiccated remedy parts in the near-term (CQ Tr. 12). Again, however, we have agreed with NHTSA that the right solution for public safety is not to wait for the completion of a process of engineering changes and approvals, but is to take action now to replace the original inflators that are subject to the recalls with new non-desiccated PSAN inflators. The new inflators, even without desiccant, will provide an important margin of safety over the older units being replaced, particularly those that have been exposed for many years to conditions of high heat and absolute humidity. If the additional testing we have committed to perform shows that these non-desiccated remedy parts should be replaced at some point in the future, we will act in the interests of public safety to do so. In the meantime, we strongly believe, and NHTSA agrees, that the goal of safety is best served through the expanded recall actions we have recommended.

Has Takata been reluctant to take action in response to safety concerns raised by airbag ruptures?

Representative Markwayne Mullin suggested that Takata has delayed to act and has refused to take "ownership" of the safety issues involved in the airbag ruptures and recalls (CQ Tr. 54). We must respectfully disagree. Takata initiated discussions with NHTSA, and our voluntary agreement to the Consent Order with NHTSA and our proactive filing of four DIRs that propose expansive new recalls of several types of inflators, including national recalls, amply demonstrate that we have acted responsibly and without undue delay to address all public safety concerns associated with the inflator ruptures. On the basis of available information, Takata agreed with NHTSA in June 2014 to support regional field actions to replace inflators in the regions with the highest levels of absolute humidity. We needed to assess the results of tests conducted on those and other returned inflators before taking the actions now proposed.

Even though the extensive testing and research to date indicates that the risk of rupture is limited to an extremely small number of older inflators in certain very specific circumstances, Takata has agreed with NHTSA to take bold actions that go well beyond the scope of the safety risks shown by the science and testing. We proposed the expanded recalls in response to the safety concerns of the public, Congress, and NHTSA, because we agree with you, Mr. Chairman and Ranking Member Schakowsky, and with the Subcommittee that every vehicle in America should be equipped with a safe airbag. Any single failure of a Takata airbag to deploy properly is unacceptable to us.

Even the two DIRs proposing recalls for passenger inflators that are limited at present to certain specified high-absolute-humidity States go well beyond the geographic regions of most concern—and, indeed, well beyond the geographic scope of most of the previous regional recalls and safety campaigns relating to the same passenger inflators. These recommended recalls will include more States than the previous regional campaigns, and they will cover all vehicles of the relevant makes and models that ***have ever been registered in any part of the listed States***, not

just the vehicles registered in particular counties or coastal regions where the absolute humidity levels are consistently highest.

We have also agreed with NHTSA to conduct a broad program of testing of inflators beyond the scope of the proposed recalls, in order to determine the appropriate service life of remedy parts and to help NHTSA determine whether further recall actions may be necessary in the future. We are cooperating and will continue to cooperate actively and fully with NHTSA and the automakers to conduct that testing and to follow through on all the commitments we have made in the Consent Order and the DIRs.

Is Takata contesting NHTSA's jurisdiction?

Representative Yvette D. Clarke asked whether Takata has changed its legal position from last December and now agrees with NHTSA that NHTSA has statutory authority to require original equipment parts manufacturers like Takata to decide that a safety defect exists and to conduct recalls (CQ Tr. 30-32). As I tried to make clear at the hearing, I was not intending to describe Takata's legal position on these issues or address whether Takata's interpretation of NHTSA's statutory jurisdiction has changed.

As I also tried to explain, regardless of Takata's legal position concerning NHTSA's statutory authority over original equipment suppliers, we are not fighting NHTSA, and we are not resisting taking action in response to the public safety issues raised by the inflator ruptures. We have voluntarily agreed with NHTSA to take broad actions, including recommending dramatically expanded recalls, to address the safety concerns involved with the airbag ruptures, and we recognize NHTSA's authority to enforce the commitments Takata has made in the Consent Order.

What role do the automakers' original equipment validation and testing specifications play in the issues raised by the inflator ruptures?

In reference to a May 20 *New York Times* article, Representative Clarke also asked me whether it is Takata's position that the automakers "shared the blame" for airbag ruptures because the research shows that the automakers' original equipment specifications for inflators did not anticipate the long-term phenomenon associated with years of exposure to conditions of high heat and absolute humidity identified by our experts (CQ Tr. 33-34).

I wish to clarify that in responding to these questions, I was intending only to confirm that our experts from the Fraunhofer Institute have indeed concluded that the specifications and industry standards prescribed by the automakers for the testing and validation of the inflators as original equipment in vehicles did not comprehend the phenomenon of long-term moisture diffusion and propellant alteration that may affect a very small number of inflators after many

years of exposure to particular conditions. I was not intending to suggest anything about the potential allocation of responsibility between the automakers and Takata.

I also wish to make it clear that in answering questions regarding Takata's practices in testing inflator products in accordance with the specifications prescribed by automakers and the auto industry (CQ Tr. 34), I was speaking only in general terms. As a general matter, it is Takata's practice to test and validate new inflator products to meet or exceed the automakers' specifications or to seek exceptions from such requirements, as approved by the relevant automakers. I was not intending to address, and do not have detailed knowledge of, the testing or validation of any specific inflator products, including any exceptions to or variations from particular testing requirements.

* * *

I hope these clarifications are helpful to the Subcommittee. I also hope that this letter serves to underscore what we know to be true: Takata agrees with you that we must take bold action, without delay, to reassure the public that we are doing all we can to make sure that every Takata airbag system is safe. That is precisely why we initiated discussions with NHTSA and agreed to make broad commitments to support expanded remedy actions and testing programs beyond the scope suggested by the available scientific data.

Respectfully submitted,

Kevin M. Kennedy

cc: All Members of the Subcommittee
Chairman Fred Upton
Ranking Member Frank Pallone, Jr.