Xprts

August 6, 2014

Frank S. Borris II,
Director
Office of Defects Investigation
1200 New Jersey Avenue, S.E.
Washington, DC 20590

Re: Petition for Defect and Recall

To the office of defect investigation of the National Highway Traffic Safety Administration (NHTSA)

Mr. Borris,

Enclosed are materials which lead me to believe there is a major defect in the GM vehicles. The defects allow second and third row occupants to be ejected in spite of a fully deployed rollover window curtain airbag system.

The enclosures include:

1. Basis for defect request
2. Case Claim
3. CDR Record
4. Trevino Case Rebuttal Report

Thank you for your consideration,

Donald Friedman
Xprts, LLC
501 Meigs Road
Santa Barbara, CA 93109
Ph: 805-683-6835

Attachment 1

To the Office of Defect Investigation (ODI) of the National Highway Traffic Safety Administration (NHTSA).

This letter requests that the ODI, conduct an investigation of structural and consumer expectation defects in millions of General Motors vehicles that result in severe injury and death. The defects allow second and third row occupants to be ejected in spite of a fully deployed rollover window curtain airbag system. This request stems from the investigation of a 2011 accident in McAllen Texas, involving a 2010 Chevrolet Tahoe, in a case named [redacted] versus GM. (see Attachment 2)

Briefly, the case involves four adults and four children returning from Mexico on a federal highway. The CDR record indicates the deployment of the passenger side airbag in an 8 mph Delta V and the subsequent deployment of window curtain airbags during a passenger side rollover. (See Attachment 3) Physical evidence indicates that the right, third row child was ejected after the first quarter turn and the second row left side unbelted adult was ejected on the second roll. The initially belted second row middle seat occupant became unbelted and was partially ejected from the right second row window when the vehicle came to rest on its wheels. (Attachment 4)

This vehicle has an SWR of 2.1 such that it is prone to break out the window glass and open ejection portals which are intended to be closed by the rollover window curtain airbags. However while GM tethers both ends of the first row frontal window curtain airbags, the rear of the second row airbags are untethered and the front of the third row seat airbags are also untethered. The lack of sufficient roof strength to avoid or limit window breakage of the second and third rows and the lack of tethering both ends of the window curtain airbags are the defects which resulted in injury and death (See Figures 1 and 2).

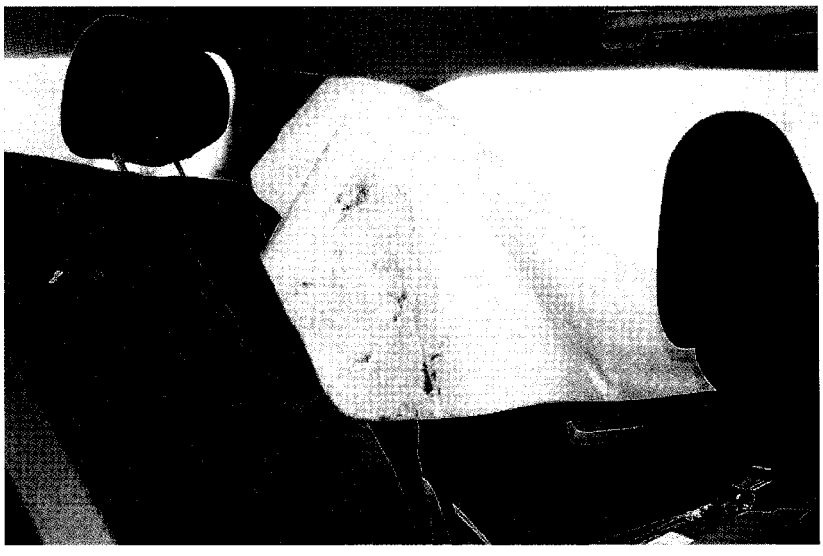

Figure 1. Untethered rear of second row window curtain airbag (Driver side)

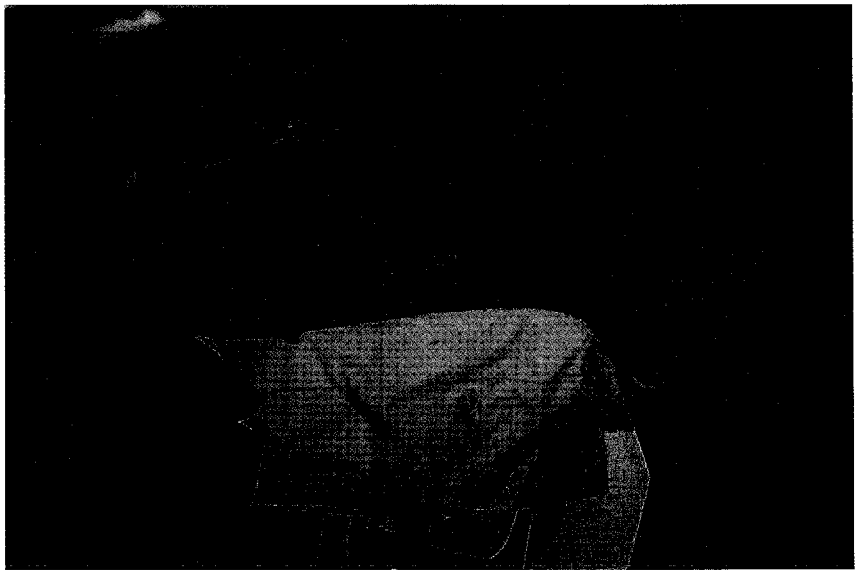

Figure 2. Untethered rear of second row window curtain airbag (Passenger side)

This implementation by GM likely occurred by 2005 in all vehicle lines and models including millions of vehicles. GM does not deny the partial tethering of the second and third row window curtains although GM advertises the rollover protection afforded by them. We don't know whether the lack of tethers fails the FMVSS 201 Upper Interior Protection tests. GM has opposed increased roof strength regulations for 35 years and its 2013 Tahoe roof strength is still at an SWR of 2.1. We have no information as to whether the tethers will be included to meet the ejection mitigation regulation FMVSS 226. GM claims that 2006-2010 Ford Explorer, 2003-2008 Infiniti FX35, 2007-2009 Chevrolet Silverado Pickup Crewcab, 2009 Nissan Murano, 2008-2013 Nissan Rogue, 2008-2012 Jeep Liberty, 2006-2013 Honda Ridgeline and 2009-2013 Honda Fit vehicle airbags are only partially tethered in the second and third rows. If true, perhaps it is because their stronger roofs limit window breakage which is a load distributer for the partially untethered bags.

Attachment 2

CAUSE NO.: _____

[redacted]	§	**IN THE DISTRICT COURT OF**
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V.	§	**_____ JUDICIAL DISTRICT**
	§	
GENERAL MOTORS, L.L.C., LUCKY WHOLESALE SEAFOOD, AND [redacted]	§	
	§	
	§	
Defendants.	§	**WILACY COUNTY, TEXAS**

PLAINTIFFS' ORIGINAL PETITION, REQUEST FOR DISCLOSURES AND REQUEST FOR PRODUCTION TO DEFENDANTS, GENERAL MOTORS, LLC, LUCKY WHOLESALE SEAFOOD, AND [redacted]

TO THE HONORABLE JUDGE OF SAID COURT:

NOW COMES [redacted] AND [redacted] INDIVIDUALLY AND AS NEXT FRIEND OF [redacted] AND [redacted], MINORS, [redacted] INDIVIDUALLY AND AS NEXT FRIEND OF [redacted], [redacted] AND [redacted], MINORS, [redacted] INDIVIDUALLY AND AS THE PERSONAL REPRESENTATIVE OF THE ESTATE OF [redacted], DECEASED, (hereinafter collectively referred to as "Plaintiffs") complaining of Defendant, GENERAL MOTORS, LLC, (hereinafter collectively referred to as "GM"), Defendant,

LUCKY WHOLESALE SEAFOOD, (hereinafter referred to as "LUCKY"), and Defendant, [redacted], and in support of this cause of action, would respectfully show unto the Court the following:

I

DISCOVERY CONTROL PLAN

Pursuant to Rule 190 of the Texas Rules of Civil Procedure, discovery is intended to be conducted under Level 3 as set forth in Rule 190.4.

II

PARTIES

Plaintiffs [redacted] Individually and as Next Friend of [redacted] Minor Children, are individuals who reside in Hidalgo County, Texas.

Plaintiffs, [redacted] Individually and as Next Friend of [redacted], [redacted] Minor Children, are individuals who reside in Hidalgo County, Texas.

Plaintiff, [redacted] (Decedent), at the time of her death was a resident of McAllen, Hidalgo County, Texas. Plaintiff [redacted] Individually and as the Personal Representative of the Estate of [redacted], (Decedent), is a natural person, who resides in Hidalgo County, Texas.

Plaintiffs, [redacted] bring this suit under the Texas Wrongful Death and Survivals Statutes of §§71.001 et seq. of The Texas Civil Practices & Remedies Code on behalf of Decedent surviving children, and her estate.

Defendant, General Motors, L.L.C. is a foreign corporation, organized and formed under the laws of the State of Michigan. GM designed, manufactured, tested, marketed, and distributed the vehicle involved in this case. GM was at the time of this collision doing business in the State of Texas and its principal place of business and registered service agent are in Dallas County, Texas. Defendant GM may be served with process through its Registered Agent, CT Corporation System located at 350 North St. Paul Street, Suite 2900, Dallas Texas. Service of citation is requested by private service.

Defendant, [redacted] is organized under the laws of the State of Texas, doing business in and maintaining agents and agencies within the State of Texas. Service of process may be effected upon said Defendant by serving the owners of the corporation, [redacted] at its principal place of business located at [redacted], Port Mansfield, Wilacy County, Texas [redacted]. Service of citation is requested by private service.

Defendant, [redacted] is an individual who resides in San Antonio, Bexar County, Texas. Said Defendant may be served with process at his home at the following address: [redacted] San Antonio, Texas [redacted] or wherever he may be found. Service of citation is requested by private service.

III

JURISDICTION

Jurisdiction is appropriate in this Court in that this is a lawsuit seeking damages within the jurisdictional limits of the District Courts of the State of Texas, and this Court has personal jurisdiction over Defendants as set out above.

Jurisdiction would not be proper in federal court as there is no complete diversity of citizenship between the Plaintiffs and the Defendants in this case. Moreover, Plaintiffs are not asserting any claims or causes of action based on federal statutes, treaties, or laws. Plaintiffs expressly disavow any federal claims or causes of action. Moreover, this lawsuit asserts no claims against the United States, nor does it involve any claims based on maritime law.

The court has jurisdiction over this matter, and venue is proper in Wilacy County, Texas, pursuant to Section 15.002(a)(3) of the Texas Civil Practices and Remedies Code, because Wilacy County is the county in which and where Defendant, LUCKY, maintains their corporate office and are resident entities of Wilacy County, Texas; therefore, venue is proper in Wilacy County, Texas pursuant to Section 15.002(a)(3) of the Texas Civil Practices and Remedies Code.

VI

VENUE

Venue is proper in Wilacy County, Texas pursuant to Sections 15.002(a)(3) of the Texas Civil Practices and Remedies Code

V

FACTUAL BASIS OF CLAIM

On August 20, 2011, Plaintiffs, [redacted] Deceased, were traveling southbound on IH 37 in San Antonio Bexar County Texas. As they traveled on IH 37, they came upon a large plastic storage container belonging to Defendant, [redacted], which was lying in the

middle of the roadway and impeding traffic. Plaintiff's vehicle, a 2010 Chevrolet Suburban, Vin # 1GNMCAE37AR[redacted], safely avoided a the plastic storage container. Defendant [redacted] failed to control the vehicle he was operating when he served and lost control of his vehicle. Defendant [redacted] vehicle traveled into the lane of travel of Plaintiffs. Defendant's vehicle violently struck Plaintiffs forcing it into the grassy center median. Plaintiff's vehicle began to violently roll over several times during the crash sequence.

Although Plaintiffs, [redacted] Deceased, [redacted] and [redacted] were seated in passenger seats, and properly belted, they sustained severe and permanent personal injuries in the collision when the seat belts failed and the roof structure intruded into the passenger compartment.

Defendant GM designed, manufactured, marketed and placed the subject Chevrolet Suburban Model into the stream of commerce in a defective and unreasonably dangerous condition.

At the time of the accident, the subject Chevrolet Suburban Model was in the same or substantially the same condition as it was when it left the possession of Defendant GM.

As a result of the negligence of Defendants in the design, manufacture and marketing and distribution of the subject vehicle, Plaintiffs, [redacted] individually and as next friend of [redacted] individually and as next friend of [redacted] suffered, and continue to suffer, permanently disabling injuries and

damages as more fully described below. Additionally Plaintiff, [redacted] suffered fatal injuries resulting in her death.

VI

PLAINTIFFS' CAUSES OF ACTION AGAINST DEFENDANT GENERAL MOTORS, LLC

The defective vehicle was designed, manufactured, assembled, and/or distributed by your Defendant, GM, and placed same into the stream of commerce for ultimate use by consumers. The vehicle described above was defective in that it was defectively manufactured and not crashworthy as designed as stated above and defendant knowingly placed same into the stream of commerce in an unreasonably dangerous condition which placed the ultimate consumer at a risk of death. Defendants knew that the manufacturing and design defects existed, but were negligent and grossly negligent in failing to ensure that all of the subject vehicles were removed from the market to prevent injury or death to those consumers who may subsequently purchase or operate the vehicle in question.

Defendant failed to warn Plaintiffs of the unreasonably dangerous condition of the vehicle as more specifically described herein.

The incident complained of herein and severe personal injuries of Plaintiffs, [redacted] Minors, and the death of [redacted] was proximately caused by the negligence of Defendants in one or more of the following respects:

a) In failing to warn your Plaintiffs and Decedent of the defective condition of the vehicle;

b) In failing to remediate the defective design and manufacturing defect prior to distribution and sale to your Plaintiffs;

c) In manufacturing a defective and unreasonably dangerous product by failing to test or analyze the vehicle for use upon the highways in crash studies under normal operating conditions prior to distribution;

d) In failing to ensure that all of the subject vehicles were removed from the market or repaired to prevent injury or death to those consumers who may subsequently purchase or operate the vehicle in question; and,

e) Strict liability in tort.

The design defects in the vehicle in question as stated herein rendered it defective and unreasonably dangerous, which defective and unreasonably dangerous condition was a producing cause of the rollover in question, the injuries caused thereby, and the damages sought by Plaintiffs herein.

Pursuant to Tex. Civ. Prac. & Rem. Code §82.005, a safer alternative design was economically and technologically feasible at the time the product in question left the control of Defendant GM, and would have prevented the operator compartment intrusion without affecting the utility of the product.

Each of these acts and omissions, singularly or in combination with others, constituted negligence, which proximately caused the incident resulting in the Plaintiffs' injuries and damages.

VII

CAUSES OF ACTION AGAINST DEFENDANT LUCKY WHOLESALE SEAFOOD

NEGLIGENCE AND NEGLIGENT ENTRUSTMENT

Defendant, [redacted], committed acts of omission and commission, which collectively constituted negligence and that negligence proximately caused the accident and Plaintiffs' injuries and damages.

Defendants, [redacted] owed Plaintiffs a duty to hire, control, and retain competent drivers. Defendant, [redacted] was reckless in the hiring and retention of their employees and in providing the dangerous and unfit company vehicle. Defendant, [redacted] also had a duty to ensure that its company vehicle was being driven by competent drivers using safe traveling procedures and equipment. Defendant, [redacted] breached these duties. The traveling procedures and equipment used to transport the company owned large plastic storage containers was dangerous and unfit for travel on public roadways. Defendants' breach proximately caused Plaintiffs' damages.

As the owner of the company vehicle used in transport of this storage containers, Defendant, [redacted] is guilty of negligent entrustment in that it entrusted a vehicle to its employee, when they knew or should have known that the employee was an incompetent and reckless driver, and that employee's negligence proximately caused the accident and Plaintiffs' injuries and damages,

Defendant, [redacted] owed Plaintiff a duty to operate their company vehicles in a safe manner and in compliance with all traffic and motor carrier transport laws, rules and regulations. On the occasion in question, Defendant's employee breached their duty by operating in a negligent and reckless manner, including the following;

a) In failing to properly secure his load;

Defendants' conduct was negligent per se because Defendants breached a duty imposed by them by statute or ordinance. Plaintiff belongs to a class of persons the statutes are designed to protect (See Texas Transportation Code, Section 544.007; 545,062(a); and 545.351. Defendants violated these statutes without excuse. Said violations proximately caused the accident and Plaintiff's damages.

VIII

GROSS NEGLIGENCE AGAINST DEFENDANT [redacted]

The negligence of Defendant, [redacted], was of such a character as to make them guilty of gross negligence. Defendant's conduct, when viewed objectively, involved an extreme degree of risk, considering the probability and magnitude of the potential harm to others, and Defendants were subjectively aware of the risk involved, but nevertheless preceded with conscious indifference to the rights, safety and welfare of others, including Plaintiff.

IX

PLAINTIFFS' CLAIM OF NEGLIGENCE AGAINST DEFENDANT [redacted]

Defendant, [redacted] had a duty to exercise that degree of care that a reasonably prudent person would use to avoid harm to others under circumstances similar to those described herein.

Plaintiffs' injuries were proximately caused by Defendant, [redacted], negligence, careless and reckless disregard and breach of said duty, which consisted of, but is not limited to, the following acts and omissions:

a) In that Defendant failed to keep a proper lookout for Plaintiffs' safety that would have been maintained by a person of ordinary prudence under the same or similar circumstances;

b) Failure to drive at the appropriate speed such as a person of ordinary care would have done under the same or similar circumstances;

c) In that Defendant was negligent due to driving while inattention;

d) In that Defendant was negligent by failing to control his speed;

e) In that Defendant was negligent by driving recklessly;

f) In that Defendant failed to take proper evasive action in an attempt to avoid the collision in question;

g) In that the Defendant failed to be attentive to his surroundings; and

h) In that Defendant failed to exercise ordinary care to protect Plaintiffs, [redacted] Deceased.

These are violations of the motor vehicle laws of the State of Texas and operating safety precautions and warnings issued by the Texas Department of Transportation. Defendant failed to conform his conduct to a standard of conduct that a reasonably prudent operator in the same or similar circumstances would have done in operating his vehicle.

X

CAUSATION

All of the above and foregoing was a proximate and producing cause of the event made the basis of this suit and damages set forth herein to Plaintiffs due to the conduct of Defendants, General Motors, LLC, [redacted] as stated herein.

XI

DAMAGES FOR PLAINTIFFS [redacted]

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the

accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XII

DAMAGES FOR PLAINTIFFS [redacted]

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] was caused to suffer serious bodily injuries and has incurred the following damages:

a) Loss of Consortium in the past, including damages to the family relationship, loss of care, comfort, solace, companionship, protection, services, and/or physical relations;

b) Loss of Consortium in the future including damages to the family relationship,

loss of care, comfort, solace, companionship, protection, services, and/or physical relations;

c) Loss of Parental Consortium in the past, including damages to the parent-child relationship, including loss of care, comfort, solace, companionship, protection, services, and/or parental love;

d) Loss of Household Services in the past; and

e) Loss of Household Services in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XIII

DAMAGES FOR PLAINTIFFS [redacted] MINOR

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] minor, was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XIV

DAMAGES FOR PLAINTIFFS [redacted] MINOR

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] minor, was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XV

DAMAGES FOR PLAINTIFFS [redacted]

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted], was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XVI

DAMAGES FOR PLAINTIFFS [redacted], MINOR

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] minor, was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XVII

DAMAGES FOR PLAINTIFFS [redacted], MINOR

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] Minor, was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court.

Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XVIII

DAMAGES FOR PLAINTIFFS [redacted] MINOR

As a direct and proximate result of the occurrence made the basis of this lawsuit, the Plaintiffs, [redacted] was caused to suffer serious bodily injuries and has incurred the following damages:

a) Reasonable medical care and expenses in the past. Plaintiffs incurred these expenses for the necessary care and treatment of the injuries resulting from the accident complained of herein and such charges are reasonable and were usual and customary charges for such services in Hidalgo County, Texas;

b) Reasonable and necessary medical care and expenses, which will in all reasonable probability be incurred in the future;

c) Physical pain and suffering in the past;

d) Physical pain and suffering in the future;

e) Physical impairment in the past;

f) Physical impairment, which, in all reasonable probability, will be suffered in the future;

g) Disfigurement in the past;

h) Disfigurement in the future;

i) Mental anguish in the past; and

j) Mental anguish in the future.

The maximum amount of monetary damages for Plaintiffs' claims; Plaintiffs at this time, pleads that the maximum amount which is within the jurisdictional limits of the Court. Plaintiffs reserve the right to either file a trial amendment or an amended pleading on this issue if subsequent evidence shows that this figure is either too high or too low.

XIX

SURVIVAL DAMAGES OF PLAINTIFFS, [redacted] DECEDENT

As a direct and proximate cause of the occurrence made the basis of this suit and acts of Defendants as described herein, [redacted] (Decedent) sustained serious personal injuries, pain and suffering and mental anguish which ultimately resulted in her untimely death.

As a direct and proximate cause of the occurrence made the basis of this suit, Plaintiffs' Estate [redacted] Decedent, incurred the following damages:

XX

SURVIVAL CAUSE OF ACTION TO THE ESTATE OF [redacted] FOR DAMAGES

a) Physical Pain & Mental Anguish in an amount within the jurisdictional limits of this Court;

b) Medical Expenses incurred in an amount within the jurisdictional limits of this Court;

c) Funeral and Burial Expenses in an amount within the jurisdictional limits of this Court;

d) Pre-Judgment Interest at the rate of .05% per annum in an amount within the jurisdictional limits of this Court; and

e) Exemplary Damages pursuant to CPRC 41.008 in an amount within the jurisdictional limits of this Court and as provided by CPRC 41.008(1)(A) & (B).

By reason of the above, Plaintiffs, [redacted] Decedent, has suffered losses and damages in a sum in excess of the jurisdictional limits of the Court for which this lawsuit is brought by her personal representatives, [redacted] and [redacted], the heirs and beneficiaries of [redacted], seeking to recover

all damages recoverable pursuant to the Texas Survival Statute as beneficiaries of the Estate of [redacted] including his physical pain and mental anguish, medical expenses, funeral and burial expenses.

XXI

WRONGFUL DEATH CLAIM FOR DAMAGES OF PLAINTIFFS

As a direct and proximate cause of Defendants', GM, [redacted] conduct, Plaintiffs, [redacted] have suffered various injuries and damages. Plaintiffs have suffered and will continue to suffer pain, agony, mental anguish and distress, and psychological injuries.

As a result of the negligent acts of the Defendants, GM, [redacted] Plaintiffs experienced physical and mental pain and suffering.

Plaintiffs have suffered damages, arising from the death of [redacted] in the past and will in all reasonable probability sustain such damages in the future, including pecuniary losses, loss of care, maintenance, support, services, advice, counsel, loss of companionship and society, loss of love, comfort, companionship, Loss of parental consortium and mental anguish, for which recovery of damages are sought under the Texas Wrongful Death Act in an amount within jurisdictional limits of this Court.

XXII

EXEMPLARY DAMAGES AGAINST DEFENDANT GENERAL MOTORS, LLC

Defendant, GM, acts or omissions described above, when viewed objectively from the standpoint of the Defendant at the time of the act or omission, involved an extreme degree of risk, considering the probability and magnitude of the potential harm

to Plaintiffs and others. Defendant had actual, subjective awareness of the risk involved in the above described acts or omissions, but nevertheless proceeded with conscious indifference to the rights, safety, or welfare of Plaintiffs and others.

Based on the facts stated herein, Plaintiffs request exemplary damages be awarded to Plaintiffs and against Defendant, GM.

XXIII

PRE- AND POST-JUDGMENT INTEREST

Plaintiffs seek recovery of such pre-judgment and post-judgment interest as permitted by law.

XXIV

RESERVATION OF RIGHTS

Plaintiffs reserve the right to prove the amount of damages at trial. Plaintiffs reserve the right to amend their petition to add additional counts upon further discovery and as their investigation continues.

XXV

REQUEST FOR JURY TRIAL

Plaintiffs, in accordance with Rule 216 of the Texas Rules of Civil Procedure, request a trial by jury.

XXVI

CONDITIONS PRECEDENT

Pursuant to Rule 54 of the Texas Rules of Civil Procedure, all conditions precedent to Plaintiffs right to recover herein has been performed or has occurred.

XXVII

PRAYER

WHEREFORE, PREMISES CONSIDERED, Plaintiffs, [redacted] Individually And As Next Friend Of [redacted] Minors, [redacted] Individually And As Next Friend Of [redacted] Minors, [redacted] Individually and as the Personal Representative Of The Estate Of [redacted] Deceased, pray that this cause be set for trial before a jury, and that Plaintiffs recover judgment of and from Defendants, General Motors, LLC, [redacted] for their actual damages in such an amount as the evidence may show and the jury may determine to be proper, together with pre-judgment interest, post-judgment interest, costs of suit, and such other and further relief to which they may show themselves to be justly entitled, whether at law or in equity, by this pleading or proper amendment thereto.

XXVIII

REQUEST FOR DISCLOSURES TO DEFENDANTS, GENERAL MOTORS, LLC, [redacted]

Pursuant to Rule 194 of the Texas Rules of Civil Procedure, Plaintiffs request that Defendants named herein provide and disclose, within 50 days of service of this request, the all of the mandatory information and material described in Rule 194.2 of the Texas Rules of Civil Procedure as provided therein.

XXIX

REQUEST FOR PRODUCTION OF DOCUMENTS TO DEFENDANTS, GENERAL MOTORS, LLC, [redacted] AND [redacted]

Pursuant to Rule 196 of the Texas Rules of Civil Procedure, Plaintiffs request that Defendants named herein produce, within 50 days of service of this request, the following documents for inspection and copying:

a) A true and correct copy of all insuring agreements, both primary and excess liability coverage which were in existence at the time of the incident made the basis of this suit and which may be available to provide coverage for the losses sustained by the Plaintiffs as alleged herein.

Respectfully submitted,

GUERRA LAW FIRM
320 W. Pecan Avenue
McAllen, Texas 78501
Tel. (956) 618-2557
Fax. (956) 618-1690

By: _____
MANUEL GUERRA, III
Texas Bar No. 00798226

Attorney for Plaintiffs, [redacted] and [redacted] Individually And As Next Friend Of [redacted] And [redacted] Minors, [redacted] Individually And As Next Friend Of [redacted] And [redacted], Minors, [redacted] Individually and as the Personal Representative Of The Estate Of [redacted], Deceased

Attachment 3

BOSCH

CDR CRASH DATA RETRIEVAL SYSTEM

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	1GNMCAE37AR[redacted]
User	[redacted]
Case Number	[redacted]
EDR Data Imaging Date	11/09/2011
Crash Date	08/20/2011
Filename	1GNMCAE37AR[redacted]ACM.CDRX
Saved on	Wednesday, November 9 2011 at 16:17:44
Collected with CDR version	Crash Data Retrieval Tool 4.1.1
Reported with CDR version	Crash Data Retrieval Tool 4.1.1
EDR Device Type	Airbag Control Module
Event(s) recovered	Non-Deployment, Deployment, Deployment

Comments

- 8790 CROWNHILL BLVD, SAN ANTONIO, TX
- DLC USED
- BATTERY PACK USED TO POWER VEHICLE SYSTEMS
- SIR LAMP: FLASHED ON AND OFF AND REMAINED ON
- MILEAGE: 50,715
- ATTENDED BY: DAN MORROW (GUERRA LAW FIRM REP), YVONNE HERNANDEZ (BROCK, PERSON, GUERRA, AND REYNA), STEVE HOWARD (REP DOLLAR THRIFTY), KELLEY ADAMSON (ADAMSON ENGINEERING), JOY TULL (HARTLINE), [redacted]

Data Limitations

Recorded Crash Events:

There are two types of recorded crash events for Front, Side, and Rear (FSR) Events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH [8 km/h]. A Non-Deployment Event contains Pre-Crash and Crash data. The oldest Non-Deployment event can be overwriten by a Deployment Event, if all three records are full and the Non-Deployment Event is not locked. Non-Deployment Events can be overwritten after approximately 250 ignition cycles. Also, a Non-Deployment event can be recorded if one of the following occurs without the Deployment of any of the frontal air bags, side air bags, or roll bars:

-Pretensioner(s) only Deployment
-Head Rest Deployment
-Battery Cut-Off Deployment

The second type of SDM recorded crash event for FSR Events is the Deployment Event. It also contains Pre-Crash and Crash data. Deployment Events cannot be overwritten or cleared by the SDM.

There are also two types of recorded crash events for Rollover Events. The first is the Non-Deployment (Non-rollover) Event. A Non-Deployment Event records data but does not deploy the air bag(s). A Non-Deployment Event contains Pre-Crash and Crash data. Non-Deployment Rollover event follow the same rules as FSR Non-Deployment events. The SDM can store up to three Events. Once the SDM records a combination of three Deployment or locked Non-Deployment Events, the SDM must be replaced.

Data:

For FSR Events, SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. For Deployment Events, the SDM will record 220 milliseconds of data after the Deployment criteria is met and up to 70 milliseconds before the Deployment criteria is met. For Non-Deployment Events, the SDM will record the first 300 milliseconds of data after algorithm enable. Velocity Change data is displayed in SAE sign convention.

For Rollover Events, the SDM may record Lateral Acceleration, Vertical Acceleration, and Roll Rate data, if the SDM is rollover capable. This data reflects what the sensing system experienced during the recorded portion of the event. For Non-Deployment (Non-rollover) Events, the SDM will record 750 milliseconds of data before a calibrated angle threshold is reached. For Deployment Events, the SDM will record up to 490 milliseconds of data before the Deployment criteria is met and 250 milliseconds after the Deployment criteria is met. Vehicle Recorded Acceleration and Roll Rate data are displayed in SAE sign convention.

-Time Between Events is recorded at a 10 millisecond sample rate and is displayed in seconds for a maximum time of 655.33 seconds. The counter measures from the start of one event to the start of the next event, if both events occur within the same ignition cycle.
-The CDR tool displays time from Algorithm Enable (AE) to time of Deployment command in a Deployment event and AE to time of maximum SDM recorded vehicle velocity change in a Non-Deployment event. Time from AE begins when the first air bag system enable threshold is met and ends when Deployment command criteria is met or at maximum SDM recorded vehicle velocity change. Any air bag systems may be a source of an enable.
-Time From Algorithm Enable to Maximum SDM Recorded Vehicle Velocity Change is captured when the largest, absolute value of either the Longitudinal or Lateral Recorded Vehicle Velocity Change occurs. The Maximum may occur between the recorded 10 millisecond sample points.
-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.
-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:
    -Significant changes in the tire's rolling radius
    -Final drive axle ratio changes
    -Wheel lockup and wheel slip
-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.
-Pre-Crash data is recorded asynchronously.
-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:
    -The SDM receives a message with an "invalid" flag from the module sending the pre-crash data
-Pre-Crash Electronic Data Validity Check Status indicates "Data Not Available" if:
    -No data is received from the module sending the pre-crash data
-Belt Switch Circuit Status indicates the status of the seat belt switch circuit.
-The ignition cycle counter will increment when the power mode cycles from OFF/Accessory to RUN. Applying and removing of battery power to the module will not increment the ignition cycle counter.
-Ignition Cycles Since DTCs Were Last Cleared can record a maximum value of 253 cycles and can only be reset by a scan tool.
-Deployment Event Counter tracks the number of Deployment events that have occurred during the SDM's lifetime.
-Event Counter tracks the number of qualified events (either Deployments, Non-deploy, or Rollover events) that have occurred during the SDM's lifetime.
-The Algorithm Enable to Deployment Command Criteria Met times for the following will be indicated for whichever occurs first:
    -Driver Thorax or Driver Curtain
    -Passenger Thorax or Passenger Curtain
    -Driver Pretensioner Loop #1 or Driver Pretensioner Loop #2
    -Passenger Pretensioner Loop #1 or Passenger Pretensioner Loop #2
-All data should be examined in conjunction with other available physical evidence from the vehicle and scene

Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by Body Control Module, via the vehicle's communication network.
-The Belt Switch Circuit is wired directly to the SDM.

01041_SDM11-delphi_r007

Event Data (General)

Ignition Cycles At Investigation	3996
ESS # 1 Traceability Data	AU447039315011EC
ESS # 2 Traceability Data	AT44703931000E06
ESS # 3 Traceability Data	AH274429303013FA
ESS # 4 Traceability Data	AJ274429303013FD
ESS # 5 Traceability Data	DA44704931500DD0
ESS # 6 Traceability Data	DB44704931500E60
ESS # 7 Traceability Data	??00000000000000
ESS # 8 Traceability Data	??00000000000000
Vehicle Identification Number	?GNMCAE37AR[redacted]
System Type	Delphi
Manufacturing Traceability Data	AS0674KZ932830PJ
Software Module Identifier 1	00CE1158
Software Module Identifier 2	013F0403
Software Module Identifier 3	01AE4BE4
End Model Part Number	00CE0102

Event Data (Event Record 1)

Event Recording Complete	Yes
Event Record Type	Non-Deployment
Crash Record Locked	No
Data Recording Complete - Deployment Status Data	No
Data Recording Complete - SDM Recorded Vehicle Velocity Change Data	No
Deployment Event Counter	0
Event Counter	1
OnStar Notification Event Counter	0
Algorithm Active: Rear	Yes
Algorithm Active: Rollover	Yes
Algorithm Active: Side	Yes
Algorithm Active: Frontal	Yes
Ignition Cycles At Event	3988
Time Between Events (sec)	Data Not Available
Concurrent Event Flag Set	No
Event Severity Status: Rollover	No
Event Severity Status: Rear	No
Event Severity Status: Right Side	No
Event Severity Status: Left Side	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Frontal Stage 1	No
Event Severity Status: Frontal Pretensioner	No
Driver 1st Stage Deployment Loop Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	No
Passenger Pretensioner Deployment Loop #1 Commanded	No
Driver Pretensioner Deployment Loop #2 Commanded (If Equipped)	No
Passenger Pretensioner Deployment Loop #2 Commanded (If Equipped)	No
Driver Thorax Loop Commanded (If Equipped)	No
Passenger Thorax Loop Commanded (If Equipped)	No
Driver Row 2 Thorax Loop Commanded (If Equipped)	No
Passenger Row 2 Thorax Loop Commanded (If Equipped)	No
Driver Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Knee Deployment Loop Commanded (If Equipped)	No
Passenger Knee Deployment Loop Commanded (If Equipped)	No
Driver Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Passenger Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Center Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Battery Cutoff Loop Commanded (If Equipped)	No
Driver Roll Bar Loop Commanded (If Equipped)	No
Passenger Roll Bar Loop Commanded (If Equipped)	No
Steering Column Energy Absorbing Loop Commanded (If Equipped)	No
Driver Head Rest Loop Commanded (If Equipped)	No
Passenger Head Rest Loop Commanded (If Equipped)	No
Driver Row 2 Head Rest Loop Commanded (If Equipped)	No
Passenger Row 2 Head Rest Loop Commanded (If Equipped)	No
Center Row 2 Head Rest Loop Commanded (If Equipped)	No
High Voltage Battery Cutoff loop commanded (If Equipped)	No
Driver Belt Switch Circuit Status	Buckled
Passenger Belt Switch Circuit Status	Buckled
Driver Seat Position Status (If Equipped)	Rearward
Passenger Seat Position Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Occupied
Passenger Classification Status	Small Adult
Passenger SIR Suppression Switch Circuit Status (If Equipped)	Data Not Available

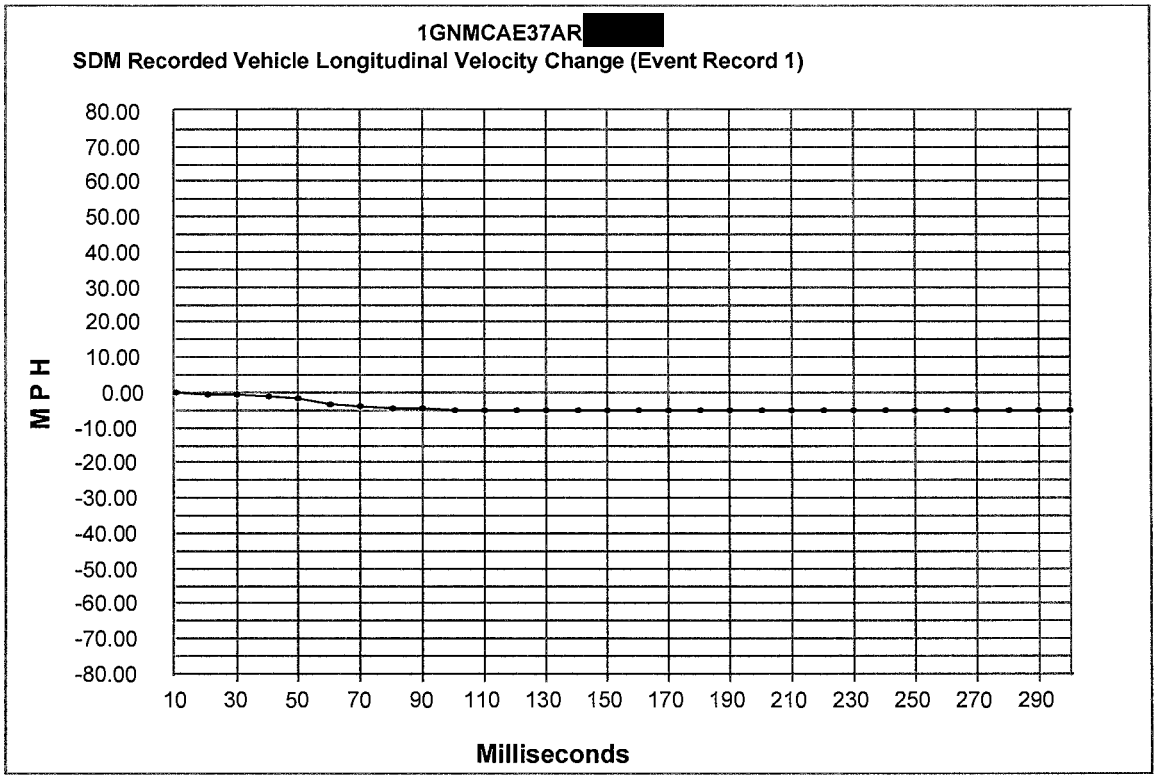
Passenger Air Bag ON Indicator Status	On
Passenger Air Bag OFF Indicator Status	Off
Low Tire Pressure Warning Lamp	Data Not Available
SIR Warning Lamp Status	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	655330
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	3982
Ignition Cycles Since DTCs Were Last Cleared at Event Enable	253
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Time From Algorithm Enable to Maximum SDM Recorded Vehicle Velocity Change (msec)	140
Longitudinal SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h]	-5 [-8]
Lateral SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h]	-4 [-6]
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Driver Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Passenger Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Driver Pretensioner Time From Algorithm Enable to Deployment Loop #1 or Loop #2 Command Criteria Met (msec)	Data Not Available
Passenger Pretensioner Time From Algorithm Enable to Deployment Loop #1 or Loop #2 Command Criteria Met (msec)	Data Not Available
Rollover Sensor - time from Event Enable to time of angle threshold (msec)	Data Not Available

Pre-Crash Data -1 to -.5 sec (Event Record 1)

Times (sec)	Cruise Control Active	Cruise Control Resume Switch Active	Cruise Control Set Switch Active	Engine Torque (lb-ft [N-m])	Reduced Engine Power Mode Indicator
-1.0	Data Not Available	Data Not Available	Data Not Available	-4 [-6]	Off
-0.5	Data Not Available	Data Not Available	Data Not Available	1 [1]	Off

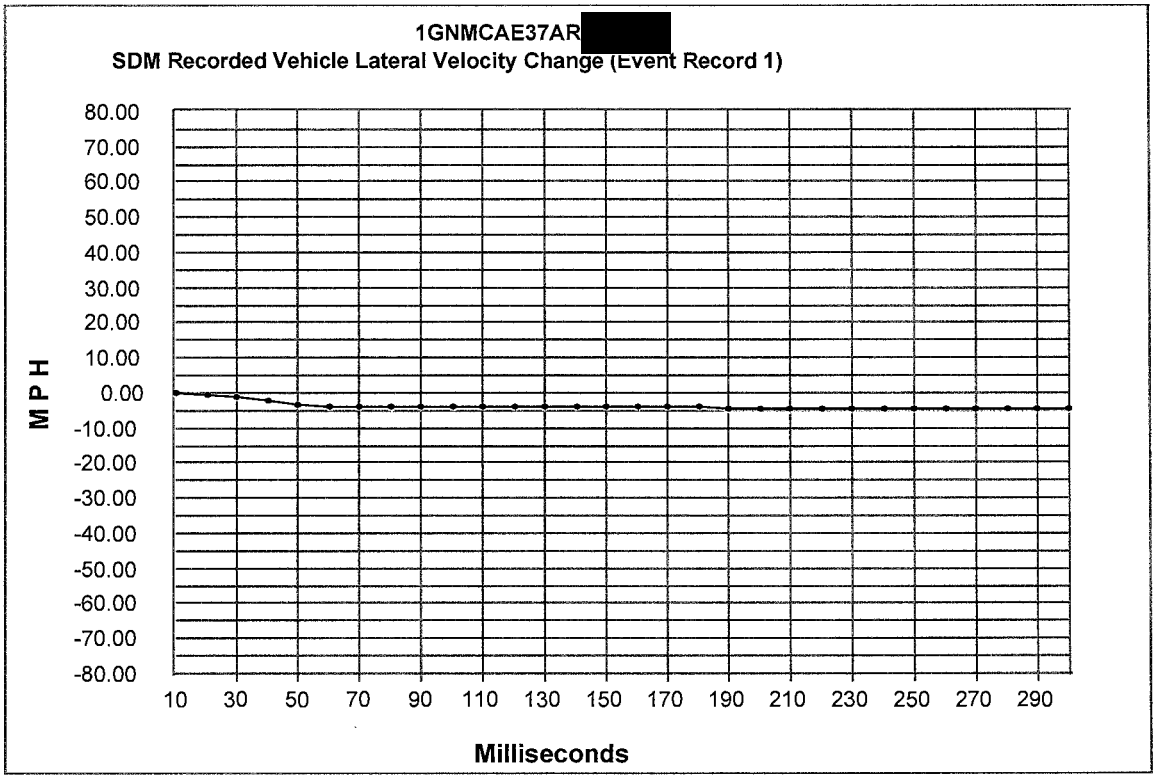
Pre-Crash Data -2.5 to -.5 sec (Event Record 1)

Times (sec)	Accelerator Pedal Position (percent)	Brake Switch Circuit State	Engine Speed	Throttle Position (%)	Vehicle Speed (MPH [km/h])
-2.5	0	Off	1472	13	68 [109]
-2.0	0	Off	1472	11	67 [108]
-1.5	0	On	1472	9	68 [109]
-1.0	0	On	1408	7	65 [105]
-0.5	0	On	1344	6	61 [98]



Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
10	0.0	0.0
20	-0.6	-1.0
30	-0.6	-1.0
40	-1.2	-2.0
50	-1.9	-3.0
60	-3.1	-5.0
70	-3.7	-6.0
80	-4.3	-7.0
90	-4.3	-7.0
100	-5.0	-8.0
110	-5.0	-8.0
120	-5.0	-8.0
130	-5.0	-8.0
140	-5.0	-8.0
150	-5.0	-8.0
160	-5.0	-8.0
170	-5.0	-8.0
180	-5.0	-8.0
190	-5.0	-8.0
200	-5.0	-8.0
210	-5.0	-8.0

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
220	-5.0	-8.0
230	-5.0	-8.0
240	-5.0	-8.0
250	-5.0	-8.0
260	-5.0	-8.0
270	-5.0	-8.0
280	-5.0	-8.0
290	-5.0	-8.0
300	-5.0	-8.0



Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
10	0.0	0.0
20	-0.6	-1.0
30	-1.2	-2.0
40	-2.5	-4.0
50	-3.1	-5.0
60	-3.7	-6.0
70	-3.7	-6.0
80	-3.7	-6.0
90	-3.7	-6.0
100	-3.7	-6.0
110	-3.7	-6.0
120	-3.7	-6.0
130	-3.7	-6.0
140	-3.7	-6.0
150	-3.7	-6.0
160	-3.7	-6.0
170	-3.7	-6.0
180	-3.7	-6.0
190	-4.3	-7.0
200	-4.3	-7.0
210	-4.3	-7.0

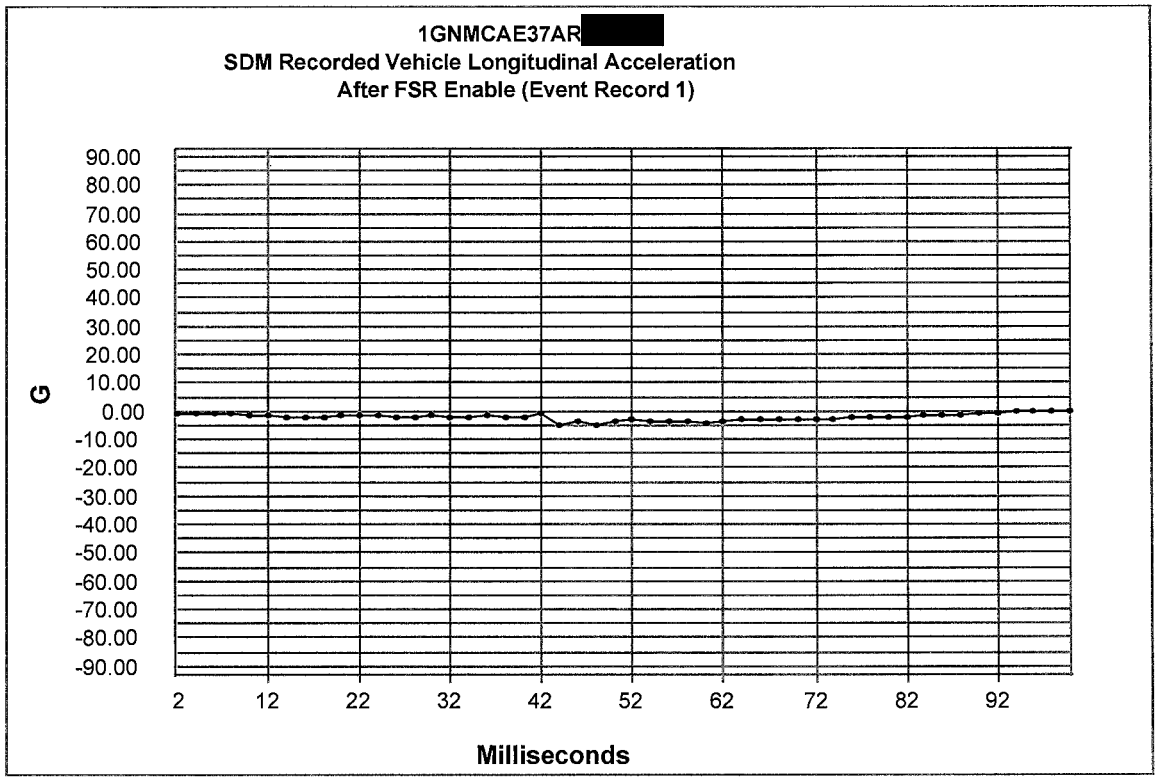
Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
220	-4.3	-7.0
230	-4.3	-7.0
240	-4.3	-7.0
250	-4.3	-7.0
260	-4.3	-7.0
270	-4.3	-7.0
280	-4.3	-7.0
290	-4.3	-7.0
300	-4.3	-7.0

SDM Recorded Vehicle Lateral Acceleration (Event Record 1)

Contains No Recorded Data

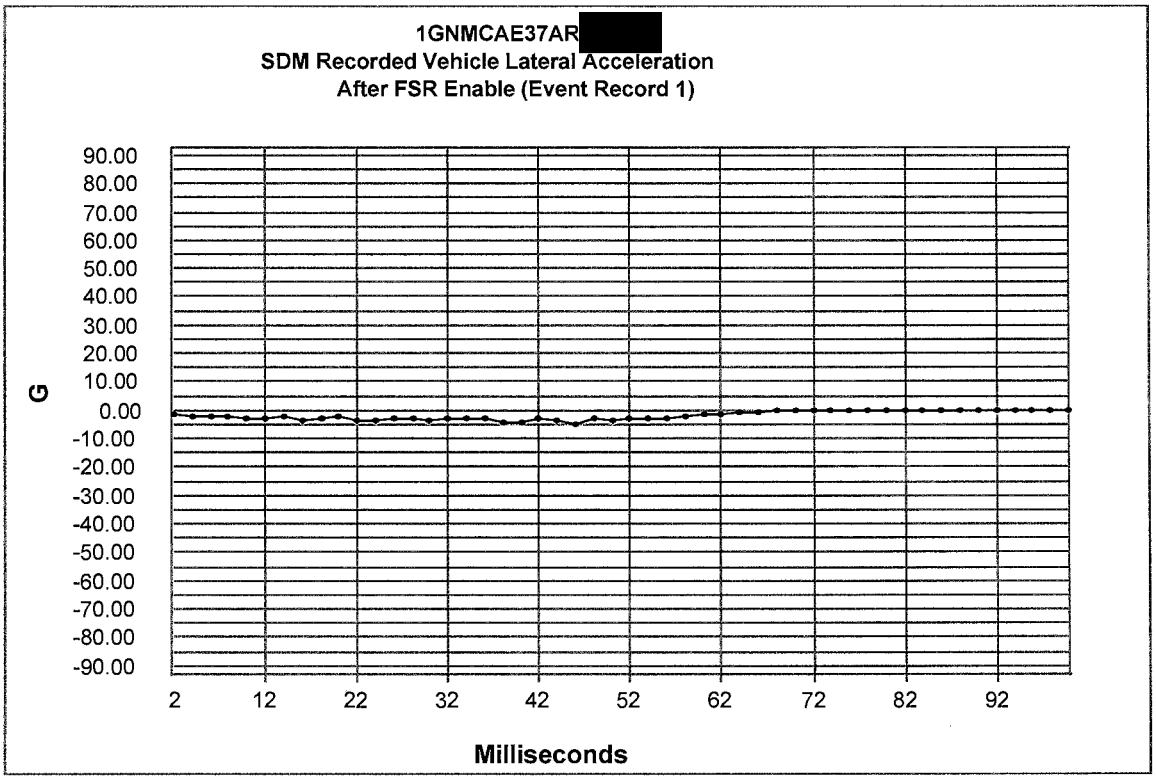
SDM Recorded Vehicle Roll Rate (Event Record 1)

Contains No Recorded Data



Time	G
2	-0.7
4	-0.7
6	-0.7
8	-0.7
10	-1.5
12	-1.5
14	-2.2
16	-2.2
18	-2.2
20	-1.5
22	-1.5
24	-1.5
26	-2.2
28	-2.2
30	-1.5
32	-2.2
34	-2.2
36	-1.5
38	-2.2
40	-2.2
42	-0.7
44	-5.1
46	-3.6
48	-5.1
50	-3.6

Time	G
52	-2.9
54	-3.6
56	-3.6
58	-3.6
60	-4.4
62	-3.6
64	-2.9
66	-2.9
68	-2.9
70	-2.9
72	-2.9
74	-2.9
76	-2.2
78	-2.2
80	-2.2
82	-2.2
84	-1.5
86	-1.5
88	-1.5
90	-0.7
92	-0.7
94	0.0
96	0.0
98	0.0
100	0.0



Time	G
2	-1.5
4	-2.2
6	-2.2
8	-2.2
10	-2.9
12	-2.9
14	-2.2
16	-3.6
18	-2.9
20	-2.2
22	-3.6
24	-3.6
26	-2.9
28	-2.9
30	-3.6
32	-2.9
34	-2.9
36	-2.9
38	-4.4
40	-4.4
42	-2.9
44	-3.6
46	-5.1
48	-2.9
50	-3.6

Time	G
52	-2.9
54	-2.9
56	-2.9
58	-2.2
60	-1.5
62	-1.5
64	-0.7
66	-0.7
68	0.0
70	0.0
72	0.0
74	0.0
76	0.0
78	0.0
80	0.0
82	0.0
84	0.0
86	0.0
88	0.0
90	0.0
92	0.0
94	0.0
96	0.0
98	0.0
100	0.0

Event Data (Event Record 2)

Event Recording Complete	Yes
Event Record Type	Deployment
Crash Record Locked	Yes
Data Recording Complete - Deployment Status Data	Yes
Data Recording Complete - SDM Recorded Vehicle Velocity Change Data	No
Deployment Event Counter	1
Event Counter	2
OnStar Notification Event Counter	1
Algorithm Active: Rear	Yes
Algorithm Active: Rollover	Yes
Algorithm Active: Side	Yes
Algorithm Active: Frontal	Yes
Ignition Cycles At Event	3988
Time Between Events (sec)	.87
Concurrent Event Flag Set	No
Event Severity Status: Rollover	Yes
Event Severity Status: Rear	No
Event Severity Status: Right Side	No
Event Severity Status: Left Side	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Frontal Stage 1	No
Event Severity Status: Frontal Pretensioner	No
Driver 1st Stage Deployment Loop Commanded	No
Passenger 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop #1 Commanded	Yes
Passenger Pretensioner Deployment Loop #1 Commanded	Yes
Driver Pretensioner Deployment Loop #2 Commanded (If Equipped)	No
Passenger Pretensioner Deployment Loop #2 Commanded (If Equipped)	No
Driver Thorax Loop Commanded (If Equipped)	No
Passenger Thorax Loop Commanded (If Equipped)	No
Driver Row 2 Thorax Loop Commanded (If Equipped)	No
Passenger Row 2 Thorax Loop Commanded (If Equipped)	No
Driver Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped)	Yes
Passenger Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped)	Yes
Driver Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Knee Deployment Loop Commanded (If Equipped)	No
Passenger Knee Deployment Loop Commanded (If Equipped)	No
Driver Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Passenger Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Center Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Battery Cutoff Loop Commanded (If Equipped)	No
Driver Roll Bar Loop Commanded (If Equipped)	No
Passenger Roll Bar Loop Commanded (If Equipped)	No
Steering Column Energy Absorbing Loop Commanded (If Equipped)	No
Driver Head Rest Loop Commanded (If Equipped)	No
Passenger Head Rest Loop Commanded (If Equipped)	No
Driver Row 2 Head Rest Loop Commanded (If Equipped)	No
Passenger Row 2 Head Rest Loop Commanded (If Equipped)	No
Center Row 2 Head Rest Loop Commanded (If Equipped)	No
High Voltage Battery Cutoff loop commanded (If Equipped)	No
Driver Belt Switch Circuit Status	Buckled
Passenger Belt Switch Circuit Status	Buckled
Driver Seat Position Status (If Equipped)	Rearward
Passenger Seat Position Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Occupied
Passenger Classification Status	Small Adult
Passenger SIR Suppression Switch Circuit Status (If Equipped)	Data Not Available

Passenger Air Bag ON Indicator Status	On
Passenger Air Bag OFF Indicator Status	Off
Low Tire Pressure Warning Lamp	Data Not Available
SIR Warning Lamp Status	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	655330
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	3982
Ignition Cycles Since DTCs Were Last Cleared at Event Enable	253
Diagnostic Trouble Codes at Event:	B0052
Fault type	$00
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Time From Algorithm Enable to Maximum SDM Recorded Vehicle Velocity Change (msec)	Data Not Available
Longitudinal SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h]	Data Not Available
Lateral SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h]	Data Not Available
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Driver Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	405
Passenger Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	405
Driver Pretensioner Time From Algorithm Enable to Deployment Loop #1 or Loop #2 Command Criteria Met (msec)	405
Passenger Pretensioner Time From Algorithm Enable to Deployment Loop #1 or Loop #2 Command Criteria Met (msec)	405
Rollover Sensor - time from Event Enable to time of angle threshold (msec)	540

Pre-Crash Data -1 to -.5 sec (Event Record 2)

Times (sec)	Cruise Control Active	Cruise Control Resume Switch Active	Cruise Control Set Switch Active	Engine Torque (lb-ft [N-m])	Reduced Engine Power Mode Indicator
-1.0	Data Not Available	Data Not Available	Data Not Available	15 [21]	Off
-0.5	Data Not Available	Data Not Available	Data Not Available	20 [28]	Off

Pre-Crash Data -2.5 to -.5 sec (Event Record 2)

Times (sec)	Accelerator Pedal Position (percent)	Brake Switch Circuit State	Engine Speed	Throttle Position (%)	Vehicle Speed (MPH [km/h])
-2.5	0	On	1472	9	68 [109]
-2.0	0	On	1408	7	65 [105]
-1.5	0	On	1280	6	60 [97]
-1.0	0	Off	1152	12	50 [81]
-0.5	0	Off	1088	10	47 [76]

SDM Recorded Vehicle Longitudinal Velocity (Event Record 2)

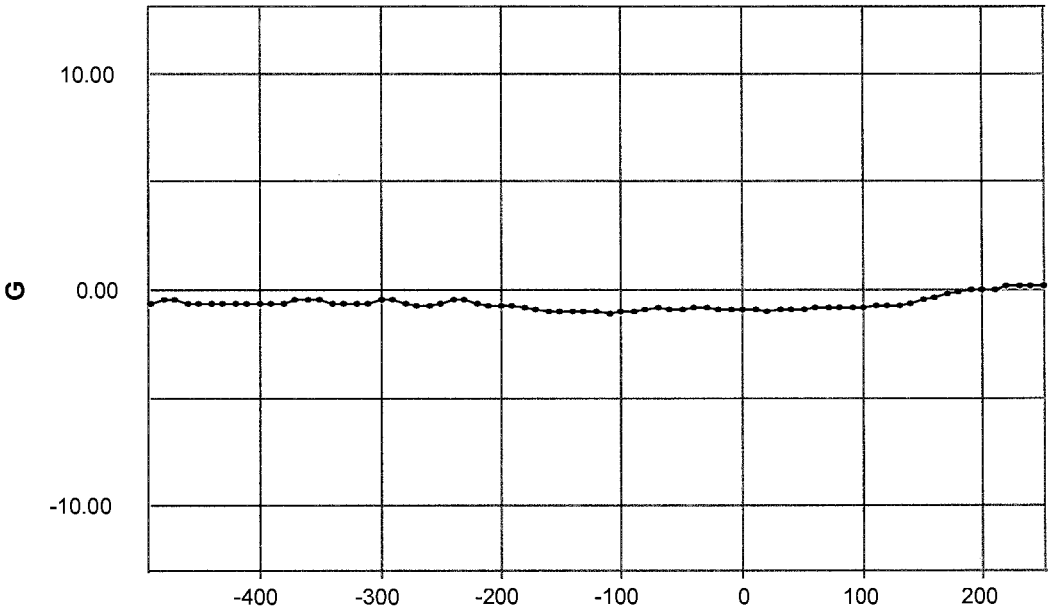
Contains No Recorded Data

SDM Recorded Vehicle Lateral Velocity Change (Event Record 2)

Contains No Recorded Data

1GNMCAE37AR[redacted]

SDM Recorded Vehicle Lateral Acceleration (Event Record 2)



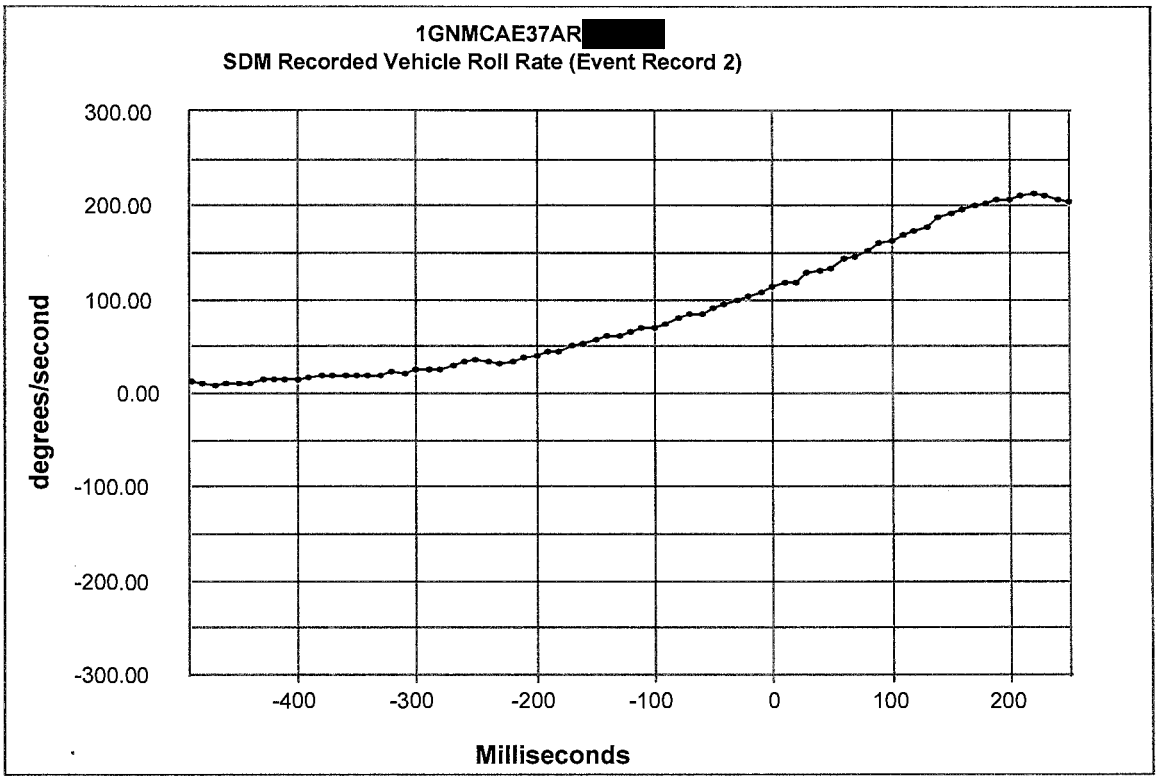
Time	g
-490	-0.6
-480	-0.5
-470	-0.5
-460	-0.6
-450	-0.6
-440	-0.6
-430	-0.6
-420	-0.6
-410	-0.6
-400	-0.6
-390	-0.6
-380	-0.6
-370	-0.5
-360	-0.5
-350	-0.5
-340	-0.6
-330	-0.6
-320	-0.6
-310	-0.6
-300	-0.5
-290	-0.5
-280	-0.6
-270	-0.7
-260	-0.7
-250	-0.6

Time	g
-240	-0.5
-230	-0.5
-220	-0.6
-210	-0.7
-200	-0.7
-190	-0.7
-180	-0.8
-170	-0.9
-160	-1.0
-150	-1.0
-140	-1.0
-130	-1.0
-120	-1.0
-110	-1.1
-100	-1.0
-90	-1.0
-80	-0.9
-70	-0.8
-60	-0.9
-50	-0.9
-40	-0.8
-30	-0.8
-20	-0.9
-10	-0.9
0	-0.9

Time	g
10	-0.9
20	-1.0
30	-0.9
40	-0.9
50	-0.9
60	-0.8
70	-0.8
80	-0.8
90	-0.8
100	-0.8
110	-0.7
120	-0.7
130	-0.7
140	-0.6
150	-0.5
160	-0.4
170	-0.2
180	-0.1
190	0.0
200	0.0
210	0.0
220	0.2
230	0.2
240	0.2
250	0.2

SDM Recorded Vehicle Vertical Acceleration (Event Record 2)

Contains No Recorded Data



Time	deg/sec
-490	12
-480	10
-470	8
-460	10
-450	10
-440	10
-430	14
-420	14
-410	14
-400	14
-390	16
-380	18
-370	18
-360	18
-350	18
-340	20
-330	20
-320	24
-310	22
-300	26
-290	26
-280	26
-270	30
-260	34
-250	36

Time	deg/sec
-240	34
-230	32
-220	34
-210	38
-200	40
-190	44
-180	44
-170	50
-160	52
-150	56
-140	62
-130	62
-120	66
-110	70
-100	70
-90	74
-80	80
-70	84
-60	84
-50	90
-40	96
-30	100
-20	104
-10	108
0	114

Time	deg/sec
10	118
20	118
30	128
40	130
50	134
60	144
70	146
80	152
90	160
100	162
110	170
120	174
130	178
140	188
150	192
160	196
170	200
180	202
190	206
200	206
210	212
220	214
230	212
240	208
250	204

SDM Recorded Vehicle Longitudinal Acceleration After FSR Enable (Event Record 2)

Contains No Recorded Data

SDM Recorded Vehicle Lateral Acceleration After FSR Enable (Event Record 2)

Contains No Recorded Data

Event Data (Event Record 3)

Event Recording Complete	Yes
Event Record Type	Deployment
Crash Record Locked	Yes
Data Recording Complete - Deployment Status Data	Yes
Data Recording Complete - SDM Recorded Vehicle Velocity Change Data	Yes
Deployment Event Counter	2
Event Counter	3
OnStar Notification Event Counter	1
Algorithm Active: Rear	Yes
Algorithm Active: Rollover	Yes
Algorithm Active: Side	Yes
Algorithm Active: Frontal	Yes
Ignition Cycles At Event	3988
Time Between Events (sec)	.77
Concurrent Event Flag Set	No
Event Severity Status: Rollover	No
Event Severity Status: Rear	No
Event Severity Status: Right Side	Yes
Event Severity Status: Left Side	No
Event Severity Status: Frontal Stage 2	No
Event Severity Status: Frontal Stage 1	Yes
Event Severity Status: Frontal Pretensioner	No
Driver 1st Stage Deployment Loop Commanded	Yes
Passenger 1st Stage Deployment Loop Commanded	Yes
Driver 2nd Stage Deployment Loop Commanded	Yes
Passenger 2nd Stage Deployment Loop Commanded	Yes
Driver Pretensioner Deployment Loop #1 Commanded	No
Passenger Pretensioner Deployment Loop #1 Commanded	No
Driver Pretensioner Deployment Loop #2 Commanded (If Equipped)	No
Passenger Pretensioner Deployment Loop #2 Commanded (If Equipped)	No
Driver Thorax Loop Commanded (If Equipped)	No
Passenger Thorax Loop Commanded (If Equipped)	Yes
Driver Row 2 Thorax Loop Commanded (If Equipped)	No
Passenger Row 2 Thorax Loop Commanded (If Equipped)	No
Driver Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 1 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Passenger Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Knee Deployment Loop Commanded (If Equipped)	No
Passenger Knee Deployment Loop Commanded (If Equipped)	No
Driver Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Passenger Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Center Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Battery Cutoff Loop Commanded (If Equipped)	No
Driver Roll Bar Loop Commanded (If Equipped)	No
Passenger Roll Bar Loop Commanded (If Equipped)	No
Steering Column Energy Absorbing Loop Commanded (If Equipped)	No
Driver Head Rest Loop Commanded (If Equipped)	No
Passenger Head Rest Loop Commanded (If Equipped)	No
Driver Row 2 Head Rest Loop Commanded (If Equipped)	No
Passenger Row 2 Head Rest Loop Commanded (If Equipped)	No
Center Row 2 Head Rest Loop Commanded (If Equipped)	No
High Voltage Battery Cutoff loop commanded (If Equipped)	No
Driver Belt Switch Circuit Status	Buckled
Passenger Belt Switch Circuit Status	Buckled
Driver Seat Position Status (If Equipped)	Rearward
Passenger Seat Position Status (If Equipped)	Data Not Available
Passenger Seat Occupancy Status	Occupied
Passenger Classification Status	Small Adult
Passenger SIR Suppression Switch Circuit Status (If Equipped)	Data Not Available

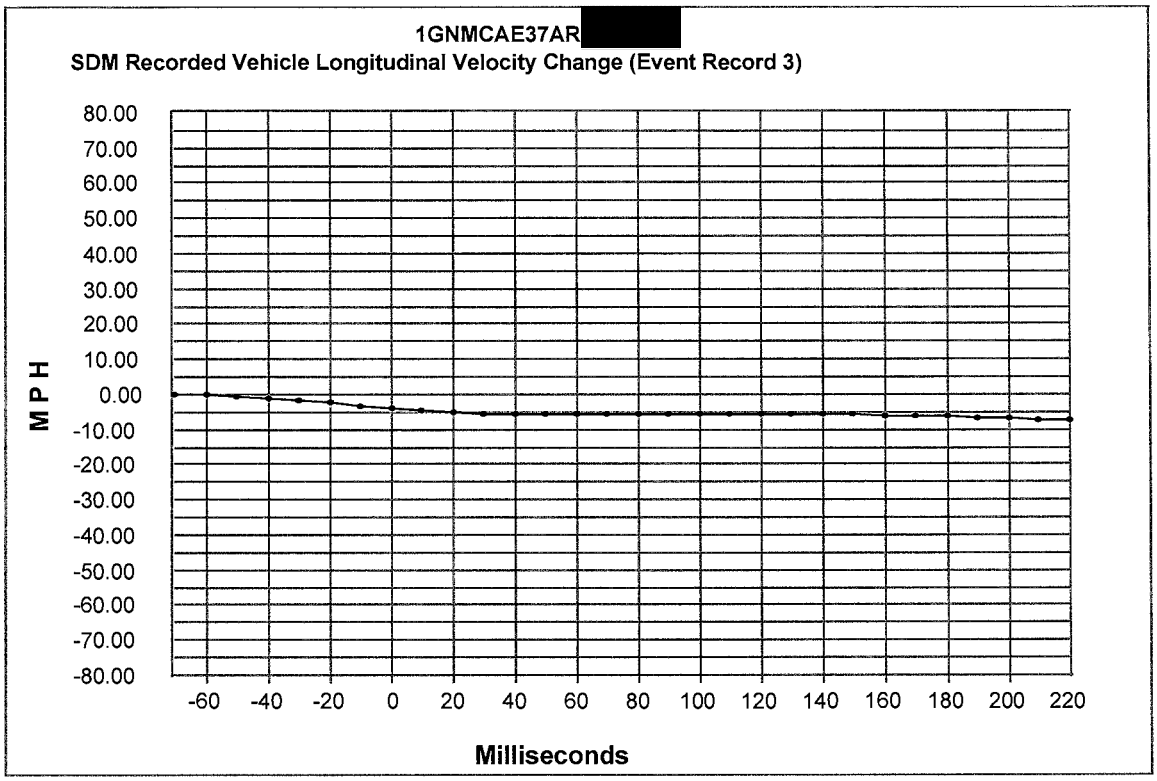
Passenger Air Bag ON Indicator Status	On
Passenger Air Bag OFF Indicator Status	Off
Low Tire Pressure Warning Lamp	Data Not Available
SIR Warning Lamp Status	On
SIR Warning Lamp ON/OFF Time Continuously (seconds)	0
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	0
Ignition Cycles Since DTCs Were Last Cleared at Event Enable	253
Diagnostic Trouble Codes at Event:	B0052
Fault type	$00
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Diagnostic Trouble Codes at Event:	N/A
Fault type	N/A
Time From Algorithm Enable to Maximum SDM Recorded Vehicle Velocity Change (msec)	400
Longitudinal SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h]	-8 [-13]
Lateral SDM Recorded Vehicle Velocity Change at time of Maximum SDM Recorded Vehicle Velocity Change MPH [km/h]	4 [6]
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	93
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	213
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	93
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	213
Driver Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	Data Not Available
Passenger Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	306
Driver Pretensioner Time From Algorithm Enable to Deployment Loop #1 or Loop #2 Command Criteria Met (msec)	Data Not Available
Passenger Pretensioner Time From Algorithm Enable to Deployment Loop #1 or Loop #2 Command Criteria Met (msec)	Data Not Available
Rollover Sensor - time from Event Enable to time of angle threshold (msec)	Data Not Available

Pre-Crash Data -1 to -.5 sec (Event Record 3)

Times (sec)	Cruise Control Active	Cruise Control Resume Switch Active	Cruise Control Set Switch Active	Engine Torque (lb-ft [N-m])	Reduced Engine Power Mode Indicator
-1.0	Data Not Available	Data Not Available	Data Not Available	7 [10]	Off
-0.5	Data Not Available	Data Not Available	Data Not Available	14 [18]	Off

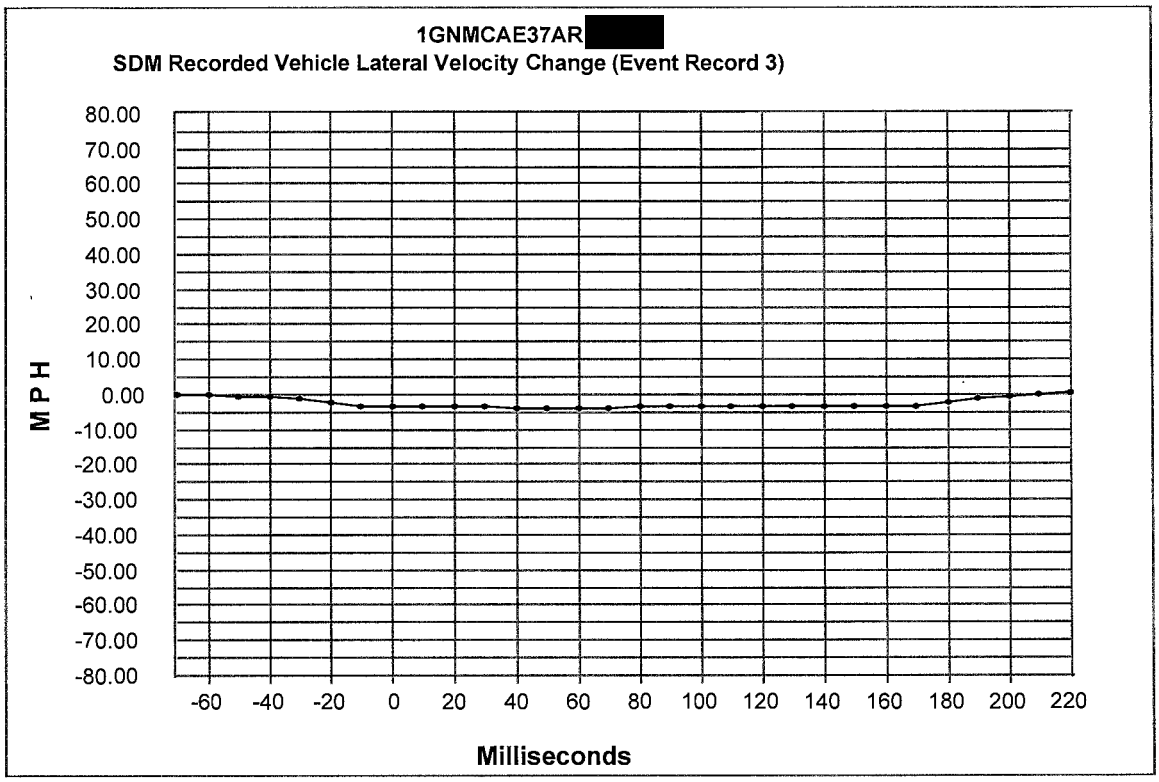
Pre-Crash Data -2.5 to -.5 sec (Event Record 3)

Times (sec)	Accelerator Pedal Position (percent)	Brake Switch Circuit State	Engine Speed	Throttle Position (%)	Vehicle Speed (MPH [km/h])
-2.5	0	On	1280	6	60 [97]
-2.0	0	On	1152	12	50 [81]
-1.5	0	Off	960	9	45 [72]
-1.0	0	Off	896	9	42 [67]
-0.5	0	Off	896	8	42 [67]



Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
-70	0.0	0.0
-60	0.0	0.0
-50	-0.6	-1.0
-40	-1.2	-2.0
-30	-1.9	-3.0
-20	-2.5	-4.0
-10	-3.1	-5.0
0	-3.7	-6.0
10	-4.3	-7.0
20	-5.0	-8.0
30	-5.6	-9.0
40	-5.6	-9.0
50	-5.6	-9.0
60	-5.6	-9.0
70	-5.6	-9.0
80	-5.6	-9.0
90	-5.6	-9.0
100	-5.6	-9.0
110	-5.6	-9.0
120	-5.6	-9.0
130	-5.6	-9.0

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
140	-5.6	-9.0
150	-5.6	-9.0
160	-6.2	-10.0
170	-6.2	-10.0
180	-6.2	-10.0
190	-6.8	-11.0
200	-6.8	-11.0
210	-7.5	-12.0
220	-7.5	-12.0



Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
-70	0.0	0.0
-60	0.0	0.0
-50	-0.6	-1.0
-40	-0.6	-1.0
-30	-1.2	-2.0
-20	-2.5	-4.0
-10	-3.1	-5.0
0	-3.1	-5.0
10	-3.1	-5.0
20	-3.1	-5.0
30	-3.1	-5.0
40	-3.7	-6.0
50	-3.7	-6.0
60	-3.7	-6.0
70	-3.7	-6.0
80	-3.1	-5.0
90	-3.1	-5.0
100	-3.1	-5.0
110	-3.1	-5.0
120	-3.1	-5.0
130	-3.1	-5.0

Time (msec)	Delta-V, lateral (MPH)	Delta-V, lateral (km/h)
140	-3.1	-5.0
150	-3.1	-5.0
160	-3.1	-5.0
170	-3.1	-5.0
180	-2.5	-4.0
190	-1.2	-2.0
200	-0.6	-1.0
210	0.0	0.0
220	0.6	1.0

SDM Recorded Vehicle Lateral Acceleration (Event Record 3)

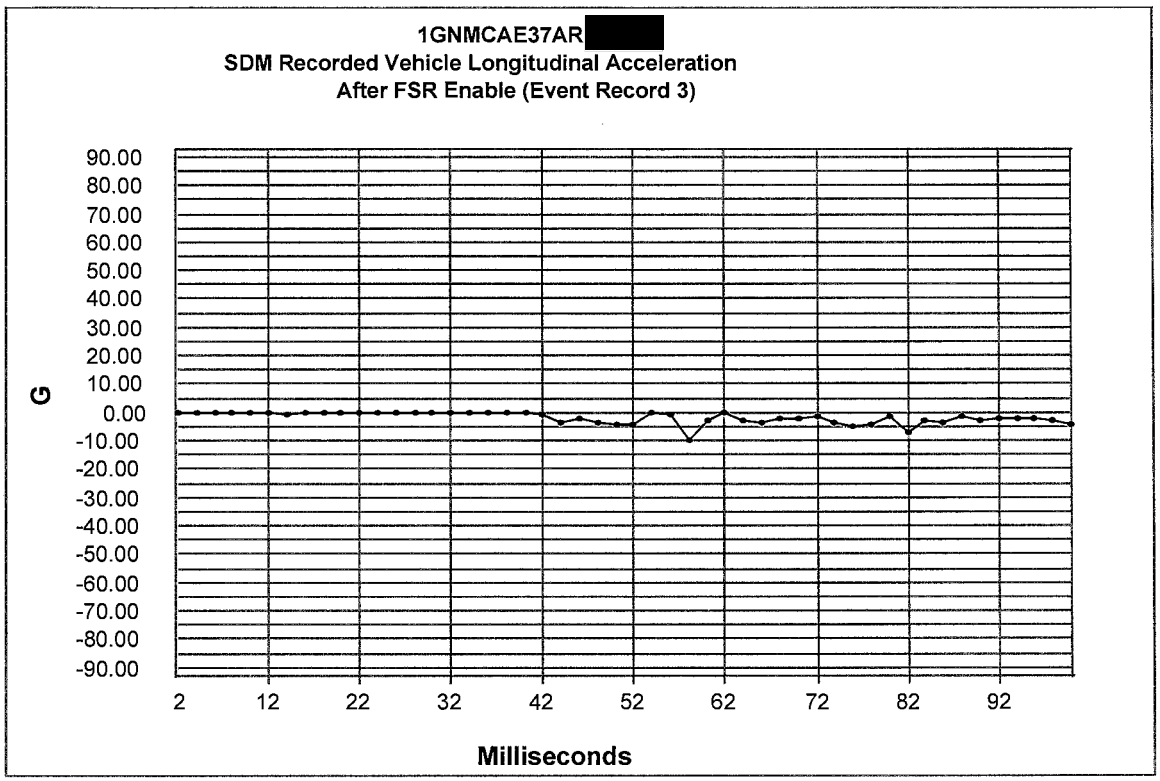
Contains No Recorded Data

SDM Recorded Vehicle Vertical Acceleration (Event Record 3)

Contains No Recorded Data

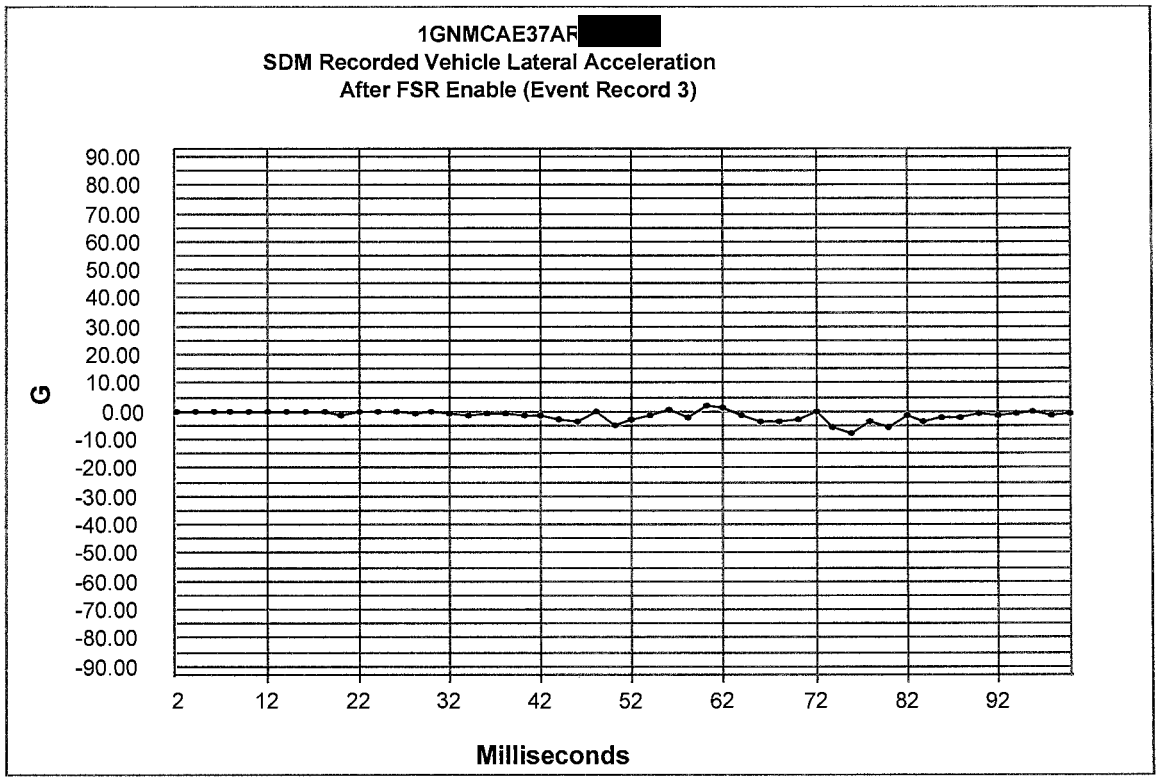
SDM Recorded Vehicle Roll Rate (Event Record 3)

Contains No Recorded Data



Time	G
2	0.0
4	0.0
6	0.0
8	0.0
10	0.0
12	0.0
14	-0.7
16	0.0
18	0.0
20	0.0
22	0.0
24	0.0
26	0.0
28	0.0
30	0.0
32	0.0
34	0.0
36	0.0
38	0.0
40	0.0
42	-0.7
44	-3.6
46	-2.2
48	-3.6
50	-4.4

Time	G
52	-4.4
54	0.0
56	-0.7
58	-10.2
60	-2.9
62	0.0
64	-2.9
66	-3.6
68	-2.2
70	-2.2
72	-1.5
74	-3.6
76	-5.1
78	-4.4
80	-1.5
82	-7.3
84	-2.9
86	-3.6
88	-1.5
90	-2.9
92	-2.2
94	-2.2
96	-2.2
98	-2.9
100	-4.4



Time	G
2	0.0
4	0.0
6	0.0
8	0.0
10	0.0
12	0.0
14	0.0
16	0.0
18	0.0
20	-1.5
22	0.0
24	0.0
26	0.0
28	-0.7
30	0.0
32	-0.7
34	-1.5
36	-0.7
38	-0.7
40	-1.5
42	-1.5
44	-2.9
46	-3.6
48	0.0
50	-5.1

Time	G
52	-2.9
54	-1.5
56	0.7
58	-2.2
60	2.2
62	1.5
64	-1.5
66	-3.6
68	-3.6
70	-2.9
72	0.0
74	-5.8
76	-8.0
78	-3.6
80	-5.8
82	-1.5
84	-3.6
86	-2.2
88	-2.2
90	-0.7
92	-1.5
94	-0.7
96	0.0
98	-1.5
100	-0.7

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

```
DPID $32
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DPID $35
78 00 00 00 00 00 00

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DID $03
41 54 34 34 37 30 33 39 33 31 30 30 30 45 30 36

DID $05
41 48 32 37 34 34 32 39 33 30 33 30 31 33 46 41

DID $07
41 4A 32 37 34 34 32 39 33 30 33 30 31 33 46 44

DID $09
44 41 34 34 37 30 34 39 33 31 35 30 30 44 44 30

DID $0B
44 42 34 34 37 30 34 39 33 31 35 30 30 45 36 30

DID $0D
01 00 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $0F
01 00 30 30 30 30 30 30 30 30 30 30 30 30 30 30

DID $30
02 00 08 01

DID $90
00 47 4E 4D 43 41 45 33 37 41 52 31 33 32 32 32 36

DID $9A
06 01

DID $B4
41 53 30 36 37 34 4B 5A 39 33 32 38 33 30 50 4A

DID $C1
00 CE 11 58

DID $C2
01 3F 04 03

DID $C3
01 AE 4B E4

DID $CB
00 CE 01 02
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DID $31

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0020	5C	FC	FC	30	20	60	C0	40	00	00
0030	00	00	00	54	00	FF	F0	15	16	17
0040	17	17	06	94	06	A2	06	07	09	0B
0050	0D	62	69	6D	6C	6D	0C	FF	FD	0F
0060	8E	FD	FF	FF	FF	FF	FF	FF	FF	FF
0070	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0080	FF	FF	FF	FF	FF	FF	FF	FF	FF	0E
0090	77	79	FF	FF	FF	FF	FF	FF	FF	FF
0100	7F	7F	7E	7E	7E	7D	7D	7B	7C	7A
0110	7A	79	79	79	78	79	78	79	77	79
0120	77	79	77	79	77	79	77	79	77	79
0130	77	79	77	79	77	79	77	78	77	78
0140	77	78	77	78	77	78	77	78	77	78
0150	77	78	77	78	77	78	77	78	77	78
0160	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0170	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0180	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0190	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0220	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0230	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0260	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0270	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0280	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0290	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0300	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0310	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0320	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0360	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0370	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0380	FF	FF	FF	FF	FF	FF	7E	7E	7E	7E
0390	7D	7D	7C	7C	7C	7D	7D	7D	7C	7C
0400	7D	7C	7C	7D	7C	7C	7E	78	7A	78
0410	7A	7B	7A	7A	7A	79	7A	7B	7B	7B
0420	7B	7B	7B	7C	7C	7C	7C	7D	7D	7D
0430	7E	7E	7F	7F	7F	7F	7D	7C	7C	7C
0440	7B	7B	7C	7A	7B	7C	7A	7A	7B	7B
0450	7A	7B	7B	7B	79	79	7B	7A	78	7B
0460	7A	7B	7B	7B	7C	7D	7D	7E	7E	7F
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0490	00	00	00	00	00	00	00	00	00	00

DID $32

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0020	5C	FC	FC	30	20	60	C0	40	00	00
0030	00	00	00	05	40	FF	F0	11	12	14
0040	16	17	06	CA	06	D7	0A	0C	06	07
0050	09	4C	51	61	69	6D	0C	FF	FD	0F
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 0190   77 FF 87 77 FF 88 78 FF 88 78
 0200   FF 88 78 FF 88 77 FF 89 77 FF
 0210   89 77 FF 8B 77 FF 8A 78 FF 8C
 0220   78 FF 8C 77 FF 8C 76 FF 8E 76
 0230   FF 90 77 FF 91 78 FF 90 78 FF
 0240   8F 77 FF 90 76 FF 92 76 FF 93
 0250   76 FF 95 75 FF 95 74 FF 98 73
 0260   FF 99 73 FF 9B 73 FF 9E 73 FF
 0270   9E 73 FF A0 72 FF A2 73 FF A2
 0280   73 FF A4 74 FF A7 75 FF A9 74
 0290   FF A9 74 FF AC 75 FF AF 75 FF
 0300   B1 74 FF B3 74 FF B5 74 FF B8
 0310   74 FF BA 73 FF BA 74 FF BF 74
 0320   FF C0 74 FF C2 75 FF C7 75 FF
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 0340   76 FF D4 76 FF D6 76 FF D8 77
 0350   FF DD 78 FF DF 79 FF E1 7B FF
 0360   E3 7C FF E4 7D FF E6 7D FF E6
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DID $33

 0000   A5 F0 02 00 03 01 0F 0F 94 00
 0010   4D 00 FF FF 24 E8 10 00 00 00
 0020   5C FC FC 30 20 60 C0 40 00 00
 0030   00 00 00 01 40 FF F0 0E 0E 0F
 0040   12 14 06 B4 06 C5 08 09 09 0C
 0050   06 43 43 48 51 61 0D 00 00 00
 0060   00 FD 80 52 00 FF FF FF FF FF
 0070   FF FF FF FF FF FF FF FF FF FF
 0080   FF FF FF FF FF FF FF FF FF 28
 0090   72 85 1F 47 1F 47 FF 66 FF FF
 0100   7F 7F 7F 7F 7E 7E 7D 7E 7C 7D
 0110   7B 7B 7A 7A 79 7A 78 7A 77 7A
 0120   76 7A 76 79 76 79 76 79 76 79
 0130   76 7A 76 7A 76 7A 76 7A 76 7A
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 0150   75 7B 74 7D 74 7E 73 7F 73 80
 0160   FF FF FF FF FF FF FF FF FF FF
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0170	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0190	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0230	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0240	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0260	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
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0290	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0300	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0310	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0320	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0330	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0340	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0350	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0360	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0370	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0380	FF	FF	FF	FF	FF	FF	7F	7F	7F	7F
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0400	7F	7F	7F	7F	7F	7F	7E	7A	7C	7A
0410	79	79	7F	7E	71	7B	7F	7B	7A	7C
0420	7C	7D	7A	78	79	7D	75	7B	7A	7D
0430	7B	7C	7C	7C	7B	79	7F	7F	7F	7F
0440	7F	7F	7F	7F	7F	7D	7F	7F	7F	7E
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Attachment 4

Xprts

January 7, 2013

Manuel Guerra III
Guerra Law Firm
320 W. Pecan
McAllen, Texas 78501

Re: [redacted] *v. General Motors Corporation*

Dear Mr. Guerra,

This report supplements the Xprts, LLC, report in this matter dated July 30, 2012, and provides rebuttal related to defense expert reports General Motors produced in this matter subsequent to the July 2012 report.

INTRODUCTION

Plaintiff's case is about the rollover death of [redacted] from roof crush and belt excursion and the ejection of [redacted] and [redacted] from a 2010 Chevrolet Tahoe, which rolled over in the median of IH -37 San Antonio, Bexar County, Texas. The subject rollover corresponds to the containment performance required in 1970 by FMVSS 208 that GM vehicles then and now do not, meet. In the following material the defense expert's opinion is quoted in *Italics* and Plaintiff's comments or rebuttal follow.

DEFENSE EXPERTS REPORTS

[redacted] – ON GLAZING

> *"(1) The ejection portals were created when the tempered side glass vacated the window openings as a result of penetration by an outside object such as the rear view mirror and/or objects on the ground upon vehicle impact with the ground, and/or occupant loading from the vehicle interior. They were not created due to roof deformation and "defective roof strength"."*

It is highly unlikely that individual external sources would simultaneously break out the near side windows while the distortion of an integrated roof structure extends over its entire surface. Static and dynamic testing indicates that side glazing breaks out with about 4" of distortion. No external sources are required.[1]

[redacted]

- Rearview mirror, ground objects and occupant loading do not break all windows.
- Roof Crush (see page 9 of 7/12 report… window breakage occurs with 4+" of roof crush.)

[redacted]- ON BELTS

"4. [redacted] sitting in the second row center seating position, was not wearing the available lap and shoulder belt restraints at the time of the subject crash
5. The second row center seat belt system contains no physical evidence of occupant crash loading;
6. The physical evidence on the second row center seat belt components is not consistent with that of a retractor that spooled out. The marks on the seat belt components are not consistent with those described in published technical literature regarding safety belt markings from intentionally disabled retractors as well as testing that I have participated in and discussed above."

Xprts inspection of the seat belts indicate that [redacted] was wearing the belts properly. Mr. Antonucci offers no explanation for the physical evidence and marks on the belts. As shown in Figures 1 and 2, the 7" of belt abrasions above the anchor, more probably than not, came from her shifting torso. The loading at 57" -58" indicates the retractor locked once but does not preclude its subsequent release and spooling. The excessive excursion she experiences comes both from moving laterally towards the driver side and out of the shoulder belt and retractor spooling. Photos show light belt loading and abrasions consistent with rollover loading of a middle passenger between two outside passengers. Note also Figures 3-5 where the far more fragile fabric of the shirt [redacted] wore is abraded at the shoulder and abdomen by the belts. See also testimony of [redacted] and [redacted] describing the fastening of [redacted] belts.

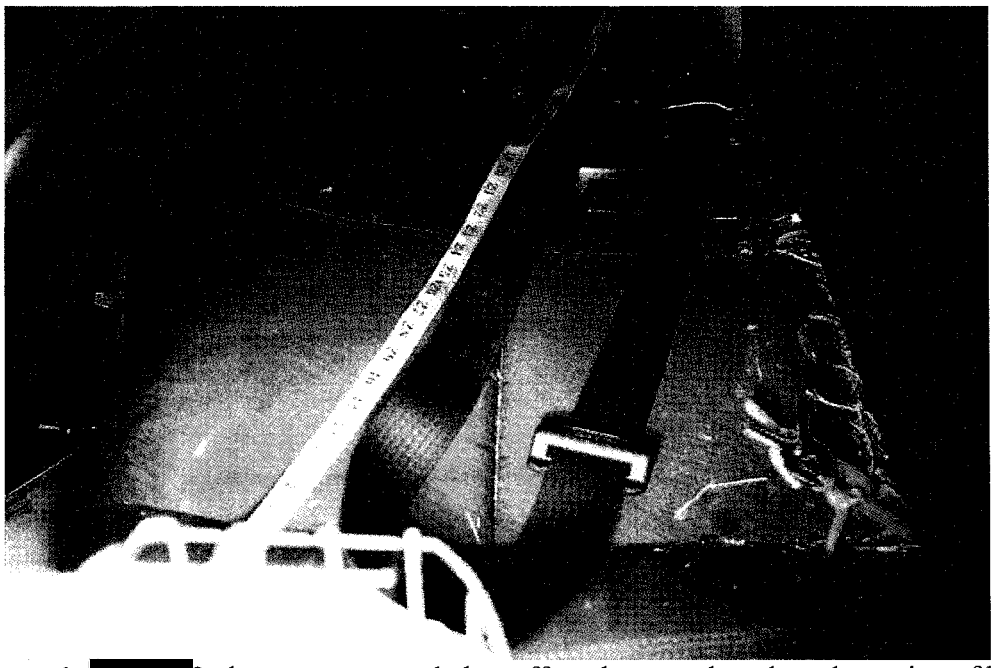

Figure 1. [redacted] 2nd row center seat belt scuff marks, torn threads and warping of belt between 22" and 29" consistent with loading

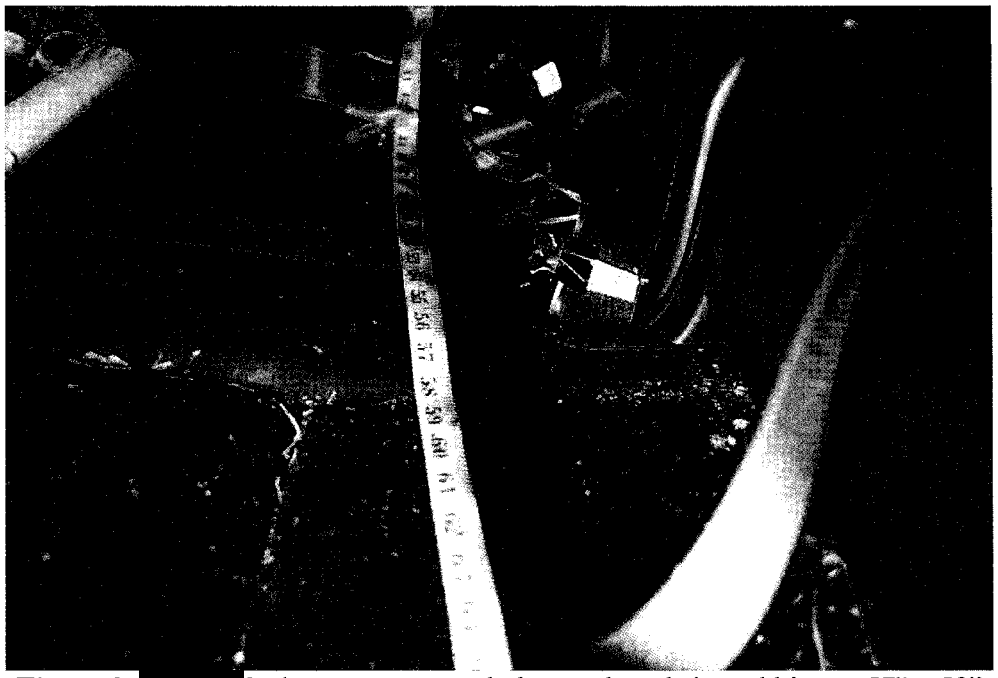

Figure 2. [redacted] 2nd row center seat belt torn threads in webbing at 57" – 58" consistent with belt loading

Figure 3. [redacted] shirt she wore on the day of the subject accident

Figure 4. [redacted] shirt showing torn threads in the area of the right shoulder

Figure 5. [redacted] shirt showing torn threads in the area of the left abdomen

[redacted] ON FRONTAL AND SIDE AIRBAGS

The fact that the roof rail air bags deployed was not due to any defect in the air bag system.

- *The SDM Event Record 1 represents the 2010 Chevrolet Tahoe collision with the 2001 Honda Prelude.*
- *The SDM Event Record 2 represents the 2010 Chevrolet Tahoe roll over event.*
- *The SDM Event Record 3 represents the 2010 Chevrolet Tahoe roll over event.*

The subject Tahoe is equipped with advance airbags and an electronic frontal sensor (EFS) for offset or pole crash detection.[2] Frontal airbag deployment at 8 mph is indicative of EFS offset or pole crash detection. Based on IIHS offset frontal and side impact testing the SDM delta V deployment record of 8 mph longitudinal, 4 mph lateral and extended in time are inconsistent with the deployment threshold as interpreted by the defense. The EFS is intended to early detect a high speed pole or offset collision and deploy the airbags. The sensor is unable to differentiate between such an impact and an 8 mph longitudinal delta V with a similar speed vehicle.

This testimony is to support Dr. McNish's postulated occupant kinematics and is therefore contrived and inconsistent with the restraint information.

[2] General Motors General Specifications

[redacted] - ON WINDOW CURTAIN AIR BAGS

"2. The 2010 Chevrolet Tahoe Roof Rail Airbag design and function are not defective.

a. There were no regulatory or industry standards in place that would have dictated the performance requirements of the RRAB at the time the 2010 Tahoe was designed, developed and produced.

b. The performance criteria set forth in the linear impact test developed by General Motors to evaluate the ejection mitigation capabilities and excursion requirements of their enhanced RRAB system, where no standards existed, were met in all three rows of occupant coverage.

c. Non-inclusion of a tether on the forward edge of the third row curtain and the rear edge of the second row curtain does not deem the design defective."

There seems to be disagreement between Dr. McNish's occupant kinematic description and Balavich and Stacey deployment timing as to which and when airbags deployed and engaged the occupants who were at passenger side windows. For instance the EFS would deploy the frontal bags on contact and not wait for the development of the delta V. This has biomechanical significance to whether [redacted] hand injury is from the deploying airbag or the result of ejection during the rollover.

GM advertising and Stacey's description of the purpose of window curtain airbags were designed and installed to prevent partial and complete occupant ejection. In this case they failed to do so for both restrained ([redacted] and unrestrained ([redacted] occupants.

Tethers on [redacted] window curtains would have likely mitigated their complete ejections. Tethers are common for front seat containment and are inexpensive and effective.

GM's duty with these purported supplemental-to-belts restraint show callous indifference to its customers by ignoring mitigating the ejection of unbelted second and third row occupants.

HERRERA – ON ACCIDENT RECONSTRUCTION

Plaintiff expert Irwin's reconstruction parallels Defense expert [redacted] reconstruction with very minor differences.

Both analyses were based on detailed Black Box downloads. It is noteworthy that, even with detailed vehicle downloads, Defense expert Herrera's claimed accuracy to three significant decimals is impossible and misleading.

[redacted] – ON BIOMECHANICS

"1. Ms. [redacted] seated in the left second row seat of the subject vehicle was unrestrained and was ejected through the left second row side window just [after the far side roof crush and] prior to the vehicle reaching the completion of the second roll. She was ejected in a high-side-type ejection, more likely than not, landing on her buttocks which created a vertical acceleration through her body and resulted in multiple spinal compression fractures. More likely than not, she then rolled back striking the back of her head.

2. Had Ms. [redacted] been wearing her available and functional restraint system at her seating position, she would not have been ejected from the subject vehicle during the rollover and more likely than not would have sustained no severe injuries.

3. Ms. [redacted] who was seated in the center of the second row was not utilizing her available and functional restraints at that point. As the Tahoe impacted the side of the Honda, creating a rightward and forward velocity change, her unrestrained body was caused to move rightward such that her head was in contact with the lower forward portion of the right second row passenger's side window. As she was held in this position by the subsequent counterclockwise yaw and right-leading skid of the vehicle and the vehicle reached approximately 12 degrees of roll, the roll-activated side curtain airbag was deployed.

4. As the side curtain deployed, it contacted [redacted] head and was unable to come between her head and the window.

5. The window adjacent to the right second row passenger was fractured during the first one-quarter to three eighths roll, which allowed [redacted] head, arms and upper body to extend beyond the plane of the window. This resulted in her sustaining her fatal head injuries and the crush injuries to her chest during contact with the ground.

6. Had [redacted] been wearing her available and functional restraints at her seating position, she would more likely than not have sustained no more than mild injuries.

7. Had Miss [redacted] been wearing her available and functional restraints at her seating position, she would not have been ejected. Despite her ejection, she sustained only an AIS-1 (non-life threatening) injuries.

8. Statistics collected by the National Automotive Sampling System-Crash Data System (NASS-CDS) which have been interpreted in multiple peer reviewed studies clearly show that unrestrained occupants who are not ejected from a vehicle in a rollover are nearly twice as likely to sustain serious injuries as those who are restrained."

Although the design and installation of passive protection window glazing and window curtain airbags were to prevent partial and complete ejection, defense experts emphasize and blame the occupants choice of not wearing belts (about 50% of rollover occupants are unbelted) instead of the failure of the 100% passive protection of windows and window curtains. With windows broken by roof crush and all bags deployed, [redacted] were completely ejected and [redacted] (right front seat) hand were partially ejected.

At 8 mph Dr McNish's occupant kinematics are more likely descriptive of the unrestrained [redacted] (and supported by the golf ball size hematoma on her head), than the restrained [redacted]. The reason for the light loading of [redacted] belts are more probably than not because she was the mid second seat occupant squeezed between outboard occupants in the same row. Furthermore, [redacted] had an ice chest cooler directly behind the front seat and under her feet. In his description [redacted] is ejected in the first one and 3/8th roll, face down rather than supine and contacts the ground for her injuries and death. If that were the case she would have remained in that position with repeated contacts with the ground on subsequent rolls. In addition, the roof crush had to dissipate the near side glazing, [redacted] had to be unrestrained, and she would have had to get around [redacted] and the ice chest cooler. There is no notation of dirt or debris in the wounds suggesting that when [redacted] is flung from the driver side to the passenger side as the roll rate is arrested on the last roll, she penetrates and strikes the window frame, sill and exterior, bleeding profusely, but not the ground.

Dr. McNish bases his testimony about [redacted] on the opinion of Antonucci who indicated there was no physical evidence of [redacted] being belted. McNish's occupant kinematics are therefore correspondingly incorrect. Since [redacted] was admittedly unrestrained and has a golf ball size hematoma on the top of her head, she is more likely to be the subject of Dr McNish's scenario than [redacted].

Plaintiff's opinion is that the delta V of the pre-deployment and deployment events were insufficient for the restrained [redacted] to override [redacted] and penetrate the open window portal on the first roll. However, [redacted] in a subsequently spooled belt, follows [redacted] to the driver side on the second roll. After [redacted] is ejected [redacted] moved left, up and out of the torso belt, and received her cervical spinal cord injury from roof crush on the driver's side at the 2 5/8th roll. At the end of the third roll she was flung rotating towards supine in the spooled lap belt to the passenger side when the roll rate was arrested as the vehicle came to rest. This produced the impact lacerations on the face, head, limb, torso and chest injuries from partial ejection out the passenger side window frame, sill and glass remnants without ground contact. Markings on [redacted] shirt support an upper right to lower left shoulder belt. A description of [redacted] kinematics during the event as derived from a 2007 Chevy Tahoe JRS two roll rollover test will illustrate this motion. Those tests closely approximate the severity of roof damage based on residual crush (as the first roll of a two roll rollover) and as photogrammetrically categorized by the defense. Unfortunately, GM chose to eliminate the rear tether of the second row airbags and the front tether of the third row airbags.

[redacted] was seated between [redacted] on the right and [redacted] on the left. They described the process of belting [redacted] with the shoulder belt going from her right shoulder to her left buttocks. In a passenger side leading roll this configuration of belt is unlikely to allow a passenger side head ejection from the middle seat over the right side occupant and particularly just after the first quarter turn.

[redacted] testified that she did not have time to buckle her own belt before the roll began and was ejected through the far side fractured side window and untethered window curtain airbag. During the second roll, [redacted] motions most likely follow [redacted] and are subject to the centrifugal forces that caused her to move left and up at the same time as the far side roof was collapsing right and downward. Her position at the end of the second roll would then be leaning left, out of the torso belt. There is a notation in the autopsy report of an irregular abrasion on her right anterior axilla, which might have occurred from the torso belt as she was flung back to the passenger side. Although it is possible that [redacted] received her cervical spine injury on the second roll, it is more likely to have occurred on the driver's side roof rail impact on the third roll. That impact was severe enough to erect the near side structure and bend and tent the header. Her excursion in the belt was enhanced by the pass through and spool out of shoulder belt webbing as her right shoulder and chest came out from under the belt.

As the vehicle reaches the end of the third roll the roll rate must be arrested. During the first part of the third roll [redacted] was still in the lap belt and rotating at the same rate as the vehicle, but when the vehicle roll rate is reduced to zero she is slung in the belt from the left side to the right side penetrating the untethered bag, broken window, B-pillar and window sill rotating clockwise and ending in a supine position sustaining most other injuries than the cervical fracture, including facial lacerations and profuse bleeding without contact with the ground. On rebound from the belt she comes to rest with her head on Angela's lap or out the window as Angela exits post rest.

COOPER – ON ROOF CRUSH AND FMVSS 216 AND 216A

> *"1. While the subject vehicle was not required to comply with FMVSS 216, nor with FMVSS 216a, the roof of the subject vehicle exceeds the specifications and requirements of both standards and is not defective in design."*

Plaintiff claims GM in 1970 deceptively manipulated regulations to reject tests that cars of that era could not pass and substituted a test they could pass. The difference between the tests degraded to half the required roof strength tests. That test requirement has been in effect for 40 years as a result of GM's continued experimental deceptions that are detailed below. The result is that the 2010 Tahoe has the same inadequate roof strength which broke [redacted] cervical spine as those vehicles of 1970. GM and auto industry efforts to minimize roof strength and ignore NHTSA's containment requirements represent callous indifference to the lives of the public, including [redacted] and [redacted]. GM's knowledge, misdirection and misrepresentation are detailed below.

The opinions set forth herein are based in part on discovery documents produced by General Motors in recent disclosures and discovery responses and information provided by this expert from other previously litigated cases. General Motors technical staff prepared them initially in response to the National Highway Safety Bureau's (NHSB's) notice of proposed rulemaking (NPRM) for Federal Motor Vehicle Safety Standard (FMVSS) 208 :- passive occupant protection in frontal, side, rear and rollover crashes, and then in response to NHSB's NPRM for FMVSS 216 :- roof crush resistance.[3,4]

The purpose of the FMVSS 208 test was to reduce the likelihood of occupant ejections by requiring manufacturers to ensure that unrestrained occupants would be contained within the passenger compartment in a 30 mph dolly rollover test. To pass this test, General Motors knew that a vehicle's roof strength and resulting roof crush must not break the windows and create an occupant ejection portal. Based upon tests conducted in the mid 1960s and early 1970s, General Motors knew that its then current and projected future roof designs would fail the test unless strengthening modifications costing $9 to $15 per vehicle were designed. Although such changes were feasible, General Motors nevertheless failed to develop and implement designs that would reduce the potential for vehicle occupants to suffer serious injuries and death in rollover accidents. To avoid compliance, in 1970 General Motors joined with other industry partners and sued the NHSB in federal court on the grounds that the test was not repeatable. The appeals court upheld the NHSB and rejected the industry law suit, but not until 1974. The regulation remained in the federal register unimplemented until 2011 when FMVSS 226:- Ejection Mitigation was implemented.[5]

In 1970 NHSB proposed as a temporary alternative to 208, a quasi static test in which a small platen was pressed onto both A Pillar corners of the roof in sequence at 10° pitch and 25° of roll. The roof was to resist deforming 5 inches by a force 1.5 times the vehicle weight or 5,000 pounds, whichever was less. General Motors found that its then current and projected early 1970's vehicles would also fail this test without similar roof strengthening and cost as required by FMVSS 208 for ejection mitigation. As discussed below, after various deceptive practices by GM and Ford, this alternative test was rejected by the industry who proposed a quasi-static test that their vehicles could pass without modification.

The documents show that General Motors knew in 1965 to 1970 that inadequate roof strength and the resulting crush and intrusion into the passenger compartment was a major cause of death and serious injury in rollover crashes and that roof strength should be sufficient to preclude side window breakage and prevent ejection, another major cause of death and injury. General Motors, having this internal company knowledge, could have, should have and had a duty to its customers to implement feasible alternate designs,

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[3] NPRM Docket 69-7, Notice 4 Occupant Crash Protection, FMVSS 208 Federal Register Vol 35, No. 89, 5-7-1970

[4] Federal Register FMVSS 216 NHTSA-2009-0093-1 May 2009, Final Rule.

[5] Ejection Mitigation Federal Register FMVSS 226, Vol 76 No. 12 - 1-19-2011

which would have promoted safety for the public, by designing and building vehicles that could safely contain occupants within the vehicle during a rollover accident.

It was at this point in time that General Motors embarked on a policy of deception to avoid compliance with these life-saving regulations and their associated costs.

General Motors had determined that (a) its late 1960's and projected early 1970's vehicles would not comply with proposed NHSB regulations and (b) modifications to comply with the proposed NHSB regulations would cost $9 to $15 per vehicle. General Motors, with callous indifference to the safety of its customers, provided the NHSB with deceptive and misleading comments and data, and lobbied for an alternate test that its weak roof vehicles could meet, but which would do nothing to protect occupants and reduce deaths and injuries. It was not until 1989, after the alternate test had been fully implemented in the United States auto fleet for 13 years, that NHTSA in a required report to Congress confirmed, as GM knew, that there was no safety benefit to the alternative test. But that's not all...

General Motors and its industry partners prepared, published and used in product liability litigation a series of experimental deceptions (if not lies) from 1970 to 2005 perpetuating the idea that the FMVSS 216 roof strength regulation was adequate and enhancements would have no life-saving or injury mitigation effect. Those deceptions are detailed next and the associated documents are in footnotes.

1. The NHSB 1970 10° of pitch two sided NPRM was rejected because the platen was too small, instead of admitting that 7 of 8 vehicles failed the test.[6],[7]
2. Industry proposed a "more representative" large platen test, which the weak roofed vehicles could pass without improvement.[8]
3. GM lobbied President Nixon on tape to curtail the Department of Transportation's (DOT) safety regulations, trading lives for lower cost, better value vehicles.[9],[10]
4. Malibu I – GM claimed the conclusion that low average force on the head of the dummy in production and roll caged roofed vehicles were similar, but made excuses for three high level forces on the dummy's head only in production vehicles.[11]
5. Malibu II – High peak neck load to an erect aligned head/neck and roof intrusion vector is commonplace, injurious and occurs before an inch of roof crush, so a

[6] Federal Register, "Roof Intrusion Protection for Passenger Cars - Proposed Motor Vehicle Safety Standard 216" Docket No. 2-6; Notice 4, 1-6-1971

[7] Fisher Body Test Report, Body-Static Roof Intrusion Tests - 1970 and 1971 F, H, A, X, and B Styles, March 1971.

[8] GM, Chrysler, AMC and Ford Hearings before the Subcommittee on Executive Reorganization of the Committee on Government Operations United States Senate, 89th Congress, 1st Session, 1965.

[9] The National Archives – Conversation Among President Nixon, Lide Anthony Iacocca, Henry Ford II, and John D. Ehrlichman, April 1971.

[10] www.pbs.org Frontline Exclusive – Nixon and Detroit: Inside the Oval Office, February 21, 2002.

[11] K F Orlowski, R T Bundorf, E A Moffatt, 'Rollover Crash Tests – The Influence of Roof Strength on Injury Mechanics', Society of Automotive Engineers, 851734, 1985.

strong or weak roof doesn't matter. Except that alignment is almost impossible to occur to a human neck in a rollover.[12]

6. An industry expert claimed that increased roof strength did not reduce incapacitating and fatal injuries in 60,000 police-reported cases. The study was flawed and invalid because the cases did not match NHSTA-investigated cases.[13]
7. The direction of vehicle rotation in a spit test can increase the excursion of the occupant to the roof, misrepresenting the clearance between the occupant's head and the roof.
8. Dynamic Controlled Rollover Impact System (CRIS) tests results show no difference in injury measures between production and reinforced roofs by:
    - Tethering the aligned head/neck at the center of the roof[14]
    - Aligning the roof impact with the dummy's aligned head/neck
    - Removed roof liner padding to increase injury measures
    - Dropped the vehicle from 11 to 13 inches to increase injury measures[15]
    - Clipping the video to obscure when and where the neck of the dummy in the production vehicle bends
9. Biomedical experiments with an aligned specimen neck and impactor falsely suggest that most human lower neck injury is primarily axial compression and buckling, not bending.[16]
10. Experts then claim in an animation that at the point of initial roof deformation, the head, neck, torso, and roof intrusion vector are aligned and the head is stopped at ground contact in a rollover.[17]
11. The bending stiffness of the GM designed dummy neck is stronger by a factor of ten than an untensed human neck, facilitating axial compression loading demonstrations.
12. Diving and torso augmentation, not roof crush cause injury, while such loading has been measured to contribute only 20% of the loading from roof crush.[18]
13. Ejections are the result of being unbelted and not from roof crush portal creation and/or a lack of glazing mitigation.[19]

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[12] G S Bahling, R T Bundorf, G S Kaspzyk, E A Moffatt, K F Orlowski, J E Stocke, 'Rollover and Drop Tests – The Influence of Roof Strength on Injury Mechanics Using Belted Dummies', Society of Automotive Engineers, 902314, 1990.

[13] E A Moffatt, J Padmanaban, "The Relationship Between Roof Strength and Occupant Injury in Rollover Accident Data," Report No. FaAA-SF-R-95-05-37, May 1995

[14] E A Moffat, et al., "Matched-Pair Rollover Impacts of Rollcaged and Production Roof Cars Using the Controlled Rollover Impact System (CRIS) PPT," SAE, 2003.

[15] EA Moffat, et al., "Matched-Pair Rollover Impacts of Rollcaged and Production Roof Cars Using the Controlled Rollover Impact System (CRIS)," SAE, 2003.

[16] R W Nightingale, J H McElhaney, D L Camacho, M Kleinberger, B A Winkelstein, B S Myers, The Dynamic Responses of the Cervical Spine: Buckling, End Conditions, and Tolerance in Compressive Impacts, SAE 973344.

[17] J G Paver and D Friedman, "Is BFD a Hyperflexion Injury or Compression with Localized Bending Injury or Both?" International Crashworthiness Conference 2012, Milano, Italy. 2012. Paper No. 2012-111.

[18] B L Allen, et al., "A Mechanistic Classification of Closed, Indirect Fractures, and Dislocations of the Lower Cervical Spine," Philadelphia, PA, 1982.

[19] D Friedman, J G Paver and R McGuan, "Design, Development and Validation of Rollover Dummy Injury Measures," International Crashworthiness Conference 2012, Milano, Italy. 2012. Paper No. 2012-110.

A more complete and detailed set of discovery documents and regulations highlighting the same deceptive intent is included in Attachment A.

CONCLUSIONS

GM experts define defective as violating a regulatory test performance specification. State law supersedes this definition in the sense that manufacturers' have a duly to provide what is to their knowledge and the state of the art, a reasonably safe vehicle. Plaintiff claims that a vehicle which can be shown to be not reasonably safe is likewise defective. If there is no regulatory test specification that affects safety defense experts claim it is not defective unless it is declared defective by the Office of Defect Investigation. However, the safety issue is always (except for side saddle gas tanks) resolved by negotiation and a recall modification. The unintended acceleration of Toyota vehicles were presumably fixed by recalls. They were never declared defective, but Toyota settled tens of thousands of claims for tens of millions of dollars. In that way a manufacturer, as in this case, can claim that the intentional elimination of a window curtain airbag tether intended to contain occupants but which allows an ejection is not a defect.

Similarly a non specified function of an occupant protection device cannot in the defense expert's mind, be defective (such as the deployment of frontal airbags at 8 mph). The reason for this emphasis on non-defective is plaintiff's duty to prove defense liability resulting from "defect and causation", the first two of the liability questions to the jury.

GM expert reports are functionally self serving and combined by Dr. McNish to suggest an implausible scenario of [redacted] fatal injury from contact with the ground, rather than inadequate roof strength, ineffective and untethered rear second row and front third row window curtain airbags.

The reports of GM's corporate and expert witnesses provided no evidence that they understand the debunked misrepresentations, deceptions and lobbying of GM and industry efforts to minimize roof strength and ignore occupant containment. Furthermore, all measurements, observations, interpretations and opinions are based on post crash photos and data. Defense experts have no data as to when and what happened to the structure and the occupants during the four or more seconds of the three-roll rollover. Roof strength and containment are related through portal creation and victim injury.

Based upon its knowledge and the industry's previous experience, however, GM knew or reasonably should have known that the design of the 2010 Chevrolet Tahoe placed vehicle occupants at a significant risk of suffering substantial injuries and death.

Plaintiff contends that the 1978 FMVSS 208 rollover test of the NHTSA/Minicars Research Safety Vehicle conceptually demonstrated effective containment of unrestrained front seat occupants by a combination of adequate roof strength and partially

fixed, composite glazing.[20] Furthermore, plaintiff has experimentally demonstrated alternative designs of side window glazing, which would have been effective in containing occupants in a reasonably strong roof. By not testing the 2010 Chevrolet Tahoe in a dynamic rollover test so it could confirm what it knew since the 1960's and 1970's – that its vehicles would not perform adequately and instead lead to more serious injuries and deaths – GM, at best, chose a path of willful ignorance. Nevertheless, GM disingenuously contends that its vehicle performs safely during foreseeable rollover events. Yet, in the European market, where GM also competes, GM used alternative designs that provided stronger roofs and retained unbelted occupants within the perimeter of the vehicle thereby reducing the chances of occupant ejections.[21] By its own admission, therefore, GM demonstrates that feasible alternative designs for the 2010 Chevrolet Tahoe existed that would have been effective in containing occupants. In spite of overwhelming evidence of past deceptions, and GM's manipulation of regulations, the GM corporate witnesses still believe the deceitful story propagated by GM and others in the industry. They ignore the evidence that the 1970 to 2010 vehicles cannot pass the 10° two sided test and believe that GM's compliance with the industry proposed regulation that the early 1970's cars and current trucks could meet, provide appropriate safety for consumers in rollovers.

Claimed Vehicle Defects: In this system analysis, the claimed defects were identified and their effects on Plaintiff's biomechanical engineering injury potential were evaluated.

Defect #1: Roof Strength
Defect #2: Glazing
Defect #3: Safety Belts
Defect #4: Window Curtain Tethers

Defect #1: Roof Strength

The systems analysis identified and it is my opinion that the Tahoe's roof structure was defectively designed and unreasonably dangerous beyond the contemplation of the average consumer and, therefore, unsafe for sale to the public. Nothing in the defense expert reports, as identified in this rebuttal and comment report, alters that opinion.

Proposed Alternative Roof Designs

At the time of manufacture of the subject Tahoe, there were technologically and economically feasible alternative roof designs available that preserve the integrity of the occupant compartment and maintain windshield and side window integrity. These include:

[20] D E Struble, et al, "The Minicars Research Safety Vehicle Program," Vol. 1 – Technical Final Report, DOT-HS-7001552, Sept. 1981.
[21] GM Opel Testing – Final Report, Test Results, 01/30/1986

1. GM and Ford's 1970 analysis to double the roof strength primarily by adding $9 to $15 of metal to the A-pillar to meet the proposed 10 degree of pitch test would have been a good start.[22]
2. The geometry of the 1980 Minicars Research Safety Vehicle (RSV) roof in conjunction with a foam filled sheet metal roof panel and pillars limited roof deformation to 3.9 inches in a 30 mph 3 roll dolly rollover test.
3. The substitution of high strength steel for cold roll steel of the same section size more than doubled conventional roof strength in the 2003 Volvo XC-90 and in many, if not most vehicles after about 2005.

To a reasonable degree of engineering certainty, my opinion is that a strong geometrically shaped roof structure would not have intruded into the occupant survival space enough during this crash to cause fracture and dissipation of most if not all of the Tahoe's potential tempered glazing ejection portals.

Defect #2: Containment / Glazing

I have concluded that the Tahoe containment design was defective and unreasonably dangerous beyond the contemplation of the average consumer and, therefore, unsafe for sale to the public. Specifically, I am of the opinion that the weak, large major radius roof geometry with tempered side and rear glass were not effective barriers in preventing partial or full ejection in rollover crashes and therefore defective in design.

Proposed Alternative Containment Designs

I have asserted that, at the time of manufacture of the subject Tahoe, there were technologically and economically feasible alternative containment designs which would prevent ejection and were available such as the bonded upper composite glazing of the 1980 Minicars' RSV with openable pass through lower glazing, in conjunction with the previously stated roof strength and geometry alternative designs.

Defect #3: Safety Belts and Airbags

I am of the opinion that the GM Tahoe's lap-and-shoulder safety belt and airbag systems were defectively designed and unreasonably unsafe beyond the contemplation of the average consumer and, therefore, unsafe for sale to the public. Belts display markings that indicate spooling of the belt subsequent to an initial lock-up which typically occurs when the belt tension is released, the locking mechanism is not engaged and the occupant motion withdraws webbing.

Indications are that the embodiment of advanced frontal airbags have increased fatality rates by 15% and suggest even greater increased serious injury rates as identified by the

[22] Roof Intrusion Protection for Passenger Cars, Proposed Motor Vehicle Safety Standard, 2-18-1971.

IIHS.[23] Evidence in this case is the deployment of frontal bags with an 8 mph longitudinal Delta V as a result of an Electronic Frontal Sensor (EFS) signal.

Proposed Alternative Safety Belt and Airbag Designs

I am of the opinion that, at the time of the design and manufacture of the subject GM Tahoe, there were technologically and economically feasible alternative safety belt and airbag designs available. These include:

1. Belt locking and tightening pre-tensioners
2. Doppler proximity Electronic Frontal Sensors[24]

Defect #4: Window Curtain Tethers

The purpose of window curtain airbags is to supplement glazing and contain occupants. To do so requires that the curtain cover and preclude the penetration of any part of the occupant beyond the exterior surface of the portal. The deployment and securement of the bags depends on attachments which stretch the bag over the portal. This is common practice for frontal bags. However in this case GM chose to leave the rear of the second row airbags and the front of the third row airbags untethered, allowing [redacted] and [redacted] to be ejected. The apparent justification is that it wasn't necessary to contain those occupants in GM's ramp rollover tests which represent a small percentage of rollover trips compared to lateral rollovers.[25]

GM's Knowledge of the Defects and Failure to Act

- GM has known for decades that a strong roof is needed for occupant protection in a rollover.
- GM knew how to technologically and economically design and build a strong roof structure suitable for rollover protection, but negligently choose not to do so.
- GM failed to exercise due engineering diligence and conduct appropriate dynamic testing of the vehicle roof structure to evaluate occupant protection in a rollover.
- GM knew that there was a high degree of risk of serious harm or death to occupants of the subject vehicle in the case of a rollover crash due to the design of its roof, glazing, safety belt and airbags, yet GM disregarded that risk and designed, manufactured, and distributed this vehicle without adequate roof strength and other faulty features to protect its occupants.
- The potentially life-threatening conduct of the subject vehicle designer, manufacturer, and distributor in marketing the defective vehicle was evidence of a

[23] Brumbelow M.L., Teoh E.R., Zuby D.S., McCartt, A.T., 'Roof Strength and Injury Risk in Rollover Crashes.' Insurance Institute for Highway Safety, Arlington, Virginia, 2008.
[24] Friedman, D. and E. Belohoubeck, "The Near-Term Prospect For Automotive Electronics - Minicars' Research Safety Vehicle" IEEE, Paper No. 780858, 1978.
[25] M Mao, T Chen, J Latchford, EC Chirwa, "Static and Dynamic Roof Crush Simulation Using LS-DYNA3D," ICRASH 2004.

reckless disregard and conscious indifference for the lives and safety of others committed intentionally.

Sincerely,

Donald Friedman

Attachment A – Rollover History Timeline

Rollover History Timeline

1. 1935 to 1950 - GM begins rollover testing (History of Rollovers Video). Roof crush is not a problem.
2. July 1965 - GM, Chrysler, AMC and Ford testify about their rollover testing and focus on how safe their vehicles are in rollover tests.
3. April 1966 - GM and Lundstrom's 1969 Design Goals for Safety – Roof Top Strength "The roof structure should be strong enough to withstand a 70-mph ground level rollover".
4. May 1966 - GM 1969 Design Goals - Body Design - No. 1 Pillar. "Redesign of the upper body structure to keep the No. 1 Pillar forward of the swingline of a belted occupant should be considered." "Retention of the windshield is advantageous in the event of a rollover due to added roof strength." "We are presently in trouble with the "A" or Number 1 pillar."
5. July 1966 – Federal Register, Volume 31, No. 136- Federal Standard no. 515/25 – Roll Bar Structure for Automotive Vehicles – Purpose and Scope: This standard establishes requirements and test procedures for a roll bar structure installed on specific automotive vehicles to afford occupant protection in a rollover.
6. August 1967 - Visit of NHSB to GM Technical Center and Proving Grounds. Crusher was revealed to NHSB officials. See depo of Bob Carter and Ben Kelley – legal made decisions
7. October 1967 – Federal Register, Volume 32, No. 200 – Proposed Rule Making - Docket Nos. 2-6; Notice 67-5, "Intrusion – Passenger Cars, Multipurpose Vehicles, Trucks and Buses – The Administrator is considering the issuance of a Federal Motor Vehicle Safety Standard specifying requirements to limit the amount of intrusion or penetration on exterior impact, including front, side, rear, and roof, of vehicle and other structures into passenger compartments of passenger cars, multipurpose passenger vehicles, trucks and buses."
8. July 1968 – Proceedings, GM, Automotive Safety seminar, Safety Research & Developmental Laboratory, GM Proving Ground, Milford, Michigan – GM held a seminar with the presentation of the paper written by E. Klove and G. Ropers "Roof and Windshield Header Construction" attended by Federal Highway Administration officials. The static crusher was shown again. Fisher Body has developed a static roof crush laboratory test procedure and equipment suitable for applying and measuring loads and deflections of roof structure. The test load is applied through a pad 24 x 74" placed over the roof support roof structure of an automobile body mounted on rigidly supported frame. The test load is applied inboard 25 degrees from the vertical and toward the rear 5 degrees from the vertical. These are the same angles as prescribed in the SAE Inverted Drop Test. GM Executive VP – H. G. Warner states during the presentation of GM Automotive Safety Policies, "We in GM are willing to share our accumulated knowledge and experience in the safety field with the rest of the industry and with the educational community. We also want to keep an open line of communication between our industry and the Federal Government. We do not intend to let

Federal safety standards become our maximum standards. We are exceeding government requirements substantially in many areas and we plan to continue this policy. GM has established a leadership position in the safety field, and we are determined to maintain it. We will not be satisfied until our vehicles provide the greatest possible protection for occupants – up to the limits of our technology and the physical laws of nature."

9. December 1968 – Field Collision Performance Report by GM Engineers states that, "The occupant-vehicle impact speeds are generally low..." and "The front roof support pillars are the area of the roof structure most likely to be impacted in a rollover (67%). These supports should receive prime consideration in any program to increase roof strength."
10. December 1968 – Passenger Car Roof Crush Test Procedure – SAE J374 – SAE Recommended Practice.
11. April 1970 – General Technical Committee Meeting – "Static Crush Machine – Mr. Lundstrom reported that the divisions had reconfirmed their interest and support for the installation of static crush machine in the Safety Research and Development Laboratory. It was felt that the Research Laboratory machine and the Chevrolet machine under construction were not enough capacity to handle all of the various vehicle development programs under way."
12. 1970 - NHSB issues 208, frontal, side, rear and rollover tests – Objective to reduce casualties by stopping ejections, but roof must be strong to do that.
13. Chrysler, GM and Ford Comments to Docket 69-7, Notice 4 (FMVSS 208)
14. December 1970 - GM, Ford, Chrysler and AMA Petition for Reconsideration of FMVSS 208.
15. January 1971 – Federal Register – Roof Intrusion Protection for Passenger Cars – Proposed Motor Vehicle Safety Standard (S6.5 – Repeat test on the other front corner of the roof.)
16. February 1971 – GM Comments to the Docket No. 69-7; Notice 8
17. 1971 – GM Technical Committee Meeting – Top Strength – Mr. Nick Feles of Fisher Body; briefly discussed Docket No. 2-6 on roof intrusion protection, which has a proposed effective date of January 1, 1973, and would be required of all passenger cars, including convertibles. ...The recommended GM position would be on the basis that field accidents do not relate roof crush to injury, and that sufficient lead time must be provided in order for the industry to meet the requirements. It was felt that the static test requirements could be acceptable with minor modifications until a more meaningful test could be developed."
18. March 1971 - Research from independent roof strength contractors (Lockheed, Georgia) recommend stronger static test protocol "Crashworthiness of Vehicle Structures: Passenger car Roof Structures Program." The report concludes that, "For future tests involving the evaluationof passenger car roof structures, it is recommended that requirements for testing at a roll angle of 45 degree be deleted and that all testing be accomplished at a 25 degree roll angle...The 25 degree is therefore considered to be more critical from the standpoint of the occupant's safety."
19. March 5, 1971 – GM Product Test Report No. 111037 & 111037A– Subject: Bodies – Static Roof Intrusion Tests – 1970 and 1971 F, H A. X and B Styles,

Forward: The Product Testing Laboratory was asked to conduct static roof intrusion tests in accordance with the proposed roof intrusion requirement (Docket 2-6; Notice 4) issued on December 28, 1970. Conclusions: All the bodies tested failed to meet the requirements of the proposed roof intrusion requirements (Docket 2-6; Notice 4) except the X-27 body that passed.

20. April 1971 – Comments to Docket No. 2-6; Notice 4 by manufacturers. Ford comments reflect changes needed to meet the new proposed standard and GM, Chrysler and AMA comments reflect changes that include *crossing out* section S6.5 Repeat the test on the other front corner of the roof of the vehicle, showing far side damage in rollovers. 69-7 (FMVSS 208) prepared by Office of Crashworthiness
21. May-June 1971 - Ford and GM meet with members of the DOT. Members of the DOT travel to GM.
22. December 1971 – Federal Register, Volume 36 –Motor Vehicle Safety Standard No. 216, Roof Crush Resistance – Passenger Cars – Docket 2-6; Notice 5 – Effective August 15, 1973 – S6 has been changed to: Both the left and the right front portions of the vehicle's roof structure shall be capable of meeting the requirements, but a particular vehicle need not meet further requirements after being tested at one location."
23. 1976 - Rollover Accident at GM proving Grounds: roof crush kills Firestone engineer.
24. 1977 - GM builds a portable cage to be inserted in test vehicles at proving ground
25. 1979 - GM Overview of field accident data on LTV rollovers – 2.5 times more than cars
26. 1980s – GM engineers perform static crush tests on their vehicles in anticipation for the application of FMVSS 216 to their vehicles. In Test No. L 16878, Ivars Arums makes notes in testing the C/K cab. The load was applied to the A Pillar rearward at 45 degrees to the horizontal. He instructs to have the loads stopped if the structure buckles (load drops off) and if the glazing fractures. He also instructs that the first loading will be on the left A pillar and then if the glazing breaks before the load peaks, then the cab will be repositioned to test the right A pillar until the load peaks.
27. August 1981 - GM Engineering Report No. 41695 – "Occupant Protection System Guide for Proving ground Tests Operations" – this document details the safety precautions used in testing vehicles at the proving grounds. The level of safety equipment needed (roll cage, helmet, 4-5 point seat belts, safety seat) is determined by the static stability ratio of the vehicle being tested.
28. 1982 - GM stops doing rollover testing in U.S.
29. 1982 – "Cervical Spine Injury Mechanisms," Nusholtz paper of Cadaver drop tests at 10 mph
30. 1983 - Rollover testing continued at Opel in Europe
31. 1985 - Malibu 1 SAE paper – claims no relation between roof crush and injury – see videos
32. 1985 – Motor Vehicle Data for the 1985 Chevrolet S-10 Blazer 2-door shows a SSF of 1.03
33. 1987-1998 - Rollover Accidents occur at GM Proving Grounds

34. 1989 - Buccolo v GM rollover where deceptive confidential data first revealed
35. 1989 – "Comparative Evaluation of Rollover Rates" Conducted for R. E. Rasmussen of GM Proving Grounds.
36. November 1989 - Federal Register, Docket No. 89-22; Notice 1 – Roof Crush Resistance – NHTSA proposes to apply these requirements to multipurpose passenger vehicles, trucks and buses that have a gross vehicle weight rating of 10,000 pounds or less, manufactured on or after September 1, 1991.
37. January 2, 1990 - GM reiterates for LTV response to NPRM that no relation roof crush to injury and objects to the elimination of 5,000 pound test limit. "In spite of numerous studies which have demonstrated the lack of a causal relationship between roof crush and occupant injury in rollover accidents, GM recognizes that there is a common misconception that roof intrusion is a cause of injury in vehicle rollovers. However, GM's research has shown that occupant injury causation in rollovers results primarily from ejection or occupant impact with the vehicle interior. ...A significant GM study of unrestrained occupants in dynamic rollovers, which has received wide acceptance in the technical community confirmed that roof deformation is not related to increased occupant injury in rollovers."
38. January 5, 1990 – Federal Register, Vol. 55, No. 4 – FMVSS 216 – Roof Crush Resistance – NHTSA denies GM petition to extend comment period. "GM submitted a petition requesting that the comment period be extended by 90 days solely on the issue of the agency's tentative decision not to set a 5,000 pound weight limit in place for light trucks...However, GM was concerned about whether its light trucks could meet the proposed requirements when tested without the 5,000 pound limit." GM wanted more time to test their prototypes for the 1992 model year which incorporated safety features which included structural modifications to meet FMVSS 204 and 208. "GM said that prototypes now being assembled have already been committed to 'predetermined validation schedules...which do not permit FMVSS 216 testing..."
39. February - May 1990 – GM Product Evaluation Engineering Report: S/T Truck FMVSS 216 Roof Crush Investigation Results Test #6XC0204 – testing done on the standard cab, extended cab, 2 door Blazer without glass. GM compares the tests to a 4 door Blazer FMVSS 216 test performed with glass. Clearly shows the effect of glass on roof strength.
40. March 13, 1990 – GM memo notes that they need more work (cost for modifications) 1992 S/T regular, extended cab and 2 door Blazer models.
41. 1992 S/T regular, extended cab and 2 door Blazer models.
42. May 14, 1990 - GM follows up January 2, 1990 comments
43. 1990 - Malibu II – continuing the deception – see videos
44. 1991 - The Safe Road to Fuel Economy – Gov't / Industry- SAE refuses to publish
45. April 17, 1991 – Federal Register, Volume 56, No. 74 – FMVSS 216 Roof Crush Resistance – "Summary of the Final Rule – After considering the comments and other available information, the NHTSA has decided to adopt its proposal to extend Standard No. 216 to light trucks, but to do so in a way that differs in two significant respects from that proposal. The GVWR limitation on the affected

vehicles is 6,000 pounds instead of the proposed 10,000 pound cutoff.... effective September 1, 1993."

46. November 1991 – "Study on Passenger Car Rollover Simulation," Sakurai paper – GM changes Mitsubishi's mind about roof crush
47. 1992 - Hughes v GM roof crush $7.8 million C/K pickup truck
48. 1993 - Stapp paper, "The Causal Relationship in Rollover Accidents between Vehicle Geometry, Intrusion, Padding, Restraints and Head and Neck Injury," submitted by Friedman and rejected by GM staffers
49. May 1995 – "The Relationship Between Roof Strength and Occupant Injury in Rollover Accident Data" [redacted] paper of police files in effort to justify roof crush doesn't matter, was flawed by not matching NASS-CDS data.
50. 1995 - [redacted] v GM trial ends in Plaintiff verdict [redacted]
51. 1997 - [redacted] GM roof crush Plaintiff's verdict – The C/K pickup truck appeal was upheld – [redacted]
52. 1999 [redacted] trial release of the confidential GM Photo Analysis of 10 GM PII's
53. 2000 - [redacted] v GM retrial ends in Plaintiff's verdict – [redacted]
54. 2001 - [redacted] v GM appeal
55. 2003 – CRIS testing of 1996 Chevrolet S-10 Blazer
56. August 2005 - NHTSA releases NPRM 2005-22143 and Preliminary Regulatory Analysis for public comment.
57. August 2005 - NHTSA Releases "The Role of Post-Crash Headroom in Predicting Roof Contact Injuries to the Head, Neck, or Face During FMVSS No. 216 Rollovers." "...analyses indicate that positive post-crash headroom reduced the severity of a roof contact injury to the head, neck, or face." "...occupants with negative post-crash headroom were more likely to experience an injury at each severity level than occupants with positive post-crash headroom. When controlling for possible confounding factors, the multivariate analysis indicates that an occupant with negative post-crash headroom had 5 times the odds of a particular level of injury severity than an occupant with positive post-crash headroom." In Summary, "...post-crash headroom remains a statistically and substantively significant predictor of injury risk."
58. November 2005 - Submissions to Docket NHTSA-2005-22143 - Alliance of Automobile Manufacturers, GM, Ford, DaimlerChrysler