



GENERAL MOTORS LLC
Vehicle Safety and Crashworthiness

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14V-047
(10 pages) Supplemental

March 11, 2014

Ms. Nancy Lewis
Associate Administrator for Enforcement
National Highway Traffic Safety Administration
Recall Management Division (NVS-215)
1200 New Jersey Avenue, SE – Room W45-306
Washington, DC 20590

Re: NHTSA Recall No. 14V-047

Dear Ms. Lewis:

This letter supersedes General Motors' letter of February 25, 2014, and is submitted pursuant to the requirements of 49 CFR 573.6 as it applies to a determination by General Motors to conduct a safety-related recall for 2006-2007 model year (MY) Chevrolet HHR and Pontiac Solstice, 2003-2007 MY Saturn Ion, and 2007 MY Saturn Sky vehicles.

573.6(c)(1): General Motors Company; Chevrolet, Pontiac and Saturn Brands.

573.6(c)(2),(3),(4): This information is shown on Attachment A.

573.6(c)(5): General Motors has decided that a defect which relates to motor vehicle safety exists in 2006-2007 MY Chevrolet HHR and Pontiac Solstice, 2003-2007 MY Saturn Ion, and 2007 MY Saturn Sky vehicles. The ignition switch torque performance may not meet General Motors' specification. If the torque performance is not to specification, the ignition switch may unintentionally move from the "run" position to the "accessory" or "off" position with a corresponding reduction or loss of power. This risk may be increased if the key ring is carrying added weight or the vehicle goes off road or experiences some other jarring event. The timing of the key movement out of the "run" position, relative to the activation of the sensing algorithm of the crash event, may result in the airbags not deploying, increasing the potential for occupant injury in certain kinds of crashes.

Until the recall repairs have been performed, it is very important that customers remove all items from their key rings, leaving only the vehicle key. The key fob (if applicable), should also be removed from the key ring.

573.6(c)(6): As permitted by the provisions of 49 C.F.R. 573.6(b), and pursuant to the requirements of 49 C.F.R. 573.6(c)(6), General Motors now submits the attached chronology of principal events that were the basis for the determination that the defect related to motor vehicle safety. See Attachment B. This chronology refers to numerous engineering inquiries, known within General Motors as Problem Resolution Tracking System ("PRTS") inquiries. As stated in the enclosed document, General Motors is prepared to share with



NHTSA upon request the PRTS reports referenced therein, as well as other documentation related to this recall.

573.6(c)(8): Dealers are to replace the ignition switch.

GM provided dealers notification of the recall on February 26, 2014 and March 4, 2014. GM will be providing a recall service bulletin to dealers on or about April 7, 2014. In addition, GM mailed the owner letters on March 10 and 11, 2014.

Pursuant to 577.11(e), GM will provide reimbursement to owners for repairs completed on or before ten days after the owner mailing is completed, according to the plan submitted on May 23, 2013.

573.6(c)(10): GM will provide copies of the dealer bulletin under separate cover. GM has previously provided a copy of the owner letter.

573.6(c)(11): GM's assigned recall number is 14063.

Sincerely,

A handwritten signature in black ink, appearing to read "M. Carmen Benavides". The signature is fluid and cursive, with the first name "M." and last name "Benavides" clearly distinguishable.

M. Carmen Benavides, Director
Product Investigations and Safety Regulations

14063
Attachment

**VEHICLES POTENTIALLY AFFECTED BY MAKE, MODEL, AND MODEL YEAR
PLUS INCLUSIVE DATES OF MANUFACTURE**

<u>MAKE</u>	<u>MODEL SERIES</u>	<u>MODEL YEAR</u>	<u>NUMBER INVOLVED</u>	<u>INCLUSIVE MANUFACTURING DATES (FROM) (TO)</u>		<u>DESCRIPTIVE INFO. TO PROPERLY IDENT. VEH.</u>	<u>EST. NO. W/CONDITION</u>
Chevrolet	A	2006	113,911	04/11/2005	06/22/2006	HHR	*
Chevrolet	A	2007	99,672	05/15/2006	06/23/2007	HHR	"
Pontiac	M	2006	18,750	03/16/2005	06/23/2006	Solstice	"
Pontiac	M	2007	21,310	06/05/2006	06/15/2007	Solstice	"
Saturn	A	2003	96,358	06/01/2002	07/24/2003	Ion	"
Saturn	A	2004	121,107	04/29/2003	08/07/2004	Ion	"
Saturn	A	2005	71,024	04/27/2004	06/06/2005	Ion	"
Saturn	A	2006	96,227	04/13/2005	05/05/2006	Ion	"
Saturn	A	2007	94,118	04/05/2006	03/28/2007	Ion	"
Saturn	M	2007	15,547	12/06/2005	06/14/2007	Sky	"
GM Total:			748,024				

* All involved vehicles will be corrected as necessary.

573.6(c)(2)(iv): Delphi Packard Electrical/Electronic Architecture
5725 Delphi Drive
M/C 483.400.301
Troy, Michigan 48098

Tel: [1] 248.813.2334
Fax: [1] 248.813.2333

The involved parts are manufactured in Mexico.

ATTACHMENT B - 573.6(c)(6)

CHRONOLOGY

**Re: Recall of 2006-2007 Chevrolet HHR and Pontiac Solstice,
2003-2007 Saturn Ion, and 2007 Saturn Sky Vehicles**

On February 7, 2014, General Motors ("GM") notified the National Highway Transportation Safety Administration ("NHTSA") of its decision to recall 2005-2007 model year Chevrolet Cobalt and 2007 model year Pontiac G5 vehicles. By letter dated February 24, 2014, GM submitted to NHTSA a chronology of principal events that were the basis for the determination that the defect related to motor vehicle safety, with respect to the recall of the Cobalt and G5 vehicles ("the Cobalt and G5 recall").

In making this recall determination, GM's Executive Field Action Decision Committee ("EFADC") was asked to consider a proposed recall only of the Cobalt and G5 vehicles. The submissions to the EFADC did not propose a recall of the Ion, HHR, Solstice and Sky vehicles. Following GM's announcement of the Cobalt and G5 recall on February 7, 2014, as will be discussed in more detail below, the decision was made to conduct a more in-depth analysis of information related to the vehicles that were listed on Service Bulletins 05-02-35-007 and 05-02-35-007A, but were not included in the February 7, 2014 recall submission to NHTSA.

By letter dated February 25, 2014, GM notified NHTSA of its decision to recall all of the other vehicles listed in the aforementioned Service Bulletins—specifically, 2003-2007 model year Saturn Ion, 2006-2007 model year Chevrolet HHR and Pontiac Solstice, and 2007 model year Saturn Sky vehicles ("the Ion, HHR, Solstice and Sky recall"). Because these vehicles were equipped with the same ignition switch installed in the 2005-2007 model year Chevrolet Cobalt and 2007 model year Pontiac G5 vehicles, the chronology submitted on February 24, 2014, with respect to the Cobalt and G5 recall is relevant to GM's decision to issue the Ion, HHR, Solstice and Sky recall. In addition to the events set forth in the chronology submitted to NHTSA regarding the Cobalt and G5 recall, the following describes the principal events that were the basis for the determination, relating to the Ion, HHR, Solstice and Sky recall, that the defect related to motor vehicle safety. GM's review of data and information relating to the recalled vehicles continues.

* * *

2005. GM employees received field reports of Chevrolet Cobalt vehicles losing engine power, including instances in which the key moved out of the "run" position when a driver inadvertently contacted the key or steering column. Engineering inquiries, known within GM as Problem Resolution Tracking System ("PRTS") reports, were opened to assess this issue. During the course of a PRTS opened in May 2005, an engineer proposed that GM redesign the key head from a "slotted" to a "hole" configuration. That proposal was initially approved, but later cancelled. The PRTS process led to GM's issuing Information Service Bulletin 05-02-35-007 in December 2005. This Service Bulletin provided "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs," and applied to a number of vehicles, including vehicles subject to the Ion, HHR, Solstice and Sky recall—specifically, 2003-06 Saturn Ion, 2006 Chevrolet HHR,

and 2006 Pontiac Solstice vehicles—all of which were equipped with the same ignition switch as the Cobalt. The Service Bulletin informed dealers that: “there is potential for the driver to inadvertently turn off the ignition due to low ignition key cylinder torque/effort”; “[t]he concern is more likely to occur if the driver is short and has a large and/or heavy key chain”; and “the customer should be advised of this potential and should take steps to prevent it—such as removing unessential items from their key chain.” In addition, the Service Bulletin advised that “Engineering has come up with an insert for the key ring so that it goes from a ‘slot’ design to a hole design. As a result, the key ring cannot move up and down in the slot any longer—it can only rotate on the hole.” The Service Bulletin further stated that, “[i]n addition, the previous key ring has been replaced with a smaller, 13 mm design. This will result in the keys not hanging as low as in the past.”

Certain of the reported incidents that pre-dated GM’s issuance of Service Bulletin 05-02-35-007 and GM’s public response to inquiries about those incidents were chronicled in newspaper articles that appeared in THE NEW YORK TIMES, THE PLAIN DEALER (Cleveland, OH), and THE DAILY ITEM (Sunbury, PA). GM concluded in December 2005 that the Service Bulletin and field service campaign were the appropriate response to the reported incidents, given that the car’s steering and braking systems remained operational even after a loss of engine power, and the car’s engine could be restarted by shifting the car into either neutral or park.

2006. On April 26, 2006, the GM design engineer responsible for the ignition switch installed in all of the vehicles subject to the Cobalt and G5 recall and the Ion, HHR, Solstice and Sky recall signed a document approving changes to the ignition switch proposed by the supplier. This document referred to the “GMX 357” vehicle platform, which was GM’s internal designation for the Saturn Ion. The approved changes included, among other things, the use of a new detent plunger and spring that increased torque force in the ignition switch. This change to the ignition switch was not reflected in a corresponding change in the part number for the ignition switch. GM believes that the supplier began providing the re-designed ignition switch to GM for all of the recalled vehicles at some point during the 2007 model year.

In May 2006, a field evaluation inquiry, known within GM as a Field Performance Report (“FPR”), was opened to address customer complaints that their Saturn Ion vehicles would neither crank nor start. Attached to this FPR was a document bearing the logo of the ignition switch supplier, titled “PROPOSED PCB [printed circuit board] LAYOUT.” Under “[p]roblem description,” the document stated, “[s]witch presents Contact Bounces & contact permanent deformation,” “[c]ustomer rejects switches,” and “[f]unctional Problem when car starts.” The “[p]roposed actions from Product Engineering” included “[c]hange PCB design to remove via holes from contact traces,” “[e]nlarge PCB vias to avoid contactors being in via limits,” and “[d]etent plunger to increase torque force to be within spec.” Under “[c]urrent status for PCB,” the document stated, among other things, “1.-Validation for Torque & Angle for timing corrections ~ DONE,” “2.-GM RDE approve GM3660 ~ DONE,” and “6.-SOP @ Condura for new PCB & Spring/Plunger ~ 6/30/06.” The FPR was closed, citing Technical Service Bulletin 06-02-35-017.

GM updated Service Bulletin 05-02-35-007 in October 2006 to include additional vehicles and model years, including the vehicles subject to the Ion, HHR, Solstice and Sky recall—specifically, the 2007 Saturn Ion, the 2007 Chevrolet HHR, the 2007 Pontiac Solstice, and the 2007 Saturn Sky and the 2007 Pontiac G5. GM's warranty records indicate that GM dealers have provided key inserts to 474 customers who brought their vehicles into dealers for service.

2007. A GM investigating engineer was tasked with tracking crashes in which Cobalts were involved in frontal impacts and the airbags did not deploy, in order to try to identify common characteristics of these crashes. Data from the vehicles' sensing and diagnostic modules ("SDM's") were available for nine of the crashes, and that data showed that the ignition was in the "run" position in five of the crashes and in the "accessory" position in four of the crashes. Such information was not available for Saturn Ion vehicles because they were equipped with an SDM that was not designed to record when the engine was not running.

GM discontinued production of the Ion at the end of the 2007 model year, as previously planned.

2011. In late July 2011, a meeting was held at GM involving Legal Staff, Field Performance Assessment ("FPA") and Product Investigations personnel who would be involved in the Field Performance Evaluation ("FPE") process. Soon thereafter, in August 2011, a Field Performance Assessment Engineer ("FPAE") was assigned to move forward with an FPE investigation of a group of crashes in which airbags in 2005-2007 model year Chevrolet Cobalts and a 2007 Pontiac G5 had not deployed during frontal impacts, which also included a review of information related to the Ion, HHR and Solstice vehicles. This FPE investigation did not identify frontal-impact crashes involving 2004 model year Saturn Ion vehicles that resulted in fatalities in which the recall condition may have caused or contributed to the airbags' non-deployment. These crashes have since been identified and are included below in the number of crashes identified based on the data and information collected and reviewed to date.

During the course of the FPE investigation, the FPAE's analyses included the following: reviewing data relating to complaints of stalling in the Ion for all model years; reviewing data relating to crashes involving Ions from certain model years in which airbags had not deployed; testing the torque performance of ignition switches from salvage yard vehicles, including Ions, HHRs, Cobalts and G5s (but not Solstice or Sky vehicles); measuring the difference among a wide variety of GM vehicles in the distance between a driver's knee and the ignition; and studying vehicles' different steering columns and shrouds, including those of the Ion and the Cobalt.

GM's FPE process consisted of several steps, beginning with investigation of the issue, then presentation of potential solutions to decision makers, and culminating in a decision and implementation of that decision. At the outset of the process, investigating engineers worked to develop a technical understanding of the issue. They then presented their findings and proposed solutions to the Field Product Evaluation Recommendation Committee ("FPERC"). The FPERC's recommendations were then presented to the Executive Field Action Decision Committee ("EFADC"), which decided on a course of action. The FPERC and EFADC could request further analysis before making recommendations or decisions as to what, if any, field action was warranted.

2012. Based on the information accessed and collected by the FPAE, the investigation sought, among other things, to determine whether there were known engineering reasons that would explain why certain reported non-deployment crashes involved 2007 and earlier model year Ion vehicles. In May 2012, the assigned FPAE studied a cross-section of steering columns and ignition switches from Chevrolet Cobalts, Chevrolet HHRs, Pontiac G5s, and Saturn Ions, in model years ranging from 2003 through 2010. The FPAE accessed, inspected, and tested these steering columns and ignition switches for torque performance at a salvage yard. Some of these ignition switches—including a number for model year 2004-2007 Ion and model year 2006-2008 HHR vehicles—exhibited torque performance below that specified by GM for the ignition switch. Because the Ion was discontinued after model year 2007, no Ion vehicles from later model years could be tested for torque performance.

The FPE investigation focused on determining the cause of these variations in torque performance by model year. A review of GM's records by those involved in the investigation did not identify design changes to the ignition switch that would explain the variations in torque performance for the 2007 and earlier model year vehicles and that of the 2008 and later model year vehicles, with the exception of the Ion which ceased production after the 2007 model year. GM also considered other components that might potentially influence the torque performance of the ignition switches, including changes made to the Cobalt's anti-theft system at the beginning of the 2008 model year. Again, no explanation was discovered. GM engineers conducted separate studies using the "Red X" and "Design for Six Sigma" problem-solving methodologies, in hopes of better understanding the differences in observed torque performance, but those, too, produced inconclusive results. These latter studies were concluded in November 2012 and January 2013, respectively.

The FPAE collected some data relating to certain Saturn Ion crashes in which airbags did not deploy and where injuries occurred, and discussed the data with at least one other investigator to evaluate whether the ignition switch in Ion vehicles may have caused or contributed to airbag non-deployment. This analysis identified two crashes involving Ion vehicles—from model years 2005 and 2007—in which the FPAE concluded that the ignition switch torque performance could potentially have resulted in airbag non-deployment upon frontal impact. These two crashes did not result in fatalities.

2013. In late April 2013, the FPAE learned that the torque performance of a GM service part ignition switch purchased after 2010 differed substantially from that of an ignition switch that was original equipment installed on a 2005 Cobalt. He also learned that others had observed and documented that the detent plunger and spring used on the service part switch differed from those used on the original equipment switch installed on the 2005 Cobalt. Shortly thereafter, GM retained outside engineering resources to conduct a comprehensive ignition switch survey and assessment. That investigation included torque performance testing, ignition switch teardowns, and x-ray analyses of ignition switches in used production vehicles both before and after the 2007 model year. The data gathered by GM's outside technical expert showed that: the ignition switches that he tested that had been installed in early-model Ion and Cobalt vehicles did not meet GM's torque specification; changes had been made to the ignition switch's detent plunger and spring several years after the start of production; and those changes most likely explained the variation from GM's specifications for torque performance observed in the original switches installed in 2007 and earlier model year vehicles.

On October 29, 2013, after dialogue with the supplier, GM was provided with supplier records showing that changes had in fact been made to the detent plunger and spring late in the 2006 calendar year. Those changes increased the switch's torque performance. Testing and analysis further determined that whether a key moves from the "run" to "accessory" position and how that key movement affects airbag deployment depends on a number of factors, including: vehicle steering inputs and path of travel immediately before key movement; the weight and load on the key ring immediately before key movement; whether the installed ignition switch meets the torque specifications that GM provided to its supplier; and the timing of the movement of the key out of the "run" position relative to the activation of the airbag's sensing algorithm of the crash event.

Upon completion of this analysis, the issue was presented to the Field Performance Evaluation Review Committee ("FPERC") and the Executive Field Action Decision Committee ("EFADC"). These two committees reviewed the findings in early December, culminating in an EFADC meeting on December 17, 2013. Factual questions were raised at that meeting that required further analysis, the findings of which were presented at a second EFADC meeting on January 31, 2014, on which date the EFADC directed a safety recall of the Chevrolet Cobalt and Pontiac G5 for model years 2005 through 2007.

As part of the FPE analysis, PowerPoint documents were prepared for purposes of presenting the investigative findings and recommendation to the EFADC on December 17, 2013, and January 31, 2014. The PowerPoint documents reflect the fact that the EFADC was asked to consider a proposed recall of only the Cobalt and G5 vehicles. The members of the EFADC received a primary slide deck in advance of the meeting. For these two meetings, a "backup" slide deck was prepared so that additional slides could be presented, as necessary, in order to respond to questions posed by EFADC members. The primary slide decks for these meetings include information relating to the FPAE's examination of the Ion and HHR vehicles and the results of field testing of vehicles' ignition switch torque performance, which reflected a number of model year 2004-2007 Ion and model year 2006-2008 HHR vehicles that were below GM specifications. The "backup" decks for these two meetings also include information relating to the FPAE's examination of key insert claims data for the Ion, HHR and Solstice vehicles, and proffered differences between the Cobalt, Ion and HHR vehicles that could explain a perceived absence of the recall condition in the Ion and HHR vehicles. These documents do not contain any information relating to the Sky vehicles. The "backup" slide decks also included factual material relating to other vehicles, including: (1) a chart, which in part reflects "Ignition Switch Position from SDM Download – Airbag Non-Deployment Incidents," and which identifies two crashes involving Ion vehicles—from model years 2005 and 2007—in which the ignition switch torque performance could potentially have resulted in airbag non-deployment upon frontal impact (also referred to as "unconfirmed reports")¹ and a statement that there were no such incidents for the HHR; (2) the review of Vehicle Owner Questionnaires ("VOQ's") for Ion and HHR vehicles; (3) photographs comparing the steering columns in Ion and Cobalt vehicles; and (4) a copy of the April 26, 2006 document approving changes to the ignition switch proposed by the supplier. It is not clear which of the backup slides were reviewed during these two meetings.

¹ These two crashes did not result in fatalities.

The submissions to the EFADC did not propose a recall of the Ion, HHR, Solstice and Sky vehicles. The data collected by the FPAE did not include the crashes involving model year 2004 Ion vehicles that resulted in fatalities in which the recall condition may have caused or contributed to the airbags' non-deployment. As stated above, these crashes have since been identified. GM has provided copies of these PowerPoint documents to NHTSA.

2014. Additional analyses were conducted in February 2014 relating specifically to the Ion, HHR, Solstice and Sky vehicles. These analyses included a collection and review of data regarding crashes involving these vehicles and allegations of airbag non-deployment. The analyses also included a search for and review of FPR and PRTS reports relating to these vehicles, regardless of model year; a number of these, initiated in 2003 and 2006, addressed complaints of stalling in Ion vehicles.² One report initiated in 2001, during pre-production development of the Ion, addressed an issue relating to the ignition switch's "passlock" system. The report stated that the causes of the problem included "low detent plunger force" in the ignition switch, and stated that an ignition switch design change had resolved the problem. A 2003 report documented an instance in which the service technician observed a stall while driving, noted that "[t]he owner had several keys on the key ring," and stated that "[t]he additional weight of the keys had worn out the ignition switch." In that instance, the technician replaced the ignition switch and the FPR was closed. Other reports primarily addressed customer complaints of not being able to start their Ions' engines, but the warranty and technical assistance data collected in support of these reports included complaints of stalling.

An EFADC meeting was held on February 24, 2014, on which date the EFADC directed a safety recall of the Chevrolet HHR and Pontiac Solstice for model years 2006 and 2007, Saturn Ion for model years 2003 through 2007, and the Saturn Sky for model year 2007.

The dealers are to replace the ignition switch. GM provided dealers notification of the recall on February 26, 2014 and March 4, 2014. GM will be providing a recall service bulletin to dealers on or about April 7, 2014. GM mailed the owner letters on March 10 and 11, 2014. Pursuant to 577.11(e), GM will provide reimbursement to owners for repairs completed on or before ten days after the owner mailing is completed.

Based on the data and information collected, reviewed, and analyzed to date, GM has identified eight frontal-impact crashes in the United States involving 2003 to 2007 model year Saturn Ion vehicles in which the recall condition may have caused or contributed to the airbags' non-deployment. Of these eight crashes, GM is currently aware of four involving the Saturn Ion that resulted in four fatalities (all of which involved 2004 model year vehicles) and six injuries of frontal occupants (which involved 2004, 2005, 2006 & 2007 model year vehicles). GM is currently aware of three frontal-impact crashes in the United States involving 2006 to 2007 model year Chevrolet HHR vehicles in which the recall condition may have caused or contributed to the airbags' non-deployment. These three crashes resulted in three injuries to frontal occupants. GM

² GM is prepared to share with NHTSA upon request the PRTS and FPR reports referenced in this document.

is not currently aware of any frontal-impact crashes in the United States involving 2006-2007 model year Pontiac Solstice or 2007 model year Saturn Sky vehicles in which the recall condition may have caused or contributed to the airbags' non-deployment. It is important to emphasize that GM continues to review data and information relating to the recalled vehicles in order to evaluate, among other things, whether there were any other crashes involving the recalled vehicles in which the recall condition may have caused or contributed to the airbags' non-deployment.

GM employees became aware of most of the aforementioned crashes within two weeks of the dates on which they occurred. As GM learned of these crashes, employees undertook to investigate the underlying facts and circumstances to determine, among other things, why the airbags had not deployed. Throughout this period, GM was involved in claims and lawsuits with respect to the Ion and HHR vehicles where the non-deployment of airbags may have been caused by the ignition switch condition. These eleven crashes in the United States are out of a total U.S. population of 748,024 vehicles subject to the Ion, HHR, Solstice and Sky recall. GM's review of data and information relating to the recalled vehicles continues.