REPORT TO BOARD OF DIRECTORS OF GENERAL MOTORS COMPANY REGARDING IGNITION SWITCH RECALLS

May 29, 2014

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JENNER & BLOCK

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I. INTRODUCTION

In the fall of 2002, General Motors ("GM")[1] personnel made a decision that would lead to catastrophic results – a GM engineer chose to use an ignition switch in certain cars that was so far below GM's own specifications that it failed to keep the car powered on in circumstances that drivers could encounter, resulting in moving stalls on the highway as well as loss of power on rough terrain a driver might confront moments before a crash. Problems with the switch's ability to keep the car powered on were known within GM's engineering ranks at the earliest stages of its production, although the circumstances in which the problems would occur were perceived to be rare. From the switch's inception to approximately 2006, various engineering groups and committees considered ways to resolve the problem. However, those individuals tasked with fixing the problem – sophisticated engineers with responsibility to provide consumers with safe and reliable automobiles – did not understand one of the most fundamental consequences of the switch failing and the car stalling: the airbags would not deploy. The failure of the switch meant that drivers were without airbag protection at the time they needed it most. This failure, combined with others documented below, led to devastating consequences: GM has identified at least 54 frontal-impact crashes, involving the deaths of more than a dozen individuals, in which the airbags did not deploy as a possible result of the faulty ignition switch.

The below-specification switch approved in 2002 made its way into a variety of vehicles, including the Chevrolet Cobalt. Yet GM did not issue a recall for the Cobalt and other cars until

[1] Except as otherwise specifically noted, the term "GM" is used throughout this Report as follows. When reference is made to GM prior to July 10, 2009, the reference is to General Motors Corporation. On June 1, 2009, General Motors Corporation filed a Chapter 11 bankruptcy petition in the United States Bankruptcy Court for the Southern District of New York. On July 5, 2009, that court approved the sale of substantially all of the assets of General Motors Corporation to an entity that became known as General Motors Company. That sale closed on July 10, 2009. When reference is made to GM from and after July 10, 2009, the reference is to General Motors Company, the purchaser of the assets.

2014, and even then the initial recall was incomplete. GM personnel's inability to address the ignition switch problem for over 11 years is a history of failures.

While GM heard over and over from various quarters – including customers, dealers, the press, and their own employees – that the car's ignition switch led to moving stalls, group after group and committee after committee within GM that reviewed the issue failed to take action or acted too slowly. Although everyone had responsibility to fix the problem, nobody took responsibility. It was an example of what one top executive described as the "GM nod," when everyone nods in agreement to a proposed plan of action, but then leaves the room and does nothing.

A critical factor in GM personnel's initial delay in fixing the switch was their failure to understand, quite simply, how the car was built. GM had specifically designed the airbag system *not* to deploy, in most circumstances, in the event that the ignition switch was turned to Off or Accessory, a deliberate and sensible decision made to prevent passengers from being injured by airbags in parked cars. In 2004, however, GM engineers, faced with a multitude of reports of moving stalls caused by the ignition switch, concluded that moving stalls were not safety issues because drivers could still maneuver the cars; they completely failed to understand that the movement of the switch out of the Run position meant the driver and passengers would no longer have the protection of the airbags. As a result, GM personnel viewed the switch problem as a "customer convenience" issue – something annoying but not particularly problematic – as opposed to the safety defect it was. Once so defined, the switch problem received less attention, and efforts to fix it were impacted by cost considerations that would have been immaterial had the problem been properly categorized in the first instance. Indeed, in this same decade, GM

issued hundreds of recalls at great expense (including at times when its financial condition was precarious) because in the great majority of instances, it correctly determined or agreed that the issues that came to its attention implicated safety and demanded prompt action. But in the case of the Cobalt, it did not do so.

From 2004 to 2006, not one of the committees considering a fix for the switch – filled with engineers and business people whose job was to understand how GM's cars were built and how different systems of the car interact – ever reclassified the problem from one of customer convenience to one of safety or demonstrated any sense of urgency in their efforts to fix the switch. GM's Product Investigations group, charged with identifying and remedying safety issues, made the same mistake; it opened and closed an investigation in 2005 in the span of a month, finding no safety issue to be remedied.

As the early committees failed to fix the problem, accidents and fatalities in which airbags did not deploy began coming to GM personnel's attention, including GM's in-house counsel and the engineers who worked with them. Those outside GM, including, in 2007, a trooper from the Wisconsin Safety Patrol and a research team from Indiana University, figured out the connection between the switch and the airbag non-deployment. Yet, GM personnel did not.

From 2007 on, as years passed and fatalities mounted, engineers investigating the non-deployments and attempting to understand their cause were neither diligent nor incisive. The investigators failed to search for or obtain critical documents within GM's own files, or publicly available documents that helped non-GM personnel make the connection between the switch and airbag non-deployment. Investigators, convinced that the cause of the airbag non-deployments

was a complicated mystery still to be unraveled, failed to consider fully the simple, and ultimately correct, cause: the switch that caused cars to stall was turning the power off and disabling the airbags just as cars were about to crash. Along the way, the investigators were misled by the GM engineer who approved the below-specification switch in the first place; he had actually changed the ignition switch to solve the problem in later model years of the Cobalt, but failed to document it, told no one, and claimed to remember nothing about the change. While stumped by the inability to determine why different model year Cobalts performed differently, the investigating engineers nonetheless failed to take certain basic investigative steps, such as taking apart both poorly and properly functioning switches to compare the two. In 2013, an outside expert working for a plaintiff's attorney took apart two switches and quickly found the cause it took GM years to determine.

Throughout the entire 11-year odyssey, there was no demonstrated sense of urgency, right to the very end. The officials overseeing the potential fixes and investigations did not set timetables, and did not demand action. When, in December 2013, GM's recall committee initially met to discuss whether to recall Cobalts and other vehicles with the switch, members of the committee deferred the decision for another six weeks to gather yet more information, in part because the presentation provided to them failed to alert them to fatalities.

While the issue of the ignition switch passed through numerous hands at GM, from engineers to investigators to lawyers, nobody raised the problem to the highest levels of the company. As a result, those in the best position to demand quick answers did not know questions needed to be asked.

As a whole, from beginning to end, the story of the Cobalt is one of numerous failures leading to tragic results for many. As discussed below, many individuals have substantial responsibility for the delay in recalling the Cobalt. These individuals, as well as the GM committees and groups that had responsibility for the Cobalt, failed to demand action in the face of mounting injuries and fatalities, to make themselves or others accountable, and to marshal the information and expertise at their disposal to solve a problem that brought harm to GM's customers. This report traces the history of the ignition switch, from GM's design and production of the ignition switch to its belated recall in 2014, ultimately proposing recommendations to help avoid such a tragedy from ever occurring again.

II. SUMMARY OF FACTS

Jenner & Block LLP ("Jenner") was directed on March 10, 2014, to determine how and why it took so long for GM to recall the Cobalt.[2] Jenner was given unfettered access to witnesses and documents, and Jenner was asked for an unvarnished account. Jenner was asked to complete this task on a very expedited timetable, recognizing, in this instance, it was critical to find the truth quickly rather than explore every possible avenue.[3] The evidence showed:

From the outset, the Cobalt ignition switch had significant problems that were known to GM personnel. Designed to be a new generation ignition switch first introduced in the Saturn Ion, the switch was so plagued with problems that the engineer who designed it labeled it then "the switch from hell." The prototype switch performed so poorly that its entire electrical

[2] In this report, we sometimes use "Cobalt" to refer to not just that model, but also other Delta and Kappa platform vehicles that shared the same ignition switch and that are covered by the ignition switch recall. These other models include the Chevrolet HHR, the Pontiac G5 and Solstice, and the Saturn Ion and Sky.
[3] As part of this investigation, review of documents (discussed in greater detail below) continues on a daily basis. To the extent that review yields additional relevant documents that materially change the contents of this report, such information will be provided to the Board.

concept needed to be redesigned. Upon completion, the redesigned switch failed to meet the mechanical specifications for torque – that is, it required less force to turn the key than the designers had mandated. Erroneously believing that this low torque would not affect the car's performance, an engineer – Ray DeGiorgio – approved going into production with a deviation from GM specifications. He permitted the switch to be produced with the low torque that would ultimately lead to accidents in which the airbags did not deploy.

As it turned out, when finally put into production, the redesigned switch initially failed for reasons entirely unrelated to the low torque. The ignition switch often would not start the car in cold weather, causing a huge volume of customer complaints and a focus on fixing the switch so that cars would start.

But starting the car was not the only issue. The low torque required to turn the ignition switch led to its own set of problems. The Cobalt (and the Saturn Ion before it) was stalling at highway speeds. From the outset, GM employees, customers, and members of the automotive press found repeatedly that they would hit the key fob or keychain with their knee, and the car would turn off. GM received some of these reports before the Cobalt's launch, and others afterwards. There were scathing reviews in the press. There were customer complaints describing the moving stalls and customers' safety concerns. The complaints were documented in GM electronic forms as a part of GM's standard vehicle improvement process, and were duly considered by multiple committees of engineers and business people, including those with oversight over entire vehicle lines.

These processes failed to resolve the issue. The teams of experienced GM engineers on the committees that considered the Cobalt ignition switch did not recognize that their colleagues

had designed the car so that turning the key to Accessory or Off would disable the airbags.[4] As a result and because numerous engineers believed that consumers could still safely maneuver cars that had stalled, the engineers categorized the problem as an issue of customer satisfaction, not safety. The decision not to categorize the problem as a safety issue directly impacted the level of urgency with which the problem was addressed and the effort to resolve it.

The problem of moving stalls and the ignition switch continued throughout 2005, and was described both within GM and in the media. In May and June 2005, reviewers from two newspapers, including the *New York Times*, wrote about how they or a family member had inadvertently turned a Cobalt off with their knees. One of GM's main safety lawyers e-mailed a colleague trying to marshal evidence for the press that the risk was "remote" and "inconsequential." He wrote that he did not want to be criticized for failing to "defend a brand new launch." GM employees were upfront about the company's view about the complaints they had heard about moving stalls; they informed the *New York Times* of their view that moving stalls in the Cobalt did not pose a safety problem.

At the same time, a different group of engineers within GM, the senior engineers charged with dealing with safety issues, attempted to determine whether the problem could be easily replicated. The Director of Product Investigations, GM's group of safety investigators, among others, succeeded in turning off the car with her knee. A more junior GM safety investigation engineer was tasked with investigating the issue, which included compiling a file of customer complaints, of which she found a number. The safety engineer presented the issue to a committee charged with reviewing such matters, and the committee closed the safety

[4] A single engineer involved in the review process told Jenner interviewers that he raised this issue at the time, but neither contemporaneous documents nor interviews of his colleagues corroborated his account.

investigation with no further action, also ignorant of the fact that turning the ignition switch to Accessory disabled the airbags with potentially catastrophic results.

In 2005, various committees within GM considered proposed fixes, but those were rejected as too costly – a consideration that would not have mattered had the problem been considered a safety concern. Instead of fixing the ignition switch, in December 2005, GM sent a notice to dealers (a "Technical Service Bulletin," "bulletin," or "TSB") warning that customers might complain of ignition cut-offs caused by low ignition torque, counseling that customers remove heavy items from their key rings, and offering an insert to the key that would reduce the likelihood that the ignition switch would rotate inadvertently. That bulletin did not refer to the problem as "stalling," however, precisely because GM believed customers might associate stalling with a safety problem. Only a customer who had already experienced a stall and who came into a dealer to complain would get information about the proposed solutions. Other customers would remain unaware of the problem, as well as GM's proposed solutions.

In 2007, two years after GM closed its initial safety investigation, entities outside GM began paying attention as Cobalts crashed, airbags did not deploy, and fatalities occurred. In April 2007, a trooper of the Wisconsin Safety Patrol (Wisconsin's state police force) published an accident reconstruction report on a Cobalt fatality in which the airbags did not deploy. The trooper pointed out (a) that the ignition switch appeared to be in Accessory; (b) that GM had issued a bulletin to dealers warning that low torque could lead to inadvertent turning of the ignition switch (he found the bulletin on the NHTSA website); and (c) that airbags would not deploy when the ignition switch was turned to the Accessory position. Although an electronic

copy of this report resided in GM's files as of 2007, no GM engineer investigating the ignition switch reported seeing it until 2014.

Over the years, Indiana University's Transportation Research Center and two plaintiffs' experts would also locate GM's Technical Service Bulletin and reach the same, correct conclusion regarding the connection between the ignition switch and airbag non-deployment. Within GM, however, the investigation languished. In 2007, a Field Performance Assessment ("FPA") engineer, John Sprague, whose job was to support GM's products liability defense team, was asked to track incidents of Cobalt airbag non-deployments in a spreadsheet. Sprague was given directions neither about a deliverable nor a time frame, highlighting several themes that permeated GM personnel's failed efforts to understand or solve the problem: lack of urgency, lack of ownership of the issue, lack of oversight, and lack of understanding of the consequences of the problem.

The spreadsheet simply grew. Yet Sprague was not aware of important GM records of prior problems with the ignition switch (including the bulletin sent to dealers and the prior work done to propose solutions). Over time, however, through his work on various litigation matters, Sprague and his colleagues in FPA came to recognize a pattern of non-deployment of airbags in the Cobalt and hypothesized about a cause related to the electrical connections in the ignition switch.

One of the observations Sprague made was that the non-deployments stopped in Model Year ("MY") 2008 Cobalts. Sprague wondered whether there had been some kind of part change at that time that would explain why the non-deployments had ended. He was correct. In 2006, Ray DeGiorgio, the engineer who had approved the below-specification ignition switch

originally, had authorized a change in the ignition switch that increased the torque required to turn the key. But when asked in 2009 and in the years that followed whether the ignition switch had changed, DeGiorgio said that it had not. To this day, in informal interviews and under oath, DeGiorgio claims not to remember authorizing the change to the ignition switch or his decision, at the same time, not to change the switch's part number. DeGiorgio's deliberate decision not to change the part number prevented investigators for years from learning what had actually taken place.

By 2011, outside counsel, privy to the FPA engineers' data, had repeatedly warned GM in-house counsel that GM could be accused of egregious conduct due to its failure to address the problem of airbag non-deployment in the Cobalt, and that such conduct might subject GM to liability, including punitive damages. Seeing the pattern of accidents regarding non-deployments, in 2011, GM in-house lawyers called for a meeting with engineers and asked for the investigation to be taken over by GM's Product Investigations unit, which was charged with investigating potential safety issues. It was assigned to an investigator named Brian Stouffer. Once again, the investigation moved with no sense of urgency. When he began the investigation, Stouffer was handed a dossier on the matter that included information about the prior investigations into moving stalls, and he soon obtained the Technical Service Bulletin. In 2012, Stouffer was also given the 2007 Indiana University report and a report from a plaintiff's expert, both laying out the correct answer. Stouffer, however, discounted those reports, believing they did not answer the question before him, and, in doing so, ultimately prolonged the resolution of the problem. Among other things, he could not explain why MY 2008 Cobalts did not have a

problem with airbag non-deployment, having also been misled by DeGiorgio's statement that the same ignition switch was in early and later model year vehicles.

In the ensuing two years, Stouffer's investigation proceeded slowly and without significant progress, ultimately becoming "stuck" by early 2013. It was only when a plaintiff's expert in a products liability case compared switches from pre- and post-MY 2008 Cobalts by x-raying them – something GM investigators had never done – that GM engineers came to understand that the early model year Cobalts had a different ignition switch than the later model year vehicles, and that the switch used in the early model years suffered from torque well below GM's specifications.

Despite learning about what GM's outside counsel called a "bombshell" in April 2013, it was not until February 2014 that GM issued the first recall. In the interim, various additional investigative steps were taken that eventually confirmed what the plaintiff's expert had already made clear. Eventually, in December 2013, the proposed recall made its way to the Executive Field Action Decision Committee (the "EFADC"), the GM committee that considers recalls and whose members include three GM vice presidents, including its chief engineer. Still, no action was taken, because the chief engineer questioned the data demonstrating the problem and EFADC members were not presented with fatality information and therefore felt no sense of urgency to make a decision. It was not until approximately six weeks later that GM instituted its first recall of the ignition switch, and even that recall was incomplete based on the failure of GM personnel to obtain and present all relevant information to the EFADC decision-makers.

III. JENNER & BLOCK'S INVESTIGATIVE PROCESS

This investigation covered a time period of more than fifteen years, involved hundreds of witness interviews, and the review of millions of documents. Throughout the entire investigation, GM provided unfettered access and cooperation.

A. Mandate from GM's CEO and Its Board

GM's CEO, Mary Barra, and its Board directed Anton R. Valukas and Jenner to investigate the circumstances that led up to the recall of the Cobalt and other cars due to the flawed ignition switch. We were directed to do as full and complete an investigation as was possible in the short period allotted and to return to Ms. Barra and the Board with the unvarnished truth about what happened, why it happened, and what GM should do to ensure that it never happens again. Jenner was also asked to focus on the knowledge of specific senior executives, as well as GM's Board. This report presents facts learned through the investigation requested by the CEO and the Board.

While GM gave Jenner unfettered access and devoted enormous resources to this effort, it is important to note what was not done. We have not sought to reconstruct accidents or determine which injuries or fatalities were or were not caused by the safety defect in the Cobalt and other cars; that was not in our mandate, nor was it realistic in the time allotted.[5] This report does not delve into any issues related to recalls other than those surrounding the ignition switch.

B. Document Collection and Review

Jenner identified over three hundred document custodians for collection. Many of those custodians were identified early in the investigative process, and additional custodians were

[5] Throughout this report, when we use the term "defect," "safety defect," "Ignition Switch defect" and the like, we are referring to the defect identified by GM in its 573 letter to NHTSA. GM Recall 573 Letter (Feb. 7, 2014) [DOC ID 000002796457; GMNHTSA000439255].

added as new information and investigative leads were obtained. Multiple sources of custodial and non-custodial data were collected and reviewed, including but not limited to: (1) forensically imaged hard drives; (2) server-based e-mails and electronic share drives; (3) legacy electronic data collections; (4) hard copy documents; and (5) database collections from various GM electronic databases, such as such as Global Document Management ("GDM") and Problem Resolution and Tracking System Plus ("PRTS+"). Search terms designed to identify the most relevant subset of information were developed and applied.

Jenner also requested and reviewed hundreds of boxes of hard-copy documents from GM storage facilities. Those boxes were identified following a search of indices for file names that were responsive to search terms. Potentially responsive documents were converted to electronic files.

On April 10, 2014, Jenner requested that the ignition switch manufacturer, Delphi Mechatronics ("Delphi"), provide documents relevant to the approval and testing of the ignition switch, as well as all correspondence between GM and Delphi on the subject of the switch. Delphi agreed to provide certain documents as well as the requested correspondence, under the condition that GM provide reciprocal documents and correspondence, to which GM agreed. As a result, GM and Delphi exchanged certain materials. As of May 28, 2014, counsel for Delphi informed Jenner that Delphi remained in the early stages of document review, still had not reviewed numerous documents, and had other relevant materials it was not providing to Jenner.

The volume of e-mail, other electronically stored documents, and converted hard copy documents is estimated at 23 terabytes of data. All data was maintained on four databases, housed and maintained on servers hosted by one of four professional forensic firms: KPMG,

Ernst & Young, Iris Data Services, and Document Technologies, Inc. In total, Jenner collected in excess of 41 million documents.

Documents were reviewed through two different processes: a document production process and an investigative process. In the document production process, after others conducted "first level" review to identify documents potentially responsive to government requests, Jenner lawyers conducted a "second level" review and responsive documents were (a) prepared for production to various governmental entities and (b) analyzed for investigative use. In parallel to the document production process, Jenner investigative teams also conducted targeted searches for documents. Any documents identified as relevant by Jenner investigative teams were directed to the document production process.

C. Witness Interviews

Jenner was provided with unlimited access to interview any GM employee. Every request for an interview of a GM employee was granted. A number of former GM employees and third parties were also interviewed as part of the investigation. Because former GM General Counsel Robert Osborne is employed in an "of counsel" capacity at Jenner, an outside law firm unaffiliated with Jenner was retained to conduct, and did conduct, the interview of Mr. Osborne. The same law firm conducted the interview of former GM General Counsel Thomas Gottschalk.

In all, over 230 witnesses were interviewed over a period of approximately 70 days. Because certain witnesses were interviewed more than once, the total number of interviews conducted was over 350. All interviews were conducted by at least two Jenner attorneys, with the exception of the interviews of Mr. Osborne and Mr. Gottschalk, which were conducted by an outside firm in coordination with Jenner.

As part of the investigation, Jenner sent letters requesting the opportunity to interview plaintiff's counsel in a number of cases described herein. The letters were sent via electronic mail and via UPS overnight delivery on April 10, 2014. Although UPS has confirmed that the letters were delivered, and the electronic mail was not returned as undeliverable, to date, none of the counsel contacted has responded to our request.

D. King & Spalding's Role

GM retained King & Spalding ("K&S") to assist in responding to requests from governmental agencies. Its lawyers assisted in searches for documents and conducted first level document review. K&S lawyers participated in a limited number of our witness interviews, largely during the initial phase of the investigation.

IV. BACKGROUND

A. General Motors

GM is one of the largest engineering and manufacturing enterprises in the world.[6] For 77 years until 2007, and again in 2011, GM sold more cars worldwide than any other company.[7] In 2013 alone, GM produced more than 9.7 million vehicles worldwide,[8] generating revenues of $155.4 billion and profits of $3.8 billion.[9]

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[6] *The 2013 IndustryWeek 1000*, IndustryWeek, at 1-2, *available at* www.industryweek.com/resources/iw1000/2013 (last accessed May 27, 2014) [DOC ID 000240753003].
[7] Greg Gardner, *GM Is World's Largest Automaker Once More*, Detroit Free Press (Jan. 20, 2012), at 1 [DOC ID 000240753006]; Christine Tierney and Robert Snell, *Toyota Overtakes GM in Global Sales*, Detroit News (Jan. 22, 2008), at 1 [DOC ID 000240786002].
[8] Press Release, GM Delivered 9.7 Million Vehicles Globally in 2013, General Motors Company (Jan. 14, 2014), *available at* http://media.gm.com/media/us/en/gm/news.detail html/content/Pages/news/us/en/2014/Jan/0114_2013gm-global-sales html (last accessed May 29, 2014) [DOC ID 000240753002].
[9] General Motors Company, 2013 Annual Report, at 14 [DOC ID 000240786006].

GM employs more than 210,000 employees in 396 facilities located in 30 countries.[10] As a result, the most senior GM executives have literally tens of thousands of employees working under them. GM also has 21,000 dealers worldwide.[11]

Along with its strategic partners, GM produces cars and trucks through 11 brands worldwide, four in North America.[12] (Prior to its bankruptcy, GM had several other brands in North America.[13]) In 2013 alone, GM's brands sold over 9 million vehicles worldwide, in more than 120 countries.[14] Of course, older models also remain on the road, meaning that the total number of vehicles currently in production vastly understates the full number and variety of GM vehicles on the road at any given time.

Each vehicle is itself a composite of numerous subsystems and component parts. A car includes a chassis with suspension, wheels, powertrain (composed of the drivetrain, engine and transmission), a cooling system, an electrical system, a fuel system, an HVAC and climate control system, steering and braking systems, and an instrument panel and controls. Vehicles have become increasingly complicated over time, and now also routinely include power systems that operate locks, windows, doors, trunks, and headlights, as well as sophisticated computerized systems controlling advanced safety features such as airbags, anti-lock brakes, electronic stability control, lane departure warnings, and parking assist, not to mention additional features

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[10] Our Company, General Motors Company, at 1, *available at* www.gm.com/company/aboutGM/our_company.html (last accessed May 27, 2014) [DOC ID 000240753007].
[11] Our Company, General Motors Company, at 1, *available at* www.gm.com/company/aboutGM/our_company.html (last accessed May 27, 2014) [DOC ID 000240753007].
[12] Our Company, General Motors Company, at 2, *available at* www.gm.com/company/aboutGM/our_company.html (last accessed May 27, 2014) [DOC ID 000240753007]; General Motors Company, 2013 Annual Report, at 20 [DOC ID 000240786006].
[13] *See* General Motors Corp., 2007 Annual Report, at 63 [DOC ID 000236388003].
[14] General Motors Company, 2013 Annual Report, at 12 [DOC ID 000240786006]; Our Company, General Motors Company, *available at* www.gm.com/company/aboutGM/our_company html (last accessed May 27, 2014) [DOC ID 000240753007].

like cruise control and web-based navigation and infotainment systems. Counting at the smallest possible units, a single car can have literally tens of thousands of parts – all of which must be manufactured or sourced by GM to make each of the more than 100 vehicles in its product line.[15] To fashion these parts into a car and sell it in the market, GM's employees perform a variety of functions, starting with research and development and proceeding progressively to design, manufacturing, purchasing (component parts), marketing, sales, and customer service.

B. GM's Small Car Product Line

In the early 2000s, GM looked to develop a successful small car line to supplement sagging sales of its trucks and SUVs. As late as 2004, truck and SUV sales represented 60 percent of the vehicles sold by GM in the United States and represented a substantially higher profit margin per vehicle than smaller cars.[16] As gasoline prices escalated, however, sales of trucks and SUVs suffered in the United States.[17] This decreased demand for large vehicles made the success of smaller, more efficient cars important to the Company's financial performance.[18] Sales of smaller, fuel-efficient cars were also important to GM's ability to meet federal emissions regulations.[19]

1. The "Delta Platform" of Vehicles

In developing vehicles, including its new small car product line in the 2000s, GM grouped vehicles into "platforms." Vehicles in the same platform shared certain base

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[15] *See* John Stark, *Product Lifecycle Management: 21st Century Paradigm for Product Realisation* (Springer 2006), at 23 ("There are over 20,000 parts in a car.").
[16] General Motors Corp., 2004 Annual Report, at 47 [DOC ID 000236389003]; General Motors Corp., 2005 Annual Report, at 5, 45, 48 [DOC ID 000236388002].
[17] Claudia Hirsch, *Reality Check: US Auto Brands Fizzle in June, Dealers Say*, Market News International (June 30, 2006) at 1, 2 [DOC ID 000236387022].
[18] *See* General Motors Corp., 2005 Annual Report, at 52 [DOC ID 000236388002] (expressing efforts to "reallocat[e] capital and engineering to support more fuel-efficient vehicles").
[19] *See* General Motors Corp., 2005 Annual Report, at 30 [DOC ID 000236388002]; Gap Assessment to Toyota Presentation [Draft] (2005), at 19 [DOC ID 000240785002].

architectural design elements.[20] The "Delta Platform" of vehicles included the Saturn Ion, Chevrolet Cobalt, Chevrolet HHR, and Pontiac G5.[21] Certain model years of each of these vehicles contained the ignition switch that led to GM's recalls in 2014 (hereinafter "Ignition Switch"):[22]

1. *Saturn Ion:* The Saturn Ion was the first car in the Delta Platform to launch. It was a small sedan, first offered in MY 2003.[23] GM subsequently aimed to improve the Ion by integrating design elements from the Cobalt.[24] Production ended with MY 2007.[25]

2. *Chevrolet Cobalt:* The Chevrolet Cobalt launched in MY 2005.[26] It replaced the Cavalier, but was designed to have a higher price point than its predecessor.[27] GM ended production of the Cobalt in June 2010.[28]

3. *Chevrolet HHR:* The Chevrolet HHR was a station wagon, launched in MY 2006, and offered through MY 2011.[29]

4. *Pontiac G5:* The Pontiac G5 was first introduced in Canada for MY 2005, and was released in the U.S. in MY 2007. The 2010 model was the last sold to the public.[30]

The Ignition Switch used in the Delta Platform was also used in certain model years of Kappa Platform vehicles – the Saturn Sky and Pontiac Solstice:[31]

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[20] J&B Interview of James Zito, May 14, 2014.
[21] GM Program Architecture Brand (March 2010), at 3-4 [DOC ID 000058109415]. The Delta Platform also included the Opel Astra and the Opel Zafira, *see id.* at 1. Neither car was sold in the United States.
[22] EFADC PowerPoint Presentation (Dec. 17, 2013), at 7 [DOC ID 000001788022; GMHEC000002899-2947].
[23] *See Ion Replaces S*, Motor Trend (Jan. 2002), at 1 [DOC ID 000236387010]; Tony Swan, *Preview: Saturn Ion: Cool? Yes. Electrifying? We'll See.*, Car and Driver, vol. 48, no. 2 (Oct. 2002), at 2 [DOC ID 000236387030].
[24] Ed Garsten, *GM Thinks Big With Small Cobalt; New Model Seeks to Turn Tide of Losses*, Detroit News (June 15, 2004), at 3 [DOC ID 000236387023].
[25] GM Program Architecture Brand (March 2010), at 5 [DOC ID 000058109415].
[26] GM Program Architecture Brand (March 2010), at 4 [DOC ID 000058109415].
[27] Ed Garsten, *GM Thinks Big With Small Cobalt; New Model Seeks to Turn Tide of Losses*, Detroit News (June 15, 2004), at 1 [DOC ID 000236387023].
[28] Mike Floyd, *Just Cruze-in': GM Drip-Feeds More Info on Baby Chevy*, Motor Trend, vol. 62, no. 2 (Feb. 2010), at 17 [DOC ID 000236387014].
[29] GM Program Architecture Brand (March 2010) [DOC ID 000058109415].
[30] GM Program Architecture Brand (March 2010) [DOC ID 000058109415].
[31] J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Alberto Manzor, March 21, 2014; *see also, e.g.*, EFADC PowerPoint Presentation (Feb. 24, 2014), at 2-4 [DOC ID 000001731002; GMHEC000002735-38]; e-mail from John Hendler, GM, to various GM employees, including Lori Queen (Sept. 28, 2005) [DOC ID 000012168192; GMHEC000219123].

1. *Saturn Sky:* The Saturn Sky was a "roadster," initially released for MY 2007, and offered through MY 2009.[32]

2. *Pontiac Solstice:* Like the Sky, the Pontiac Solstice was a sports car. The car was introduced for MY 2006, and was offered through MY 2009.[33]

The Ignition Switch was developed as a "corporate common" part, meaning that it was designed to be used in multiple vehicle platforms.[34] This use of one common Ignition Switch across platforms was a way to reduce costs.[35]

2. GM's Marketing of the Cobalt

Lori Queen, who served as the Vehicle Line Executive for small cars beginning in 2001, explained that the Cobalt was meant to be a statement that GM was getting back into the small car game.[36] The Cobalt replaced the Chevy Cavalier in GM's product line-up and represented an effort to debunk the stereotype of GM's small cars as "cheap and cheerful."[37] The Delta Platform – and the Cobalt in particular – was designed to compete against popular mid-market, foreign compact cars like the Toyota Corolla and the Honda Civic.[38] To compete with these foreign models, GM engineers working on the Cobalt were provided additional funds to make the car quieter and smoother for passengers.[39]

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[32] GM Program Architecture Brand (March 2010) [DOC ID 000058109415].
[33] GM Program Architecture Brand (March 2010) [DOC ID 000058109415].
[34] J&B Interview of Chris Berube, April 22, 2014; J&B Interview of Andrew Brenz, April 23, 2014; J&B Interview of Thomas Utter, April 24, 2014; *see also* e-mail from Chris Berube, GM, to Andrew Brenz, GM, and copying Ken Wasmer, GM (Nov. 21, 2004) [DOC ID 000012140259; GMHEC000330211-12].
[35] J&B Interview of Thomas Utter, April 24, 2014.
[36] J&B Interview of Lori Queen, March 17, 2014; *see also Review: 2005 Cobalt, GM has Finally Stepped Up to the Plate in the Small-Car Game*, Motor Trend (Nov. 2005).
[37] J&B Interview of Lori Queen, May 12, 2014.
[38] 2005 Product Information, 2005 Chevrolet Cobalt (Aug. 1, 2004), at 6 [DOC ID 000233911002]; *see also, e.g.*, 2007 Cobalt Brochure, at 18 [EXPORTSM000000164] (comparing the Cobalt's audio and stereo features with those found in the Toyota Corolla, Honda Civic, and Ford Focus); Ed Garsten, *GM Thinks Big With Small Cobalt; New Model Seeks to Turn Tide of Losses*, Detroit News (June 15, 2004) [DOC ID 000236387023].
[39] J&B Interview of Doug Parks, March 18, 2014.

GM wanted the Cobalt to be an "aspirational vehicle" to attract drivers looking for a more European touring car feel[40] and directed marketing efforts at young drivers.[41] During the launch of the Cobalt brand, GM held promotional events at several popular spring break locations.[42] For the Ion, GM hosted marketing events at nightclubs.[43] GM's marketing efforts bore fruit: the Cobalt enjoyed substantial sales to younger drivers. By the end of 2008, 40 percent of Cobalt Coupe sales were to drivers under 30.[44] The Cobalt Sedan, however, was less popular with young drivers; only 18 percent of sales were to customers under 30.[45]

The release of the Cobalt was met with generally favorable reviews. *Car and Driver* reported that the Cobalt "quietly – very quietly and serenely – prove[s] that when GM decides to build an accomplished car, it can."[46] *Edmunds* complimented the Cobalt for having "materials quality, styling and comfort [that were] all light-years ahead of the Cavalier."[47] But not all reviews were so glowing. For example, *Consumer Reports* complained that although the Cobalt "is an improvement over the dated, outgoing Cavalier, . . . [i]t isn't very agile, and steering is too light at low speeds. . . . Although quick, its engine was noisy and had paltry fuel economy."[48]

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[40] J&B Interview of Lori Queen, May 12, 2014.
[41] John Hendler, GM, Delta GMX001 Electrical Content Overview v. 1.4 (April 3, 2001), at 4 [DOC ID 000136777531; GMHEC000485652-5824]; 2009 CY Aveo, Cobalt & HHR Strategic Marketing Plans: Phase I (Nov. 5, 2008), at 22, 25 [DOC ID 000233911040].
[42] Revolver Marketing Group, *General Motors/Chevrolet National "Cobalt" Brand Launch*, *available at* http://www revolvermarketinggroup.com/project/general-motorschevrolet-national-launch-of-the-cobalt-brand/ [DOC ID 000236387003].
[43] *Saturn Invites Young New Yorkers to Celebration for ION Launch*, The Auto Channel (April 2, 2002), *available at* http://www.theautochannel.com/news/2002/04/02/038119 html#.U2l-Rd-pPq8 [DOC ID 000236387008].
[44] Cobalt Coupe & Sedan Compares [DOC ID 000233911053].
[45] Cobalt Coupe & Sedan Compares [DOC ID 000233911053].
[46] Aaron Robinson, *Road Test: Chevrolet Cobalt LS: Plainly Good*, Car and Driver (April 2005), at 101 [DOC ID 000236387028]; *see also id.* ("Is the Cobalt that good? For GM, it's miraculous . . . .").
[47] *Full 2005 Chevrolet Cobalt Review*, Edmunds.com, *available at* http://www.edmunds.com/chevrolet/cobalt/2005/#overview-pod-anchor [DOC ID 000236387016].
[48] *Chevrolet Cobalt*, Consumer Reports (May 2005), *available at* http://www.consumerreports.org/cro/cars/past-road-test/small-sedans-505/chevrolet-cobalt/index.htm [DOC ID 000236387002].

In 2005, the Cobalt and other Delta Platform vehicles received substantially positive safety ratings based on crash testing prior to release.[49] Later, in 2011, data from the Insurance Institute for Highway Safety, however, suggested that the MY 2005-08 Cobalt's driver death rate was higher than any four-door vehicle in its class. Only three other vehicles across all classes had higher driver death rates during that period: the Chevy Aveo, the Nissan 350Z, and the Nissan Titan.[50]

3. Cobalt and Delta Platform Sales and Profitability

A 2006 presentation for a meeting of GM's North American Strategy Board reflected that for GM to succeed, the Cobalt needed to be at least a break-even vehicle.[51] And, in fact, the Cobalt and other Delta Platform vehicles enjoyed positive sales results, particularly compared to other GM vehicles at the time. By the end of 2005, the Cobalt was GM's second-best-selling car.[52] In 2006, it was reported that sales of the Cobalt and HHR both "exceeded expectations."[53] In May 2008, while GM's overall sales declined 30 percent compared to the previous year, sales

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[49] *See, e.g.*, *Chevrolet Cobalt*, Consumer Reports (May 2005), *available at* http://www.consumerreports.org/cro/cars/past-road-test/small-sedans-505/chevrolet-cobalt/index htm [DOC ID 000236387002]; James R. Healey, *Cobalt's a Little Bit of a Love-Hate Car*, USA Today (March 10, 2005), *available at* http://usatoday30.usatoday.com/money/autos/reviews/healey/2005-03-10-cobalt_x.htm [DOC ID 000240786004].
[50] Insurance Institute For Highway Safety, Status Report, vol. 46, no. 5 (June 9, 2011), at 3, *available at* http://www.iihs.org/externaldata/srdata/docs/sr4605.pdf [DOC ID 000236387004].
[51] General Motors North America Strategy Board, Executive Summary, Global Delta DSI Review (May 16, 2006), at 7 [GMHEC200031653-65; DOC ID H_01015014].
[52] Staff/Wire Reports, *Cobalt Ranks Second in Sales*, Vindy.com (Jan. 5, 2006), *available at* http://www4.vindy.com/content/business_tech/372311088812641.php [DOC ID 000236387012].
[53] Daniel Howes, *Building Successes, Not Just Buyouts, Improve GM Chances*, Detroit News (June 28, 2006) [DOC ID 000236387025].

of the Cobalt were up 17.8 percent.[54] But retail sales of the Cobalt also were consistently below the retail sales of its predecessor, the Cavalier.[55]

Multiple witnesses characterized the Cobalt and other Delta Platform cars as "cost conscious vehicle[s]" produced on "slim margins."[56] In an effort to boost sales, GM offered steep discounts on its cars – including the Cobalt.[57] The Cobalt was also sold in large volumes to fleet buyers, including daily rental companies, at discounted prices.[58] In both 2005 and 2006, over 60,000 Cobalts were sold to rental companies, which represented over 30 percent of GM's total sales of the Cobalt in those years.[59] By 2010 – the Cobalt's last full year on the market – fleet sales reportedly accounted for approximately 60 percent of the Cobalt's sales.[60]

C. GM in the 2000s

The Cobalt was developed against the backdrop of major challenges in the American automobile industry. In the early and mid-2000s, the so-called Big Three – GM, Ford, and Chrysler – all faced financial problems. From 2001 to 2007, GM's global market share for automobiles declined from 15 percent to 13.3 percent.[61] Year-over-year profits for GM Automotive ("GMA") were unstable: falling in 2003, starting to recover in 2004, but then

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[54] *Chevy Cobalt Sales Reach Record as GM Sales Plunge*, The Business Journal (Youngstown, Ohio) (May 27, 2008), *available at* http://businessjournaldaily.com/chevy-cobalt-sales-reach-record-gm-sales-plunge-2008-5-27 [DOC ID 000236387019].
[55] Seven Year History of Cavalier & Cobalt Retail Sales (July 10, 2009), at 1 [DOC ID 000233911049].
[56] J&B Interview of David Trush, March 17, 2014.
[57] Sharon Silke Carty, *GM Rolls Back Fleet's Prices: Bold Cuts Unprecedented*, USA Today (Jan. 11, 2006), at 3B [DOC ID 000240512008].
[58] Ignition Switch Recall Models – Fleet Counts (May 5, 2014) [DOC ID 000240509002].
[59] Ignition Switch Recall Models – Fleet Counts (May 5, 2014) [DOC ID 000240509002]; 2007 GM Performance Management and Feedback, Brian L. Brown, Chevrolet Cobalt Marketing Manager (July 30, 2007), at 1 [DOC ID 000233911090].
[60] Robert Schoenberger, *Strong Sales of Chevy Cruze Are Fueling Optimism at GM*, Cleveland Plain Dealer (Feb. 2, 2011), at C1 [DOC ID 000240786005].
[61] General Motors Corp., 2003 Annual Report, at 44 [DOC ID 000236389002]; General Motors Corp., 2007 Annual Report, at 47 [DOC ID 000236388003].

turning into large losses in 2005.[62] In 2005, GM as a whole posted a consolidated net loss of $10.6 billion.[63] By 2007, it was reported that "Ford lost an average of $1,467 on each vehicle it built in North America; GM lost $729 and Chrysler [lost] $412."[64]

In the face of these challenges, all three automakers engaged in efforts to reduce costs by cutting production, pressuring suppliers to lower costs, reducing health care and pension spending, and reducing their workforces.[65] In November 2005, GM announced a major cost-cutting effort. The plans included the shuttering of nine assembly facilities and three service and parts facilities by 2008, and a reduction of more than 30,000 manufacturing jobs.[66] Its manufacturing realignment had a goal of reducing excess assembly capacity by one million units by 2008.[67] Between 2000 and 2008, GM's salaried workforce shrunk by 33 percent, and the number of hourly workers fell by more than 50 percent.[68]

GM also pushed its suppliers to reduce costs. As part of its 2005 initiative to reduce expenses, GM announced a plan to reduce material costs by $1 billion by 2008, and set cost-cutting targets for individual parts.[69] The Engineering group was included in GM's cost-cutting efforts. The U.S. engineering organization was consolidated from 11 engineering centers in the

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[62] General Motors Corp., 2003 Annual Report, at 44 [DOC ID 000236389002]; General Motors Corp., 2004 Annual Report, at 45 [DOC ID 000236388002]; General Motors Corp., 2005 Annual Report, at 46 [DOC ID 000236389003].
[63] General Motors Corp., 2005 Annual Report, at 43 [DOC ID 000236388002].
[64] Neal E. Boudette, *Detroit Levels Productivity Playing Field – Auto Makers Slash Labor-Cost Advantage of Japanese Rivals*, The Wall Street Journal (June 6, 2008), at B3 [DOC ID 000236387017].
[65] *See, e.g.*, Neal E. Boudette, *Detroit Levels Productivity Playing Field – Auto Makers Slash Labor-Cost Advantage of Japanese Rivals*, The Wall Street Journal (June 6, 2008), at B3 [DOC ID 000236387017]; *DaimlerChrysler CEO: Co to Address U.S. Health-Care Costs*, Dow Jones News Service (Sept. 19, 2006) [DOC ID 000236387021]; Jeffrey McCracken, *DaimlerChrysler's Pain Ripples Across Industry*, Detroit Free Press (June 5, 2003) [DOC ID 000236387024].
[66] General Motors Corp., 2005 Annual Report, at 50 [DOC ID 000236388002]; General Motors Corp., 2007 Annual Report, at 61 [DOC ID 000236388003].
[67] General Motors Corp., 2005 Annual Report, at 6, 44 [DOC ID 000236388002].
[68] *GM Lost Nearly $31 Billion In 2008*, CBS News MoneyWatch (Feb. 26, 2009), *available at* http://www.cbsnews.com/news/gm-lost-nearly-31-billion-in-2008/ [DOC ID 000236387006].
[69] General Motors Corp., 2005 Annual Report, at 6 [DOC ID 000236388002].

United States into one unit.[70] In its 2005 Annual Report, GM announced that Engineering would also be "reduc[ing] development costs through the use of common vehicle architectures that can be used on a global basis."[71]

D. Preliminary Information Notices and Technical Service Bulletins

Both Preliminary Informations and Technical Service Bulletins ("TSBs") are routine ways that GM alerts dealers about service issues. Preliminary Informations alert dealers to problems by describing issues of which GM has become aware, even before engineers have devised a solution. TSBs provide more detail and instructions on how to remedy the problem.

Both are frequently used. On average, GM published more than 60 Preliminary Informations or Technical Service Bulletins every month, an average of 738 a year.

E. Recalls

From January 1, 2000, through December 31, 2013, GM issued 374 recalls – an average of 26 recalls a year – with a total of 50.1 million vehicles affected – an average of 3.6 million vehicles per year. When GM issued the Ignition Switch recall in February/March 2014, it was GM's second largest recall since 2000, and its tenth largest since 1967 (the first year for which NHTSA data are available).[72]

F. The Ignition Switch and Airbag Technology in the Vehicles at Issue

The parts at issue in this Report are the Ignition Switch (which determined whether electrical power is provided to the airbag system), and the airbag system that includes the

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[70] General Motors Corp., 2004 Annual Report, at 4 [DOC ID 000236389003].
[71] General Motors Corp., 2005 Annual Report, at 50 [DOC ID 000236388002]; *see also* J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[72] *See* Recalls, Flat File Copies of NHTSA/ODI Databases, National Highway Traffic Safety Administration, www-odi nhtsa.dot.gov/downloads/folders/Recalls/FLAT_RCL.zip (last accessed May 29, 2014) [DOC ID 000240800002]; *see also* Appendix B, Section A-6.

Sensing Diagnostic Module ("SDM"). This section provides an overview of how these parts worked.

1. The Ignition Switch

The Delta and Kappa Platform vehicles described above contain the same Ignition Switch – a newly-designed discrete logic ignition switch ("DLIS") first developed in 1997.[73] The Ignition Switch is located in the vehicle's steering column.[74] In the Delta Platform vehicles, as in other cars, a driver starts the car by turning the Ignition Switch to Start (also called "Crank"), which starts the engine, then allowing the Ignition Switch to rotate back to Run.[75] When turned to the Accessory position, the Ignition Switch sends a signal to the Body Control Module ("BCM") conveying the new vehicle power mode.[76] The BCM then broadcasts a signal to the engine to turn off, causing the airbag's crash sensing system to turn off (preventing the air bag from deploying), loss of power steering, and loss of power brakes.[77] Certain limited functions in the vehicles, such as the radio, remain on in the Accessory mode.[78] When turned to the Off position – referred to in some GM Owner's Manuals as the "Lock" position – the Ignition Switch sends a signal to the BCM, which broadcasts a signal to turn power off to all systems in the vehicle, including the airbag system.[79] As discussed below, the airbag system in

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[73] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Thomas Utter, April 24, 2014; EFADC PowerPoint Presentation (Dec. 17, 2013), at 7 [DOC ID 000001788022; GMHEC000002899-2947].
[74] J&B Interview of Raymond DeGiorgio, March 14, 2014; Engineering Drawings of Steering Column for MY 2005 GMX357, at 7, 13 [DOC ID 000103713069].
[75] J&B Interview of James Duffy, April 24, 2014; *see also* Component Technical Specification for Column Mounted Discrete Logic Ignition Switch (Mar. 22, 2001), at 10 [DOC ID 14021301709376; GMNHTSA000441762].
[76] J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of James Duffy, April 24, 2014.
[77] J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of Thomas Mercer, May 2, 2014; J&B Interview of Vipul Modi, April 23, 2014; J&B Interview of Alan Storck, March 21, 2014.
[78] J&B Interview of Thomas Mercer, May 2, 2014.
[79] J&B Interview of Vipul Modi, March 20, 2014; J&B Interview of Andrew Brenz, April 23, 2014; *see also* Component Technical Specification for the Column Mounted Low Current Ignition Switch (Oct. 3, 1997), at 8

the Delta and Kappa Platform vehicles does, in certain circumstances, maintain an energy reserve that could be used to deploy the airbags for a very short period if the vehicle lost power during a crash.[80]

Ignition Switch

Plunger Cap and Spring

Components within the Ignition Switch control the amount of effort required to turn the switch from one position to another. A plunger cap and coiled spring inside the Ignition Switch sit in a small groove called a "detent," which holds the switch in the position to which the driver turns the key: Off, Run, Accessory, or Crank. The driver rotates the key by applying a certain amount of torque to overcome the detent, thereby rotating the switch out of one position and into another. One method to increase the effort required to rotate the Ignition Switch from one position to another is to use a longer and more tightly coiled spring.

2. The Sensing Diagnostic Module ("SDM") and Airbag System

The 2005 Cobalt, and subsequent model years, utilized an advanced airbag system. It was designed to comply with new NHTSA requirements at the time, reflected in FMVSS

[DOC ID 000127082028; GMHEC000406323-51]; Component Technical Specification for Column Mounted Discrete Logic Ignition Switch (March 22, 2001), at 8 [DOC ID 14021301709376; GMNHTSA000441762].
[80] J&B Interview of Thomas Mercer, May 2, 2014.

(Federal Motor Vehicle Safety Standard) 208. NHTSA had issued FMVSS 208 in part to address evidence showing injuries *caused by* airbag deployment in certain circumstances.[81] The 2005 Cobalt was one of the first GM vehicles to have such advanced airbags.

A fundamental component of the airbag system in the Delta and Kappa Platform vehicles at issue is the SDM. The SDM is an onboard electronic module in airbag systems that serves two primary functions. First, the SDM tracks data in real time about the vehicle's status, including the vehicle's acceleration and speed, and whether it experiences any impacts. Second, based upon this data, the SDM determines when and whether airbags should deploy, and if so, triggers deployment. In the vehicle development process, manufacturers such as GM have SDMs programmed to deploy the airbags at the proper times and in the proper circumstances based on factors like the speed of vehicle, severity of impact, and location of impact – airbags are programmed not to deploy in non-accident circumstances such as driving over rough roads or potholes.[82] In particular, the frontal airbags are programmed to deploy only when the SDM senses a sufficient level of longitudinal deceleration.[83]

By 2004, SDMs could also serve as the car's "black box" to allow forensic analysis of the causes of accidents or malfunctions of the car's components, including airbags.[84] To a certain

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[81] The U.S. Intermodal Surface Transportation Efficiency Act of 1991 required for the first time that passenger cars and light trucks built after September 1, 1998, have airbags for the driver and the right front passenger. *See* National Highway Traffic Safety Administration Office of Research and Development, *Air Bag Technology in Light Passenger Vehicles* (June 27, 2001), at 1, *available at* http://www.nhtsa.gov.edgesuite-staging net/DOT/NHTSA/NRD/Multimedia/PDFs/Crashworthiness/Air percent20Bags/rev_report.pdf [DOC ID 000236387033].

[82] Joe T. Correia, *et al.*, *Utilizing Data from Automotive Event Data Recorders* (June 2001), at 5-7, *available at* http://www nhtsa.gov/DOT/NHTSA/NRD/Articles/EDR/PDF/Research/Utilizing_Data_from_Automotive_Event_Data_Recorders.pdf [DOC ID 000240512007]; PowerPoint on GMT345 SDM Issue (May 28, 2008), at 2 [DOC ID 000001615604], attached to e-mail from Harry Wiedenmeyer, GM, to Douglas Wachtel, GM (May 28, 2008) [DOC ID 000001615603].

[83] J&B Interview of Thomas Mercer, May 2, 2014; J&B Interview of Brian Everest, May 8, 2014.

[84] J&B Interview of Terry Woychowski, March 21, 2014.

extent, the supplier retained control over some of the forensic data gathered by the SDM by requiring that its own software analytics be used to evaluate the data. GM has relied upon the supplier to obtain analysis of certain SDM data, including information about the ignition switch position in crashes.[85]

During the 2004-2008 timeframe, the Ion and certain other Delta Platform vehicles contained an SDM manufactured by Delphi Mechatronics ("Delphi"). The Cobalt contained the SDM Epsilon, manufactured by Siemens Continental ("Continental").[86]

In all of the Delta and Kappa Platform vehicles during this period (2003-2010), if the Ignition Switch is turned to Off or Accessory, then power to the SDM is lost, and the SDM powers down unless and until the ignition is returned to Run. This programming design helps to minimize the risk of unintended airbag deployments to the driver or a passenger when he or she is not sitting in the proper, restrained position, *e.g.*, a child who is in the front seat when the vehicle is stationary, or an owner who may be servicing the vehicle.[87] When the Ignition Switch is turned to Run after being in Accessory or Off, the SDM reboots, and during the few seconds of that reboot process the airbags would not deploy.[88]

If, in a crash event, power was lost, including if the ignition moved to Accessory or Off during the crash, the SDM's crash sensing protection would continue (and airbags could still deploy) for approximately 150 milliseconds ("ms") after the power loss.[89] This feature was designed to ensure that if power was lost because of and during a crash, the airbags could still

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[85] J&B Interview of William Hohnstadt, May 8, 2014.
[86] SDM-Eps Usage (March 28, 2011) [DOC ID 000002153011], attached to e-mail from John Sprague, GM, to Brian Everest, Jaclyn Palmer, and Jennifer Sevigny, GM (March 3, 2011) [DOC ID 000002153010].
[87] J&B Interview of Thomas Mercer, May 2, 2014.
[88] J&B Interview of James Churchwell, March 21, 2014; J&B Interview of John Sprague, March 26, 2014; J&B Interview of John Dolan, May 16, 2014.
[89] J&B Interview of Vipul Modi, March 20, 2014; J&B Interview of Kathy Anderson, March 19-20, 2014.

deploy.[90] As a result, the determining factor as to whether the airbags retained power to deploy was whether power was lost prior to or after the SDM started to sense the crash.

The principal functional difference between the SDMs used in the Cobalt and those used in the Ion and certain other Delta Platform vehicles lay in the SDM's recording function. In the Cobalt, the SDM retained sufficient reserve power to record data for a very brief period after losing power.[91] As a result, the Cobalt's SDM recorded whether the Ignition Switch was in the Run, Accessory, or Off position during a crash; the Ion's SDM did not.[92] This difference resulted from the fact that the SDM used in the Saturn Ion received its primary power through the ignition while the SDM in the Cobalt and the other Delta Platform vehicles received such power from the battery.[93] If the Ignition Switch were turned to Accessory or Off after a crash commenced, then the Ion's SDM would operate on a reserve power supply for a brief period sufficient to deploy the airbag but not sufficient to record data. In the same circumstance, the other Delta Platform vehicles' SDMs would both deploy the airbag and also maintain sufficient power to record deployment data.

G. The Ignition Switch and Its Impact on Airbag Deployment

Put simply, the Ignition Switch failed to stay in the Run position when it should have stayed in the Run position. The amount of effort required to rotate the Ignition Switch was too low, permitting it to move under certain circumstances from the Run position to the Accessory or Off position, when it was not the driver's intention to do so. As described above, the torque performance of the Ignition Switch was the result of the plunger and spring interacting with the

[90] J&B Interview of Thomas Mercer, May 2, 2014.
[91] J&B Interview of John Sprague, March 26, 2014.
[92] J&B Interview of Kathy Anderson, March 19-20, 2014.
[93] J&B Interview of Lisa Weber, May 22, 2014; J&B Interview of Brian Everest, May 8, 2014.

detent profiles inside the switch itself. The Ignition Switch required less effort to rotate from one position to another, because the spring exerted insufficient force on the detent profiles. As a consequence, if the Ignition Switch moved out of Run to Accessory or Off when it should have stayed in Run, the airbags would not deploy in the event of a crash that would otherwise meet the criteria to trigger airbag deployment. This problem of low torque affected all cars that utilized the original Ignition Switch implemented in the Cobalt and Ion.

H. Safety Regulations that Governed GM's Vehicles

Throughout the relevant time period, GM has been subject to vehicle safety regulations that are developed and enforced by the National Highway Traffic Safety Administration ("NHTSA").

1. Federal Motor Vehicle Safety Standards

The Federal Motor Vehicle Safety Standards ("FMVSS"), first promulgated in 1967, specify standards for design, construction, and performance for all new vehicles and various safety-related equipment.[94] The FMVSS are divided into three areas: crash avoidance, crashworthiness, and post-crash survivability.

The FMVSS do not address any of the specific systems implicated by the Ignition Switch at issue in this Report. The FMVSS do not impose requirements concerning ignition systems or switches, stalls, or power steering systems. The FMVSS do address power braking systems, although the primary braking requirements focus on ensuring that a vehicle's brakes satisfy certain performance standards if the power assist is disabled.[95] Issued in 2004, FMVSS 208

[94] Federal Motor Vehicle Safety Standards Act, 49 C.F.R. § 571 (1967).
[95] *See* Federal Motor Vehicle Safety Standards Act, Standard No. 135 (Light vehicle brake systems), 49 C.F.R. § 571.135 (2012); Federal Motor Vehicle Safety Standards Act Standard No. 105 (Hydraulic and electric brake systems), 49 C.F.R. § 571.105 (2012).

imposes requirements for advanced airbag systems like those included in the Cobalt. But that standard does not address airbag deployment after a power loss.[96]

Accordingly, it is the federal Motor Vehicle Safety Act's requirements regarding the reporting and recall of safety defects that govern GM's handling of the safety defect in the Cobalt, rather than the FMVSS.

2. NHTSA's Reporting Requirements

Congress enacted the National Traffic and Motor Vehicle Safety Act, 49 U.S.C. § 30101 *et seq.* ("Safety Act"), in 1966, and amended it in 2000 by passing the Transportation Recall Enhancement, Accountability and Documentation Act, 49 U.S.C. §§ 30101-30170 ("TREAD Act") in order to "reduce traffic accidents and deaths and injuries to persons resulting from traffic accidents."[97] In order to achieve this goal, Congress gave the Secretary of Transportation (and specifically, NHTSA) the authority to inspect and investigate incidents related to motor vehicle safety and also required manufacturers to satisfy two reporting obligations.[98]

Under these regulations, a manufacturer must file a Defect Information Report whenever it learns that a vehicle contains a defect related to motor vehicle safety.[99] A manufacturer must also file "Early Warning Reports" quarterly, detailing all incidents of which the manufacturer receives actual notice involving fatalities or serious injuries alleged to have been caused by a

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[96] *See* Federal Motor Vehicle Safety Standards Act, Standard No. 208 (Occupant crash protection), 49 C.F.R. § 571.208 (2012). Among other things, airbags must deploy in "'moderate to severe' front or near-frontal crashes, which are defined as crashes that are equivalent to hitting a solid, fixed barrier at 8 to 14 mph or higher." General Information – FAQ on Airbags #1, Safecar.gov, powered by the National Highway Traffic Safety Administration, *available at* http://www.safercar.gov/Vehicle+Shoppers/Air+Bags/General+FAQ (last visited May 24, 2014) [DOC ID 000236387015]. To comply with requirements that an airbag restrain a 165-pound unbelted test dummy in a crash, an airbag needs to inflate in approximately 1/20th of a second or less. Airbag Deployment, *available at* http://www.safecar.gov/Vehicle+Shoppers/Air+Bag+Deployment (last visited May 9, 2014) [DOC ID 000236387027].
[97] 15 U.S.C. § 1381; *see also* 49 U.S.C. § 30101.
[98] 49 U.S.C. § 30166(b).
[99] 49 U.S.C. § 30118(c)(1).

defect in the manufacturer's motor vehicles.[100] Manufacturers are further required to provide to NHTSA all service bulletins and other documents published to dealers involving repairs to their vehicles.[101] The relevant Safety Act and TREAD Act requirements are described in more detail in Appendix E.

This Report focuses on GM's delay in reporting the safety defect in the Cobalt and recalling the affected vehicles. The following sections describe the facts concerning GM's delay.

V. 1997–2006: DEVELOPMENT, PRODUCTION, AND RE-DESIGN OF THE IGNITION SWITCH

Section V of this report details the development, testing, and production of the Ignition Switch, its implementation in the Delta and Kappa platforms, and GM's initial investigations into moving stalls in the Cobalt from 2004 to 2006. As discussed in more detail below, the development of the Ignition Switch was fraught with problems from the outset, with GM personnel ultimately authorizing production of a switch that could rotate as a result of torque less than that required by GM's specifications. As GM personnel addressed multiple problems with the electrical components of the switch, they allowed this problem of low torque to persist into the production version of the Ignition Switch. As the Ignition Switch was implemented in GM vehicles, especially the Cobalt, reports of unexpected "moving stalls" (sometimes at high speed) led GM to open multiple investigations into the Ignition Switch.[102] Believing (incorrectly) that

[100] *See* Transportation Recall Enhancement, Accountability and Documentation Act, 49 U.S.C. § 30166(m)(3)(C) (2012); J&B Interview of Dwayne Davidson, May 6, 2013.
[101] *See* Transportation Recall Enhancement, Accountability and Documentation Act, 49 U.S.C. § 30166(m)(3)(A)(ii) (2012).
[102] Throughout this report, there are references to moving stalls resulting from inadvertent rotation of the ignition switch attributed, by drivers of vehicles, to any number of factors. In most circumstances, we do not know all details of the incident, including whether there was additional weight on a key chain or ring, such as the key fob.

the problem of low torque that led to the stalls did not present a safety problem, the various committees or groups reviewing the issue treated it as a matter of "customer convenience" and took no action. The connection to airbag non-deployment was not made, and the issue was never elevated as a defect that might threaten the safety of GM customers and lead to a recall.

This section details the multiple failures of GM personnel and processes – among the most significant of which was the failure of many individuals involved in the investigation to understand that, if the Ignition Switch moves to Accessory or Off, the airbags will not deploy. Yet, GM personnel designed the Ignition Switch to cut electrical power to most systems when the key turned to Accessory. And GM personnel designed the airbag system to shut-off when the vehicles were in the Accessory mode. Inexplicably, the engineers (and business people) interviewed who learned of moving stalls in this time period did not recognize that the loss of power from a key moving into Accessory caused the airbag system to shut off – a missed connection that led to devastating consequences. Information silos were present throughout GM and they delayed GM's response with respect to the Cobalt. Had GM personnel connected the dots and understood how their own cars were built, they might have addressed the safety defect before injuries and fatalities occurred.

As detailed below, another failure was the decision – by a single engineer who did not advise others of his decision – to accept an Ignition Switch with full knowledge that it fell well below GM's own specifications. Once moving stalls began to be reported, GM's investigations

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GM has advised NHTSA that, based on GM's testing, the Cobalt and other vehicles are safe to drive "with only a single key on the key ring and the key fob removed," and NHTSA, in turn, has said that the safety risk has been sufficiently mitigated when the Cobalt is driven in such circumstances.

minimized the issue and failed to serve their essential purpose – to identify the Cobalt safety issue and resolve the problem expeditiously.

Finally, this section details a puzzle that stumped GM for many years to come – the fact that the Ignition Switch problem appeared in MY 2005-07 Cobalts, but not MY 2008-10 Cobalts. As discussed in more detail below, Ray DeGiorgio, the same GM engineer who originally approved the below-specification Ignition Switch, authorized a change in the Ignition Switch in 2006 that increased the torque required to turn the key. He addressed the defect, but by not changing the part number and not telling anyone that the part had been redesigned, he effectively concealed the fact that the change had been made. Even today, however, DeGiorgio claims not to remember doing so, nor does he remember authorizing the alteration without a concurrent change in the part number. As detailed in this section of the Report, DeGiorgio's failure to disclose this critical information had very significant consequences going forward. GM investigators struggled to identify the root cause of the Ignition Switch problem for years, in part because they could not explain why, if the Ignition Switch was mechanically the same in all model years, incidents ceased occurring in MY 2008. As set forth below, while the decision to change the Ignition Switch, without changing the part number, violated GM's policies, GM also failed to have in place an oversight system sufficient to ensure such decisions were reviewed and the correct decisions made.

A. The Development of the Ignition Switch

Beginning as early as 1997, GM engineers designed and patented a new type of "low-current" switch, called the Discrete Logic Ignition Switch ("DLIS"), which functioned in conjunction with the car's body control module ("BCM") to communicate the key position of the

car to other vehicle components.[103] This new design was developed to be less prone to failure, less expensive, and less likely to catch fire than existing ignition switches.[104] The Ignition Switch was also an effort to develop a "corporate common" switch that could be used in the future on multiple vehicle platforms.[105]

The Ignition Switch had a new electrical architecture that included multiple electrical contacts through which to signal key position to the BCM.[106] The hope was that the new Ignition Switch would be less likely to fail in communicating key position to the rest of the car.[107] GM solicited bids from its suppliers to build the switch, a process known as "sourcing."[108] GM selected Eaton Corporation, which was subsequently acquired by Delphi Mechatronics in 2001, to develop and produce the Ignition Switch.[109]

1. 1997-2001: The Specification for the Ignition Switch

A GM project engineer, Tom Utter, drafted the initial Component Technical Specification (the "Specification") in 1997, which set forth the technical parameters for the Ignition Switch.

Section 3.2.2.3 of the Specification, which governed the "Tactile Characteristics" of the switch, included a "TARGET" force displacement curve specifying 20 Newton-centimeters ("N-

[103] J&B Interview of Thomas Utter, April 24, 2014.
[104] J&B Interview of Thomas Utter, April 24, 2014.
[105] J&B Interview of Calvin Wolf, May 14, 2014.
[106] J&B Interview of Thomas Utter, April 24, 2014.
[107] J&B Interview of Thomas Utter, April 24, 2014.
[108] J&B Interview of Calvin Wolf, May 14, 2014; J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of David Trush, April 30, 2014.
[109] J&B Interview of Calvin Wolf, May 14, 2014; J&B Interview of Ralf Nickel, March 26, 2014. At the time the bid was issued and won, the ignition switch business later purchased by Delphi was owned by Eaton Corporation; therefore, the Eaton name appears on some of the earliest drawings. *See* Eaton News Release, Eaton completes sale of Vehicle Switch/Electronics Division to Delphi Automotive, *available at* http://www.eaton.com/Eaton/OurCompany/NewsEvents/NewsReleases/98066106 (last visited May 29, 2014) [DOC ID 000240799005].

cm") as the torque needed to turn the ignition from Run to Accessory.[110] As noted below, the target curve indicated that the "actual curve [was] to be furnished by [the] supplier after GM Engineering approval."[111]

Section 3.2.2.3 described the desired feel of the switch – "smooth, with clearly defined detents" – and also provided that "[f]inal switch tactile feel is subject to GM Engineering approval."[112] The Specification was revised in 1998 and 1999, without changes to the parameters for the torque required to rotate from Run to Accessory.[113]

[110] Component Technical Specification (Oct. 2, 1997), at 16 [DOC ID 000127082028; GMNHTSA 000406020].
[111] Component Technical Specification (Oct. 2, 1997), at 16 [DOC ID 000127082028; GMNHTSA 000406020].
[112] Component Technical Specification (Oct. 2, 1997), at 16 [DOC ID 000127082028; GMNHTSA 000406020].
[113] J&B Interview of Thomas Utter, April 24, 2014; Component Technical Specification (Feb. 17, 1998), at 16 [DOC ID 15032000616447; GMNHTSA000474077]; Component Technical Specification (Oct. 19, 1999), at 23 [DOC ID 000045096899; GMNHTSA000273092].

Utter transferred responsibility for the Ignition Switch Specification to Calvin Wolf, a Design Release Engineer ("DRE"), around the time GM sourced the switch to Eaton in 1998.[114] According to Wolf, he transitioned responsibility for the Ignition Switch to Ray DeGiorgio in September or October 1999.[115] DeGiorgio did not recall taking over responsibility for the Ignition Switch as early as the fall of 1999.[116] The 1999 version of the Specification contained the requirements for two different switches: the Ignition Switch that would be used in the "2003 Delta Z Program" vehicles, including the Ion (referred to as the GMX 357)[117] and eventually the Chevrolet Cobalt, and a different low-current ignition switch used in the 2001 GMX 320 Program – *i.e.*, the Cadillac Catera.[118] DeGiorgio recalled that, as of October 1999, he was the DRE for the low current Catera ignition switch, but not the Ignition Switch being developed for the Ion.[119]

DeGiorgio took over responsibility as DRE for the Ignition Switch sometime between October 1999 and March 2001, and he worked on the switch leading up to the Ion launch in late 2002.[120] DeGiorgio had worked at GM as a DRE since approximately 1991, and had spent his career focused on vehicle switches.[121]

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[114] J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of Calvin Wolf, May 14, 2014; Component Technical Specification (Feb. 17, 1998), at 1 [DOC ID 15032000616447; GMNHTSA000474077]. A Design Release Engineer is responsible for a particular component or part in a vehicle. J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Joseph Joshua, March 25, 2014; J&B Interview of Joseph Manson, April 22, 2014.
[115] J&B Interview of Calvin Wolf, May 14, 2014.
[116] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[117] Each GM vehicle has an internal reference number. The "GMX" prefix refers to cars and the "GMT" prefix refers to trucks. The Ion was the GMX 357, and the Cobalt was the GMX 001.
[118] Component Technical Specification (Oct. 19, 1999) [DOC ID 000045096899; GMNHTSA000273092]; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[119] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[120] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; Component Technical Specification (March 22, 2001), at 1 [DOC ID 14021301709376; GMNHTSA000441762].
[121] J&B Interview of Raymond DeGiorgio, March 14, 2014.

Wolf recalled a meeting in or around September 1999 at which he transitioned responsibility for the Ignition Switch to DeGiorgio.[122] Representatives from Eaton also attended the meeting to discuss preliminary test results on a very early prototype of the Ignition Switch.[123] According to Wolf, Eaton had performed torque tests that showed the switch was not meeting the rotational torque values in GM's Specification.[124] Wolf suggested that a second detent plunger and spring be added to the switch to increase rotational torque, but that suggestion did not get much traction because the switch did not have internal space to accommodate a second detent and spring.[125] The Eaton representatives suggested that, instead of using an "off-the-shelf" spring, they could customize a spring to increase the rotational torque required to turn the switch.[126] Wolf did not recall any further discussion of that suggestion, or whether the idea was ultimately implemented.[127] Shortly after that meeting, Wolf moved to a new position in a different department.[128] According to Wolf, Eaton did not present physical spring options to him or DeGiorgio, or drawings of different spring options.[129]

On March 22, 2001, DeGiorgio "finalized" the Specification for the Ignition Switch.[130] DeGiorgio designated the Specification as "finalized" in order to signal to the supplier that he did not anticipate making any more changes to the switch and to memorialize accepted agreements related to the Specification at that point in time.[131] Section 3.2.2.3 of the 2001

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[122] J&B Interview of Calvin Wolf, May 14, 2014.
[123] J&B Interview of Calvin Wolf, May 14, 2014.
[124] J&B Interview of Calvin Wolf, May 14, 2014.
[125] J&B Interview of Calvin Wolf, May 14, 2014.
[126] J&B Interview of Calvin Wolf, May 14, 2014.
[127] J&B Interview of Calvin Wolf, May 14, 2014.
[128] J&B Interview of Calvin Wolf, May 14, 2014.
[129] J&B Interview of Calvin Wolf, May 14, 2014.
[130] Component Technical Specification (March 22, 2001), at 1 [DOC ID 14021301709376; GMNHTSA000441762]; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[131] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

version of the Specification maintained the original 1997 Specification's force displacement curve specifying a required rotational torque of 20 N-cm to turn the Ignition Switch from Run to Accessory.[132]

Section 3.2.2.3 of the 2001 version of the Specification, however, reflects a number of changes from the 1999 version. First, DeGiorgio removed the notation indicating that this was a "TARGET curve only," which meant that the force displacement curve was no longer a target, but was instead the actual torque requirement for the switch.[133] Second, DeGiorgio specified that "Torque Curve allowable tolerance shall not exceed +/- 5 N-cm."[134] Thus, by March 2001, based on DeGiorgio's finalization of the torque requirement, the torque necessary to move the Ignition Switch from Run to Accessory was, pursuant to the Specification, required to fall somewhere between 15 N-cm and 25 N-cm. Yet, as described below, DeGiorgio ultimately approved an Ignition Switch that fell well below the lower limit of acceptable torque that he himself had "finalized" in the Specification.

The 2001 version of the Specification also stated: "[a]ctual curve to be furnished by supplier after GM Engineering approval."[135] According to DeGiorgio, while the curve depicted in Section 3.2.2.3 of the Specification was the actual curve for the Ignition Switch, the language signified that the switch was still subject to "fine-tuning" based on input from the vehicle

[132] Component Technical Specification (March 22, 2001), at 1, 18 [DOC ID 14021301709376; GMNHTSA000441762].
[133] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[134] Component Technical Specification (March 22, 2001), at 19 [DOC ID 14021301709376; GMNHTSA000441762].
[135] Component Technical Specification (March 22, 2001), at 19 [DOC ID 14021301709376; GMNHTSA000441762].

program team as well as GM's "TALC" engineers, who reviewed vehicle components for touch, appearance, lighting, and color.[136]

The Specification does not include particularized requirements, such as dimensions, for the Ignition Switch's detent plunger and spring. Rather, the internal components of the Ignition Switch were a "black box design," which meant that GM personnel provided the supplier information regarding the part's packaging and requirements, including the Specification, and let the supplier design the inside details of the switch as necessary to satisfy those requirements.[137] Although two alternative detent spring and plunger dimensional specifications prepared by Eaton, one with a shorter spring and plunger cap and one with a longer spring and plunger cap, were found in Delphi's documents and provided to GM as part of this investigation, the available evidence does not clarify whether they were provided to GM personnel as the switch was being developed and finalized.[138] An internal Delphi document indicates that, in April 2006, the longer spring and plunger cap replaced the shorter spring and plunger cap in the Ignition Switch.[139] We cannot confirm whether DeGiorgio – or any other DRE who worked on the Ignition Switch, such as Wolf – was given the option to choose between the two different springs, or that he chose the shorter spring.

There is no question, however, that DeGiorgio knew he was approving an Ignition Switch that fell below GM's Specification, and there is no question that the shorter spring was used in the Ignition Switch when the Cobalt was first produced.

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[136] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; e-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 18, 2002) [DOC ID 000077721033; GMNHTSA000337107]; e-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481]; J&B Interview of Matthew Schroeder, April 2, 2014.
[137] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[138] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[139] Delphi CAD drawing (April 21, 2006) [GMHEC000003206].

2. 2001-2002: Early Changes to the Prototype Ignition Switch

In accordance with GM's procedures, a sample of the Ignition Switch was installed in a prototype for the Saturn Ion, and the prototype vehicle and its component parts underwent a series of tests. Prior to launch, a new vehicle would undergo a development process called Global Vehicle Development Process ("GVDP"). Leading up to the launch, GVDP includes vehicle-level and component-level validation testing and Integration Vehicle Engineering Review ("IVER").

Both component-level testing and vehicle-level testing were performed on the Ion and the Cobalt.[140] Individual component validation testing was performed in a laboratory on stand-alone parts, and whole-vehicle validation testing was designed to test how various vehicle components perform when integrated into a vehicle.[141]

Issues identified during the development process are opened through the Problem Resolution Tracking System ("PRTS"), or its predecessor, called the PIMREP system. After identifying the issue, the originator of a PRTS selects a severity level for the problem. The severity level is a significant factor in the priority given to a PRTS report, with more severe issues addressed more urgently. The originator selects the severity level from a drop-down menu that includes brief descriptions of four options, which, during the relevant time period, were:

Code 1: Possibly Safety / Regulatory Issues / Walk Home / No Build

Code 2: Major Issues – an issue that would cause the customer to immediately return the vehicle to the dealership or cause excessive cost or labor impact at the assembly plant

[140] Component-level testing on the Ignition Switch occurred when it was implemented in the Ion, but the testing was not repeated before being put in the Cobalt. J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of John Hendler, May 20, 2014.
[141] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Eugene Carnago, May 15, 2014; J&B Interview of Doug Parks, May 1-2, 2014.

Code 3: Moderate Issues – fix on the next trip to dealership or cause moderate cost or labor impact at the assembly plant

Code 4: Annoyance / Continuous Improvement

The available records maintained by GM and its supplier, Delphi, demonstrate that the Ignition Switch required many fixes in the prototype stage, between the release of the final Specification in March 2001 and the launch of the Saturn Ion in late 2002. DeGiorgio noted that the Ignition Switch's electrical design had "failed miserably" and he essentially had to redesign the switch's electrical concept.[142] The Ignition Switch simply did not work when moving from design to an actual part.[143]

3. 2001: Early Complaints During Vehicle-Level Testing

Through the development and the testing of the Ignition Switch, a number of problems arose and were raised through the PRTS process; these included problems with both the electrical and mechanical components of the switch. At the time, the engineers working on the Ignition Switch viewed the electrical problems as the most significant.

In July and August 2001, three reports were opened to address stalls in the Model Year ("MY") 2003 Saturn ZAcar – a pre-Ion prototype vehicle.[144] In prototype testing, GM discovered that the Run detent (or groove) in the Ignition Switch was not well-defined and allowed the key to settle somewhere between Run and Accessory when the car was started.[145] After investigation, GM determined that the soft tools – used in the earliest stages of vehicle

[142] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; e-mail from Raymond DeGiorgio, GM, to David R. Desrosier, GM, *et al.* (Sept. 21, 2001) [DOC ID 15032000615592; GMNHTSA 000441799].
[143] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[144] PIMREP A-83ZA-81060 (July 24, 2001) [DOC ID 14032000611950]; PIMREP A-83ZA-81205 (Aug. 22, 2001) [DOC ID 000001776036; GMNHTSA000224993]; PIMREP A-83ZA-81254 (Aug. 24, 2001) [DOC ID 14021301695055; GMNHTSA000227713].
[145] J&B Interview of William Skelton, May 20, 2014.

production – were not strong enough to create a sufficient detent in the prototype switch.[146] Soft tools are used when a part is being developed and still undergoing changes.[147] The tools are designed to be temporary, because the part is still in development and, as changes are made to the part, the tools that create the part must also be changed. Once the initial prototype testing on the part is complete, production-quality ("hard") tools for the assembly line are developed.[148]

The problem with the Ignition Switch identified in these August 2001 reports was solved by using production-quality tools to create the Run detent.[149] By November 14, 2001, new prototype Ignition Switches had been installed and evaluated in prototype vehicles, and GM determined the problem no longer existed.[150] The detent problem addressed in these early reports was separate and distinct from the problem that led to this recall.[151]

One of the August 2001 reports noted that when the ignition circuit lost power, "the ABS [anti-lock brake system] and SDM would also drop," causing warning lights to come on for the anti-lock brakes, SDM, power steering, and airbags, among other systems.[152] The GM engineer, Jim Sewell, who authored the quoted language, stated that he understood the connection between the Ignition Switch rotating out of Run and airbag non-deployment. Yet, Sewell characterized the issue as a non-safety concern, and he did not flag the issue for other engineers; in any event, as noted above, the cause of the stalling issue that was the subject of this report was fixed prior to

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[146] J&B Interview of William Skelton, May 20, 2014.
[147] J&B Interview of John Hendler, May 20, 2014; J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[148] J&B Interview of John Hendler, May 20, 2014; J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[149] PIMREP A-83ZA-81060 (July 24, 2001) [DOC ID 14032000611950]; PIMREP A-83ZA-81254 (Aug. 24, 2001) [DOC ID 14021301695055; GMNHTSA000227713].
[150] PIMREP A-83ZA-81205 (Aug. 22, 2001) [DOC ID 000001776036; GMNHTSA000224993]; J&B Interview of Raymond DeGiorgio, March 14, 2014.
[151] J&B Interview of William Skelton, May 20, 2014.
[152] PIMREP A-83ZA-81205 (Opened on Aug. 22, 2001 and closed on Nov. 14, 2001) [DOC ID 000001776036; GMNHTSA000224993].

production.[153] Bill Skelton, who was the engineer designated to resolve the stalling problem in this particular report and who would later contemporaneously learn of the Cobalt Ignition Switch issues, stated that he did not know that rotating the Ignition Switch out of Run caused the airbag system to lose power, thus missing the consequence of the SDM failing.[154]

4. September 2001: Component-Level Testing of the Ignition Switch

At the time the Ignition Switch was being developed, component parts were subject to both development validation ("DV") testing and production validation ("PV") testing. Both phases of testing were completed by the supplier. Component-level validation testing for the Ignition Switch was typically conducted before and concurrently with the vehicle-level validation testing.[155]

During early testing of the Ignition Switch, DeGiorgio noticed problems with the prototypes provided by Delphi. In September 2001, DeGiorgio corresponded with representatives of Koyo, the supplier of the Ion steering column into which Delphi's switch was installed.[156] In his correspondence, DeGiorgio stated he recently learned that 10 of 12 prototype switches from Delphi "[f]ailed to meet engineering requirements," and the "failure is significant," adding that DeGiorgio himself "must ensure this new design meets engineering requirements."[157] According to DeGiorgio, the "engineering requirements" and failures he

[153] J&B Interview of James Sewell, May 27, 2014. Sewell recalled having no involvement with later Cobalt Ignition Switch issues.
[154] J&B Interview of William Skelton, May 20, 2014.
[155] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of John Hendler, May 20, 2014.
[156] E-mail from Dick Angelo, Koyo, to Raymond DeGiorgio, GM, *et al.* (Sept. 18, 2001) [DOC ID 15032000615592; GMNHTSA 000441799].
[157] E-mail from Raymond DeGiorgio, GM, to David R. Desrosier, GM, *et al.* (Sept. 21, 2001) [DOC ID 15032000615592; GMNHTSA 000441799].

referenced in this e-mail were electrical requirements and failures unrelated to the Ignition Switch's torque.[158]

5. February 2002: As the Launch of the Ion Approaches, Ignition Switch Torque Tests Fail to Meet Specification

At the same time that DeGiorgio was dealing with electrical problems with the Ignition Switch, Delphi was also conducting tests on the mechanical requirements, including the torque required to turn the Ignition Switch. Validation testing conducted by Delphi in late 2001 and early 2002 revealed that the Ignition Switch consistently failed to meet the torque values in the Specification (20 N-cm +/- 5 N-cm). In early January 2002, Delphi prepared an Analysis/Development/Validation Plan & Report ("ADVP&R") documenting the results of component-level validation tests required by the Specification.[159] These tests, conducted on various dates in the fall of 2001, included a test to determine whether the torque required to rotate the switch from Run to Accessory complied with the Specification. Every sample set tested included switches for which the torque measurement fell below the Specification's minimum requirement of 15 N-cm.[160] The January report denoted this by stating "Not OK" next to each result.[161]

[158] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[159] Analysis/Development/Validation Plan & Report (Jan. 10, 2002) [DOC ID 120198-000267].
[160] Analysis/Development/Validation Plan & Report (Jan. 10, 2002), at 1-2, 5, 9, 12 [DOC ID 120198-000267]; GM Analysis/Development/Validation Plan & Report (May 21, 2002), at 3, 9, 12-13, 21, 27, 39, 50, 61 [DOC ID 120198-000281]; J&B Interview of Matthew Schroeder, April 2, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014. Two of the four tests showed a range of values from 10 N-cm to 13 N-cm.
[161] Analysis/Development/Validation Plan & Report (Jan. 10, 2002) at 1-2, 5, 9, 12 [DOC ID 120198-000267].

GM

ANALYSIS/DEVELOPMENT/VALIDATION PLAN & REPORT
(ADVP&R) FOR SUPPLIERS

SECTION II - PLAN AND REPORT DATA

APPROVED:

GM VALIDATION ENGINE

ITEM #	PROCEDURE #															
			Load Soak	Performance Requirements		hi				2001	2001					Max Measured Voltage Drop 212mV.
34	3.1.2.2		Single Function	Circuit Make Circuit Break	N/A	Delp hi	DV	6	D	11-26-2001	12-3-2001	6	D	Beta	OK	
35	3.2.1.4		Contact Resistance	Measured Resistance	100 mOhms Max	Delp hi	DV	6	D	11-26-2001	12-3-2001	6	D	Beta	OK	
36	3.1.2.3		Voltage Drop	Measured Voltage Drop	350 mV Max	Delp hi	DV	6	D	11-26-2001	12-3-2001	6	D	Beta	OK	
37	3.2.1.5		Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delp hi	DV	6	D	11-26-2001	12-3-2001	6	D	Beta	OK	
38	3.2.1.6		Isolation Resistance	Measured Resistance	20 Mohm Min	Delp hi	DV	6	D	11-26-2001	12-3-2001	6	D	Beta	OK	
39	3.2.2.3		Torque-Angle	Actuation Torque	All In N-cm	Delp hi	DV	6	D	11-26-2001	12-3-2001	6	D	Beta		See H Torq
				Off-ACC	25/15										Not OK	9/5 N-cm
				ACC-RUN	25/15										Not OK	17/10 N-cm
				Max Travel	65/55										Not OK	50/39 N-cm
				Return Torque	15 Min										OK	20/17 N-cm
				RUN-ACC	25/15										Not OK	15/10 N-cm
				ACC-OFF	25/15										Not OK	15/11 N-cm
				Displacement	All In Deg											Displacements-
				ACC Make	33/27										OK	30/29 Deg
				Key-In Break	40/34										Not OK	41/39 Deg
				RC Make	67/61										OK	64/63 Deg
				KRC Make	61/55										OK	59/58 Deg
				Diff KRC-RC	10/2										OK	7/5 Deg
				ACC Break	99/93										Not OK	99/47 Deg, #13, #18 Cont Brc
				KRC Resist	95/82										Not OK	97/95 Deg
				Diff ACC-KRC	2 Min										Not OK	3/-49 Deg
				KRC NonResist	95/82										Not OK	96/94 Deg
				Diff ACC-KRC	2 Min										Not OK	4/1 Deg
				ACC Make	99/93										Not OK	99/97 Deg

Not OK

Although these results were not found in GM's files, there is every reason to believe DeGiorgio reviewed them. He acknowledged that he typically received and reviewed ADVP&R reports with the supplier in the course of his duties as a DRE,[162] and that reviewing these reports was an important step in the validation process.[163] In addition, in early 2002, DeGiorgio discussed with Delphi the fact that the Ignition Switch did not meet the torque required by the Specification.

In February 2002, Delphi product engineer Erik Mattson e-mailed DeGiorgio and others, explaining that the Accessory detent was at "9.5 [N-cm]," below the "15 [N-cm] +\- 2 [N-cm]" that Mattson stated DeGiorgio had requested based on "Talc samples" to achieve the desired

[162] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[163] J&B Interview of Raymond DeGiorgio, March 14, 2014.

"detent feel."[164] Mattson explained the torque in the switch "can be increased," but noted there were risks that the change would trigger other issues.[165] These risks included cracking of the rotors, premature wear-out of the detent, and impact on the electrical functions (particularly the printed circuit board or "PCB").[166] Mattson characterized the cost to make the change as "nominal," but noted that it would take time to test and validate the switches.[167] Mattson thus was putting a choice before DeGiorgio – do nothing or elect to change the Ignition Switch to solve the problem of low torque, which might, however, cause electrical problems and would cause delay in getting the Ignition Switch into production.

DeGiorgio responded to Mattson's e-mail: "If increasing the detent ACCRY [Accessory] force by 5N [N-cm] will destroy this switch than [sic] do nothing . . . maintain present course. Under no circumstances do we want to compromise the electrical performance of this switch nor PPAP status."[168] DeGiorgio nevertheless informed Mattson that a torque value of 9.5 N-cm was "still too soft of a detent" and did not meet Specification requirements.[169] DeGiorgio further noted that the "[s]witch design will require detent modifications for the GMX 001 [Cobalt]

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[164] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 18, 2002) [DOC ID 000077721033; GMNHTSA000337107]. DeGiorgio noted and Mattson confirmed later in the e-mail chain that Mattson mistakenly identified the unit of measurement as "N-mm," when in truth it is "N-cm." The source of the 15 N-cm (+/- 2 N-cm) is not clear. E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].
[165] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 18, 2002) [DOC ID 000077721033; GMNHTSA000337107].
[166] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 18, 2002) [DOC ID 000077721033; GMNHTSA000337107].
[167] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 18, 2002) [DOC ID 000077721033; GMNHTSA000337107]; e-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].
[168] E-mail from Raymond DeGiorgio, GM, to Erik R. Mattson, Delphi, *et al.* (Feb. 19, 2002) [DOC ID 000077721033; GMNHTSA000337107]. "PPAP" stands for Production Part Approval Process, the process by which GM approved components for production. *See* Appendix D.
[169] E-mail from Raymond DeGiorgio, GM, to Erik R. Mattson, Delphi, *et al.* (Feb. 19, 2002) [DOC ID 000077721033; GMNHTSA000337107].

Program."[170] Thus, despite knowing the torque values were well below the Specification, DeGiorgio instructed Delphi to take no action to increase the rotational torque out of concern that changing the detent would compromise the electrical performance of the switch; at the same time, he notified Delphi that detent modifications would be required to increase torque in accordance with the Specification before the switch (currently planned for the Ion) could be used in the Cobalt, scheduled for launch in 2004.[171] DeGiorgio signed his response, "Ray (tired of the switch from hell) DeGiorgio."[172]

From: Raymond DeGiorgio
To: Erik R Mattson
CC: Larry Allen; Steven N Homer; Arnold H Hollenbeck; Ronald J Wojtecki
BCC:
Sent Date: 2002-02-19 17:39:28:000
Received Date:
Subject: Re: Increased detent force
Attachments:

Erik,
If increasing the detent ACCRY force by 5N will destroy this switch than do nothing ..... maintain present course.
Under no circumstances do we want to compromise the electrical performance of this switch nor PPAP status.

Note:
1.) Switch design will require detent modifications for the GMX 001 Program. (along with any other rotor / PCB design mods necessary to meet the CTS requirements.)
2.) Standardization of GMX 320/357 switch designs not probable unless above requirements are met.
3.) Ultimately, if the TALC Group does not buy - off on the feel of the switch than changes to the design will be required.

Ray (tired of the switch from hell) DeGiorgio

[170] E-mail from Raymond DeGiorgio, GM, to Erik R. Mattson, Delphi, *et al.* (Feb. 19, 2002) [DOC ID 000077721033; GMNHTSA000337107].
[171] E-mail from Raymond DeGiorgio, GM, to Erik R. Mattson, Delphi, *et al.* (Feb. 19, 2002) [DOC ID 000077721033; GMNHTSA000337107]; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[172] E-mail from Raymond DeGiorgio, GM, to Erik R. Mattson, Delphi, *et al.* (Feb. 19, 2002) [DOC ID 000077721033; GMNHTSA000337107]; e-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].

Mattson asked for clarification regarding the Specification requirements: "Where in the CTS [Component Technical Specification] is there an exact requirement of these forces? All I see is a general curve that is marked 'This is a TARGET curve only, actual curve to be furnished by supplier after GM Engineering approval.'"[173] As noted above, however, by 2002, the "TARGET curve" language had been removed from the Specification and replaced with a specific requirement of 20 N-cm with a +/- 5 N-cm tolerance. Mattson further wrote that he was "not saying it is impossible to change the detent forces, but it does have an impact on timing and our suppliers will not do it for free."[174] Mattson also replied that the "Talc samples were 9.6 N-cm. The new production intent version of the switch has 9.5 N-cm. We feel this is a match of the TALC switch."[175] Mattson concluded: "We can revise this again but we all need to be aware of the impacts in timing, cost, and possible other issues that might be created when we are this close to PPAP."[176] We have not located a response from DeGiorgio.

When interviewed, DeGiorgio acknowledged that Delphi had not achieved the required torque for the Ignition Switch.[177] Given the switch's history of electrical failures, however, he was hesitant to make any changes that might jeopardize the functionality of the switch's electrical architecture.[178] Because he believed the Ignition Switch had performed properly and without incident during the numerous vehicle-level tests conducted on the prototype Ion,[179]

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[173] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].
[174] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].
[175] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].
[176] E-mail from Erik R. Mattson, Delphi, to Raymond DeGiorgio, GM, *et al.* (Feb. 19, 2002) [DOC ID 14042800393158; GMNHTSA000441481].
[177] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[178] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[179] Issues noted during Captured Test Fleet ("CTF") testing of the Ion are set out in Appendix F.

DeGiorgio approved production of the switch – even though the switch's torque was below the Specification.[180] DeGiorgio explained that he signed his e-mail message "tired of the switch from hell" because he was frustrated by the numerous electrical issues exhibited by the Ignition Switch and the amount of time and energy he had spent resolving them.[181]

Following these discussions with Mattson, subsequent torque tests reported in 2002 showed even worse results; torque values to rotate from Run to Accessory ranged from as low as 4 N-cm or 5 N-cm up to 11 N-cm.[182] Like the January report, the April report states "Not OK" next to each of the results.[183] GM does not have records of receiving these test results around the time they were conducted. However, as with the January 2002 ADVP&R report, under standard procedures, DeGiorgio would have received and reviewed them as the engineer responsible for the Ignition Switch.[184]

After interviewing hundreds of witnesses, we have not identified any GM personnel, other than DeGiorgio, who received or reviewed these test results, or knew (prior to 2013) that the Ignition Switch failed to meet the Specification when it was approved for production in 2002.

6. May 2002: Despite Failing Test Results, The Ignition Switch Goes Through Production Part Approval Process.

On May 3, 2002, GM personnel approved shipment of the Ignition Switch through its Production Part Approval Process, known as the "PPAP."[185] PPAP is the process through which

[180] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[181] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[182] GM Analysis/Development/Validation Plan & Report (May 21, 2002), at 3, 9, 12-13, 21, 27, 39, 50, 61 [DOC ID 120198-000281]. The full results for the torque required to turn from Run to Accessory were 5 N-cm, 5 N-cm, 4 N-cm, 7 N-cm, 10 N-cm, and 11 N-cm.
[183] GM Analysis/Development/Validation Plan & Report (May 21, 2002), at 3, 9, 12-13, 21, 27, 39, 50, 61 [DOC ID 120198-000281].
[184] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[185] PPAP Report (May 3, 2002) (Delphi version) [DOC ID 120198-000677]; PPAP Report (May 3, 2002) (GM version) [DOC ID 000005779025; GMNHTSA000607040].

parts are tested, validated, and ultimately released for production. The PPAP package should contain, among other things, two key authorizations: one from the supplier and one from GM. The Commodity Validation Sign Off, GM Form 3660 ("Form 3660") signifies GM's engineering approval for a part to ship,[186] and the Part Submission Warrant ("PSW") represents the supplier's confirmation that the parts being shipped comply with GM's requirements.[187]

No complete PPAP package for the Ignition Switch approval in 2002 has been located in either GM's or Delphi's files. According to GM's Global Supplier Quality Manual and the standardized PPAP guidelines adhered to by GM, the onus is on the supplier – Delphi – to compile and maintain the complete PPAP "package."[188] Delphi has not provided, and has been unable to locate, a complete PPAP package for the Ignition Switch.[189] The final engineering drawing would have been a part of the PPAP package.[190]

According to DeGiorgio, in 2002, he had the authority to approve the Ignition Switch for production – and did in fact approve it – even though it did not comply with all Specification requirements, without needing anyone else to sign off on his approval decision.[191] There are inconsistent accounts of whether practices at the time required someone else also to approve the

[186] J&B Interview of Ralf Nickel, March 26, 2014.
[187] AIAG PPAP Manual (3d ed. Aug. 2000), at 90 [DOC ID 000123252680].
[188] GM Global Supplier Quality Manual (Sept. 2008), at 22-23 [DOC ID 000049740003]; AIAG PPAP Manual (3d ed. Aug. 2000), at 2-3 [DOC ID 000123252680].
[189] Typically, GM would store the Form 3660 and Part Submission Warrant in the Global Quality Tracking System ("GQTS"). GM Global Supplier Quality Manual (Sept. 2008), at 22 [DOC ID 000049740003]. GM has searched its database and other document sources extensively and has not located this documentation; because the requisite database that stores Form 3660s automatically deletes information from the system one year after a part ceases to be in production, it is not likely that the original Form 3660 from 2002 for the Ignition Switch still exists in GM's files. J&B Interview of Brenda Van Eman, April 15, 2014.
[190] AIAG PPAP Manual (3d ed. Aug. 2000), at 3 [DOC ID 000123252680].
[191] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

switch and whether GM required documentation of a deviation from Specifications.[192] However, no evidence has been uncovered that suggests that any GM employee, other than DeGiorgio, knew, prior to production, that the Ignition Switch approved for the Ion and Cobalt was below specification.[193]

Ultimately, with the knowledge and approval of DeGiorgio, the Ignition Switch went into production despite having a torque value well below the requirements set forth in the Specification.[194] This explains how the switch came to be in a GM car in the first place. The fact, however, that a below-specification ignition switch had been authorized was not known to the engineers who were investigating the Cobalt's Ignition Switch over the next decade; indeed, it is not until 2013 that GM engineers, lawyers, and investigators came to understand that the

[192] Two GM employees who were validation engineers for switches (including ignition switches) during the time periods of 2004 and 2007, stated that – prior to 2004 – there were not validation engineers for ignition switches, and the design release engineer for the switch had authority to approve a switch for production. J&B Interview of Michael Berden, May 27, 2014; J&B Interview of Eugene Carnago, May 15, 2014. Other employees, who did not have validation responsibility for switches, thought other approvals may have been required in the early 2000s for component level sign-off into production. J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of John Hendler, April 25, 2014.

[193] An October 7, 2001 "Reliability Test" assessment document describes durability test results for the ignition switch in the GMX 357 (Ion) performed during the "DV" (developmental validation) stage of testing. Memo from John Kneebone, Reliability Engineer, to Robert Berkman, Reliability Group Manager, *et al.* (Oct. 7, 2001) [DOC ID 000240402013]. It is unclear whether this document pertains to the Ignition Switch at issue (it references a different part number – "P/N 12450257" – and lists a Design Release Engineer other than DeGiorgio). The document notes that, following the durability test at the DV stage, "all post performance parameters" were met "with no exceptions." *Id.* The document also notes certain design modifications to the switch, including "enforced rotor, new P.C.B., lower contact force, and lower spring force." *Id.* Witnesses interviewed about this document did not recall it, could not confirm whether it pertained to the Ignition Switch at issue, and did not know whether the Ignition Switch used in the Ion was below Specification going into production. J&B Interview of Rod Davies, May 23, 2014; J&B Interview of John Reinke, May 27, 2014.

[194] That a part is below specification is not the same as the part being unsafe or necessarily containing a "defect" as that term is defined under the Safety Act. In this case, however, the low torque of the Ignition Switch, which was well below GM's Specification, led to the safety defect that affected the recalled vehicles.

torque value of the switch was far below the required Specification.[195] The failure to document and track such authorizations impeded investigators in future years.

B. The Ignition Switch In Production: Early Issues With the Ion and Cobalt

DeGiorgio stated that he approved the Ignition Switch – even though it was below Specification – because no issues with the performance of the switch, once placed in the Ion, were brought to his attention during the Ion's development. He had no awareness that the below-specification torque would have an impact on the safe operation of the car.[196] DeGiorgio claimed that, had issues with the torque performance of the Ignition Switch in the Ion or Cobalt been raised to his attention, he would have revisited the switch and its torque performance.[197] The following section shows that several issues, some raising direct questions about the torque performance of the Ignition Switch, were raised to DeGiorgio's attention in 2003, 2004, and 2005. Yet, at no time did he inform other GM personnel that the Ignition Switch was out of specification.

During this time period, GM personnel received complaints that the Ignition Switch in the Ion and Cobalt inadvertently rotated out of the Run position, causing moving stalls. While GM engineers learned of these complaints, not one engineer (with one exception discussed below) involved in addressing the complaints reports being aware that the key rotation also caused the airbags not to deploy. This fundamental information gap led to enormous consequences. Complaints of ignition shut-offs and moving stalls were classified as non-safety issues; that classification was not revisited even as new complaints surfaced; and resolution of

[195] As noted *infra*, a few additional engineers were made aware that the 2006 change in the Ignition Switch was addressing the below-Specification torque of the original Ignition Switch. Those engineers were not involved in the various investigations of the Cobalt in future years.
[196] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[197] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

the issues remained mired in cost and "business case" justifications – factors that would have played no role in resolving a safety issue. As a result, nothing was done to fix the problem, and cars continued to be manufactured and sold with the defect. Had the safety defect been understood and addressed, GM would have prevented injuries and fatalities that occurred in the coming years.

1. Fall 2002: Ion Production Starts and Ignition Switch Problems Begin

GM launched the Ion (MY 2003) into production in fall of 2002. The MY 2003 Ion was produced by GM's Saturn division at the manufacturing plant in Spring Hill, Tennessee. In 2003, GM's Saturn division received hundreds of customer complaints and warranty claims related to the MY 2003 Ion Ignition Switch.[198] Witnesses recalled that the vast majority of claims concerning the Ion involved complaints of "no crank/no start" problems, which arose from electrical, rather than mechanical, problems with the Ignition Switch.[199] A no crank/no start problem occurs when a vehicle will not start when the Ignition Switch is turned to the Crank position.[200] There were, however, also reports of intermittent stalls.[201]

A Field Performance Report was opened in October 2003 ("the October 2003 Report") to address customers' comments of intermittent stalls while driving.[202] The October 2003 Report attached a list of 65 Ion stalls, some attributed to heavy key chains.[203] The October 2003 Report

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[198] *See, e.g.*, FPR 2648 (Aug. 4, 2003) [DOC ID 000116874244]; FPR 2568/2003/US (Aug. 28, 2003) [DOC ID GMCB-000000743211]; PRTS N143183 (Sept. 12, 2003) [DOC ID 000001776038; GMNHTSA000225258]; 2003 Ion Ignition Switch Warranty Spreadsheet [DOC ID 000001776037; GMNHTSA000225347].
[199] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Keith Mikkelson, April 23, 2014.
[200] J&B Interview of Keith Mikkelson, April 23, 2014. Doug Parks explained that no crank/no start is a common problem in vehicles under development. J&B Interview of Doug Parks, May 1-2, 2014.
[201] *See, e.g.*, PRTS N143183 (Sept. 12, 2003), at 1 [DOC ID 000001776038; GMNHTSA000225258]; FPR 3101/2003/US (Oct. 9, 2003), at 1 [DOC ID 000001776033; GMNHTSA000335192].
[202] FPR 3101/2003/US (Oct. 9, 2003), at 1 [DOC ID 000001776033; GMNHTSA000335192].
[203] Attachment to FPR 3101-2003-US (Oct 9, 2003), at 1 [DOC ID 000012196221; GMNHTSA000000250].

was canceled in January 2004 for the purported reason that a different report already resolved the issue.[204] In fact, the other report (described below) did not address the same issue – stalls – but addressed instead only a no crank/no start problem.[205] Nevertheless, the October 2003 Report was closed and the 65 Ion stalls listed in the report's attachment, including those caused by low torque in the Ignition Switch, were unresolved. By addressing the first problem and not the second, the engineers failed to resolve the Ignition Switch issue early in the production of the Ion. Moreover, the failure to understand that the problem had not been addressed in the Ion may have had an impact when GM initiated the Ignition Switch recall in 2014, which excluded the Ion. When the first recall was issued, members of the EFADC did not understand that the Ion had the same problem.

2. 2003-2004: The Volume of No Crank/No Start Complaints Obscures Stalling Issue

The majority of warranty claims filed against the Ion Ignition Switch involved complaints of no crank/no start during cold weather.[206] These no crank/no starts in the Ion were caused in part by the way grease inside the switch functioned in cold weather.[207] The no crank/no start problem was initially difficult to replicate and diagnose due to the warm climate at the Spring Hill facility (where cars were tested), and the fact that cars with the problem were towed to a dealer, warmed up inside the shop, and then no longer exhibited the problem.[208]

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[204] FPR 3101/2003/US (Oct. 9, 2003), at 5 [DOC ID 000001776033; GMNHTSA000335192].
[205] FPR 2568/2003/US (Aug. 28, 2003), at 1 [DOC ID GMCB-000000743211; GMNHTSA100054548]; J&B Interview of Raymond DeGiorgio, March 14, 2014.
[206] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Keith Mikkelson, April 23, 2014; J&B Interview of Matthew Schroeder, April 2, 2014.
[207] J&B Interview of Keith Mikkelson, April 23, 2014; J&B Interview of Raymond DeGiorgio, March 14, 2014.
[208] J&B Interview of Keith Mikkelson, April 23, 2014; J&B Interview of Raymond DeGiorgio, March 14, 2014.

On August 28, 2003, Saturn opened an issue report that included a chart of 212 Ion Ignition Switches returned to Delphi as failed parts under warranty.[209] Delphi's analysis of the returned switches repeatedly showed that nothing was wrong with them, but the problem continued.[210] In January 2004, GM opened a second issue report for the same no crank/no start problem.[211] Eventually, engineers brought a refrigerated trailer to the Spring Hill plant, drove an Ion into the trailer, and replicated the no crank/no start problem in the cold conditions.[212]

Once the cold temperatures had been identified as the problem trigger, DeGiorgio was able to identify solutions: a change to the grease in the Ignition Switch, and electrical changes to the Switch's Printed Circuit Board ("PCB").[213] On February 19, 2004, DeGiorgio initiated Engineering Work Order ("Work Order" or "EWO") 302726 to implement both the grease and electrical changes.[214] The Work Order provided for a change to the Ignition Switch part number from 12450250 to 10392423.[215] One of the changes described in the Work Order – the grease change – was implemented quickly; switches with the new grease were scheduled to reach the Spring Hill plant in May 2004.[216] While the grease change resolved approximately 90 percent of the no crank/no start complaints, it did not resolve them all.[217] The other electrical changes described in the Work Order were not implemented immediately.

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[209] FPR 2568/2003/US (Aug. 28, 2003) [DOC ID GMCB-000000743211; GMNHTSA100054548]; J&B Interview of Keith Mikkelson, April 23, 2014.
[210] J&B Interview of Keith Mikkelson, April 23, 2014.
[211] PRTS N151929 (Jan. 13, 2004) [DOC ID 14032000612148; GMNHTSA 000228284].
[212] J&B Interview of Keith Mikkelson, April 23, 2014; PRTS N151929 (Jan. 13, 2004), at 8 [DOC ID 14032000612148; GMNHTSA 000228284].
[213] PRTS N151929 (Jan. 13, 2004) [DOC ID 14032000612148; GMNHTSA 000228284]; J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Keith Mikkelson, April 23, 2014.
[214] EWO 302726 (Feb. 19, 2004) [DOC ID 000000000080; GMNHTSA000220667]; PRTS N151929 (Jan. 13, 2004) [DOC ID 14032000612148; GMNHTSA 000228284].
[215] EWO 302726 (Feb. 19, 2004), at 2 [DOC ID 000000000080; GMNHTSA000220667].
[216] PRTS N151929 (Jan. 13, 2004), at 8 [DOC ID 14032000612148; GMNHTSA 000228284].
[217] J&B Interview of Raymond DeGiorgio, March 14, 2014.

The cold weather no crank/no start problem was a personal embarrassment to DeGiorgio, and he continued to work to resolve the remaining electrical problems in the Ignition Switch into 2004 and beyond.[218] Focused on that, he and other engineers ignored reports of the moving stall problem, considering them a "duplicate" – even though they were very different issues with completely different causes. Consequently, the low torque problem went unaddressed, even though now it was causing moving stalls.[219]

3. August 2004: The Cobalt Goes Into Production Using the Same Ignition Switch

In August 2004, GM started production on a new vehicle program, the Chevrolet Cobalt.[220] As a small car and part of GM's Delta Platform, the Cobalt contained the Ignition Switch with the improved grease change bearing the part number 10392423.[221] Two and a half years before the Cobalt's launch, on March 27, 2002, DeGiorgio had recommended using in the Cobalt the Ignition Switch already under development at that time for use in the Ion.[222]

Leading into the launch of the Cobalt, the Cobalt Program Team included, among others, Vehicle Line Executive ("VLE") for Small Cars Lori Queen, who also served as Vehicle Line

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[218] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

[219] GM employees were also having problems with their own MY 2004 Ions. A January 9, 2004 Report received from GM employee Gerald A. Young stated, "The ignition switch is too low. All other keys and the key fob hit on the driver's right knee. The switch should be raised at least one inch toward the wiper stalk," characterizing it as "a basic design flaw [that] should be corrected if we want repeat sales." In a February 19, 2004 Report, GM employee Onassis Matthews stated: "The location of the ignition key was in the general location where my knee would rest (I am 6'3" tall, not many places to put my knee). On several occasions, I inadvertently turn [sic] the ignition key off with my knee while driving down the road. For a tall person, the location of the ignition key should be moved to a place that will not be inadvertently switched to the off position." Finally, in an April 15, 2004 Report, GM employee Raymond P. Smith reported experiencing a one-time inadvertent shut-off: "I thought that my knee had inadvertently turned the key to the off position." CVEP Report for MY 2004 ION 3 SEDAN AUTOMATIC (Jan. 9-April 15, 2004) [DOC ID 000000000002].

[220] GM Divisional Launch Updates, Weekly NASB Mailout Presentation (March 11, 2005), at 2 [DOC ID 000038474474].

[221] Engineering Work Order 333314 (April 19, 2004) [DOC ID 000001775096].

[222] E-mail from Raymond DeGiorgio, GM, to William K. Post, GM, *et al.* (March 27, 2002) [DOC ID 000077721069; GMNHTSA000329878]; J&B Interview of Raymond DeGiorgio, March 14, 2014.

Director ("VLD") for the Cobalt at that time; Vehicle Chief Engineer ("VCE") Doug Parks; Program Engineering Manager ("PEM") Gary Altman; and Vehicle Systems Engineer ("VSE") for electrical systems John Hendler.[223] DeGiorgio served as the DRE for the Cobalt Ignition Switch.

4. Spring 2004: Issues With Moving Stalls in the Captured Test Fleet

As with other cars, one part of GM's testing came from its Captured Test Fleet ("CTF"), a group of early production cars driven by GM employees who were charged with identifying problems before launch. For the 2005 Cobalt, there would have been 80-90 CTF vehicles operating in the spring of 2004 (as the 2005 Cobalt was released in the summer of 2004).[224] GM engineers report that problems identified during the CTF testing process ordinarily would have been provided to the program team charged with the Cobalt.[225] None of the GM personnel interviewed remember any reports of problems with the CTF.

Joseph Taylor, a Program Quality Manager who administered the CTF program for the Cobalt, did not recall any CTF reports of Ignition Switch or stalling issues for the Cobalt, either during the initial 2004 CTF or in subsequent model years.[226] Taylor himself, however, drove a 2005 Cobalt test vehicle and personally experienced moving stalls with the Cobalt.[227] Between Taylor and those working for him, Taylor estimated that there were three instances of the car stalling as a result of the Ignition Switch being inadvertently turned off.[228] Taylor did not report

[223] J&B Interview of Lori Queen, May 12, 2014; J&B Interview of Doug Parks, May 1-2, 2014; J&B Interview of John Hendler, April 25, 2014.
[224] J&B Interview of Joseph Taylor, May 16, 2014.
[225] J&B Interview of Gary Altman, May 20, 2014.
[226] J&B Interview of Joseph Taylor, May 16, 2014.
[227] J&B Interview of Joseph Taylor, May 16, 2014.
[228] J&B Interview of Joseph Taylor, May 16, 2014.

these instances in his CTF reports because he did not consider them significant.[229] Taylor, like many other GM engineers, did not regard stalling as a safety issue.[230] As a result, this important information never made its way to anyone else at GM.

The CTF data collected for the Ion and Cobalt pre-production did, however, include reports of a number of stalls due to Ignition Switch issues. One December 5, 2002 report relating to a 2003 Saturn Ion reads: "The position of the ignition key leaves it vulnerable to being bumped by your knee while driving and shutting off the engine. I've accidently done this twice while driving on the expressway. I'm concerned the steering wheel may lock up too. There should be a finger lock on the key to keep it from accidently turning." CTF data include similar reports relating to the Cobalt beginning in 2004.

5. Summer/Fall 2004: Early Reports of Cobalt Moving Stalls

As the Cobalt moved into production, it too – like its Ion predecessor – experienced inadvertent Ignition Switch shut-offs that resulted in moving stalls. Unlike the Ion, the Cobalt moving stalls were not disregarded as "duplicates" of a different problem. Nonetheless, GM engineers working on the Cobalt failed to understand what others at GM already knew: when the Ignition Switch was inadvertently turned to Off or Accessory – by design – the airbags would not deploy. A critical error resulted when the engineers categorized the problem with the Ignition Switch as a "convenience" issue rather than a safety issue. Instead of implementing a solution to the problem, the engineers debated partial solutions, short-term fixes, and cost.

Around the time of the Cobalt launch, two reports surfaced of moving stalls caused by a driver bumping the key fob or chain with his knee. First, at a summer or fall 2004 press event

[229] J&B Interview of Joseph Taylor, May 16, 2014.
[230] J&B Interview of Joseph Taylor, May 16, 2014.

associated with the launch of the Cobalt in Santa Barbara, California,[231] a journalist informed Doug Parks, the Cobalt Chief Engineer, that while adjusting his seat in the Cobalt he was driving, the journalist had turned off the car by hitting his knee against the key fob or chain.[232] Parks asked Gary Altman, the Program Engineering Manager, to follow up on the complaint by trying to replicate the incident and to determine a fix.[233]

After the Cobalt press event, Altman and another GM engineer test drove a Cobalt at the Milford Proving Grounds and replicated the incident described by the journalist.[234] At the time, Altman thought it was possible that a moving stall could be caused in *any* vehicle by positioning the key a certain way and hitting the key fob or chain with one's knee.[235] Both he and Parks regarded the incident as an isolated event with no safety implications – the prevailing view within GM.[236]

DeGiorgio learned about the press event moving stall and was approached by a GM engineer who suggested that DeGiorgio could "beef up" the Ignition Switch detents (which

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[231] Parks believed the following GM personnel were also at the Santa Barbara press event: Lori Queen, Vehicle Line Executive; Jim Queen, Vice President for Global Engineering; Robert Lutz, Vice President for Global Product Development; and Altman. J&B Interview of Doug Parks, March 18, 2014. Lori Queen does not remember being in attendance. J&B Interview of Lori Queen, March 24, 2014. Lutz did not remember being aware of a journalist experiencing a moving stall. J&B Interview of Robert Lutz, May 2, 2014.
[232] J&B Interview of Doug Parks, March 18, 2014.
[233] J&B Interview of Gary Altman, March 14, 2014; J&B Interview of Doug Parks, March 18, 2014.
[234] J&B Interview of Gary Altman, March 14, 2014. One engineer at GM's Milford Proving Grounds initially reported in our investigation that he believed he had heard a discussion among the Ion or Cobalt program team about an "executive test drive" event at which then-CEO Rick Wagoner had "kneed off" the ignition switch while driving. J&B Interview of James Sewell, May 27, 2014. Our investigation interviewed most of the GM employees whom the engineer described as the sources of his information, and none of them recalled any such event, which they indicated would have been memorable. *See, e.g.*, J&B Interview of Sonja Russell, May 28, 2014; J&B Interview of Ken Kelzer, May 28, 2014; J&B Interview of Doris Der, May 28, 2014; J&B Interview of David Lynch, May 28, 2014; J&B Interview of Alberto Manzor, May 27, 2014. Wagoner reported that he does not recall any such event either. J&B Interview of George ("Rick") Wagoner, May 28, 2014. As discussed above, an event of this sort occurred at the Milford facility when Alan Storck and Gary Altman replicated the ignition switch problem in November 2004 following the media event. On reflection, the Milford engineer advised that he was not certain Wagoner was involved and that perhaps he was referencing the Storck event. J&B Interview of James Sewell, May 28, 2014.
[235] J&B Interview of Gary Altman, March 14, 2014.
[236] J&B Interview of Gary Altman, March 14, 2014; J&B Interview of Doug Parks, March 18, 2014.

would increase the torque). DeGiorgio, however, rejected this idea.[237] He said he thought – again in error – that, to prevent a driver's knee from knocking the key out of Run, it would be necessary to add a second detent to the Ignition Switch.[238] To add a second detent, DeGiorgio also would have to add a second plunger, and he thought the Switch did not have sufficient room to accommodate it.[239] DeGiorgio did not consider a less extreme increase in torque – using a longer spring – and whether such an increase was feasible in the existing architecture of the Switch.[240] As would be proven true two years later due to implementation by DeGiorgio himself, such an increase was both feasible and ultimately would remedy the problem. Again, this marked a missed opportunity to resolve the problem at an early stage.

In another incident, on November 22, 2004, engineers in GM's High Performance Vehicle Operations ("HPVO") group wrote DeGiorgio and informed him that an individual in their group had repeatedly experienced a moving stall during a track test of the Cobalt SS (the high-performance version of the Cobalt) when the driver's knee "slightly graze[d]" the key fob.[241]

A GM engineer forwarded this complaint to DeGiorgio, and explicitly asked DeGiorgio whether there was "a specification on the force/torque required to keep that switch in the RUN

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[237] PRTS 172404 (Nov. 19, 2004) [DOC ID 000001771143; GMNHTSA000142658]; J&B Interview of Raymond DeGiorgio, March 14, 2014.
[238] J&B Interview of Raymond DeGiorgio, March 14, 2014.
[239] PRTS 172404 (Nov. 19, 2004) [DOC ID 000001771143; GMNHTSA000142658]; J&B Interview of Raymond DeGiorgio, March 14, 2014.
[240] *See* J&B Interview of Raymond DeGiorgio, March 14, 2014.
[241] E-mail from Andrew Brenz, GM, to Raymond DeGiorgio, GM (Nov. 22, 2004) [DOC ID 000012140259; GMNHTSA000329908]; e-mail from Andrew Brenz, GM, to Raymond DeGiorgio, GM (Nov. 22, 2004) [DOC ID 000012140262; GMNHTSA000329910]; J&B Interview of Chris Berube, April 22, 2014; J&B Interview of Andrew Brenz, April 23, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

position."[242] He also asked DeGiorgio: "If so, is the switch meeting that spec? If not, what are the options for implementing a stronger spring?"[243] Thus, by Fall 2004, GM employees had noted a "slight graze" of the key fob would move the key out of Run, had questioned whether the Ignition Switch was meeting its torque specifications, and had suggested considering options for a stronger spring to increase torque – the solution that would ultimately be implemented several years later.

DeGiorgio never responded to the questions put to him. Rather, DeGiorgio prepared two draft e-mail responses, neither of which were sent. Neither of the drafts directly respond to the pointed questions being put to him, and he never explained to the other engineer that the Ignition Switch was below specification. In both drafts, DeGiorgio wrote that he had been discussing or working on the issue with John Hendler, an electrical engineer on the Cobalt program.[244] In one of his draft responses, DeGiorgio explained that he did "not have any quick/easy solution that will provide you the necessary Key/Cylinder retention forces during high-g maneuvers," but identified "[t]he location of the Key/Cylinder (Low Mount) [a]s a major road block."[245] DeGiorgio identified options to resolve the issue, including to "[i]ncrease detent plunger force

[242] E-mail from Andrew Brenz, GM, to Raymond DeGiorgio, GM (Nov. 22, 2004) [DOC ID 000012140259; GMNHTSA000329908]; e-mail from Andrew Brenz, GM, to Raymond DeGiorgio, GM (Nov. 22, 2004) [DOC ID 000012140262; GMNHTSA000329910].
[243] E-mail from Andrew Brenz, GM, to Raymond DeGiorgio, GM (Nov. 22, 2004) [DOC ID 000012140259; GMNHTSA000329908]; e-mail from Andrew Brenz, GM, to Raymond DeGiorgio, GM (Nov. 22, 2004) [DOC ID 000012140262; GMNHTSA000329910].
[244] Draft e-mail from Raymond DeGiorgio, GM, to Andrew Brenz, GM (undated) [DOC ID 000012140259; GMNHTSA000329908]; Draft e-mail from Raymond DeGiorgio, GM, to Andrew Brenz, GM (undated) [DOC ID 000012140262; GMNHTSA000329910].
[245] Draft e-mail from Raymond DeGiorgio, GM, to Andrew Brenz, GM (undated) [DOC ID 000012140262; GMNHTSA000329910].

for better key retention," an option DeGiorgio thought would only "slightly" improve the problem.[246] DeGiorgio concluded that he did not have a recommendation among the options.[247]

Despite being informed of the problem again, DeGiorgio made no changes to the Ignition Switch, and no one was alerted to the fact that the Ignition Switch failed to meet GM's Specification.

6. November 2004: Cobalt Moving Stall Is Classified As A Non-Safety Issue

On November 19, 2004, GM personnel opened a PRTS report (hereafter "November 19, 2004 PRTS") to address the complaint at the press event that the car could be "keyed off with knee while driving."[248] This was the first of six reports opened between 2004 and 2009 in connection with moving stalls in the Cobalt.[249]

As a critical decision point, the problem described in the November 19, 2004 PRTS was assigned a severity level of 3 – on a scale of 1 (most severe) to 4 (least severe).[250] Although the problem could have been designated a severity level 1 safety problem, it was not. The decision as to which severity level should be assigned to a problem rests with a committee, the Current

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[246] Draft e-mail from Raymond DeGiorgio, GM, to Andrew Brenz, GM (undated) [DOC ID 000012140262; GMNHTSA000329910].
[247] Draft e-mail from Raymond DeGiorgio, GM, to Andrew Brenz, GM (undated) [DOC ID 000012140262; GMNHTSA000329910].
[248] PRTS N172404 (Nov. 19, 2004), at 1 [DOC ID 000001771143; GMNHTSA000142658].
[249] PRTS N172404 (Nov. 19, 2004) [DOC ID 000001771143; GMNHTSA000142658]; FPR 0793/2005/US (March 9, 2005) [DOC ID 14030700023227; GMNHTSA000019374]; PRTS N182276 (May 16, 2005) [DOC ID 14021301731575]; FPR 1462/2005/US (May 16, 2005) [DOC ID 14032000612239; GMNHTSA000263601]; FPR 2327/2006/US (Aug. 1, 2006) [DOC ID 000005317021; GMNHTSA000269131]; PRTS 1078137 (Feb. 4, 2009) [DOC ID 000002828012; GMNHTSA000225663].
[250] PRTS N172404 (Nov. 19, 2004) [DOC ID 000001771143; GMNHTSA000142658]. A severity level 3 signified issues of moderate severity, defined at the time of this PRTS as "Moderate Issues – fix on the next trip to dealership or cause moderate cost or labor impact at the assembly plant." CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 14 [DOC ID GMCB-000000977278].

Production Improvement Team ("CPIT").[251] The CPIT included a cross-section of business people and engineers, including the Program Engineering Manager (responsible for the vehicle). It is chaired by the Vehicle Line Director, who is the business lead for the vehicle program and reports directly to the Vehicle Line Executive – in this case, Lori Queen. The failure to designate the problem as a safety issue had enormous consequences for the resolution of the problem, because, as discussed below, non-safety designated problems were considered less urgent to address and dependent on cost considerations when determining fixes for the problems.

The opening of this original Cobalt PRTS report and its designation of the problem as a non-safety issue highlights a broader issue that affected the entirety of GM's investigation of the Ignition Switch. Individuals at GM generally did not regard moving stalls as an inherent safety problem.[252] Their view – at the time and repeated in investigative interviews – was that moving stalls were not safety issues because a driver would be able to control the car and steer it to the side of the road.

None of the engineers, with one exception discussed below, involved in the PRTS process who had primary responsibility for the functioning of the Ignition Switch, understood that loss of power would prevent the airbags from deploying.[253] Had the engineers working on the PRTS issue known what others at GM knew at the time – that moving the key out of Run and

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[251] An engineer, Alan Storck, originated the PRTS, but the CPIT was responsible for officially opening and reviewing the PRTS, including deciding the appropriate severity designation. J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Sarah DeVries, May 13, 2014.

[252] This Report uses the term "moving stall" as shorthand to describe the condition of loss of motive power, regardless of the cause. We understand that in the automotive industry the term "moving stall" may be limited to events where a part breaks or an electrical malfunction causes a loss of propulsion while a vehicle is still on – as opposed to the condition here that is caused by other events (knee-key interaction or off-road driving with additional weight on a keychain, combined with the low torque Ignition Switch). J&B Interview of Carmen Benavides, May 26, 2014.

[253] J&B Interview of Gary Altman, March 14, 2014; J&B Interview of David Trush, April 30, 2014; J&B Interview of Alan Storck, March 21, 2014; J&B Interview of Blendi Sullaj, March 20, 2014; J&B Interview of David Trush, March 17, 2014; J&B Interview of William Kemp, May 9, 2014.

into Accessory would result in non-deployment of the airbags – they now state they would have designated the PRTS reports as safety issues and moved to resolve the problem more quickly.[254] Their failure to understand how the Ignition Switch interacted with the airbags, a part of the car for which they did not have oversight or responsibility, was a significant factor in the failure to resolve the switch problems in a timely fashion. Moreover, GM's failure to have an effective process to ensure that issues in one part of a vehicle that might affect other aspects were identified and elevated resulted in GM not issuing recalls when it should have. Had the engineers and business people who were charged with ensuring the safety of these vehicles understood how this automobile was constructed, they would have resolved the safety issue more quickly.

The engineers who opened and worked on the PRTS report did not know of any accidents or fatalities that might have been attributable to problems with the Ignition Switch in the Ion or Cobalt, even though GM has now identified at least several crashes that might be attributable to the safety defect prior to the end of 2004. Numerous witnesses who considered the PRTS reports stated that this would have changed their view as to whether the problem they were seeing in the Cobalt represented a safety issue.[255]

7. March 2005: November 2004 PRTS Closed With No Solution

The engineers working on the November 19, 2004 PRTS developed a number of possible solutions to address the problem of the Ignition Switch and presented them to the two

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[254] *See, e.g.*, J&B Interview of John Hendler, April 25, 2014; J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Alberto Manzor, March 21, 2014; J&B Interview of Alberto Manzor, May 1, 2014; J&B Interview of David Trush, April 30, 2014.

[255] J&B Interview of Gary Altman, March 14, 2014; J&B Interview of Steven Oakley, April 10, 2014; J&B Interview of David Trush, March 17, 2014. At the time of the November 19, 2004 PRTS, GM's legal department had opened one case file involving a frontal crash of an MY 2004 Ion in which the airbags did not deploy. See *infra*.

committees GM had created to consider changes in production vehicles – the CPIT and VAPIR committees. VAPIR (Vehicle and Process Integration Review), by design, includes a cross-section of Vehicle System Engineers because they are supposed to be able to recognize whether an issue impacts other functions within the vehicle.[256]

Prior to beginning committee meetings to consider possible solutions, GM personnel did take one step to identify the problem for dealers (not consumers). In February 2005, GM issued a Preliminary Information, a communication that GM sends to dealers (but not consumers) about a possible issue, even if there is not yet a resolution to the issue.[257] The Preliminary Information explained the potential for drivers to inadvertently turn off the ignition, explained the cause to be the low torque of the Ignition Switch, and specifically noted the potential for a "stall."[258] The Preliminary Information explained that "[t]he customer should be advised of this potential and to take steps, such as removing unessential items from their key chain, to prevent it."[259]

By March 2005, the engineers were ready to present proposed solutions in presentations to the CPIT and the VAPIR. A presentation provided to the VAPIR on March 1, 2005 listed two possible "Best Solutions," yet neither involved improving the Ignition Switch itself.[260]

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[256] J&B Interview of Lori Queen, May 12, 2014.
[257] J&B Interview of Mickey Sabol, April 24, 2014; J&B Interview of Steven Oakley, April 23, 2014.
[258] Preliminary Information, Engine Stalls, Loss of Electrical Systems, and No DTCs (Feb. 28, 2005) [DOC ID 000000000067; GMNHTSA000272962].
[259] Preliminary Information, Engine Stalls, Loss of Electrical Systems, and No DTCs (Feb. 28, 2005) [DOC ID 000000000067; GMNHTSA000272962].
[260] PRTS N172404 (Nov. 19, 2004), attaching CMX001 Lock Module Detent in RUN Presentation, at 9 [DOC ID 000001771143; GMNHTSA000142658].

The presentation also included some "Ruled Out" solutions, including changing the design of the key head from a slot to a hole – a solution GM personnel ultimately pursued. With a slot design, the key ring could move up and down in the slot. If the key ring contained extra weight, that movement could exert torque on the Ignition Switch and, combined with other circumstances, move it from Run to Accessory. Keeping the key ring in the center of the key (through a hole design) would prevent such movements.[261] The estimated cost to make the key change was $70,000 for tooling for a new key head, $400,000 to modify production assembly equipment, and a piece price increase of $0.50 per vehicle.[262]

The presentation to the CPIT also described a "Sure Solution" to fix the problem: change the location of the Ignition Switch on the steering column from a low-mount to a higher mount.[263] According to David Trush, the Lead Design Engineer on the ignition cylinder, the

[261] J&B Interview of Alberto Manzor, March 21, 2014.
[262] David Trush, GM, Cobalt Estimate to Change the Vehicle Key for the Cobalt Only (March 4, 2005) [DOC ID 000001771143; GMNHTSA000142693].
[263] PRTS N172404 (Nov. 19, 2004), Attached Presentation Slides, at 3 [DOC ID 000001771143; GMNHTSA000142658].

"sure" solution was not seriously considered because it did not address the torque issues in the Ignition Switch and would have been an expensive fix.[264]

Initially, both the CPIT and the VAPIR committees discussed the key head design change as what they called a "containment" solution.[265] However, on March 9, 2005, a few days after a second CPIT meeting, the November 19, 2004 PRTS was closed "with no action." The report reflects that it was closed pursuant to the "directive" of the Cobalt Program Engineering Manager ("PEM").[266] Altman, who was the PEM at the time, said that he did not have the authority to close the PRTS without action, and suggested senior Cobalt program team members Doug Parks (Chief Engineer), Lori Queen (Vehicle Line Executive), or Queen's direct report, Sarah DeVries (Vehicle Line Director) made the decision.[267] Queen denied that she made the decision to close this report, and suggested Altman did have authority because the issue was a severity level 3.[268] Neither Parks nor DeVries recalled closing the PRTS.[269] Under the GM policy in effect at the time, Altman did not have authority to close the PRTS himself; the CPIT had to approve the closure of a non-safety related PRTS when no action was taken.[270]

The interviews here showed a troubling disavowal of responsibility made possible by a proliferation of committees. It is an example of what witnesses called the "GM salute," a crossing of the arms and pointing outward towards others, indicating that the responsibility

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[264] J&B Interview of David Trush, March 17, 2014; J&B Interview of David Trush, April 30, 2014.
[265] PRTS N172404 (Nov. 19, 2004), at 10 [DOC ID 000001771143; GMNHTSA000142658].
[266] PRTS N172404 (Nov. 19, 2004), at 10 [DOC ID 000001771143; GMNHTSA000142658].
[267] J&B Interview of Gary Altman, March 14, 2014. Deb Lund and Sarah DeVries confirmed that the PEM could not close the PRTS by itself. J&B Interview of Deb Lund, May 14 & 16, 2014; J&B Interview of Sarah DeVries, May 13 & 16, 2014.
[268] J&B Interview of Lori Queen, May 12, 2014.
[269] J&B Interview of Doug Parks, May 1-2, 2014. J&B Interview of Sarah DeVries, May 13 & 16, 2014.
[270] "Closed Without Action" Approval Guidelines By Issue Type & Closure Code [DOC ID S006897_000000629].

belongs to someone else. Here, because a committee was "responsible," no single person bore responsibility or was individually accountable.

Cost estimate to change the vehicle key for the Cobalt only
per David Trush 3/04/05

Author: Blendi Sullaj/US/GM/GMC on 09-Mar-2005 9:36

Per GMX001 PEM's directive we are closing this PRTS with no action. The main reasons are as following:
1.All possible solutions were presented in CPIT and VAPIR:

a. The lead-time for all the solutions is too long.
b. The tooling cost and piece price are too high.
c. None of the solutions seems to fully countermeasure the possibility of the key being turned (ignition turn off) during driving.

Thus none of the solutions represents an acceptable business case.
03/09/2005 - Blendi Sullaj

As shown above, the November 19, 2004 PRTS stated that "none of the solutions represents an acceptable business case" – a standard phrase used by GM personnel for closing a PRTS without action.[271] David Trush, the lead engineer on the ignition cylinder, explained that to present an "acceptable business case," a solution should solve the issue, be cost effective, and have an acceptable lead time to implement the change.[272] In this case, according to Trush, the proposed changes were not implemented because none of them was guaranteed to resolve the problem completely.[273] Lori Queen confirmed that a discretionary, or non-safety related, part change had to clear a series of financial hurdles before it would be approved.[274] Engineers who proposed a discretionary change had to make out an "acceptable business case" before the

[271] GMNA PRTS+ Closure Codes (Close w/out Action) (Effective Dec. 2007) [DOC ID GMCB-000000977300].
[272] J&B Interview of David Trush, March 17, 2014; J&B Interview of David Trush, April 30, 2014.
[273] J&B Interview of David Trush, March 17, 2014; J&B Interview of David Trush, April 30, 2014.
[274] J&B Interview of Lori Queen, May 12, 2014.

financing for the change would be approved. The specific financial hurdles included cost, lead time, investment, and whether the proposed change would fix a problem.[275]

Here, the decision to close the PRTS without action was a direct consequence of the decision to classify the problem as one of "convenience" rather than "safety." As a direct consequence of their failure to understand the safety defect in the Cobalt, the engineers put the issue into a category of problems for which cost was a relevant consideration. Without exception, the engineers involved with the Cobalt said that, if they had understood that rotating the key to Accessory would cause the airbags not to deploy and had considered the issue one of safety, the PRTS would not have been closed without action.[276] Witnesses said the presence of any safety concerns would have changed the analysis entirely, mooting the cost-benefit analysis of the "business case."[277]

Because the issue was not designated as a safety concern – severity level 1 – at the outset, the consequence was no action by GM. And the initial classification of the issue as one of "convenience," once made, was not likely to be disturbed. As Lori Queen stated, if an issue was not identified as a safety issue at the time it was presented to the CPIT, which had responsibility for reviewing and approving severity designations, there was unlikely to be any check or review of that initial determination.[278] Queen stated: "If I was an engineer, and defined something as a customer satisfaction issue, I don't think anyone would have questioned that, at the program-

[275] J&B Interview of Lori Queen, May 12, 2014.
[276] J&B Interview of Gary Altman, March 14, 2014; J&B Interview of John Hendler, April 25, 2014; J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Lori Queen, May 12, 2014; J&B Interview of David Trush, March 17, 2014.
[277] J&B Interview of John Hendler, April 25, 2014; J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Lori Queen, May 12, 2014; J&B Interview of David Trush, March 17, 2014.
[278] J&B Interview of Lori Queen, May 12, 2014.

team level, or above, unless it was truly obvious that something more serious was going on."[279] In practice then, the initial input of an engineer on an issue, which may not be fully understood because it had not yet been investigated, effectively became the default for determining the level of severity of a problem.

The VAPIR was, however, a committee that included a cross-section of Vehicle System Engineers who had expertise in the various systems within the vehicle (including electrical, powertrain, chassis, and others), as well as a safety engineer, rather than engineers focused simply on one part of the car – as engineers such as DeGiorgio and Trush did. The purpose of having a committee with engineering expertise is to identify whether an issue in one part or system may impact other functions in the vehicle. Nonetheless, this committee simply deferred to the original designation that this was not a safety issue. There is no evidence that anyone on the CPIT or the VAPIR either understood or at least considered that turning the key to Accessory would disable the airbags. The failure of the committees to fulfill their role of understanding the interaction of the various systems in GM cars and to review and consider the severity designation resulted in the Ignition Switch being treated as a convenience issue, with its solution dependent on cost. When a cost-effective solution was not found, the safety defect was not addressed.

Here, as elsewhere in the story of the Cobalt, the structure within GM was one in which no one was held responsible and no one took responsibility. While people were responsible for being on the committee, they were insulated from individual responsibility for action.

[279] J&B Interview of Lori Queen, May 12, 2014.

8. 2004-2005: GM Discussions With NHTSA Regarding Engine Stalls

As noted above, the engineers working on the Cobalt did not view a moving stall as a *per se* safety problem. That view was shared by others in the automotive industry in this time period,[280] and also was the subject of discussions between NHTSA and GM around the same time that the Cobalt team was working on issues related to the Ignition Switch (2004-05).[281]

According to Gay Kent, the then-Director of Product Investigations, NHTSA was concerned with engine stalls across the automobile industry and several safety recalls were issued for engine stall issues in that time period.[282] Kent said NHTSA's new focus was to establish a framework with which to evaluate stalling conditions.[283] In December 2004, GM noted internally that it was "[c]urrently debating three engine stall conditions at this time."[284] None of these conditions related to the Cobalt.[285]

Kent, Bill Kemp, Keith Schultz, and others engaged with NHTSA in the late spring of 2004 regarding engine stalling more broadly. Kemp's notes from these conversations suggest that NHTSA agreed with GM's view that engine stalling was not a *per se* safety issue.[286] Kemp's contemporaneous notes also indicate that GM represented that, with respect to engine

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[280] *See, e.g.*, *Salsitz v. Nasser*, 208 F.R.D. 589, 593 (E.D. Mich. 2002). In this matter, Ford Motor Co. had concluded that moving stalls did not pose an unreasonable threat to motor vehicle safety when it decided not to report multiple stalls created by its mounting a "thick film ignition switch" directly onto the engine motor block. After repeated analysis and discussion, Ford's Policy and Strategy Committee determined that the stalling issue did not rise to the level of a reportable safety problem. *Id.*
[281] E-mail from Gay Kent, GM, to GM employees and NHTSA representatives (Jan. 2, 2005) [DOC ID 000007486261; GMNHTSA000218516]; J&B Interview of Gay Kent, March 18, 2014.
[282] J&B Interview of Gay Kent, March 18, 2014.
[283] J&B Interview of Gay Kent, May 16, 2014.
[284] Bob Lange & Douglas Wachtel, GM, Field Performance Evaluation (FPE) Sensitivity and Recall Lessons Learned – 2004 Presentation (Dec. 4, 2004), at 66 [DOC ID 000000626923; GMNHTSA000218550].
[285] J&B Interview of Gay Kent, May 16, 2014.
[286] William Kemp, Draft Talking Points for Queen-Medford Conversation on Monday, May 24, 2004 [DOC ID 000045764417].

stalls, GM focused on the frequency with which stalls occurred; GM personnel also emphasized that, in the specific car under discussion, there had been "[n]o crashes, no injuries…."[287]

On May 17, 2004, during a NHTSA visit to the GM Milford Proving Grounds, GM gave a presentation titled "Engine Stall & Loss of Assist Demonstration."[288] The purpose of the demonstration was "[t]o establish through demonstration and data that an engine stall is not, per se, a safety defect."[289] The driving demonstration permitted NHTSA officials to experience whether a vehicle could be controlled after a vehicle stall on a variety of different road courses."[290] Airbag deployment was not addressed in the slide deck.

At a June 3, 2004 meeting with NHTSA, GM presented its perspective on engine stalls – specifically, that those occurring on acceleration require more rigorous review. GM also represented to NHTSA that in assessing a given stall, it considered severity, incident rate, and warning to the driver.[291] Kemp's notes from this meeting indicate NHTSA told GM that, in a case where the number of failures was "inordinately high," the factors should be considered but did not necessarily "immunize" a manufacturer from conducting a safety recall.[292]

On June 11, 2004, Kent followed up with a letter to NHTSA, which included responses to questions NHTSA asked GM at the June 3, 2004 presentation. One such question was the

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[287] William Kemp, Notes from Discussion with Ron Medford (May 19, 2004), at 2 [DOC ID 000045775681]; William Kemp, Draft Points for Settlement of Saab 9-3 Stalling Condition [DOC ID 000045764403].
[288] Engine Stall & Loss of Assist Demonstration (May 17, 2004) [DOC ID 000130987046-51].
[289] Engine Stall & Loss of Assist Demonstration (May 17, 2004) [DOC ID 000130987048].
[290] Engine Stall & Loss of Assist Demonstration (May 17, 2004) [DOC ID 000130987049]; J&B Interview of Gay Kent, March 18, 2014.
[291] Gay Kent, Engine Stall Presentation (June 3, 2004), at 9 [DOC ID 000087173734].
[292] William Kemp, Notes (June 3, 2004), at 2 [DOC ID 000045775064].

number of safety recalls (3) and other field actions (17) that GM had conducted in the past 20 years for engine stalling.[293]

As time progressed, GM continued to develop its framework for assessing engine stalling issues. In March 2005, GM Product Investigations, the group of engineers with responsibility for safety issues, drafted a multi-factor framework for assessing the safety impact of the engine stall problem.[294] Factors relevant to the framework included whether a vehicle could be restarted after a stall, whether the stall occurred when the vehicle was moving or parked, whether the driver retained control over power steering and brakes, and whether the driver received any warning signs before the stall occurred.[295]

As part of the framework, GM established a guideline that 20-30 incidents per thousand vehicles ("IPTV") over a three-year period was a reasonable rate for an engine stall problem.[296] This guideline does not appear in the written presentation given to NHTSA at the time.[297] Doug Wachtel reported that Kent orally informed NHTSA of this guideline.[298] Kent recalls discussing the 20-30 IPTV with NHTSA as "guidance," but did not recollect presenting it as a "GM guideline."[299]

We have uncovered no documentary evidence as to whether NHTSA specifically accepted GM's approach to stalls in 2004 or 2005, though NHTSA's own approach can be seen

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[293] Letter from Gay Kent, GM, to Kathleen C. DeMeter, ODI-NHTSA (June 11, 2004), at 1 [DOC ID 000087173763].
[294] W. Kauffman, GM, Applying Stalling Assessment Framework (March 2005), at 1 [DOC ID 000005586008; GMNHTSA000329010]; J&B Interview of Gay Kent, March 18, 2014.
[295] J&B Interview of Gay Kent, March 18, 2014; W. Kauffman, Applying Stalling Assessment Framework (March 2005) [DOC ID 000005586008; GMNHTSA000329010].
[296] J&B Interview of Gay Kent, March 18, 2014.
[297] Engine Stall Presentation, GM and NHTSA QTRLY Review (March 8, 2005) [DOC ID 000009088578].
[298] J&B Interview of Gay Kent, March 18, 2014.
[299] J&B Interview of Gay Kent, May 16, 2014.

by its actions.[300] There is evidence that NHTSA, in fact, may not have accepted GM's supposed "guideline." In the summer of 2013, NHTSA questioned GM's use of the rate of 20 IPTV over three years.[301] Additionally, there is no documentary evidence that anyone at GM was keeping track of IPTV for moving stalls for the Cobalt, much less reporting that information separately to NHTSA. There was no formal policy in place at GM regarding recording IPTV figures or monitoring cars over time.[302] Finally, there is no evidence that anyone at GM or anyone at NHTSA was considering the circumstance presented by the Cobalt – that the moving stall was caused by an inadvertent shut-off of the ignition, which resulted in airbag non-deployment.

9. Spring 2005: GM's Brand Quality Group Learns of Moving Stall Issues

After the Cobalt program team closed the November 19, 2004 PRTS with no action taken, additional complaints of Cobalt stalls and inadvertent Ignition Switch shut-offs continued to come into GM's Brand Quality Group. The engineers in that group similarly failed to connect the problems with the Ignition Switch to loss of airbags, and therefore failed to classify the problems as a safety concern.

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[300] In 2007, NHTSA indicated its approach when it denied a vehicle defect petition concerning stalls in Ford Taurus and Mercury Sable vehicles, finding that only 3 out of 228,000 vehicles experienced stalling and that those 3 stalls occurred at low speeds and did not result in any crashes, losses of control, or high risk events. In reaching this conclusion, NHTSA looked at such factors as incidents per thousand vehicles; speeds at which stalling occurs; type of operation during which stalling occurs; whether the vehicle can quickly be restarted after stalling; whether the stalling affects steering functions; whether the stalling affects braking functions; and any crashes or other unsafe events that may have resulted from the stalling. *See* NHTSA Denial of Motor Vehicle Defect Pet., 72 Fed. Reg. 73973-01 (Dec. 28, 2007) [DOC ID 000240799004].

[301] In his interview, Doug Wachtel stated that Carmen Benavides mentioned the 20-IPTV-over-three-years rate to NHTSA in summer of 2013 and they "beat [her] up" about it. According to Wachtel, NHTSA said that they do not endorse a 20-IPTV-over-three-year rate and asked Benavides how GM came up with that number. J&B Interview of Douglas Wachtel, May 14, 2014; e-mail from Benavides, GM, to Douglas Wachtel and others, GM (Aug. 20, 2013) (Benavides states that when she "visited NHTSA a few weeks back they were clear that [sic] to point out to me they do not prescribe to a 20 IPTV at 3 years") [GMCB-000000836377; GMNHTSA100105461].

[302] J&B Interview of Gay Kent, May 16, 2014.

For example, in March 2005, Jack Weber, a GM engineer, reported that during "heel-toe downshifting" in a Cobalt SS with a manual transmission (a high-performance Cobalt model), his knee contacted the key fob and key ring, which caused "pulling on the key to move it to the 'Off' position."[303] Weber also noted that the key fob "levered around the steering column cover and turned the ignition off."[304] The problem did not occur when the fob was removed from the key. Steven Oakley, a Brand Quality Manager, opened a Field Performance Report to address this issue, and the report assigned the issue the lowest severity level: four – "annoyance or continuous improvement."[305] Oakley stated that severity level 4 was the default setting and he did not change it.[306] Oakley initially thought an inadvertent shut-off was a safety issue, but Gary Altman, the PEM for the Cobalt program team, and other engineers told him it was not, and he deferred to them.[307]

In May 2005, a customer demand that GM repurchase his Cobalt was forwarded to Oakley. The complaint was that the Ignition Switch shut off during normal driving conditions with no apparent contact between the driver's knee and the key chain or fob.[308] Oakley forwarded this information internally at GM, stating that the Ignition Switch "goes to the off position too easily shutting the car off."[309] This e-mail chain was forwarded to DeGiorgio with a

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[303] E-mail from Jonathan L. Weber, GM, to Rajiv Mehta, GM, *et al.* (March 9, 2005), at 22 (attached to FPR0793/2005/US) [DOC ID GMHEC000019677].
[304] E-mail from Jonathan L. Weber, GM, to Rajiv Mehta, GM, *et al.* (March 9, 2005), at 22 (attached to FPR0793/2005/US) [DOC ID GMHEC000019677].
[305] FPR 0793/2005/US (March 9, 2005) [DOC ID GMHEC000019677]; GM CPIP and PRTS+ Process Overview, at 14 [DOC ID S006967_000206103].
[306] J&B Interview of Steven Oakley, April 10, 2014.
[307] J&B Interview of Steven Oakley, April 10, 2014.
[308] E-mail from Steven Oakley, GM, to Arnaud Dessirieix, GM (May 2, 2005) [DOC ID 000077753011; GMNHTSA000337483].
[309] E-mail from Steven Oakley, GM, to Arnaud Dessirieix, GM (May 2, 2005) [DOC ID 000077753011; GMNHTSA000337483].

request for an Ignition Switch "at the high end of the tolerance spec."[310] However, the field representative to whom the customer complained expressed skepticism that a switch with higher torque could be located. Oakley explained:

> The field rep will swap the parts if we want them to. He is concerned that this will not correct the condition, as he feels several stock cars at the dealership have about the same level of effort for the switch. They would like to have a column sent to them that we have some kind of confidence is better than what they are taking out. Again, if you just want a swap out we can do this, but without the ability to measure the effort, I have a hard time persuading them this will actually fix the car.[311]

Steven Oakley

Steven Oakley
05/04/2005 01:36 PM

To: Joseph Joshua/US/GM/GMC@GM
cc:
Subject: Re: Urgent Request

Joe:

The field rep will swap the parts if we want them to. He is concerned that this will not correct the condition, as he feels several stock cars at the dealership have about the same level of effort for the switch. They would like to have a column sent to them that we have some kind of confidence is better than what they are taking out.

Again, if you just want a swap out we can do this, but without the ability to measure the effort, I have a hard time persuading them this will actually fix the car.

Thanks

Steve

DeGiorgio was one of the GM personnel who received this e-mail chain, which effectively stated that the customer's car, as well as others at the dealership, had Ignition Switches with insufficient torque and, at least in the customer's situation, appeared to cause the car to shut off while driving.[312] For his part, DeGiorgio claims not to recall the e-mail exchange. DeGiorgio also claims that at this time he still had not received any complaints about the Ignition Switch in the Ion, which had the same Ignition Switch and had been in production since MY

[310] E-mail from Joseph Joshua, GM, to Steven Oakley, GM, *et al.* (May 4, 2005) (noting "[w]e have asked the ign switch DRE for a switch at the high end of the tolerance spec") [DOC ID 000077753011; GMNHTSA000337483].
[311] E-mail from Steven Oakley, GM, to Joseph Joshua, GM (May 4, 2005) [DOC ID 000077753011; GMNHTSA000337483].
[312] E-mail from Joseph Joshua, GM, to Joseph Manson, GM, Raymond DeGiorgio, GM, *et al.* (May 4, 2005) [DOC ID 000077753011; GMNHTSA000337483].

2003.[313] Yet, there is evidence that DeGiorgio did receive warranty data reports, and these reports showed incidents of Ion stalls connected to the Ignition Switch.[314] Again, DeGiorgio claims not to recall these reports.

By May 2005, GM personnel thus had multiple reports of moving stalls and were receiving buyback requests for Cobalts following complaints that consumers made to dealers.[315] As a result, a second PRTS report was opened on May 17, 2005 (hereafter the "May 17, 2005 PRTS").[316] This PRTS report, like the prior one, persisted in incorrectly classifying the issue as a severity level of 3 – a critical decision that would impact how others viewed the PRTS report and potential resolutions.[317]

10. The Cobalt VAPIR Committee Considers Short-Term and Long-Term Solutions to the May 17, 2005 PRTS

The May 17, 2005 PRTS also resulted in presentations to the VAPIR and the CPIT.[318] The engineers focused on different ways to prevent the stalls: (1) a short-term fix, which included changing the key head design from a slot to a hole and using a smaller key ring to prevent customers from placing too many keys on the ring; and (2) a long-term solution to either improve or replace the Ignition Switch in future model year vehicles.[319]

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[313] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[314] Spreadsheet containing Ion warranty data (Nov. 10, 2004) (found in DeGiorgio's files) [DOC ID 000080792106 - GMNHTSA 000407236]; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[315] J&B Interview of Steven Oakley, May 23, 2014.
[316] PRTS N182276 (May 16, 2005) [DOC ID 14021301731575]; FPR 1462/2005/US (May 16, 2005) [DOC ID 14032000612239; GMNHTSA000263601]; J&B Interview of Steven Oakley, April 10, 2014.
[317] PRTS N182276 (May 16, 2005) [DOC ID 14021301731575].
[318] June 7, 2005 VAPIR Agenda [DOC ID 14021301695359; GMNHTSA000227788]; June 14, 2005 VAPIR Agenda [DOC ID 14021301695341; GMNHTSA000227774]; June 21, 2005 VAPIR Agenda [DOC ID 15032000612751; GMNHTSA000482694]; June 28, 2005 VAPIR Agenda [DOC ID 15032000612849; GMNHTSA000483028].
[319] June 14, 2005 VAPIR Agenda [DOC ID 14021301695341; GMNHTSA000227774]; June 28, 2005 VAPIR Agenda [DOC ID 15032000612849; GMNHTSA000483028]; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

a. June 7, 2005 VAPIR Meeting and DeGiorgio's Ignition Switch Work

At a June 7, 2005 VAPIR meeting, the Cobalt VAPIR team discussed potential solutions to the inadvertent shut-off issue with the Ignition Switch. Around this same time, DeGiorgio recalled being asked to propose a change to the Ignition Switch that would double the torque required to turn the switch.[320] DeGiorgio identified two possibilities.

First, he proposed using a switch under development for the Saturn Vue (referred to as the "GMT 315") and the Chevrolet Equinox (the "GMT 191," hereafter referred to as the "GMT 191 switch"), which were both Theta platform vehicles.[321] According to DeGiorgio, the GMT 191 switch had enhanced electrical features.[322] The GMT 191 switch also had two detents, which would increase the torque needed to turn the switch.[323] Because the GMT 191 switch was superior to the Ignition Switch both electrically and mechanically, DeGiorgio referred to it as the "gold standard."[324] In light of the fact that the GMT 191 switch had similar packaging to the Ignition Switch in the Delta platform vehicles, it could have been put in future models of the Cobalt simply by using a different connector.[325]

Second, DeGiorgio proposed redesigning the Ignition Switch already in Delta platform vehicles. Part of DeGiorgio's plan included adding a second detent plunger.[326] DeGiorgio had not thought there was room in the Ignition Switch to accommodate a second detent plunger when

[320] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[321] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[322] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[323] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[324] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[325] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[326] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

he first learned that the engine could be knocked out of Run by a driver's knee in 2004.[327] By the summer of 2005, however, DeGiorgio was planning a second, separate electrical modification to the Ignition Switch, which was eventually implemented for MY 2008 Cobalts.[328] As part of that electrical redesign, DeGiorgio reduced the number of resistors in the Switch, which created additional space in the Switch to accommodate a second detent plunger.[329]

b. June 14, 2005 VAPIR Meeting

At the VAPIR meeting on June 14, 2005, additional proposed solutions were presented – categorized as either "short-term" or "long-term" solutions.[330] The short-term solution was to use a smaller key ring and to change the key going forward with a new key head design that used a hole instead of a slot.[331] The "long-term" solutions included DeGiorgio's idea of replacing the Ignition Switch with the GMT 191 switch, which would double the effort to shut off the ignition.[332] The estimated timing to implement the new switch was targeted for MY 2007 or MY 2008 vehicles, at a cost of $1.00/vehicle, plus tooling costs which were not known at that time.[333]

The presentation for this VAPIR meeting also included discussion of negative press coverage in the *Sunbury Daily Item* (discussed below) that described the very same issue the engineers were addressing: inadvertent shut-off of the Ignition Switch and moving stalls. The

[327] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[328] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[329] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[330] X001 Ignition Cylinder Effort . . . Next Actions VAPIR Presentation (June 14, 2005), at 1 [DOC ID 000011020041; GMNHTSA000218772].
[331] X001 Ignition Cylinder Effort . . . Next Actions VAPIR Presentation (June 14, 2005), at 1 [DOC ID 000011020041; GMNHTSA000218772].
[332] X001 Ignition Cylinder Effort . . . Next Actions VAPIR Presentation (June 14, 2005), at 1 [DOC ID 000011020041; GMNHTSA000218772].
[333] X001 Ignition Cylinder Effort . . . Next Actions VAPIR Presentation (June 14, 2005), at 1 [DOC ID 000011020041; GMNHTSA000218772].

presentation included GM's official public relations statement regarding the issue (discussed below).[334] Some engineers working on the Ignition Switch problem stated that the negative press coverage sharpened their focus on the issue and their desire to resolve it.[335] But, it did not prompt them to revisit the designation of the issue in the May 17, 2005 PRTS as a non-safety concern.

Also on June 14, 2005, similar complaints of "inadvertent ignition shut-offs" in the Solstice – which used the same defective Ignition Switch – surfaced. A GM engineer e-mailed DeGiorgio and other GM personnel involved in evaluating short-term and long-term fixes for the Ignition Switch, informing them that Solstice testing showed at least one complaint that the "ignition inadvertently turns off when hit." The engineer noted that the complaint was "very similar to the ones on the Cobolt [sic]" and suggested that the same "preventative measures" under discussion for the Cobalt should be taken for the Solstice.[336]

c. June 17, 2005 Ignition Switch Experiment at Milford Proving Grounds

On June 17, 2005, GM engineer Al Manzor conducted testing on the Ignition Switch, and the proposed GMT 191 ignition switch, at GM's Milford Proving Ground[337] to evaluate how the switches performed in the Cobalt using a key with a slotted key head versus a key head with a hole.[338] The tests performed and the results were summarized in a presentation as follows:[339]

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[334] X001 Ignition Cylinder Effort . . . Next Actions VAPIR Presentation (June 14, 2005), at 1 [DOC ID 000011020041; GMNHTSA000218772].
[335] J&B Interview of Alberto Manzor, March 31, 2014.
[336] E-mail from Devin Newell, GM, to Raymond DeGiorgio, GM, *et al.* (June 14, 2005) [DOC ID 000001748037; GMNHTSA000218756].
[337] The Milford Proving Ground is a GM engineering facility designed for vehicle research, development, and testing in Milford, Michigan. It has extensive test tracks for vehicle testing under a range of road conditions.
[338] "X001 Ignition Cylinder Effort . . . Next Actions" (June 19, 2005) [DOC ID 000012140574; GMNHTSA000218793]; J&B Interview of Alberto Manzor, May 1, 2014; e-mail from Gay Kent, GM, to Deb Nowak-Vanderhoef, GM, *et al.* (June 14, 2005) [DOC ID S006878_000038279].

X001 Ignition Cylinder Efforts…
Mock Up Results

Vehicle #	Retrofit	Rotational Torque Thru Key C/L To Shutoff	Downward Force At Key Ring To Shutoff
4033	hole in key & 13mm ring	0.1N-m	key and ring deflect >10lbs
4033	current prod	0.1N-m	6-7lbs
4177	current prod	0.1N-m	6-7lbs
4232	current prod	0.1N-m	6-8lbs
1116	increased detent effort ign cyl with current prod slotted key	0.2N-m	9-10lbs, did see as low as 7.5lbs

According to Manzor, these experiments demonstrated that changing the key head design and replacing the Ignition Switch had the potential to address the torque problem.[340] They also demonstrated that the rotational torque required to move the key out of Run was 10 N-cm, below the Specification of 15 to 25 N-cm. However, neither Manzor, nor anyone else interviewed, compared the test results to the actual Specification.[341] DeGiorgio, who received the results, did not note for anyone that the results were below the Specification.

Following the tests, Manzor took steps to expedite the key-head design change.[342] Later in June 2005, the VAPIR approved a fix for existing customers – a plug that could be inserted into keys when customers came to the dealer reporting problems – and a change to the key for production in the future (a change that was not implemented, as discussed below). On July 12, 2005, GM also issued another Preliminary Information to dealers, this time explaining (only for

[339] X001 Ignition Cylinder Effort . . . Next Actions" (June 19, 2005) [DOC ID 000012140574; GMNHTSA000218793].
[340] J&B Interview of Alberto Manzor, May 1, 2014.
[341] J&B Interview of Doug Parks, May 1-2, 2014; J&B Interview of Alberto Manzor, May 1, 2014.
[342] J&B Interview of Alberto Manzor, May 1, 2014; e-mail from Alberto Manzor, GM, to Raymond DeGiorgio, GM, *et al.* (June 20, 2005) [DOC ID 000012140573; GMNHTSA000218791]; EWO 521309 (June 9, 2005) [DOC ID S007116_000008319].

the 2005 Cobalt and 2005 Pontiac Pursuit) that a fix was available (the insert).[343] The key change (and the insert) did not, however, address the core problem of the low torque of the Ignition Switch; indeed, the engineers still regarded the key head design change as only a temporary solution[344] – or, as one engineer described it, a "band-aid."[345]

As noted above, Manzor was instrumental in moving forward the key head design change. Manzor was not involved with the Cobalt in 2004 when the initial PRTS was opened related to moving stalls; he became involved in the investigation of the Ignition Switch in the spring of 2005, around the time of the critical media reports. In the interviews conducted as part of this investigation, Manzor was the one witness who stated that he both believed and said, at the time, that the Cobalt Ignition Switch problem was incorrectly categorized as a moderate issue and should have been classified as a safety issue.[346] There is no documentary evidence of Manzor making such a statement. Manzor said he discussed his safety concerns about the Cobalt, including the potential for airbag non-deployment, with Parks, Altman, and a safety engineer, Naveen Ramachandrappa Nagapola.[347] Parks, Altman, and Nagapola did not recall those conversations, and investigation has revealed no contemporaneous evidence of such a conversation. Nagapola said he was certain such a conversation did not take place.[348] Altman said he did not consider, nor recall others considering, the possibility that the power failure might

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[343] Preliminary Information PIC3421A (July 12, 2005) [DOC ID 000124908092; GMNHTSA000458336].
[344] J&B Interview of Alberto Manzor, May 1, 2014; J&B Interview of David Trush, April 30, 2014; J&B Interview of Gary Altman, March 14, 2014. Presentation materials noted that the GMT 191 ignition switch, which would improve rotational torque by 200%, could allow GM "to transition back to a slotted key in 07/08." E-mail from Alberto Manzor, GM, to Raymond DeGiorgio, GM, *et al.* (June 20, 2005) [DOC ID 000012140573; GMNHTSA000218791]; Attached PowerPoint Presentation re "X001 Ignition Cylinder Effort . . . Next Actions" (June 20, 2005) [DOC ID 000012140574; GMNHTSA000218793].
[345] J&B Interview of David Trush, April 30, 2014.
[346] J&B Interview of Alberto Manzor, May 1, 2014.
[347] J&B Interview of Alberto Manzor, May 1, 2014.
[348] J&B Interview of Naveen Ramachandrappa Nagapola, May 1, 2014.

contribute to airbag non-deployment.[349] Parks did not recall any discussions about whether the low switch torque was a safety concern, and did not recall ever linking the Ignition Switch to the vehicle's airbags.[350]

11. June 2005: GM's Product Investigations Group Investigates Cobalt Moving Stalls in Response to Negative Media Coverage

At the same time that the engineers were trying to develop a fix for the problem of moving stalls in the Cobalt, GM was dealing with negative press about the very same problem. In the month after the May 17, 2005 PRTS was opened, the *Sunbury Daily Item*, the *New York Times*, and the *Cleveland Plain Dealer* published negative articles regarding the Cobalt.[351] On May 26, 2005, the *Sunbury Daily Item* included a review of the Cobalt in which the reviewer reported that "[u]nplanned engine shutdowns happened four times during a hard-driving test last week. . . . I never encountered anything like this in 37 years of driving and I hope I never do again."[352] On June 19, 2005, the *New York Times* reported that Chevrolet dealers were telling Cobalt owners to remove items from heavy key rings so they would not bump the ignition into the Off position. The reporter wrote that his own wife had knocked a Cobalt's steering column with her knee while driving on the freeway and the engine "just went dead."[353] When contacted by the *New York Times*, GM's manager for safety communications, Alan Adler, acknowledged the problem:

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[349] J&B Interview of Gary Altman, March 14, 2014.
[350] J&B Interview of Doug Parks, May 1-2, 2014.
[351] Gary Heller, *All-new Cobalt has good, bad, points*, Sunbury Daily Item (May 26, 2005) [DOC ID 000240759017]; Jeff Sabatini, *Making a Case for Keyless Ignitions*, New York Times (June 19, 2005) [DOC ID 000240759018]; Christopher Jensen, *Salamis, key rings, and GM's ongoing sense of humor*, Cleveland Plain Dealer (June 26, 2005) [DOC ID 000240757019].
[352] Gary Heller, *All-new Cobalt has good, bad, points*, Sunbury Daily Item (May 26, 2005) [DOC ID 000240759017].
[353] Jeff Sabatini, *Making a Case for Ignitions That Don't Need Keys*, New York Times (June 19, 2005) [DOC ID 000240759018].

> In rare cases when a combination of factors is present, a Chevrolet Cobalt driver can cut power to the engine by inadvertently bumping the ignition key to the accessory or off position while the car is running. Service advisers are telling customers they can virtually eliminate this possibility by taking several steps, including removing nonessential material from their key rings.[354]

Adler stated that GM did not consider this situation a safety issue because when the stalling occurs, the Cobalt is still controllable and can be restarted.[355] Adler further explained that this issue was not unique to the Cobalt because any vehicle could stall if the driver bumped the ignition switch from Run to Accessory or Off.[356] Adler stated in an e-mail to Manzor that he did not believe the Cobalt issue was a safety concern.[357]

In an article published a week later on June 26, 2005, the *Cleveland Plain Dealer* newspaper challenged GM's response as a "knee-slapper, suggesting that an engine that can be inadvertently turned off is not a safety problem. . . . So, if you're whisking along at 65 mph or trying to pull across an intersection and the engine stops, [you restart the engine after shifting to neutral.] Only a gutless ninny would worry about such a problem. Real men are not afraid of temporary reductions in forward momentum."[358]

Members of GM's legal staff learned of the *Cleveland Plain Dealer* article before it was published. Bill Kemp, a GM senior attorney who worked closely with the engineering groups and who had principal responsibility for safety issues in the legal department, suggested they

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[354] Alan Adler, GM Statement on Chevrolet Cobalt Inadvertent Shutoffs (June 13, 2005) [DOC ID S006878_000015062; GMNHTSA300005313].
[355] Alan Adler, GM Statement on Chevrolet Cobalt Inadvertent Shutoffs (June 13, 2005) [DOC ID S006878_000015062; GMNHTSA300005313].
[356] Alan Adler, GM Statement on Chevrolet Cobalt Inadvertent Shutoffs (June 13, 2005) [DOC ID S006878_000015062; GMNHTSA300005313]; e-mail from Alan Adler, GM to Alberto Manzor, GM, *et al.* (June 15, 2005) [DOC ID 000012140463;GMNHTSA000218778].
[357] E-mail from Alan Adler, GM. to Alberto Manzor, GM, *et al.* (June 15, 2005) [DOC ID 000012140463; GMNHTSA000218778].
[358] Christopher Jensen, *Salamis, key rings, and GM's ongoing sense of humor*, Cleveland Plain Dealer (June 26, 2005) [DOC ID 000240759019].

should give the columnist "a videotape demonstration showing the remoteness of this risk."[359] Another GM attorney, Elizabeth Zatina, responded that she was "not optimistic we can come up with something compelling."[360] Kemp replied: "[w]e can't stand hearing, after the article is published, that we didn't do enough to defend a brand new launch."[361]

William J. Kemp

From: William J. Kemp
Sent: 06/23/2005 05:18 AM
To: Elizabeth Zatina
Subject: Re: Cleveland Plain Dealer article

We can't stand hearing, after the article is published, that we didn't do enough to defend a brand new launch.

The media coverage increased GM's focus on the Ignition Switch, and, for the first time, the issue was raised with its Product Investigations ("PI") unit.[362] The PI group was charged with solving significant engineering problems, including both customer satisfaction and safety problems; it is the primary unit charged with investigating and resolving potential safety defects.[363] The PI group refers some investigations to the Field Performance Evaluation ("FPE") process, which is used to evaluate safety, compliance, emission, and customer satisfaction issues, and to determine whether a field action (*e.g.*, a recall) is necessary.[364]

In response to the media coverage, GM Product Investigations Manager Doug Wachtel assigned PI employee Elizabeth Kiihr to investigate the Cobalt Ignition Switch shut-off.[365]

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[359] E-mail from William Kemp, GM, to Elizabeth Zatina, GM, *et al.* (June 22, 2005) [DOC ID 000009103179].
[360] E-mail from Elizabeth Zatina, GM, to William J. Kemp, GM (June 23, 2005) [DOC ID 000009103179].
[361] E-mail from William J. Kemp, GM, to Elizabeth Zatina, GM (June 23, 2005) [DOC ID 000009103179].
[362] J&B Interview of Douglas Wachtel, March 18, 2014.
[363] J&B Interview of Gay Kent, May 16, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[364] J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[365] J&B Interview of Douglas Wachtel, March 18, 2014.

(Until April 2013, the Product Investigations group had 8 investigators; now it has 40.)[366] Wachtel's team looked at early data from the field and found 14 incidents that might have been related to the Ignition Switch.[367] The PI group also tried to recreate the problem themselves.[368] Wachtel and Gay Kent obtained a Cobalt and drove around GM's property in Warren. Kent had a long and heavy key chain, and was able to knock the ignition from Run to Accessory by moving her leg so that her jeans caused friction against the fob.[369] Wachtel could reproduce the phenomenon even more easily, but still only by contacting the key chain rather than hitting bumps in the road.[370]

Notwithstanding the multiple media reports, the customer complaints, and being able to replicate the issue in the field, the PI team concluded that the Ignition Switch problem was not of such a magnitude as to require a recall, either for safety or customer service. On June 28, 2005, the same day that the VAPIR was finishing its consideration of engineering fixes, the PI team held an Investigation Status Review ("ISR") meeting at which Elizabeth Kiihr presented on the Ignition Switch.[371]

Following that meeting, Kiihr e-mailed Manzor stating: "We are currently not planning on continuing this issue in the FPE process."[372] According to Kiihr, at the time of the investigation, she did not think the problem was occurring frequently; she noted that drivers still

[366] J&B Interview of Mark Johnson, May 7, 2014; J&B Interview of Carmen Benavides, April 22, 2014.
[367] J&B Interview of Elizabeth Kiihr, May 15, 2014; TREAD Search Results (June 28, 2005) [DOC ID 000005586004; DOC ID 000005586005; DOC ID 000005586006].
[368] J&B Interview of Douglas Wachtel, March 18, 2014.
[369] J&B Interview of Douglas Wachtel, March 18, 2014.
[370] J&B Interview of Douglas Wachtel, March 18, 2014.
[371] J&B Interview of Elizabeth Kiihr, May 15, 2014.
[372] E-mail from Alberto Manzor, GM, to Joseph Manson, GM, *et al.* (June 28, 2005) [DOC ID S007116_000008261] (quoting e-mail from Elizabeth Kiihr).

had manual steering and brakes available after a stall.[373] She and her PI colleagues, GM's lead safety investigators, failed to understand that turning off the ignition also disabled the airbags. They did not consider the circumstance that would be repeated in years to come: customers in off-road situations losing power due to the low torque of the Ignition Switch just before a crash – when airbags are needed the most. Instead, the PI team supported issuing a Technical Service Bulletin – a notice to dealers, but not consumers – about the issue, which GM did in December 2005.[374] Product Investigations also supported changing the key design from a slot to a hole style key.[375]

The evidence demonstrates that DeGiorgio was alerted to the press problems as well. Delphi internal communications from June 2005 indicate that "Ray" asked for "force displacement curves" on "ignition switches (mainly the Delta)." The Delphi engineer stated, "Cobalt is blowing up in their face in regards to turning the car off with the driver's knee."[376]

From: Coniff, John B
Sent: Tuesday, June 14, 2005 2:28 PM
To: Svoboda, Thomas E; Lin, George J
Subject: Force displacement curves

Tom, who has the capability to run force displacement, curves on all the Ignition switches (mainly the Delta) is it Condura or D.G.? Ray is requesting this information. Cobalt is blowing up in their face in regards to turning the car off with the driver's knee. Please le t me know.

Thanks

[373] J&B Interview of Elizabeth Kiihr, May 15, 2014.
[374] J&B Interview of Douglas Wachtel, March 18, 2014; Service Bulletin 05-02-35007 (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773].
[375] J&B Interview of Douglas Wachtel, March 18, 2014.
[376] E-mail from John B. Coniff, Delphi, to Thomas E. Svoboda, Delphi, *et al.* (June 14, 2005) [DOC ID 000051786007].

DeGiorgio claims not to recall hearing about any of the negative press, nor whether he had made such a comment to Delphi.[377] We have found no documents within GM reflecting such a communication.

Days after the ISR, a GM customer filed a complaint about a 2005 Cobalt prone to moving stalls.[378] The customer complaint states: "2005 Chevrolet Cobalt experienced problems with total loss of the electrical system and the vehicle stalling…The consumer stated the ignition switch was poorly installed. Even with the slightest touch the vehicle will shut off in motion." Attached to the complaint is a letter from the customer to GM Customer Service that states:

> This is a safety/recall issue if ever there was one. Forget the bulletin. I have found the cause of the problem. Not suggested causes as listed in bulletin. The problem is the ignition turn switch is poorly installed. Even with the slightest touch, the car will shut off while in motion. I don't have to list to you the safety problems that may happen, besides an accident or death, a car turning off while doing a high speed must cause engine and other problems in the long haul. I am forwarding this letter to [NHTSA] as I firmly believe that this ignition switch needs to be recalled, reexamined and corrected.[379]

[377] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[378] Customer complaint (June 29, 2005) [DOC ID 000014669078; GMNHTSA000540683]. We are also aware of one Better Business Bureau arbitrator decision mandating that GM repurchase a Cobalt from a customer who complained of intermittent stalling, because "unexplained stalling of a vehicle in traffic certainly constitutes a serious safety hazard." BBB arbitration decision of Norma Lovaco (Feb. 27, 2006) [DOC ID EXPORTJM000042544].
[379] Customer complaint (June 29, 2005) [DOC ID 000014669078; GMNHTSA000540683].

June 29, 2005

Chevrolet- General Motors Corp.
PO Box 33170
Detroit, MI 48232-5170

2005

RE: 2005 CHEVY COBALT VIN# 1G1AL52F357[redacted]

Dear Customer Service:

As my previous correspondence explained, a safety situation had occurred (three times) with my new 2005 Cobalt- turning off while driving. The third time was very close to an accident on a

This is a safety/recall issue if ever there was one. Forget the bulletin. I have found the cause of the problem. Not suggested causes as listed in bulletin. The problem is the ignition turn switch is poorly installed. Even with the slightest touch, the car will shut off while in motion. I don't have to list to you the safety problems that may happen, besides an accident or death, a car turning off while doing a high speed must cause engine and other problems in the long haul.

I am forwarding this letter to the National Highway Traffic Safety Administration as I firmly believe that this ignition start switch needs to be recalled, re-examined, revised and corrected.

5. Driver's knee does NOT hit the key chain.

Despite this complaint, the Ignition Switch problem continued to be categorized as a customer convenience issue rather than a safety issue. On July 12, 2005, GM updated its prior Preliminary Information to dealers (not customers), advising that "Engineering has come up with an insert for the key ring, so that it goes from a 'slot' design to a hole. As a result, the key ring cannot move up and down the slot any longer, it can only rotate on the hole. In addition, the previous key ring has been replaced with a smaller, 13mm design."[380]

12. September 2005: Engineering Committees Reject Proposals to Change the Switch

In September 2005, engineering teams considered whether to replace the problematic Cobalt Ignition Switch altogether with the GMT 191 switch that DeGiorgio had been advocating. The motive to make the change, according to Lori Queen (the Vehicle Line Engineer for Small Cars), was that the Cobalt team identified a customer satisfaction issue with the Ignition Switch

[380] Preliminary Information PIC3421A (July 12, 2005) [DOC ID 000124908092; GMNHTSA000458336].

and had figured out how to fix it.[381] Queen did not remember why the proposed use of the GMT 191 switch was rejected; her review of contemporaneous documents led her to conclude that it was rejected as being too expensive and would not result in offsetting changes in savings on warranty costs.[382] Once again, GM personnel's misclassification of the issue as one of convenience, rather than safety, resulted in a solution being derailed by cost.

In rejecting the GMT 191 switch proposal, the Cross-VAPIR committee (*see* Appendix B) concluded that the proposed key head design change would be an adequate fix – a fix that ended up being cancelled in the coming months.[383]

13. December 2005: GM Issues a Technical Service Bulletin Regarding "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs"

Having failed to identify the airbag non-deployment connection and having declined to treat moving stalls as a safety issue, GM personnel proceeded with partial field solutions. One of those was the decision to send a Technical Service Bulletin in 2005 to dealers. A Technical Service Bulletin ("TSB") is also a communication to dealers (not consumers), and generally provides information both about a problem and a potential solution. TSBs are provided to NHTSA and available on the NHTSA website.

In December 2005, GM issued a TSB entitled: "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs."[384] Like the prior Preliminary Information, the TSB explained to dealers that GM now had an insert to change the key from a slot to a hole and a new smaller 13 mm key ring. The TSB applied to five models:

[381] J&B Interview of Lori Queen, May 12, 2014.
[382] J&B Interview of Lori Queen, May 12, 2014.
[383] J&B Interview of David Trush, March 17, 2014; EWO 521309 (June 9, 2005) [DOC ID S007116_000008319].
[384] Service Bulletin 05-02-35007 (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773].

- 2005-2006 Chevrolet Cobalts;
- 2006 Chevrolet HHRs;
- 2005-06 Pontiac Pursuits;
- 2006 Pontiac Solstices; and
- 2003-2006 Saturn Ions.[385]

The main text of the TSB was virtually identical to the prior Preliminary Informations from earlier in 2005, in describing a "potential for the driver to inadvertently turn off the ignition due to low ignition key cylinder torque/effort."[386]

Like the prior Preliminary Information, the TSB also warned that drivers should "remov[e] unessential items from their key chain," and explained that engineering had developed an insert for the key head, designed to change the slot to a hole, and noted that GM would be providing smaller key rings.[387] Unlike the Preliminary Information that preceded this Service Bulletin[388] or an earlier Service Bulletin request drafted by Steve Oakley, the Technical Service Bulletin did *not* describe the problem as involving a "stall."[389] According to Oakley, the term "stall" is a "hot" word that GM generally does not use in bulletins because it may raise a concern about vehicle safety, which suggests GM should recall the vehicle, not issue a bulletin.[390]

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[385] Service Bulletin 05-02-35007 (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773].
[386] Preliminary Information, Engine Stalls, Loss of Electrical Systems, and No DTCs (Feb. 28, 2005) [DOC ID 000000000067; GMNHTSA000272962].
[387] Service Bulletin 05-02-35007 (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773].
[388] Preliminary Information, Engine Stalls, Loss of Electrical Systems, and No DTCs (Feb. 28, 2005) [DOC ID 000000000067; GMNHTSA000272962].
[389] Service Bulletin 05-02-35007 (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773]; Preliminary Information, Engine Stalls, Loss of Electrical Systems, and No DTCs (Feb. 28, 2005) [DOC ID 000000000067; GMNHTSA000272962]; Preliminary Information (July 12, 2005) [DOC ID 14032000467431; GMNHTSA000002397]; Preliminary Information (Sept. 15, 2005) [DOC ID 14032000467433; GMNHTSA000002399].
[390] J&B Interview of Steven Oakley, April 23, 2014.

Others agreed that GM is sensitive to using the word "stall" in a service bulletins and closely scrutinizes any bulletin that does include "stalls" as a symptom.[391] Others at GM confirmed that there was concern about the use of "stall" in a TSB because such language might draw the attention of NHTSA.[392] Oakley said that at times, he included "hot" words to draw attention to an issue from Product Investigations personnel who review Service Bulletins before release.[393] Oakley also noted, however, that he was reluctant to push hard on safety issues because of his perception that his predecessor had been pushed out of the job for doing just that.[394] As discussed above, discussions with Altman and other engineers alleviated Oakley's initial concern that the Ignition Switch presented a safety issue.[395]

Oakley's draft with the "hot" language went to Product Investigations for review. Again, the engineers in Product Investigations failed to make the link between the Ignition Switch position and airbag non-deployment and did not elevate the Cobalt's Ignition Switch as a safety issue into the process to consider recalls.[396] Instead, it excised the "hot" word "stall" from the bulletin, and considered the matter closed.[397]

As a result, the Technical Service Bulletin did not solve the problem. In order for a GM vehicle owner to learn of the suggested service fix (*i.e.*, removal of excess weight from the key chain) and to obtain a key insert plug and smaller key ring, (1) the customer had to experience a

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[391] J&B Interview of Douglas Wachtel, March 18, 2014; J&B Interview of Keith Mikkelson, April 23, 2014.
[392] J&B Interview of Carmen Benavides, May 19, 2014; J&B Interview of Gay Kent, May 16, 2014.
[393] J&B Interview of Steven Oakley, April 23, 2014.
[394] J&B Interview of Steven Oakley, May 7, 2014.
[395] J&B Interview of Steven Oakley, April 10, 2014.
[396] J&B Interview of Douglas Wachtel, March 18, 2014.
[397] J&B Interview of Steven Oakley, April 23, 2014; Preliminary Information, Engine Stalls, Loss of Electrical Systems, and No DTCs (Feb. 28, 2005) [DOC ID 000000000067; GMNHTSA000272962]; Service Bulletin 05-02-35007 (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773].

moving stall; (2) the customer had to go to the dealership to complain of the issue; (3) the technician at the dealership had to diagnose the issue properly; and (4) the technician had to search GM's bulletin database to identify the applicable bulletin without using the term "stall" since the word would not appear in the TSB as issued. The odds were not with the consumer. Moreover, when GM issued the TSB, the prior Preliminary Informations (which had accurately used the word "stall") were removed from the dealer database as obsolete. Although GM created over 10,000 key plug inserts, only approximately 430 were ever requested by customers.

Moreover, as discussed above, although GM made the key insert available to consumers of previously purchased vehicles, it did not, at the same time, change the key for cars that were rolling off the assembly line and those yet to be produced. That fix for future production vehicles, approved by the VAPIR in June 2005, was not implemented in 2005. GM was having a price dispute and quality problems with its supplier, Ortech, which was going out of business. Those disputes were delaying other changes to the ignition cylinder that GM personnel believed were more important; in September 2006, GM personnel abandoned the change to the key head, citing those delays. Thus, even the "band-aid" that GM engineers thought they were applying was not implemented for new cars. This ended GM's efforts to implement the key design and key ring change in the 2005 and 2006 time period.

14. After Numerous Reports of Moving Stalls, Engineering Work to Resolve the Problem, Multiple Committee Meetings, and a Brief Investigation by GM's Safety Investigators, No Meaningful Action Is Taken

The fact that keys were being inadvertently turned to Accessory was certainly no secret. Consumers, the media, and GM's own employees reported the problem on numerous occasions, and how it led to moving stalls. GM engineers replicated the stalls multiple times in the field,

and knew full well – from the outset – that the ignition turned to Accessory because of low torque, a below-Specification torque approved by DeGiorgio. While engineers developed short-term and long-term solutions for the problem, none of the engineers on the multiple, cross-disciplinary committees that looked at the stalling problem made the simple connection that GM had designed the car so that turning the key to Accessory disabled the airbags.

The engineers made a basic mistake. They did not know how their own vehicle had been designed. And GM did not have a process in place to make sure someone looking at the issue had a complete understanding of what the failure of the Ignition Switch meant for a customer.

As a result, those looking at the stalls caused by the inadvertent turning of the Ignition Switch rated the problem a "convenience" issue rather than one of "safety" – an error that led to enormous consequences for many. GM personnel further compounded this error by providing information to its dealers that obscured the problem – removing the word "stall" from its TSB precisely because that word might trigger customer's concerns about safety.

As a result of these multiple failures, and the failure of DeGiorgio to provide critical information to those reviewing the issue, Cobalts stayed on the road with a safety defect that could have been addressed many years earlier.

C. The Ignition Switch Part Change

Unbeknownst to the GM engineers discussing potential solutions to the problem of low torque in the Ignition Switch, DeGiorgio was communicating with Delphi about how to increase torque in the Ignition Switch for future model years. These discussions led to a solution to the problem of low torque in certain MY 2007 Cobalts and all Cobalts from MY 2008-2010.

The fact that GM personnel investigating the Ignition Switch in future years did not know about the fix, and that DeGiorgio himself says he does not remember it, had a significant effect on GM's response in ensuing years. In the end, as described below, the hidden implementation of a solution to the problem addressed the issue for drivers of MY 2008-2010 Cobalts (and some MY 2007 Cobalts), but made it more difficult for GM engineers to determine what was causing problems for the drivers of earlier models. As a result, drivers of earlier model year Cobalts and other vehicles continued to drive cars with safety defects.

1. Late 2005 to Early 2006: Discussions About Changing the Spring and Plunger

Documents reflect that, in late 2005 (months after the bad press) and early 2006, DeGiorgio discussed with Delphi putting a stronger spring and plunger into the Ignition Switch.[398] In January 2006, a Delphi engineer sent DeGiorgio an e-mail informing him that, "per our conversation in December, I sent you the 24 Delta Ignition Switch samples for vehicle testing. . . . These switches contain the new PCB design and also the stronger Catera detent spring-plunger."[399]

As noted in the January 2006 e-mail, one of the solutions discussed was using a spring from the new Cadillac Catera SRX (GMT 265) switch in the Cobalt. Throughout 2005, DeGiorgio had been working on improving the electrical architecture of the ignition switch for

[398] E-mail from John B. Coniff, Delphi, to Raymond DeGiorgio, GM (Sept. 22, 2005) [DOC ID 000012168115; GMNHTSA000263918]; e-mail from Raymond DeGiorgio, GM to John B. Coniff, Delphi, *et al.* (Sept. 22, 2005) [DOC ID 000012168115; GMNHTSA000263918]; e-mail from John B. Coniff, Delphi, to Raymond DeGiorgio, GM (Sept. 22, 2005) [DOC ID 000012168115; GMNHTSA000263918]; e-mail from George J. Lin, Delphi, to Raymond DeGiorgio, GM, John B. Coniff, Delphi, *et al.* (Sept. 28, 2005) [DOC ID 000012168174; GMNHTSA000406699]; e-mail from George J. Lin, Delphi, to Raymond DeGiorgio, GM, John B. Coniff, Delphi, *et al.* (Oct. 4, 2005) [DOC ID 000012168224; GMNHTSA000263926]; e-mail from George J. Lin, Delphi, to Raymond DeGiorgio, GM, John B. Coniff, Delphi, *et al.* (Oct. 20, 2005) [DOC ID 000012168344; GMNHTSA000406701].

[399] E-mail from Arturo Alcala, Delphi, to Raymond DeGiorgio, GM, John B. Coniff, Delphi, *et al.* (Jan. 6, 2006) [DOC ID 000051786002; GMNHTSA000257777].

the Catera SRX; in fact, DeGiorgio had worked on an earlier version of the switch in 1999 for the Cadillac Catera car (the GMX 320). In early 2006, DeGiorgio and Delphi expressly discussed using the spring and detent plunger from the Catera in the Cobalt Ignition Switch.[400] The evidence does not show, however, whether importing the Catera spring into the Ignition Switch in the Cobalt (and other Delta and Kappa platform vehicles) was Delphi's idea or DeGiorgio's. Regardless, the plan took root.

Following discussions with DeGiorgio, Delphi produced a new version of the Cobalt Ignition Switch with two changes, one electrical and one mechanical. The electrical one was a "new PCB [Printed Circuit Board] design," intended to address electrical problems with the Ignition Switch that continued to cause the vehicle not to start (the no crank/no start problem). The mechanical change was a "stronger Catera detent spring-plunger," a change intended to increase the torque required to turn the Ignition Switch.[401] An internal Delphi document indicates that this switch design – with a longer detent spring-plunger – was the same as the longer detent spring-plunger design originally drafted by Delphi in 2001.[402] In other words, this option had been available when the Ignition Switch had first been designed.

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[400] E-mail from Eduardo P. Rodriguez, Delphi, to Raymond DeGiorgio, GM, *et al.* (March 24, 2006) [DOC ID DLPH_DOJ_0000913]; spreadsheet referring to Catera spring and plunger in Cobalt ignition switch [DOC ID DLPH_DOJ_0000924], attached to e-mail from Eduardo P. Rodriguez, Delphi, to Raymond DeGiorgio, GM, *et al.* (March 31, 2006) [DOC ID DLPH_DOJ_0000923]; e-mail from Eduardo P. Rodriguez, Delphi, to Raymond DeGiorgio, GM, *et al.* (March 31, 2006) [DOC ID DLPH_DOJ_0000927]; e-mail from Raymond DeGiorgio, GM, to Eduardo P. Rodriguez, Delphi, *et al.* (April 5, 2006) [DOC ID DLPH_DOJ_000927].

[401] E-mail from Arturo Alcala, Delphi to Raymond DeGiorgio, GM, John B. Coniff, Delphi, *et al.* (Jan. 6, 2006) [DOC ID 000051786002; GMNHTSA000257777].

[402] Drawing 741-76307-T [DOC ID GMHEC000003206]; 2001 Long Detent Spring Drawing, Drawing 741-79378 (2001) [Ex. A.3.a(2) 2001 Long Detent Spring Drawing]; 2001 Short Detent Spring Drawing, Drawing 741-75259 (2001) [Ex. A.3.a (1) 2001 Short Detent Spring Drawing]; e-mail from Antero Cuervo, Delphi, to Lyle Miller, Delphi (Oct. 29, 2013) [DOC ID 000004253527; GMNHTSA000223906]. There is no indication that GM received these documents in 2001.

In early 2006, Delphi employees continued to correspond with DeGiorgio regarding the changes to the Ignition Switch. The main focus of Delphi's correspondence was on the electrical changes, but the e-mails also discussed the modification in the switch to the stronger "Catera Spring/Plunger."[403] An internal Delphi document from January 2006 specifically described the change to the spring as a request from GM "to be in specification according [to] the GM spec for the torque forces," an acknowledgment that the current production Ignition Switch was out of specification and that DeGiorgio was now focusing on meeting the Specification.[404]

2. April 2006: DeGiorgio's Approval of the Ignition Switch Design Change

On April 26, 2006, DeGiorgio approved the redesigned Ignition Switch by signing what is called a Form 3660, giving Delphi permission to begin manufacturing the redesigned switch.[405] The Form 3660 stated, "[n]ew detent plunger (Catera spring/plunger) was implemented to increase torque force in switch."[406] Each Form 3660 has to link back to a master work order, and this one did as well. But the work order to which it was linked was only for the electrical improvements to the Ignition Switch; the work order did not include the change to the spring and plunger.[407] As the work order stated, and DeGiorgio confirmed, there was no cost associated with the change to the Catera spring.[408] The new Ignition Switch required greater torque to turn the key than the original switch and, as became clear in future years, did not lead

[403] E-mail from Arturo Alcala, Delphi, to Raymond DeGiorgio, GM, John B. Coniff, Delphi, *et al.* (Jan. 6, 2006) [DOC ID 000051786002; GMNHTSA000257777]; e-mail from Raymond DeGiorgio, GM, to Arturo Alcala, Delphi (Jan. 9, 2006) [DOC ID 000051786002; GMNHTSA000257777].
[404] Delphi Change Request Form (Jan. 15, 2006) [DOC ID 120198-000353].
[405] Form 3660 (April 26, 2006), at 3 [DOC ID 000004253529; GMNHTSA000223924].
[406] Form 3660 (April 26, 2006), at 3 [DOC ID 000004253529; GMNHTSA000223924].
[407] EWO 302726 (Feb. 19, 2004) [DOC ID 000000000080; GMNHTSA000220667].
[408] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; EWO 302726 (Feb. 19, 2004) [DOC ID 000000000080; GMNHTSA000220667].

to the non-deployment of airbags in crashes. Thus, the change that actually succeeded in resolving the Ignition Switch problem by increasing the torque (a) was made at no cost, (b) used a part that had been available in 2001, and (c) had no corresponding work order, resulting in no one finding it until shortly before the recall.

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Note that the during cycling, 1 amp was applied on the Delta Ignition Sw. This validation was submitted with New PCB correct timings adjusts as Customer required, also New detent plunger (Catera spring/Plunger) was implemented to increase torque force in the switch.

Supplier Name (please print)* Eduardo Rodriguez Title* Present Product Eng Phone No.* 956-554-5857
Supplier Authorized Signature* Eduardo Rdz P. Dated:* 4/24/06

GM DECISION: Rejected (see comments below) ☐ Re-submit (see comments below) ☐ Sign-Off Complete ☒
GM Name (please print) Ray DeGiorgio Phone No. 586-947-3555
GM Authorized Signature Code: CZ34 Dated: APRIL 26, 2006
Comment:

Delphi's Part Submission Warrant was signed a month later.[409] Delphi documents suggest that the new Ignition Switch went into production sometime after June 26, 2006.[410]

DeGiorgio states that he does not remember any of these events, including the discussions with Delphi about increasing torque, the use of a Catera spring he had previously worked on, or the authorization of the change.

[409] Delphi Part Submission Warrant (May 26, 2006) [DOC ID 120198-000363].
[410] PRTS 1996/2006/US (May 22, 2006) [DOC ID 14021301731670].

3. May 2006: DeGiorgio's Approval of the Design Change Without a Change in Part Number

Although the design of the Ignition Switch changed, the part number remained the same. An internal Delphi document dated May 27, 2006, expressly stated that "Ray [sic] DeGiorgio … agree[d] to implement change without changing GM p/n. He provides his approval."[411] As Mary Barra has explained, it was "Engineering 101" that, given the significance of the change to the ignition switch, the part number should have been changed.[412] But DeGiorgio did not change it.

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Engineering Change Support Information Cover Page

File Number:	57128dat.doc

Main information about Technical Evaluation:	This information support the implementation on New PCB 12861211 Rev 5 and the New Detent Plunger 741-79378. Durability 3 times life test was perform according GM specification in Lab Test # C005-177. Torque and Angle test was perform in DG with Work Request 06-0871 Ray DeGiorgio (GM RDE) agree to implement change without changing GM p/n. He provides his approval with GM3660 to implement both changes. *PCB price is increasing and being in negotiations with Viasystems to get a better price, according Managers and PDT meeting we can not wait to get the correct price because the big fall-out registered in the production line closed to 30%

Part numbers are the means by which GM and its suppliers keep track of the components in GM vehicles. GM had a policy that required an engineer to change the part number for any change that impacts a part's "fit, form, or function."[413] Here, the change to the spring in the Ignition Switch changed the part's function, but DeGiorgio chose not to change the part number.

[411] Form 3660 Cover Memorandum (May 26, 2006), at 1 (enclosing a copy of the Form 3660 for approval) [DOC ID 000004253529; GMNHTSA000223924].
[412] J&B Interview of Mary Barra, April 14, 2014.
[413] Section No. G3.1.1 of GM's Global Product Description System – "Vehicle Part Number Assignment" (Feb. 8, 2003), at 2 [DOC ID 000039358889; GMNHTSA000553412].

GM's policy further provided that an engineer could seek an exception to the part number requirement (i) if certain criteria are met, or (ii) if the criteria are not met, with approval of the Change Approval Board.[414] The facts here did not meet the criteria for an exception, and DeGiorgio did not seek authorization of the Change Approval Board to proceed with the same part number.

Design Release Engineers, like DeGiorgio, are responsible for determining whether a part change requires a new part number.[415] There are exceptions to the part number change rule, none of which DeGiorgio availed himself. We found no proposal not to change the part number, no use of a temporary work order (under which he could change a part while operating temporarily under the old part number), and no other scrutiny of any kind. For his part, DeGiorgio remembers none of this and offers no explanation for why he did not change the part number.

Whatever DeGiorgio's reasons for not changing the part number, the failure to make the change had serious consequences. Although the change effectively cured the problem of low rotational torque in the Ignition Switch and addressed the safety problem in future cars, it did nothing for cars built prior to the break-point.[416] Worse, as crashes continued to occur and GM investigators tried to find the cause, the failure to change the part number led the investigators in future years to a wrong conclusion. When they incorrectly concluded there had not been a change in the Ignition Switch between MY 2008 models and earlier, they incorrectly concluded

[414] Section No. G3.1.1 of GM's Global Product Description System – "Vehicle Part Number Assignment" (Feb. 8, 2003), at 3-4 [DOC ID 000039358889; GMNHTSA000553412].
[415] J&B Interview of Vickie Teetsel, April 9, 2014.
[416] In September 2006, Raymond DeGiorgio purchased an MY 2007 Cobalt for his son. It is not clear, based on the timing of the purchase, whether the Cobalt had the old version of the Ignition Switch or the improved version of the Ignition Switch with the new spring authorized by DeGiorgio.

that the Ignition Switch was not to blame. Had others at GM known that the Ignition Switch had been changed during MY 2007,[417] it is highly likely they would have concluded their investigation much more swiftly and recalled the Cobalt and other cars earlier.

VI. 2006 – 2014: THE LONG INVESTIGATION INTO ROOT CAUSE

As described above, by June 2006, engineers at GM had been addressing the issue of moving stalls in the Cobalt for almost two years. Still, they did not view the problem as a safety issue and did not understand the relationship between airbag non-deployment and the ease with which the Ignition Switch could be rotated to Accessory. And, notwithstanding a decision to change the key head, no solution had, in fact, been implemented. (Although DeGiorgio had approved a redesign of the switch in 2006, it did not address the MY 2005, MY 2006, and certain MY 2007 vehicles.) By this time, GM personnel had publicly announced that there was no safety issue with Cobalt moving stalls, and GM's group of safety engineers, the Product Investigations ("PI") group, had determined no further investigation was warranted.[418]

From 2006 to 2011, GM's PI group did not focus on issues related to the Cobalt Ignition Switch. Beginning in 2006, however, GM attorneys and a different group of engineers working

[417] There is no evidence that DeGiorgio told others at GM, including engineers on the Cobalt program team, about the spring change to the Ignition Switch that he authorized in April 2006. However, documents subsequent to the change indicate that a handful of GM engineers in other departments received information describing the change. For example, a June 30, 2006 e-mail from Delphi to DeGiorgio described the changes to the switch, including that the "detent plunger is implemented to increase torque forces to be within specification," and included four other GM engineers on the e-mail. E-mail from Eduardo P. Rodriguez, Delphi, to Raymond DeGiorgio, GM, *et al.* (June 2, 2006) [DOC ID DLPH_DOJ_0000970]. Similarly, an unrelated PRTS report was opened in June 2006 by a Saturn supply quality engineer that referred back to DeGiorgio's change to the switch, and specifically noted: "The detent plunger torque force was increased. This change was treated as a black box tier 3 design change and was approved via a 3660 document signed off by the GM DRE." PRTS N202832 (June 13, 2006), at 10 [DOC ID 14030700024180; GMNHTSA000020327; GMHEC000020630]. These individuals were not involved in the investigations that ensued in the coming years, nor did they hold a position, like DeGiorgio's, with responsibility for the Ignition Switch.

[418] J&B Interview of Gary Altman, March 14, 2014; J&B Interview of Doug Parks, March 18, 2014; PRTS N172404 (Nov. 19, 2004) [DOC ID 000001771143; GMNHTSA0001426581]; Alan Adler, GM Statement on Chevrolet Cobalt Inadvertent Shutoffs (June 13, 2005) [DOC ID S006878_000015062; GMNHTSA300005313].

in collaboration with them began to see accidents and claims in Ions and Cobalts that involved non-deployment of airbags and that, they would ultimately conclude, related to the Ignition Switch. As discussed below, the ongoing work of Field Performance Assessment ("FPA") engineers made slow progress, in no small part because they failed to search for or find information relevant to the problem of airbag non-deployment that was either public or actually in GM's own files. The FPA engineers, accustomed to focusing on individual claims or lawsuits and explanations of individual crashes, did not even consider searching for this information, which might have materially advanced their investigation.

The failure to locate and use this information, the failure to elevate issues in a timely manner, and the narrowness with which each group – lawyers and engineers alike – approached their roles, are important reasons why the investigation proceeded slowly.

A. 2006: Litigation Into Fatalities Begins

For the most part, the first Cobalt and Ion airbag non-deployment cases began reaching GM's Legal Staff in late 2005 and 2006.[419] The first two, [redacted] death and [redacted] head injuries, involved accidents in which GM would not have expected the airbags to deploy. But in the third, the death of [redacted], engineers believed that the airbags should have deployed, and despite "extensive analysis," the GM lawyer working with the

[419] GM's Legal Department received notice of the first Ion non-deployment claim in January 2004 for [redacted], who was in a 2004 Saturn Ion. Letter from Douglas Brown, GM, to Yvette Young, ESIS (Jan. 28, 2004) [DOC ID 000001714004; GMNHTSA000200613]; J&B Interview of Douglas Brown, March 19, 2014. While GM's claims administrator ESIS handled this claim, Doug Brown and Jaclyn Palmer were consulted, and the claim was ultimately denied. Memo from Yvette Young, ESIS, to Jaclyn Palmer, GM (Jan. 13, 2005) [DOC ID 000001714013; GMNHTSA000200638]. [redacted] is the first Cobalt claim that was brought to GM Legal's attention. GM opened the matter in September 2005. Letter from Kristy Gibb, GM, to Douglas Brown, GM (Sept. 9, 2005) [DOC ID 000001660004; GMNHTSA000200670]. GM Legal had the engineering analysis completed by January 2006, in time for a January 31, 2006 settlement roundtable meeting. GM, Activity Notes form, File No. 501661 (Jan. 31, 2006) [DOC ID 000001660023; GMNHTSA000200717].

assistance of outside counsel experienced in airbag litigation reported to colleagues that "the engineers have no solid technical explanation."[420]

1. Background on the GM Legal Department

Before addressing these specific accidents, we provide some background on how the GM Legal Department (also referred to as "GM Legal Staff" or "GM Legal") dealt with product liability cases, particularly when they intersected with safety issues.

Thomas Gottschalk was General Counsel ("GC") of GM from 1994 until August 2006. He was succeeded by Robert Osborne.[421] In July 2009, Michael Millikin succeeded Osborne as GC.[422]

During the relevant period, the General Counsel of GM North America reported to the GC. That post was held by Chris Johnson until October 2008, by Michael Robinson from October 2008 to September 2009, by Fred Fromm from 2009 to 2011, and by Lucy Clark Dougherty from March 2011 to the present.

Both the lawyers in charge of safety issues and the lawyers in charge of product litigation reported to the General Counsel of GM North America. Two of Clark Dougherty's direct reports are Bill Kemp and Larry Buonomo.[423] Kemp, Counsel for Global Engineering Organization, is widely regarded as GM's most knowledgeable, experienced, and trusted safety lawyer.[424] He has been at GM for decades. Buonomo's title is Practice Area Manager – Global Process &

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[420] GM, Settlement Roundtable/Case Summary, *Estate of* [redacted] *v. GM* – PL: 511176 (Oct. 3, 2006) [DOC ID 000001714429; GMNHTSA000297436].
[421] Cotsirilos, Tighe & Streicker, Poulos & Campbell, Ltd. Interview of Robert Osborne, May 12, 2014.
[422] J&B Interview of Michael Millikin, April 4, 2014.
[423] J&B Interview of Lucy Clark Dougherty, April 16, 2014.
[424] J&B Interview of Lawrence Buonomo, April 16, 2014.

Litigation, where he oversees, among other things, product litigation cases. Before Buonomo, a GM lawyer named Michael Gruskin oversaw product litigation cases.[425]

In the area of safety, the two functions can intersect. Indeed, Kemp and his colleague Deb Nowak-Vanderhoef sit on one of the two committees that determines whether and at what price to settle product liability lawsuits.[426] A reason for that assignment is to ensure that information from lawsuits finds its way into GM's safety function, that is, to the engineers who make safety decisions.[427] Their presence is a practice specifically designed to defeat information silos, and to ensure important information makes its way to engineers.[428]

Product litigation staff attorneys have frontline responsibility for managing lawsuits and claims that are not in litigation, called not-in-suit-matters, or NISMs. When necessary to defend lawsuits or NISMs, the product litigation staff attorneys retain outside counsel. Outside counsel is required to provide a written evaluation of all lawsuits and NISMs to GM soon after receiving a matter. The purpose of these "early" evaluations is to determine whether a case is a trial candidate or a case that should be settled. Outside counsel is expected to provide updated case evaluations at key points throughout the litigation – including after the case is assigned a trial date.

Two groups of non-lawyers dedicated to assisting GM product litigators and outside counsel in defending product claims are Field Performance Assessment ("FPA") engineers and ESIS claims administrators. FPA engineers are assigned to gather information and assess

[425] J&B Interview of Lawrence Buonomo, April 16, 2014.
[426] J&B Interview of William Kemp, April 17, 2014; J&B Interview of Deborah Nowak-Vanderhoef, May 1, 2014.
[427] J&B Interview of Ronald Porter, April 30, 2014; J&B Interview of Jaclyn Palmer, April 24, 2014.
[428] J&B Interview of Michael Gruskin, May 12, 2014.

technical issues in lawsuits and NISMs.[429] The FPA group is distinct from Product Investigations and the FPE process.[430] FPA engineers conduct their own technical assessments, which might include reviewing police reports and medical records, interviewing witnesses, inspecting vehicles, and analyzing SDM data.[431] FPA engineers share their technical assessments with product litigation staff attorneys and outside counsel, assist in responding to plaintiffs' discovery requests, and may testify as experts or 30(b)(6) witnesses. FPA engineers' technical assessments are the lawyers' primary source of technical information for the early case evaluations, and are a critical factor in the evaluation of settlement decisions.[432]

GM's claims administrators are employees of a vendor called ESIS, work solely on GM claims, and have offices at GM.[433] ESIS employees are responsible for conducting field investigations and processing NISM claims against GM.[434] ESIS field investigators photograph the vehicle, conduct interviews, and, with permission, download SDM and other diagnostic data out of a vehicle's computer.[435] ESIS forwards this information to GM legal staff. ESIS also negotiates settlements and presents claims at meetings for settlement evaluation.[436] ESIS acts at the direction of the GM product litigation staff attorneys, and the claims administrators meet with the GM attorneys on a weekly basis.

GM has a structured settlement process by which GM decides whether and for how much a case should be settled. At the lowest monetary level, product litigation staff attorneys were

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[429] J&B Interview of Jennifer Sevigny, March 27, 2014; J&B Interview of Douglas Brown, March 19, 2014; J&B Interview of Keith Schultz, March 18, 2014; J&B Interview of Kathy Anderson, March 19-20, 2014.
[430] J&B Interview of Keith Schultz, March 18, 2014.
[431] J&B Interview of Douglas Brown, March 19, 2014.
[432] J&B Interview of Kathy Anderson, March 19-20, 2014; J&B Interview of Douglas Brown, March 19, 2014.
[433] J&B Interview of Kathy Anderson, March 19-20, 2014.
[434] J&B Interview of Dan Derrick, March 31, 2014; J&B Interview of Annette Rigdon, May 14, 2014.
[435] J&B Interview of Ryan Jahr, April 1, 2014; J&B Interview of Jaclyn Palmer, May 8, 2014.
[436] J&B Interview of Annette Rigdon, May 14, 2014; J&B Interview of Jameia Price, May 12, 2014.

vested with $100,000 in settlement authority.[437] Settlements of between $100,000 and $1.5 million (a limit which was eventually increased to $2 million) required approval at a committee known as the "Roundtable." The Roundtable Committee met weekly, was led by the Litigation Practice Area Manager, and all product litigation staff attorneys were invited to attend.

Settlement offers between $2 and $5 million required approval of a group called the Settlement Review Committee ("SRC"), which met monthly, and was chaired by the head of global litigation. Members of the SRC included both the GC of GM North America and Kemp.[438] Cases over $5 million require approval by the General Counsel.

When a case was before the Roundtable or the SRC, the responsible product litigation staff attorney would present his/her case.[439] At the end of a presentation to either group, the Roundtable and SRC committees voted.[440] The chair was the ultimate decision maker.[441] Michael Gruskin chaired both the Roundtable and SRC committees from August 2007 to March 2012. Larry Buonomo chaired both committees beginning on March 8, 2012. In terms of case volume, the SRC considered an average of 1.4 cases per meeting in 2012 and 1.3 per meeting in 2013. The Roundtables considered an average of 3.4 cases per meeting in 2012 and 3.76 per meeting in 2013.

[437] Michael Gruskin, GM, Legal Staff Settlement Review Processes, March 23, 2009 [DOC ID O_00016584].
[438] The current range for the SRC is $2 million to $5 million; earlier it was $1.5 million to $5 million. If there were no matters to consider, the meetings were cancelled. Michael Gruskin, GM, Legal Staff Settlement Review Processes, March 23, 2009 [DOC ID O_00016584].
[439] J&B Interview of Lawrence Buonomo, April 16, 2014.
[440] J&B Interview of Lawrence Buonomo, April 16, 2014.
[441] J&B Interview of Lawrence Buonomo, April 16, 2014.

The main function of the Roundtable was to generate better claim evaluations and settlement forecasts through a "peer review" structure.[442] But a number of GM lawyers reported that it had a second function as well: to spot trends indicating safety issues. Product litigation attorney Ron Porter stated that it was well recognized that a goal of the Roundtable and SRC process was to identify potential safety issues and refer them to engineers.[443] His product litigation colleague Jaclyn Palmer said that attorneys discussed potential product safety or accident trends at Roundtables on occasion, and the Roundtable Committee referred issues to GM engineers for a follow-up investigation.[444] Not all GM lawyers, however, agreed with this view. Buonomo, for example, said that it was not the Roundtable's function to spot trends and that if a lawyer had to flag a trend, then the system had already failed.[445]

To put this issue in a specific context, at a Roundtable discussion on the Cobalt airbag non-deployment issue in 2012, a junior lawyer recalled asking whether there should be a recall.[446] He was told that the issue had already been raised with engineering, that the engineers were working on it, and that they had not come up with a solution. This lawyer got the "vibe" that the lawyers had "done everything we can do."

We have discovered no formal written policies governing how the settlement committees should handle safety issues. Multiple witnesses, however, described how things worked in practice. In practice, the mechanism for getting safety issues from GM Legal to GM Engineering was through Bill Kemp. For example, former GC Thomas Gottschalk described

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[442] Michael Daar, GM, *et al.*, Outside Counsel Guidelines Sub Group – Early Case Evaluation and Peer Review Process, Feb. 27, 2009 [DOC ID 000005787998].
[443] J&B Interview of Ronald Porter, April 30, 2014.
[444] J&B Interview of Jaclyn Palmer, April 24, 2014.
[445] J&B Interview of Lawrence Buonomo, April 16, 2014; J&B Interview of Lawrence Buonomo, May 13, 2014.
[446] J&B Interview of Nabeel Peracha, May 21, 2014.

how the primary responsibility for spotting trends belonged to engineering, which had access to a host of different inputs ranging from warranty claims to customer complaints. But, said Gottschalk, when lawyers did become aware of a safety issue, they were to raise the issue, and a common way of doing that was to go to Kemp or his colleague Deb Nowak-Vanderhoef – who would, in turn, raise it with engineers.[447]

GM's expectations for its lawyers – including the expectation that lawyers elevate certain issues to superiors – were reflected in a 2003 memorandum from then-GC Gottschalk to "All Attorneys."[448] Gottschalk reminded the lawyers who worked for him, "If you as an attorney are aware of any threatened, on-going, or past violation of a federal, state or local law or regulation . . . it is your responsibility to respond appropriately."[449]

Gottschalk discussed factors in determining how to respond, including the seriousness of the matter, the existence of threat of harm to others, the lawyer's degree of knowledge of the situation, and the lawyer's level of experience and position within GM. Gottschalk wrote that while some matters could be addressed directly by the attorney, in other cases "it may be more appropriate to report the situation to your supervisor . . . so that it can be handled at a higher level."

Gottschalk also discussed what to do if one's superiors had concluded that appropriate action had been taken in response to a perceived problem, but the more junior lawyer disagreed:

> If you believe . . . that the conclusion is wrong, you should continue to seek an appropriate resolution. It is your duty to bring the situation to the attention of

[447] Cotsirilos, Tighe & Streicker, Ltd. Interview of Thomas Gottschalk, May 12, 2014.
[448] Thomas A. Gottschalk, Memorandum re Standards of Professional Conduct of Attorneys (Aug. 4, 2003), at 1 [DOC ID 00136806990].
[449] Thomas A. Gottschalk, Memorandum re Standards of Professional Conduct of Attorneys (Aug. 4, 2003), at 1 [DOC ID 00136806990].

> your supervisors or their supervisors, as necessary. If you believe that they have not addressed it appropriately or if you feel that bringing it to their attention would be futile, you should pursue it higher in the organization – if necessary, to me as General Counsel.

Michael Gruskin, a long-time GM attorney who headed the product litigation team during part of the relevant period, understood Gottschalk's direction to apply to safety issues.[450] In interviews, Osborne and Millikin, like Gottschalk, said that they expected their lawyers to elevate to them significant safety issues.[451]

2. January 2006: [redacted] Roundtable

The [redacted] matter was reviewed by GM lawyers at a Roundtable meeting on January 31, 2006.[452] [redacted] was not wearing a seatbelt when she lost control of her 2005 Chevy Cobalt on a residential street on July 29, 2005. Her car struck several small trees and a larger tree; paramedics extricated her from the vehicle, but she died en route to the hospital.[453] The SDM recorded the vehicle's power mode status as "Accessory" at the time of the crash.[454] FPA engineers Manuel Peace and Kathy Anderson and Doug Brown of the GM Legal Staff were assigned to the matter.[455]

Records show that the allegation was that the airbag did not deploy when it should have. Anderson, however, opined that the airbag was not expected to deploy because of the nature of the crash. First, it was the car's front right corner that made contact with the tree, rather than the

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[450] J&B Interview of Michael Gruskin, May 28, 2014.
[451] J&B Interview of Michael Millikin, May 29, 2014; Interview of Robert Osborne, May 7, 2014.
[452] GM, Activity Notes form, File No. 501661, Jan. 31, 2006 [DOC ID 000001660023; GMNHTSA000200717].
[453] Calspan Corporation, Calspan On-Site Air Bag Non-Deployment Investigation, Case No. CA05-049, Dec. 12, 2006 [DOC ID GMCB-000000073786; GMHEC100026303]; GM, Activity Notes form, File No. 501661, Jan. 31, 2006 [DOC ID 000001660023; GMNHTSA000200717].
[454] Crash Data Retrieval System, [redacted] SDM Data, Sept. 14, 2005 [DOC ID 000001660011; GMNHTSA000200688].
[455] GM, Activity Notes form, File No. 501661, Jan. 31, 2006 [DOC ID 000001660023; GMNHTSA000200717].

car colliding head on.[456] Second, the car had slowed gradually because it hit several small trees before coming to a stop, and one would not expect a frontal airbag deployment in those circumstances.[457] The matter was presented to the GM Roundtable.[458]

Anderson stated because the airbag was not expected to deploy, the fact that the vehicle's power mode was in Accessory was not a focus of her investigation.[459]

The case was settled.

3. September 2006: [redacted] Evaluation

Six months after the [redacted] Roundtable, GM Legal Staff received a written briefing about another non-deployment case on September 7, 2006.[460] On February 26, 2006, [redacted] was injured when a drunk driver ran a red light and hit [redacted] 2004 Saturn Ion on the side.[461] Because this was a side impact, the GM engineers concluded that the driver's airbag should not have deployed.[462] Unlike the Cobalt, the SDM for the Ion was not designed to and did not record ignition status at the time of a crash. This case was stayed at the time of bankruptcy in 2009 and did not settle.

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[456] J&B Interview of Kathy Anderson, March 19-20, 2014.
[457] J&B Interview of Kathy Anderson, March 19-20, 2014.
[458] J&B Interview of Kathy Anderson, March 19-20, 2014.
[459] J&B Interview of Kathy Anderson, March 19-20, 2014.
[460] Bowman and Brooke LLP, Case Evaluation: [redacted] *v. General Motors and* [redacted] (Sept. 7, 2006) [DOC ID 000206686110].
[461] Bowman and Brooke LLP, Case Evaluation: [redacted] *v. General Motors and* [redacted] (Sept. 7, 2006) [DOC ID 000206686110].
[462] Bowman and Brooke LLP, Case Evaluation: [redacted] *v. General Motors and* [redacted] (Sept. 7, 2006) [DOC ID 000206686110].

4. September 2006: [redacted] Evaluation

[redacted] died after her 2004 Saturn Ion left the road at high speed on July 4, 2004, went over a low curb, braked, and then struck a large utility pole head on.[463] The airbag did not deploy, and although she had been wearing her seatbelt, [redacted] was found dead at the scene.[464]

On September 25, 2006, the Dykema law firm submitted a case evaluation to GM for the [redacted] case.[465] The assigned FPAs were the same as in the [redacted] fatality, Manuel Peace and Kathy Anderson. They identified this crash as one in which there should have been an airbag deployment, and that the deployment likely would have saved [redacted] life. The Ion SDM was not designed to capture the ignition switch position at the time of the crash (as the Cobalt's SDM did). It was, however, expected to record the most recent "near deploy event."[466] But it failed to make such a recording, and the FPA engineers were unable to develop an explanation for this failure.[467] Anderson considered the hypothesis that the vehicle lost power early in the crash event, but that idea was discounted because the SDM should have had power for 150 ms after the vehicle lost power and thus should have recorded the event.[468]

There is no evidence that Peace, Anderson, in-house counsel, or outside counsel were aware of the prior PRTS reports concerning the Ignition Switch that the Cobalt and Ion shared,

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[463] Dykema Gossett LLP, Early Evaluation Report: *Estate of* [redacted] *v. GM and Saturn Corporation*, GM File No. 51176 (Sept. 25, 2006), at 1 [DOC ID 000001714421].
[464] Dykema Gossett LLP, Early Evaluation Report: *Estate of* [redacted] *v. GM and Saturn Corporation*, GM File No. 51176 (Sept. 25, 2006), at 1 [DOC ID 000001714421].
[465] Dykema Gossett LLP, Early Evaluation Report: *Estate of* [redacted] *v. GM and Saturn Corporation*, GM File No. 51176 (Sept. 25, 2006), at 1 [DOC ID 000001714421; GMNHTSA000200717].
[466] Dykema Gossett LLP, Early Evaluation Report: *Estate of* [redacted] *v. GM and Saturn Corporation*, GM File No. 51176 (Sept. 25, 2006), at 1 [DOC ID 000001714421; GMNHTSA000200717].
[467] Dykema Gossett LLP, Early Evaluation Report: *Estate of* [redacted] *v. GM and Saturn Corporation*, GM File No. 51176 (Sept. 25, 2006), at 6 [DOC ID 000001714421; GMNHTSA000200717].
[468] Dykema Gossett LLP, Early Evaluation Report: *Estate of* [redacted] *v. GM and Saturn Corporation*, GM File No. 51176 (Sept. 25, 2006), at 6 [DOC ID 000001714421; GMNHTSA000200717].

or the 2005 TSB discussing how a driver could inadvertently turn off the Ignition Switch with a knee. Peace, one of the assigned FPA engineers, had no recollection of the [redacted] case when interviewed.[469] He did not recall ever seeing the 2005 TSB, and could not opine on whether it would have made a difference to his evaluation of the case.[470]

GM staff attorney Doug Brown presented the [redacted] case to a Roundtable meeting about a week after receiving Dykema's evaluation, on October 3, 2006.[471] He reported that:

> Despite extensive analysis, the engineers have no solid technical explanation. The engineers agree that 1) the airbags . . . should have deployed; 2) the SDM did not record the crash event, for unknown reasons; . . . and 4) it is reasonably likely that deployment of the driver airbag would have prevented [redacted] death in this accident.[472]

Brown also pointed out how this non-deployment would be "problematic" given a standard GM test: "[T]he vehicle damage is remarkably similar to the test vehicle damage in a GM pole test where the bags deployed. Discovery of this test will also be problematic for GM's defense."[473]

The Roundtable granted settlement authority, and GM settled the case.[474]

5. October 2006: [redacted] Crash

On October 24, 2006, a crash occurred in which a 2005 Cobalt left the road and struck a telephone box and two trees.[475] [redacted] and [redacted] were killed; the driver,

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[469] J&B Interview of Manuel Peace, May 8, 2014.
[470] J&B Interview of Manuel Peace, May 8, 2014.
[471] Douglas Brown, GM, Settlement Roundtable/Case Summary, *Estate of* [redacted] *v. GM* – PL: 511176 (Oct. 3, 2006) [DOC ID 000001714429; GMNHTSA000297436].
[472] Douglas Brown, GM, Settlement Roundtable/Case Summary, *Estate of* [redacted] *v. GM* – PL: 511176, (Oct. 3, 2006), at 2 [DOC ID 000001714429; GMNHTSA000297436].
[473] Douglas Brown, GM, Settlement Roundtable/Case Summary, *Estate of* [redacted] *v. GM* – PL: 511176, (Oct. 3, 2006), at 2 [DOC ID 000001714429; GMNHTSA000297436].
[474] Douglas Brown, GM, Settlement Roundtable/Case Summary, *Estate of* [redacted] *v. GM* – PL: 511176, (Oct. 3, 2006), at 2 [DOC ID 000001714429; GMNHTSA000297436]; e-mail from Douglas Brown to Tim G. Jaeger (Nov. 21, 2006) [DOC ID 000001714470; GMNHTSA000297475].
[475] Tom Ellingsworth, GM, Claim form: File # 624620, [redacted] *et al.* [sic] (Feb. 28, 2007) [DOC ID 000003680368; GMNHTSA000284395].

[redacted], was severely injured. [redacted] was sitting in the front passenger seat. She was not wearing her seatbelt, and the airbag did not deploy. This crash first came to GM's attention on November 15, 2006, through a TV reporter's inquiry. Alan Adler e-mailed Dwayne Davidson, Senior Manager for TREAD Reporting at GM, and others, copying Gay Kent, Jaclyn Palmer, Brian Everest, and Doug Wachtel, with the subject line "2005 Cobalt Air Bags – Fatal Crash; Alleged Non-Deployment," asking whether anyone knew about the accident and other airbag non-deployment incidents involving the Cobalt. Adler noted: "Reporter asking for response from GM by the end of day Wednesday on what we know about air bag issues in '05 Cobalt."[476] Several of the recipients responded to the e-mail and provided available data on Cobalt frontal airbag claims.[477] It is unclear how GM responded to the reporter, but the story ultimately ran, and Adler did not think additional communication with the station was necessary.[478] Adler does not remember any response, and none has been located in a search of his files.

The day after the [redacted] crash – the timing was coincidental – GM issued an updated Technical Service Bulletin on "Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs" in the Cobalt and other vehicles. The updated Bulletin extended the December

[476] E-mail from Alan Adler, GM, to Keith Schultz, GM, *et al.* (Nov. 15, 2006) [DOC ID 000049639345; GMNHTSA000285148].
[477] Specifically, Dwayne Davidson conducted a TREAD database search that yielded over 700 records of field reports and complaints, which he offered to summarize. E-mail from Dwayne Davidson, GM, to Alan Adler, GM, *et al.* (Nov. 15, 2006) [DOC ID 000049759326; GMNHTSA000276789]. Doug Wachtel reviewed existing field actions involving the Cobalt and recommended that GM acquire the EDR data. E-mail from Douglas Wachtel, GM, to Alan Adler, GM, *et al.* (Nov. 15, 2006) [DOC ID 000049759327; GMNHTSA000276790]. Jaclyn Palmer, a GM airbag lawyer, passed Adler's message along to Doug Brown, another GM airbag lawyer, so that he could be prepared for any potential claims related to the crash. E-mail from Jaclyn C. Palmer, GM, to Alan Adler, GM, *et al.* (Nov. 15, 2006) [DOC ID 000049759330; GMNHTSA000276791]. Chris Janik provided a summary of the two Cobalt frontal airbag claims in the NHTSA database. E-mail from Christopher Janik, GM, to Douglas Wachtel, GM, *et al.* (Nov. 15, 2006) [DOC ID 000049759328; GMNHTSA000285149-50].
[478] E-mail from Alan Adler, GM, to Douglas Brown, GM, *et al.* (Nov. 20, 2006) [DOC ID 000009109885].

2005 Bulletin to include Model Year 2007 for all the models previously included, and also added the 2007 Saturn Sky.[479] Otherwise, the October 25, 2006 Bulletin was the same as the one issued in December 2005.[480] Like the 2005 Bulletin, this version omitted the word "stall."

B. 2007: Outsiders Find the Solution But GM Remains Unaware

In 2007, two analyses of the [redacted] crash, one by Wisconsin State Trooper Keith Young and another by Indiana University researchers, clearly stated that the movement of the ignition switch from Run into Accessory may have caused the airbag non-deployment – the correct answer that GM engineers did not accept until January 2014. Although Trooper Young's report was in GM's legal department files as of February 2007, GM lawyers and engineers working on airbag non-deployment cases did not learn of its existence until a few months ago. They did not learn about the Indiana University study until 2012 when a plaintiff's expert brought it to their attention. They were also unaware of GM's 2005 and 2006 TSBs on the ignition switch issue – which, aside from being in GM's own files, were publicly available on the NHTSA website, where Trooper Young found them – and the PRTSs.

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[479] GM, Technical Service Bulletin, "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs" (Oct. 25, 2006) [DOC ID 000001771028; GMHEC000138614].

[480] GM, Service Bulletin "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs" (Dec. 2005) [DOC ID 14021301709348; GMHEC000329773]; GM, Technical Service Bulletin "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System and No DTCs" (Oct. 25, 2006) [DOC ID 000001771028; GMHEC000138614]. Some copies of the October 25, 2006 Technical Service Bulletin (05-02-35-007A) were printed with a July 1, 2011 modification date. The Technical Service Bulletin, however, was not actually updated and/or published in July 2011 (or anytime after October 25, 2006). The July 1, 2011 modification date was the result of GM's June 2011 migration of data in the Electronic Service Information database (which maintained the Technical Service Bulletins) from an Ingres database to an Oracle database. As part of the migration, GM transferred data regarding the "owner" of Technical Service Bulletins. Because some "owners" of the Technical Service Bulletins had left the company, including the owner of the October 25, 2006 Technical Service Bulletin, GM assigned a new employee to serve as the "owner" of the Technical Serve Bulletins as part of the migration. This change automatically resulted in a new modification date of July 1, 2011 for Technical Service Bulletins with new owners. Technical Service Bulletins with a new owner printed after July 2011 therefore reflected a modification date of July 1, 2011. GM fixed this problem in March 2014 when it migrated data to the GM Data Center in Warren, Michigan. Accordingly, Technical Service Bulletins printed after March 2014 should reflect the correct modification date(s).

1. February 2007: Trooper Young's Reconstruction Report of [redacted] Crash

The Wisconsin State Patrol (Wisconsin's state police force) issued a "Collision Analysis & Reconstruction Report" ("the Wisconsin State Patrol report") on February 14, 2007, about the [redacted] crash.

> **INVESTIGATIVE SUMMARY**
>
> ***The following statements are opinions and inferences of this author. They are based upon the information reviewed to date. These statements are accurate to a reasonable degree of scientific certainty:***
>
> - None of the occupants were wearing their safety belts at the time of the crash.
> - The two front seat airbags did not deploy. It appears that the ignition switch had somehow been turned from the run position to accessory prior to the collision with the trees.
> - [redacted] drivers' license status was a valid instruction permit. [redacted] was violating the restrictions on her instruction permit by operating a vehicle without a qualified licensed driver in the right front seat.
> - The front tires of the [redacted] vehicle did not have the required minimum legal tire tread depth of 2/32 inch in two or more places on each front tire.
> - The speed calculated from the vault at the driveway of 48 mph and the crush speed at the trees of 38 mph do not match the information recorded in the five seconds of pre-crash data on the SDM; this may be due to power loss.

Authored by Trooper Keith Young of the Technical Reconstruction Unit, the report set out why Trooper Young believed the airbags did not deploy. He wrote:

- "The ignition switch on the . . . vehicle appears to have been in the accessory position when it impacted the trees preventing the airbags from deploying."[481] He noted that a search of the NHTSA website revealed five complaints of 2005 Cobalts turning off while being driven, three of which "talk about the knee or leg touching the ignition or key chain causing the engine to turn off."[482]

- Trooper Young then cited the October 2006 technical service bulletin which "discusses the potential for the driver to inadvertently turn off the ignition due to

[481] Keith A. Young, Technical Reconstruction Unit, Wisconsin State Patrol Academy, Collision Analysis & Reconstruction Report, Feb. 14, 2007, attached to GM Claim form (File # 624620, [redacted] et al [sic]; Feb. 28, 2007), at 9 [DOC ID 000003680368; GMNHTSA000284395].
[482] Keith A. Young, Technical Reconstruction Unit, Wisconsin State Patrol Academy, Collision Analysis & Reconstruction Report, Feb. 14, 2007, attached to GM Claim form (File # 624620, [redacted] et al [sic]; Feb. 28, 2007), at 9 [DOC ID 000003680368; GMNHTSA000284395].

low key cylinder torque/effort."[483] Therefore, he wrote: "It appears likely that the vehicles' [sic] key turned to Accessory as a result of the low key cylinder torque/effort."

- In his investigative summary, which he said was "accurate to a reasonable degree of scientific certainty," he wrote: "The two front seat airbags did not deploy. It appears that the ignition switch had somehow been turned from the run position to accessory prior to the collision with the trees."

On November 15, 2006, the ESIS opened a "rumor file" on the [redacted] crash – a file type opened for the purpose of tracking incidents that are not in active litigation and for which no claim against GM has been made.[484] In February 2007, ESIS Claims Administrator Kristy Gibb received a copy of the report.[485] Forensic evidence shows that Gibb saved the report in GM Legal's electronic files on March 2, 2007.[486]

The forensic evidence further shows that prior to 2014, the electronic copy of the report was not accessed by anyone in GM Legal, with the exception of a GM legal assistant whose responsibilities included locating claim documents for production to NHTSA in connection with GM's TREAD Act reporting duties and who accessed the document in May 2007.[487] Dwayne Davidson, Senior Manager for TREAD reporting at GM, stated that he obtained a copy of Trooper Young's report contemporaneously in the 2007 timeframe, from someone at GM Legal and then provided it to NHTSA in connection with GM's quarterly death and injury report in

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[483] Keith A. Young, Technical Reconstruction Unit, Wisconsin State Patrol Academy, Collision Analysis & Reconstruction Report, Feb. 14, 2007, attached to GM Claim form (File # 624620, [redacted] et al [sic]; Feb. 28, 2007), at 9 [DOC ID 000003680368; GMNHTSA000284395].
[484] GM, Data Sheet re [redacted] Crash (saved March 2, 2007), at 1 [DOC ID 000001714569].
[485] Tom Ellingsworth, GM, Claim form: File # 624620, [redacted] et al [sic] (Feb. 28, 2007) [DOC ID 000003680368; GMNHTSA000284395]; GM, Data Sheet re [redacted] Crash (saved March 2, 2007), at 17 [DOC ID 000001714569].
[486] J&B Interview of Ming-Liang Chi, May 14, 2014.
[487] Keith A. Young, Technical Reconstruction Unit, Wisconsin State Patrol Academy, Collision Analysis & Reconstruction Report, Feb. 14, 2007, attached to GM Claim form (File # 624620, [redacted] et al [sic]; Feb. 28, 2007), at 9 [DOC ID 000003680368; GMNHTSA000284395]; Kimberly M. Nothnagel, Resume (saved Sept. 4, 2009) [DOC ID 000078367937].

2007.[488] However, none of the GM lawyers and engineers working on Cobalt matters recall being aware of this report until 2014.

2. March 2007: NHTSA Expressed Interest in Cobalt Non-Deployments

NHTSA directly expressed an interest in Cobalt airbag non-deployments to GM on March 29, 2007, when a group of GM engineers, including Gay Kent and Brian Everest, attended a Quarterly Review meeting at NHTSA's headquarters.[489] During the course of that meeting, or during a break, NHTSA officials told the GM representatives that they had observed a number of airbag non-deployments in Cobalt and Ion vehicles.[490] According to GM witnesses, NHTSA made no formal request and did not ask GM to report back to it about the non-deployment issue.[491] There is also no evidence that NHTSA indicated that it viewed the airbag non-deployment as being caused by anything related to the Ignition Switch. We have discovered no document reflecting a further request or follow-up from NHTSA, and witnesses could recall no such follow-up from NHTSA.

According to Everest, when the GM personnel returned to Detroit, Keith Schultz, then Manager of Internal Investigations in Product Investigations, directed that Everest and John Sprague, an FPA airbag engineer, to compile information on Cobalt and Ion NISMs and lawsuits, and asked Dwayne Davidson to pull the TREAD data for similar instances.[492] As a result of this instruction, Sprague began compiling an Excel spreadsheet listing the various

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[488] J&B Interview of Dwayne Davidson, May 6, 2014.
[489] E-mail from Douglas Wachtel, GM, to Christopher Janik, GM, *et al.* (March 27, 2007) [DOC ID 000001597661; GMNHTSA000002849]; J&B Interview of Brian Everest, March 27, 2014. At this point in time, GM held quarterly meetings with NHTSA where they would have roundtable discussions in which they worked through trends that NHTSA was seeing in GM vehicles and reviewed open investigations. J&B Interview of Keith Schultz, April 24, 2014; J&B Interview of Gary Dowd, May 8, 2014.
[490] J&B Interview of Brian Everest, March 27, 2014.
[491] J&B Interview of Gay Kent, March 18, 2014; J&B Interview of Matt Jerinsky, April 16, 2014.
[492] J&B Interview of Brian Everest, March 27, 2014. For a description of the TREAD database, *see infra* Appendix E.

Cobalt accidents and non-deployments.[493] The purpose of Sprague's tracking spreadsheet was to look for trends.[494] He does not recall being given a deadline or timetable, or a specific deliverable.[495] No one specifically asked him to track Cobalt non-deployments.[496] He generally remembers sharing his spreadsheet with Everest, likely upon Everest's request.[497] He does not remember sharing the spreadsheet at any formal meeting.[498]

Witnesses have inconsistent recollections as to whether the Product Investigations group became involved in the Cobalt airbag non-deployment issues at this stage. Everest reports that, in April 2007, the FPA group transitioned the Cobalt airbag matter to the PI group, where it was taken on by an engineer named Eric Buddrius.[499] Documents in Buddrius's files indicate he was working on the issue, and a May 4, 2007 Investigation Status Review ("ISR") Presentation Planning Worksheet states that Buddrius was scheduled to present on an issue described as "Cobalt/Ion Airbag (NHTSA discussion item)."[500] Buddrius had no recollection of

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[493] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of John Sprague, March 26, 2014; J&B Interview of John Sprague, May 9, 2014; J&B Interview of John Sprague, May 15, 2014; J&B Interview of John Sprague, May 23, 2014.
[494] J&B Interview of John Sprague, March 26, 2014; J&B Interview of John Sprague, May 9, 2014; J&B Interview of John Sprague, May 15, 20146; J&B Interview of John Sprague, May 23, 2014.
[495] J&B Interview of John Sprague, May 23, 2014.
[496] J&B Interview of John Sprague, March 26, 2014; J&B Interview of John Sprague, May 15, 2014.
[497] J&B Interview of John Sprague, May 15, 2014.
[498] J&B Interview of John Sprague, May 15, 2014. Sprague set up a system whereby Annette Rigdon (an ESIS claims administrator) would forward him – and not other FPA engineers – any claims related to non-deployments, and those claims would formally be assigned to Sprague.
[499] J&B Interview of Brian Everest, March 27, 2014. During a later interview, Everest said Buddrius may not have been formally assigned to investigate the issue. J&B Interview of Brian Everest, April 29, 2014.
[500] E-mail from Douglas Wachtel, GM, to Elizabeth A. Bardowell, GM (May 1, 2007) [DOC ID 000001596837; GMNHTSA258485]. The e-mail and attached agenda state that Buddrius was scheduled to present "Cobalt/Ion Airbag (NHTSA discussion item)"); e-mail from Keith Schultz, GM, to Brian Everest and John Sprague, GM (May 3, 2007) [DOC ID 000049652057; GMNHTSA000273085] ("We are planning to have a brief discussion on the Cobalt/Ion Air Bag non-deployment issue tomorrow as part of our bi-weekly Investigation Status Review. You are both welcome to join us for this discussion . . . in fact it may be helpful if at least one of you can . . . .").

involvement.[501]

3. March-April 2007: The TSB Is Edited but the Edits Are Not Released

In March-April 2007, GM's technical bulletin group proposed publishing a revised version of the TSB that would change the subject line to include the word "stalls" – the very term deleted from the December 2005 TSB.[502] The title proposed was: "Information on Inadvertent Turning of Key Cylinder, Loss of Electrical System, Hesitation, Stalls and No DTCs Set."[503] Product Investigations rejected the proposed revision on April 10, 2007.[504] However, on April 24, 2007, Doug Wachtel (Senior Manager – Internal Investigation, Product Investigations) provided his approval to "go ahead and add the word 'stall' to the symptoms section of the bulletin."[505] One of Wachtel's direct reports indicated to Wachtel and others in an e-mail that the change to the bulletin was proceeding, but that he was awaiting warranty data and information on buybacks.[506] Wachtel later forwarded this e-mail chain to Gay Kent.[507] Despite Wachtel's approval, GM has no record of publication of the 2007 TSB. No witness has been able to explain why the revised TSB was not published, and it appears that GM personnel missed an opportunity to improve the information it provided to dealers.

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[501] J&B Interview of Eric Buddrius, April 29, 2014. Stouffer told Jenner & Block that he went to Buddrius in 2011 for information on the investigation and Buddrius had no file and no recollection of any information from it. J&B Interview of Brian Stouffer, May 9, 2014.
[502] GM, Bulletin Tracking System – Corporate Review, for Bulletin Number 05-02-35-007 (April 10, 2007) [DOC ID 000126448004; GMNHTSA000316293].
[503] GM, Bulletin Tracking System – Corporate Review, for Bulletin Number 05-02-35-007 (April 10, 2007) [DOC ID 000126448004; GMNHTSA000316293].
[504] GM, Bulletin Tracking System – Corporate Review, for Bulletin Number 05-02-35-007 (April 10, 2007) [DOC ID 000126448004; GMNHTSA000316293].
[505] E-mail from Douglas Wachtel, GM, to Dan Fernandez, GM, *et al.* (April 24, 2007) [DOC ID 000001600410; GMNHTSA000219006].
[506] E-mail from Mickey Sabol, GM, to Dan Fernandez, GM, *et al.* (May 15, 2007) [DOC ID 000001600410; GMNHTSA000219006].
[507] E-mail from Douglas Wachtel, GM, to Gay Kent, GM (May 15, 2007) [DOC ID 000001600410; GMNHTSA000219006].

4. April 2007: The Indiana University Report on [redacted] Accident

Also in 2007, the Indiana University ("IU") Transportation Research Center issued a report ("the Indiana University study") commissioned by NHTSA on April 25 titled "On-Site Air Bag Non-Deployment Investigation" for the [redacted] crash, the same fatal accident that was the subject of the report by the Wisconsin State Patrol.[508] Although at least one person was able to find the IU study on NHTSA's website,[509] GM personnel did not. Moreover, GM personnel made no efforts to systematically monitor NHTSA's website for such information and therefore did not obtain it until years later.

More broadly, we have seen no evidence that anyone from GM asked for or sought out publicly available information that would have been relevant to the investigation of the Cobalt.[510] Indeed, many GM employees involved with the Cobalt investigation became aware of these publicly available reports only recently.[511] We are unaware of any formal system at GM for seeking out or tracking publicly available information related to crashes or investigations done by others of crashes involving GM vehicles (other than the work GM does to comply with its TREAD obligations).[512] GM did become aware of some public cases through the informal

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[508] Indiana University Transportation Research Center, On-Site Air Bag Non-Deployment Investigation (April 25, 2007) [DOC ID 000001791070; GMNHTSA000223985]; Keith A. Young, Technical Reconstruction Unit, Wisconsin State Patrol Academy, Collision Analysis & Reconstruction Report, Feb. 14, 2007, attached to GM Claim form (File # 624620, [redacted] et al [sic]; Feb. 28, 2007) [DOC ID 000003680368; GMNHTSA000284395].

[509] As described *infra*, in June 2012, the plaintiff's expert in an airbag non-deployment case indicated that she found the Indiana University study on the NHTSA website. We have not been able to confirm if the report was accessible on NHTSA's website in 2007.

[510] J&B Interview of Carmen Benavides, May 19, 2014; J&B Interview of Lawrence Buonomo, May 13, 2014; J&B Interview of Elizabeth Zatina, May 14, 2014.

[511] J&B Interview of Dwayne Davidson, May 6, 2014; J&B Interview of Eric Buddrius, April 29, 2014; J&B Interview of Deborah Nowak-Vanderhoef, May 1, 2014; J&B Interview of Dale Furney, May 6, 2014; J&B Interview of Mark Johnson, May 7, 2014.

[512] J&B Interview of Carmen Benavides, May 19, 2014; J&B Interview of Lawrence Buonomo, May 13, 2014; J&B Interview of Keith Schultz, March 18, 2014 ; J&B Interview of Mickey Sabol, April 24, 2014.

"rumor" tracking system by which ESIS investigators or other GM Legal Staff would start files on cases that were not formally involved in litigation but potentially could lead to litigation.[513] But rumor files were noted by some as being hard to track, difficult to access, and not easily searchable.[514]

The IU researchers noted that in the accident they were examining, the power mode was recorded as Accessory, and, indeed, that the deputy sheriff who responded had found the ignition switch "jammed" in the Accessory position.[515] The investigators wrote:

> It is possible the ignition switch could have been knocked to the "Accessory" position by the driver's leg or knee at the time of the vault. This investigation revealed that inadvertent contact with the ignition switch or a key chain in the 2005 Chevrolet Cobalt can in fact result in engine shut-down and loss of power.[516]

The IU researchers then described how they had examined GM's October 2006 TSB and reported: "The bulletin indicates that there is a potential for the driver to inadvertently turn off the ignition due to low ignition key cylinder torque/effort."[517] Researchers then reported that they had identified "at least" six complaints on the NHTSA website[518] relating to the engine shutting off and loss of power when the Ignition Switch or key chain was contacted by the driver.

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[513] J&B Interview of Ryan Jahr, April 1, 2014; J&B Interview of Carmen Benavides, May 19, 2014; J&B Interview of Dwayne Davidson, May 6, 2014; J&B Interview of Lisa Stacey, May 8, 2014; J&B Interview of Ronald Porter, May 13, 2014; J&B Interview of Jameia Price, May 12, 2014; J&B Interview of Annette Rigdon, May 14, 2014; J&B Interview of Gay Kent, May 16, 2014.

[514] J&B Interview of Jaclyn Palmer, May 8, 2014; J&B Interview of Ronald Porter, May 13, 2014; J&B Interview of Carmen Benavides, May 19, 2014.

[515] The physical position of the ignition switch would later become critically important. For years, GM investigators were reviewing data that reflected the ignition switch position, but because they lacked data regarding the actual key position, they were skeptical about whether the data were accurate. In particular, they state that data showing the ignition switch in "run" was a barrier for years to their understanding that this was a mechanical issue rather than an electrical issue. J&B Interview of Brian Stouffer, May 9, 2014.

[516] Indiana University Transportation Research Center, On-Site Air Bag Non-Deployment Investigation (April 25, 2007), at 7 [DOC ID 000001791070; GMNHTSA000223985].

[517] Indiana University Transportation Research Center, On-Site Air Bag Non-Deployment Investigation (April 25, 2007), at 7 [DOC ID 000001791070; GMNHTSA000223985].

[518] Indiana University Transportation Research Center, On-Site Air Bag Non-Deployment Investigation (April 25, 2007), at 7 [DOC ID 000001791070; GMNHTSA000223985].

Some of the complaints reported a simple "brushing" of the key chain or touching of the ignition switch was all that was required for the engine to shut off.[519] The researchers concluded:

> It is not known what role, if any, this may have played in the non-deployment of the air bags. Such a determination would most likely require an analysis of the air bag system and ignition wiring schematic in order to determine if in fact the air bag is capable of deploying when the ignition is switched from the 'on' position to the 'accessory' position.[520]

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ON-SITE AIR BAG NON-DEPLOYMENT INVESTIGATION

CASE NUMBER - IN-06-033
LOCATION - WISCONSIN
VEHICLE - 2005 CHEVROLET COBALT
CRASH DATE - October 2006

way down. A search of the NHTSA, Office of Defects Investigation (ODI) web site, complaint tab, revealed at least six complaints (ODI identification numbers: 10144299, 10145959, 10129121, 10132335, 10151346, and 10197022) relating to the engine shutting off and loss of power in Chevrolet Cobalts when the ignition switch or key chain was contacted by the driver. Some of the complaints reported a simple "brushing" of the key chain or touching of the ignition switch was all that was required for the engine to shut off. It is not known what role, if any, this may have played in the non-deployment of the air bags. Such a determination would most likely require an analysis of the air bag system and ignition wiring schematic in order to determine if in fact the air bag is capable of deploying when the ignition is switched from the "on" position to the "accessory" position. Such an undertaking was beyond the scope of this investigation.

We have found no evidence that the Indiana University study was known to anyone at GM until it was referenced in the [redacted] case in 2012 (discussed below). Moreover, although Indiana University investigators located the TSB on the ignition switch, inexplicably neither internal nor

[519] Indiana University Transportation Research Center, On-Site Air Bag Non-Deployment Investigation (April 25, 2007), at 7 [DOC ID 000001791070; GMNHTSA000223985].
[520] Indiana University Transportation Research Center, On-Site Air Bag Non-Deployment Investigation (April 25, 2007), at 7 [DOC ID 000001791070; GMNHTSA000223985].

outside counsel working on Cobalt and Ion-related matters found the TSB (or the PRTS reports that ultimately led to the TSBs) until 2012.

5. May 2007: [redacted] and [redacted] Case Evaluation

On May 4, 2007, the law firm Hartline, Dacus, Berger, Dryer ("Hartline Dacus") submitted an evaluation concerning the [redacted] and [redacted] matter.[521]

On November 15, 2004, [redacted] was driving her 2004 Saturn Ion; her boyfriend, [redacted], was in the front passenger seat.[522] The vehicle went off the road, traveled through a brush line, and struck a tree head-on.[523] Despite the severity of the impact, the front airbags did not deploy.[524] [redacted] was killed on impact.[525] [redacted] suffered severe injuries.[526] Neither [redacted] nor [redacted] was belted.[527] Manuel Peace was the assigned FPA engineer, and Doug Brown was the GM lawyer overseeing the case.

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[521] Case Evaluation Report, [redacted] *v. General Motors Corporation and Saturn of Tyler, Ltd. and* [redacted], *Individually and as Representative of the Estate of* [redacted], *Deceased;* [redacted], *Individually; and* [redacted], *as Next Friend for* [redacted] *and* [redacted], *Minors* (May 4, 2007) [DOC ID 000001714138; GMNHTSA000295538].
[522] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 2 [DOC ID 000001714138; GMNHTSA000295538].
[523] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 2 [DOC ID 000001714138; GMNHTSA000295538].
[524] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 2 [DOC ID 000001714138; GMNHTSA000295538].
[525] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 3 [DOC ID 000001714138; GMNHTSA000295538].
[526] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v.* GM (May 4, 2007), at 3 [DOC ID 000001714138; GMNHTSA000295538].
[527] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 4 [DOC ID 000001714138; GMNHTSA000295538].

The case evaluation called the matter "unusual."[528] In discussing the technical issues in the case, outside counsel explained that, given the severity of the impact, the airbag non-deployment "must be" attributable to power loss.[529]

According to the evaluation, Peace concluded both that the airbags should have deployed and the SDM failed to record the fatal crash.[530] The evaluation noted the unique nature of the event: "Peace has never seen a situation like this, where the SDM recorded no data for the subject event."[531] Peace's best explanation for this, according to counsel, was that the vehicle lost power: "Peace believes the most likely scenario for the lack of data and the non-deployment was a power loss."[532] Peace, however, had not determined precisely how the vehicle lost power. One explanation that the engineers and lawyers were exploring was whether the battery had somehow become physically detached, but they viewed that as unlikely.[533] Peace does not recall the case or what he did to investigate it.[534]

The case was not settled and it proceeded to discovery.

6. April-September 2007: [redacted] Evaluation and Roundtable

Also in 2007, GM Legal Staff was made aware of the [redacted] case, another case involving airbag non-deployment and power loss. [redacted] sustained severe injuries after

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[528] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 4 [DOC ID 000001714138; GMNHTSA000295538].
[529] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 4 [DOC ID 000001714138; GMNHTSA000295538].
[530] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 7 [DOC ID 000001714138; GMNHTSA000295538].
[531] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 24 [DOC ID 000001714138; GMNHTSA000295538].
[532] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 24 [DOC ID 000001714138; GMNHTSA000295538].
[533] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (May 4, 2007), at 24 [DOC ID 000001714138; GMNHTSA000295538].
[534] J&B Interview of Manuel Peace, May 8, 2014.

running his 2005 Saturn Ion into the rear of an illegally parked tractor trailer on June 26, 2005. Manuel Peace and John Sprague were the FPA investigators, and Doug Brown was the GM lawyer assigned to the case.

The case proceeded to a Roundtable presentation on September 18, 2007.[535] The Roundtable briefing prepared by Brown reports: "For the accident itself, the data record is incomplete[;] probably caused, according to Manuel Peace, by a power loss during the crash."[536] Brown explained: "This case presents challenging technical issues: The SDM data is both incomplete and inaccurate. There was more than enough deceleration to have triggered the Ion's airbag sensor . . . ."[537]

7. July 2007: Continental SDM Analysis From [redacted] Crash

In 2007, the FPA Group received the SDM from a Cobalt crash involving [redacted] and sent it to the manufacturer Continental (then operating under the name Siemens VDO). Continental was able to pull data from the SDM that GM could not. According to Sprague and Everest, GM only has the ability to retrieve SDM data if that data is stored in conformity with GM's design specifications for the SDM.[538] In the case of the SDM-Epsilon, which is installed in all of the subject vehicles but the Ion, Continental took it upon itself to go above GM's design specifications and design the SDM-Epsilon to store data related to the functionality of the crash sensing algorithms for a period of time after the SDM-Epsilon has

[535] Douglas Brown, GM, Settlement Roundable/Case Summary, [redacted] *v. Saturn et al.* – PL: 511258 (Sept. 18, 2007) [DOC ID 000240500106].
[536] Douglas Brown, GM, Settlement Roundable/Case Summary, [redacted] *v. Saturn et al.* – PL: 511258 (Sept. 18, 2007), at 2 [DOC ID 000240500106].
[537] Douglas Brown, GM, Settlement Roundable/Case Summary, [redacted] *v. Saturn et al.* – PL: 511258 (Sept. 18, 2007), at 2 [DOC ID 000240500106].
[538] J&B Interview of Brian Everest, April 20, 2013.

powered down.[539] Only Continental can access this data pertaining to the crash sensing algorithm; it cannot be retrieved using GM's commercially available data retrieval tools.[540] This above-specification data can only be retrieved through Continental's proprietary data retrieval tools.[541]

Continental provided GM with a written report on July 26, 2007.[542] The report concluded:

> The SDM experienced loss of battery at some point prior to the recorded Non-Deploy event; the loss of battery qualified and the front and side algorithms were disabled until the SDM eventually depleted its energy reserve and shut down.[543]

The analysis did not provide the Ignition Switch status at the time of loss of battery power, or explain what caused the SDM to lose power.[544]

8. August 2007: Delphi Warranty Settlement Agreement

GM executed a Warranty, Settlement and Release Agreement and Covenant Not to Sue ("Warranty Settlement Agreement") with Delphi on August 14, 2007, in connection with Delphi's bankruptcy.[545] The purpose of the Warranty Settlement Agreement was to identify all known issues with Delphi parts where the estimated warranty cost recovery exceeded $1

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[539] J&B Interview of Brian Everest, April 20, 2013.
[540] J&B Interview of Brian Everest, April 20, 2013; J&B Interview of John Sprague, April 20, 2013.
[541] J&B Interview of Brian Everest, April 20, 2013; J&B Interview of John Sprague, April 20, 2013.
[542] E-mail from Brian Everest, GM, to John Sprague, GM (July 26, 2007) [DOC ID 000049661064]. Siemens sent the report to Continental and explained that it had been held up in the Legal Department. Continental sent the report to Sprague, who forwarded it to Everest, on July 26, 2007.
[543] Siemens VDO Automotive Corporation, Field Events Analysis Report [Draft] (undated) [DOC ID 000014284394; GMNHTSA000219014], attached to e-mail from Orhan Demirovic, GM, to William Hohnstadt, GM, *et al.* (Aug. 14, 2007) [DOC ID 000014284393; GMNHTSA000219013].
[544] Siemens VDO Automotive Corporation, Field Events Analysis Report [Draft] (undated) [DOC ID 000014284394; GMNHTSA000219014], attached to e-mail from Orhan Demirovic, GM, to William Hohnstadt, GM, *et al.* (Aug. 14, 2007) [DOC ID 000014284393; GMNHTSA000219013].
[545] Warranty, Settlement and Release Agreement and Covenant Not to Sue by and between General Motors Corporation and Delphi Corporation (Aug. 14, 2007) [DOC ID H_00018702; GMNHTSA00019761], attached to e-mail from Lee A. Schutzman, GM, to Frederick Henderson, GM, *et al.* (Aug. 15, 2007) [Doc ID H_00018700].

million.[546] A chart attached to the Warranty Settlement Agreement identifies 43 items closed as part of the Warranty Settlement Agreement.[547] Included on that chart are entries regarding "ignition switch failure" on the MY 2003-04 Saturn Ion and MY 2005-06 Chevy Cobalt.[548]

We have found no witness who can identify the warranty issues encompassed by the "ignition switch failure."[549] At that time, GM's warranty database was limited in the information that GM personnel could readily access.[550] GM personnel could view what repair work had been done (*e.g.*, an ignition switch was replaced), but not the reason for the repair (*e.g.*, no crank/no start due to cold weather vs. inadvertent stall).[551] No witness reported and no documents show that the torque problem was ever discussed in connection with the Warranty Settlement Agreement.[552]

C. 2008: More Fatalities Occur and More Litigation Commences

In 2008, the GM lawyers and engineers handling airbag non-deployment cases still did not look for or access relevant information in GM's files or that was publicly available: the

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[546] Warranty, Settlement and Release Agreement and Covenant Not to Sue by and between General Motors Corporation and Delphi Corporation (Aug. 14, 2007), at § 1.10 [DOC ID H_00018702; GMNHTSA00019761], attached to e-mail from Lee A. Schutzman, GM, to Frederick Henderson, GM, *et al.* (Aug. 15, 2007) [DOC ID H_00018700].

[547] Warranty, Settlement and Release Agreement and Covenant Not to Sue by and between General Motors Corporation and Delphi Corporation (Aug. 14, 2007), at 22-27 [DOC ID H_00018702; GMNHTSA00019761], attached to e-mail from Lee A. Schutzman, GM, to Frederick Henderson, GM, *et al.* (Aug. 15, 2007) [DOC ID H_00018700].

[548] Warranty, Settlement and Release Agreement and Covenant Not to Sue by and between General Motors Corporation and Delphi Corporation (Aug. 14, 2007), at 22-27 [DOC ID H_00018702; GMNHTSA00019761], attached to e-mail from Lee A. Schutzman, GM, to Frederick Henderson, GM, *et al.* (Aug. 15, 2007) [DOC ID H_00018700].

[549] J&B Interview of Ron Mills, April 30, 2014; J&B Interview of Michael J. French, May 2, 2014; J&B Interview of Charles Dryer, May 2, 2014; J&B Interview of Lee Schultzmann, May 7, 2014; J&B Interview of Fred Fromm, May 7, 2014.

[550] J&B Interview of Bob Hornak, May 19, 2014.

[551] J&B Interview of Bob Hornak, May 19, 2014.

[552] In 2007, Brian Stouffer communicated with Mike French and Lee Schutzman regarding the Delphi Warranty Settlement because he was involved in certain Delphi cases that were unrelated to the Cobalt or Ion ignition switch. Stouffer did not recall any discussions with French or Schutzman regarding Cobalt or Ion ignition switch failures. J&B Interview of Brian Stouffer, May 9, 2014; GM, Spreadsheet titled "Miscellaneous Warranty Issues" (July 16, 2007) [DOC ID 000001329123; GMNHTSA000317218].

Wisconsin State Patrol report, the Indiana University study, and the TSBs and PRTS reports. They remained unable to explain why the airbags did not deploy in the head-on crash of [redacted] MY 2004 Ion.[553] They also handled a Cobalt non-deployment case in which the power mode status was recorded as in the Run position, which they interpreted to mean that the cause of the non-deployment was something other than the Ignition Switch.[554] Instances of airbag non-deployment in which the power mode status was recorded in Run rather than Accessory stumped investigators for years.[555]

1. January 2008: Second Evaluation of [redacted] and [redacted] Matters

On January 28, 2008, the law firm Hartline Dacus submitted its second evaluation for the [redacted] and [redacted] matters.[556] Counsel wrote: "The impact with the tree was clearly severe enough to warrant deployment of the vehicle's airbags. As a result, from a technical standpoint, there is a potential problem with the non-deployment, which was originally attributed to a pre-collision power loss."[557]

Outside counsel and Peace opined that non-deployment was caused by something other than power loss.[558] "After further analysis of the accident sequence and information in the SDM download it appears that the non-deployment was not caused by a power loss but by some error

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[553] Case Evaluation Report, [redacted] *v. GM* and [redacted] *v. GM* (Jan. 28, 2008) [DOC ID 000001714199; GMNHTSA000295605].
[554] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of John Dolan, April 23, 2014.
[555] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of John Dolan, April 23, 2014; J&B Interview of James Duffy, April 29, 2014.
[556] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (Jan. 28, 2008) [DOC ID 000001714199; GMNHTSA000295605].
[557] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (Jan. 28, 2008), at 4 [DOC ID 000001714199; GMNHTSA000295605].
[558] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (Jan. 28, 2008), at 5 [DOC ID 000001714199; GMNHTSA000295605].

in the SDM which caused it to misinterpret this significant crash as a non-deployment event."[559] The lawyers reported that "Manuel Peace believes there should be a deployment event, but cannot explain why the system did not recognize it as such."[560]

Because of this unexplained non-deployment, counsel opined that it was likely "that a jury will find that the vehicle was defective."[561] GM eventually settled the case in 2008.[562]

2. July 2008: [redacted] Roundtable

In July 2008, GM Legal Staff reviewed the [redacted] matter involving a 2005 Chevy Cobalt.[563] On December 29, 2006, [redacted] had been traveling southbound on a two-lane roadway separated by double yellow lines when he entered into oncoming traffic in the northbound lane.[564] [redacted] made a hard right steering maneuver and rotated clockwise.[565] The vehicle went back across the roadway, traveled off the road, hit an embankment, and continued to travel up the incline until the vehicle hit a large tree.[566] [redacted] was unbuckled and suffered severe injuries.[567]

[redacted] airbag did not deploy.[568] Neither GM nor outside counsel had an explanation for the non-deployment.[569] Per the SDM data, the ignition was in the Run position.[570] In years to

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[559] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (Jan. 28, 2008), at 5 [DOC ID 000001714199; GMNHTSA000295605].
[560] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (Jan. 28, 2008), at 5 [DOC ID 000001714199; GMNHTSA000295605].
[561] Case Evaluation Report, [redacted] *v. GM and* [redacted] *v. GM* (Jan. 28, 2008), at 5 [DOC ID 000001714199; GMNHTSA000295605].
[562] Confidential Settlement Agreement and Complete Release, [redacted] v. GM (April 14, 2008) [DOC ID 000001714252; GMNHTSA000295723]; Confidential Settlement Agreement and Complete Release, [redacted] *v. GM* (July 22, 2008) [Doc ID 000001714567; GMNHTSA000299200].
[563] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[564] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[565] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[566] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[567] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[568] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[569] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].

come, cases such as [redacted] would baffle GM engineers, who viewed them as evidence that airbag non-deployment must be caused by something other than the Ignition Switch (because in some crashes it was being recorded as in Run).[571] The Roundtable authorized settlement and the case settled.[572]

D. 2009: The Investigation Continues and GM Goes Into Bankruptcy

In 2009, GM finally implemented the key head design change for new vehicles and continued to track and investigate Cobalt incidents.[573] There were no Roundtable or Settlement Review Committee meetings concerning Cobalt and Ion non-deployment claims.[574] Activity recommenced, however, on the product development side as engineers again began work to address the continued problems related to the Ignition Switch (discussed below).[575]

Meanwhile, at the end of 2008 and in the first half of 2009, GM received emergency funding from the federal government and, on June 1, 2009, GM filed for bankruptcy, which stayed all litigation against the company.[576] The GM entity that filed for bankruptcy (then known as General Motors Corporation) sold substantially all of its assets to an entity sponsored by the U.S. Treasury (which became known as General Motors Company) in a transaction

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[570] Bosch, Crash [redacted] SDM Data Report (Aug. 23, 2007) [DOC ID 000001660182].
[571] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of John Dolan, April 23, 2014; J&B Interview of James Duffy, April 29, 2014.
[572] GM, Settlement/Roundtable Case Summary, [redacted] 633669 (July 8, 2008) [DOC ID 000001660209].
[573] GM, Complete PRTS Report (1078137) (Oct. 8, 2012) [DOC ID 140307000022778; GMNHTSA000018925]; e-mail from David Trush, GM, to Brad Cook, GM (Feb. 19, 2009) [DOC ID 000014453007; GMNHTSA000481040]; e-mail from Joe Baaki, GM, to David Trush, GM (Aug. 10, 2009) [DOC ID 000014459780]; J&B Interview of John Dobish, April 29, 2014; J&B Interview of David Trush, April 30, 2014.
[574] J&B Interview of Jaclyn Palmer, April 24, 2014.
[575] J&B Interview of David Trush, March 17, 2014; J&B Interview of John Sprague, March 26, 2014.
[576] GM assumed the Delphi settlement in its bankruptcy case. Order Approving (I) Master Disposition Agreement for Purchase of Certain Assets of Delphi Corporation, (II) Related Agreements, (III) Assumption and Assignment of Executory Contracts, (IV) Agreement with Pension Benefit Guaranty Corporation, and (V) Entry into Alternative Transaction in lieu thereof, Docket No. 3139, *In re Motors Liquidation Company*, No. 09-50026 (Bankr. S.D.N.Y. July 14, 2009) [DOC ID 000240790005].

approved by the United States Bankruptcy Court for the Southern District of New York.[577] This sale transaction closed on July 10, 2009.

1. Late 2008/Early 2009: GM Learns of [redacted] Crash

In late 2008 or early 2009, GM FPA engineers learned about a September 13, 2008 Cobalt crash in Stevensville, Michigan, which resulted in two fatalities.[578] After the accident was reported to an ESIS employee, GM opened a "rumor file."[579] FPA engineer Lisa Stacey reviewed the publicly available information, examined the vehicle, and visited the crash scene.[580] She thought that this was an incident where a deployment would have been expected.[581] GM acquired the vehicle involved in the [redacted] crash and provided the [redacted] SDM to the SDM supplier, Continental, for further analysis.[582]

2. February 2009: A New PRTS Report Is Opened and the Cobalt Key is Changed.

In February 2009, PRTS N1078137 was opened.[583] At this time, engineer David Trush was under pressure because a high number of warranty claims were being made on the Cobalt

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[577] Order (I) Authorizing Sale of Assets Pursuant to Amended and Restated Master Sale and Purchase Agreement with NGMCO, Inc., A U.S. Treasury-Sponsored Purchaser; (II) Authorizing Assumption and Assignment of Certain Executory Contracts and Unexpired Leases in Connection with the Sale; and (III) Granting Related Relief, Docket No. 2968, In re Motors Liquidation Company, No. 09-50026 (Bankr. S.D.N.Y. July 5, 2009) [DOC ID 24053060]; Decision on Debtors' Motion for Approval of (1) Sale of Assets to Vehicle Acquisition Holdings LLC; (2) Assumption and Assignment of Related Executory Contracts; and (3) Entry into UAW Retiree Settlement Agreement Docket No. 2967, In re Motors Liquidation Company, No. 09-50026 (Bankr. S.D.N.Y. July 5, 2009) [DOC ID 000240530059].

[578] J&B Interview of Lisa Stacey, May 8, 2014; Lincoln Township Police Department, [redacted] Crash Report (Sept. 13, 2008) [DOC ID 00013514005; GMNHTSA000209908].

[579] J&B Interview of Lisa Stacey, May 8, 2014.

[580] J&B Interview of Lisa Stacey, May 8, 2014.

[581] J&B Interview of Lisa Stacey, May 8, 2014.

[582] J&B Interview of John Sprague, March 26, 2014.

[583] J&B Interview of Gary Altman, May 8, 2014; GM PRTS Complete Report (1078137) (Feb. 4, 2009) [DOC ID 14030700022778; GMNHTSA000018925]. David Trush believes that this PRTS may have been generated because he asked individuals at the Lordstown plant to open the PRTS for him, because it would make it easier to get an EWO for the key design change. He did not remember specifically speaking to anyone at Lordstown about his warranty data PowerPoint presentation, but he thought it was possible that either he showed them the data or they

key cylinder design, a metric by which he was judged.[584] At the time, the issue identified in the PRTS report was viewed as a continuation of the problems noted in earlier PRTSs (the November 19, 2004 PRTS and the May 17, 2005 PRTS).[585] Indeed, one engineer wrote, "[t]his issue has been around since man first lumbered out of [the] sea and stood on two feet."[586] It was still regarded as an issue of customer convenience rather than safety.

Trush had canceled the Work Order for a change in the Cobalt key head in 2006 because of problems with the original supplier of the key and the backlog of other part changes to the Cobalt that Trush believed were more important, which were being held up by the EWO for the key head change.[587] By June 2009, however, GM had resolved many of the outstanding technical and quality issues with its new ignition cylinder/ignition key supplier, Strattec, and GM was finally able to implement the key design change to a hole design.[588] Trush reported that both in 2005 and 2009, he believed that the key design change was a "band-aid," because the complete solution was to change the Ignition Switch.[589] By 2009, when the key design change finally was going to be applied to the production of forthcoming MY 2010 Cobalts, Trush supported the decision because it would reduce his warranty numbers, even if it did not entirely solve the problem identified in the PRTS.[590]

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saw it in one of his reports and generated the PRTS as a result. Trush said that it was not uncommon to ask a plant to originate a PRTS. J&B Interview of David Trush, April 30, 2014.

[584] J&B Interview of David Trush, April 30, 2014.

[585] J&B Interview of David Trush, March 17, 2014.

[586] E-mail from Joseph R. Manson, GM, to David M. Trush, GM, *et al.* (Feb. 18, 2009) [DOC ID 000014449994; GMNHTSA000281790].

[587] E-mail from David M. Trush, GM, to Alberto Manzor, GM (March 9, 2006) [DOC ID 000001748066; GMNHTSA000218836].

[588] GM, PRTS Complete Report (1078137) (Feb. 4, 2009) [Doc ID 14030700022778; GMNHTSA000018925]; e-mail from David Trush, GM, to Brad Cook, GM (Feb. 19, 2009) [Doc ID 00014453007; GMNHTSA000481040]; e-mail from Joe Baaki, GM, to David Trush, GM (Aug. 10, 2009) [Doc ID 000014459780].

[589] J&B Interview of David Trush, April 30, 2014.

[590] J&B Interview of David Trush, April 30, 2014.

3. May 2009: Meeting with Continental Regarding [redacted] Crash SDM

As noted above, throughout this time frame, FPA engineer Sprague continued to maintain a spreadsheet of accidents involving the Cobalt and to send SDMs from crash vehicles to Continental (the manufacturer) so that it could access information that GM could not. According to Everest, he, Sprague, Stacey, Jim Churchwell, Bill Hohnstadt, John Dolan, Jaclyn Palmer, and Eric Buddrius attended a meeting with Continental on May 15, 2009, to discuss Continental's findings with respect to the [redacted] crash.[591] Continental's report for the September 13, 2008 [redacted] accident, involving a 2006 Cobalt, stated: "The Sensing and Diagnostic Module (SDM) did not deploy [the airbag] because the algorithms were disabled at the start of the event."[592] The report identified two possible causes for the disabled algorithm: (a) the vehicle experienced "loss of battery" or (b) the SDM received a power mode status of Off from the BCM.[593]

In a 2014 interview, FPA supervisor Everest said that he now recognizes this meeting as an "aha" or "watershed moment."[594] But at the time, both he and Sprague saw Continental's findings merely as a new fact that suggested avenues of inquiry they previously had not considered. Before receiving the Continental report, Everest and Sprague explained, the FPA team had not realized that the observed pattern of Cobalt non-deployments could have been

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[591] J&B Interview of Brian Everest, March 27, 2014. Only Everest, Palmer, Sprague, and Stacey expressly remember attending the May 2009 Continental meeting. J&B Interview of Brian Everest, March 27, 2014; J&B Interview of Jaclyn Palmer, April 24, 2014; J&B Interview of John Sprague, March 26, 2014; J&B Interview of Lisa Stacey, May 8, 2014.
[592] Siemens Continental Automotive Systems US, Inc. Field Event Analysis Report (undated) [DOC ID 000014284648; GMNHTSA000220230], attached to e-mail from John Sprague, GM, to James Churchwell, GM, *et al.* (May 11, 2009) [DOC ID 000014284647; GMNHTSA000220229].
[593] Siemens Continental Automotive Systems US, Inc. Field Event Analysis Report (undated) [DOC ID 000014284648; GMNHTSA000220230], attached to e-mail from John Sprague, GM, to James Churchwell, GM, *et al.* (May 11, 2009) [DOC ID 000014284647; GMNHTSA000220229].
[594] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of John Sprague, May 15, 2014.

caused by a change in power mode signal that disabled airbag sensors.[595] After receiving the data from Continental, Sprague collected information regarding power mode status, added it to his spreadsheet, and discovered that, in fact, the power mode status was recorded as Off or Accessory in a number of accidents.[596] Everest and Sprague then set out to determine how and why the BCM could send a power mode status of Off to the SDM.

Initially, the FPA engineers believed that the most likely explanation for the power mode signal change was either a problem with the Ignition Switch or a problem with the car's body control module's ("BCM's") transmission of the power mode signal to the SDM.[597] Although they knew that a rotation of the Ignition Switch could cause the SDM to receive a power mode message of Accessory or Off, they first focused their attention on the vehicle's electrical system and its BCM.[598] They did not reach out to DeGiorgio or consider whether the cause of the non-deployments was related to the Ignition Switch, and they did not uncover all of the prior work that engineers had done in 2004-05 focused on addressing the problem of low torque that would cause the Ignition Switch to turn inadvertently to Accessory.[599] Moreover, although Everest and Sprague had spoken about the non-deployment issue during this time period with members of the Product Investigations group, none of the lawyers or engineers asked the PI group to open a formal FPE investigation following the Continental meeting.[600] The FPA team and Palmer

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[595] J&B Interview of Brian Everest, April 29, 2014; J&B Interview of Brian Everest, March 27, 2014; J&B Interview of John Sprague, May 15, 2014; J&B Interview of John Sprague, March 26, 2014.
[596] J&B Interview of John Sprague, May 27, 2014.
[597] J&B Interview of John Sprague, May 27, 2014.
[598] J&B Interview of John Sprague, May 27, 2014.
[599] J&B Interview of Brian Everest, May 27, 2014. Everest explained that he did not reach out to DeGiorgio at this time because he felt that his team, specifically Churchwell, had a sufficient understanding of ignition switches to identify any issues involving both the ignition switch and SDM. J&B Interview of Brian Everest, May 27, 2014. As noted *infra*, several months would pass before a member of the FPA team, Sprague, would examine part changes to the Ignition Switch and reach out to DeGiorgio.
[600] J&B Interview of John Sprague, May 27, 2014; J&B Interview of Brian Everest, March 27, 2014.

remained unaware of the materials the PI group had consulted and gathered in its 2005 investigation about the problem of low torque in the Cobalt Ignition Switch. In addition, they still had not found the Wisconsin State Patrol report and the Indiana University study.[601]

Without these documents and formal involvement by PI, the FPA team developed a theory on its own that the possible change in power mode from Run to Accessory was caused by a jarring event that caused the electrical insets inside the Cobalt's Ignition Switch to "open up," thus signaling to the BCM, and then to the SDM, that the Ignition Switch had moved from Run to Accessory – a theory they called the "contact bounce" theory.[602] It remained a working theory for years, although the engineers were never able to replicate it in the field. The FPA engineers believed that this explanation was consistent with the fact that many of the Cobalt airbag non-deployment crashes occurred off-road.[603]

To investigate the "contact bounce" theory, Sprague, Churchwell, and Matt Jerinsky, a lead project engineer on airbag sensing, worked with GM's rough road team to perform tests on a Cobalt.[604] In July 2009, after locating equipment and designing the course, they conducted what they described as abusive and teeth-chattering tests in which the car was driven through steep ditches and deep potholes.[605] Despite the intensity of the course, the test showed no anomalies in power mode change. Some of the insets inside the Ignition Switch changed

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[601] J&B Interview of Jaclyn Palmer, May 8, 2014.
[602] J&B Interview of John Sprague, May 27, 2014; J&B Interview of John Sprague, March 26, 2014; J&B Interview of Matt Jerinsky, April 16, 2014; J&B Interview of Brian Everest, April 29, 2014.
[603] J&B Interview of John Sprague, March 26, 2014; J&B Interview of Brian Everest, March 27, 2014; J&B Interview of James Churchwell, April 24, 2014.
[604] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of Brian Everest, April 29, 2014; J&B Interview of James Churchwell, April 24, 2014. The vehicle used was not an early model year Cobalt; the documentation suggests that it was an MY 2007, 2008, or 2010 Cobalt. J&B Interview of John Sprague, May 27, 2014.
[605] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of Brian Everest, April 29, 2014; J&B Interview of James Churchwell, April 24, 2014.

slightly, but they never fully opened up to cause a power mode change as the FPA engineers had hypothesized.[606] Still, the theory was not abandoned and continued to be discussed.

At the same time that he and other FPA investigators were looking into the "contact bounce" theory, Sprague was continuing to maintain his spreadsheet. Following the Continental report, Sprague re-reviewed the data that GM had obtained from the SDMs from the vehicles he was tracking and examined the recorded power mode at the time of each crash.[607] Sprague found that the recorded power mode was not in Run for several of the non-deployment crashes he was tracking, which he believed to be consistent with the "contact bounce" theory.[608]

At some point, Sprague noticed a pattern – the problem of non-deployment of airbags did not appear to be present in MY 2008 and later Cobalts.[609] That led him to question whether there had been some change in the Cobalt from MY 2007 to MY 2008.[610] In canvassing the part numbers for the Ignition Switch in GM's database, Sprague found no engineering work orders that showed that the design of the Ignition Switch had changed or that torque had been increased.[611]

Sprague also spoke with the Design Release Engineers for both the crash sensing system and the Ignition Switch (Ray DeGiorgio).[612] Sprague recalls talking to DeGiorgio in person for the first time in the summer of 2009.[613] He believes the conversation probably took place at

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[606] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of Brian Everest, April 29, 2014; J&B Interview of James Churchwell, April 24, 2014.
[607] J&B Interview of John Sprague, May 27, 2014.
[608] J&B Interview of John Sprague, May 27, 2014.
[609] J&B Interview of John Sprague, May 27, 2014.
[610] J&B Interview of John Sprague, March 26, 2014.
[611] J&B Interview of John Sprague, March 26, 2014; J&B Interview of John Sprague, May 27, 2014. The signed 3660 was stored in GM's Global Quality Tracking System ("GQTS").
[612] J&B Interview of John Sprague, March 26, 2014.
[613] J&B Interview of John Sprague, March 26, 2014.

DeGiorgio's office in the Vehicle Engineering Center in Warren, Michigan.[614] Sprague remembers telling DeGiorgio why he wanted to speak with him, including the fact that the vehicles appeared to be losing power while driving.[615]

Sprague said he brought a spreadsheet showing work orders related to the Ignition Switch to this meeting with DeGiorgio and the two of them looked at it together.[616] Sprague asked about work orders from the relevant time period to make sure he understood whether any changes to the switch had occurred.[617] DeGiorgio told Sprague that the MY 2008 change to the Cobalt Ignition Switch was a change only to the antitheft system.[618] DeGiorgio said there had been no change to the switch that would have affected the power mode shutting off.[619] DeGiorgio did not tell Sprague that there were any new Ignition Switch changes unaccounted for on his spreadsheet and did not reference anything about changes to the detent plunger that would have affected the torque required to turn the key.[620] DeGiorgio's statements diverted investigators.[621]

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[614] J&B Interview of John Sprague, March 26, 2014.
[615] J&B Interview of John Sprague, March 26, 2014.
[616] J&B Interview of John Sprague, March 26, 2014.
[617] J&B Interview of John Sprague, March 26, 2014.
[618] J&B Interview of John Sprague, March 26, 2014.
[619] J&B Interview of John Sprague, March 26, 2014.
[620] J&B Interview of John Sprague, March 26, 2014. Sprague says he spoke with DeGiorgio again a half dozen times at most. J&B Interview of John Sprague, March 26, 2014.
[621] Also in 2009, Tom Mercer, a senior engineer on airbag systems, approached DeGiorgio after he had learned about the problems of non-deployment of airbags in the Cobalt from Lisa Stacey of the FPA group. He told DeGiorgio about two crashes and asked whether there was something different about the Cobalt ignition switch that would result in some type of electrical failure. DeGiorgio did not mention anything about the low torque in the switch or the prior instances of stalls caused by inadvertent turning of the ignition from Run to Accessory. J&B Interview of Thomas Mercer, May 2, 2014.

E. 2010: A Different Recall and Outside Counsel Warns GM of Possible Punitive Damages

In 2010, GM issued a power steering recall for MY 2005 -2010 Cobalts, even though GM had stated publicly in 2005 that it did not view a moving stall at highway speeds to be a safety issue. GM also received its first warning from outside counsel that the company was at risk of being subject to punitive damages due to the unresolved investigation into repeated instances of Cobalt airbag non-deployments.

1. March 2010: Cobalt Power-Steering Recall

On February 19, 2010, NHTSA sent a letter to Gay Kent informing her that NHTSA was going to "investigate allegations of electric power steering (EPS) system failure in … 2005 through 2009 Chevrolet Cobalt vehicles."[622] In March, GM issued a safety recall of certain 2005-2010 Cobalt models for a power-steering defect, unconnected to the problem of low torque in the Ignition Switch.[623] In notable contrast to GM's decision in 2005 that moving stalls, which involved a loss of acceleration plus a loss of power-steering, plus a loss of power breaks (as well as loss of airbags, which the engineers failed to understand), were not a safety issue and did not compel a recall, in 2010, GM issued a recall for loss of power-steering alone. The 2010 safety recall did not cause anyone to reconsider the prior categorization of moving stalls as non-safety issues, or produce a sense of urgency in addressing the Ignition Switch problems; moreover, when Cobalt drivers brought their cars into the dealer in 2010 to have the power-steering fixed, the problem with the Ignition Switch was not remedied.

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[622] Letter from Jeffrey L. Quandt, NHTSA, to Gay Kent, GM (Feb. 19, 2010) [Doc ID 14030700008565; GMHEC000005015].
[623] Letter from Gay Kent, GM, to Daniel C. Smith, NHTSA (March 1, 2010) [Doc ID 000006051812; GMNHTSA000265363].

Despite the recall, at least some at GM still did not consider the loss of power-steering a safety problem. GM internally noted that power-steering was normally a customer satisfaction issue, but the "Cobalt was handled in a different manner based on GM's desire to obtain quick resolution and closure of the government investigation."[624] Alan Adler, GM's manager for safety communications, remembered that GM had initially been planning to categorize the electric power-steering issue as a customer satisfaction issue, but as a result of the congressional scrutiny of Toyota and the unintended acceleration issues, it was agreed that GM should issue a safety recall before the hearings so that "we would not get mentioned or dragged in to the Senate."[625]

2. October 2010: [redacted] Evaluation – The First Warning of Punitive Damages

In 2010, GM received its first warning from outside counsel that it was at risk of being subjected to punitive damages based on the non-deployment of airbags in the Cobalt. In October, King & Spalding ("K&S") prepared its first case evaluation for the [redacted] matter.[626]

[redacted], [redacted], died of blunt brain trauma after her 2006 Cobalt sideswiped a Volkswagen and then hit a tree head-on at 2:29 am on December 31, 2009.[627] [redacted] was wearing her seat belt, and her Cobalt's airbag did not deploy.[628]

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[624] July 19, 2010 PowerPoint presentation titled "GM/NHTSA Meeting Technical Briefing" at 13 [DOC ID 000001584943], attached to e-mail from Stephen G. Gehring, GM, to Douglas Wachtel, GM (July 19, 2010) [DOC ID 000001584940].
[625] J&B Interview of Alan Adler, May 2, 2014.
[626] Letter from Harold E. Franklin, Jr., King & Spalding, to Jaclyn C. Palmer, GM, and Annette Rigdon, ESIS (Oct. 7, 2010) [DOC ID 000001662352; GMNHTSA000211149].
[627] Letter from Harold E. Franklin, Jr., King & Spalding, to Jaclyn C. Palmer, GM, and Annette Rigdon, ESIS (Oct. 7, 2010), at 2 [DOC ID 000001662352; GMNHTSA000211149].
[628] Letter from Harold E. Franklin, Jr., King & Spalding, to Jaclyn C. Palmer, GM, and Annette Rigdon, ESIS (Oct. 7, 2010), at 2 [DOC ID 000001662352; GMNHTSA000211149].

According to the SDM data, the vehicle's power mode status was in the Off position at the time of the accident.[629] The [redacted] matter came into GM as a NISM assigned to Jaclyn Palmer. Kathy Anderson and John Sprague were the FPA engineers.

The evaluation in 2010 is the first case evaluation to note what K&S lawyers memorialized as a "sensing anomaly" in Cobalt vehicles.[630] According to the case evaluation, Anderson identified this crash as one in which there should have been a deployment and that a "sensing anomaly" may have prevented deployment.[631] According to Anderson, who never received the case evaluation, she had not identified a "sensing anomaly" as the potential cause of the non-deployment, but rather the "anomaly" was the Ignition Switch "contact bounce" theory that Sprague and Churchwell had been testing, but were unable to prove.[632]

K&S wrote that the failure of the airbags to deploy because of a "sensing anomaly" made this case difficult to defend:

> The severe frontal impact and damage profile will be formidable obstacles to any technical justification for the nondeployment. The preliminary determination by our airbag expert that a sensing "anomaly" prevented deployment is clearly the most challenging aspect of this case.[633]

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[629] Bosch, Crash Data Report File Information (March 10, 2010) [DOC ID 000001662309; GMNHTSA000210937].
[630] [redacted] Case Evaluation (Oct. 7, 2010), at 8 [DOC ID 000001662352; GMNHTSA000211149].
[631] [redacted] Case Evaluation (Oct. 7, 2010), at 8 [DOC ID 000001662352; GMNHTSA000211149]; J&B Interview of Kathy Anderson, May 27, 2014.
[632] J&B Interview of Kathy Anderson, May 27, 2014. The case evaluation further stated that "[t]he SDM calibration was changed for the 2008 model year and she [Anderson] has not seen this anomaly in the 2008 model year or subsequent Cobalts." In fact, Anderson had located a sensing report that indicated there had been a change from an electronic front sensor system to a raw data sensor system in MY 2008 Cobalts. According to Anderson, however, that change had nothing to do with the ignition switch "contact bounce" theory or the airbag non-deployment and she believes that K&S conflated the two concepts in writing the case evaluation. J&B Interview of Kathy Anderson, May 27, 2014.
[633] [redacted] Case Evaluation (Oct. 7, 2010), at 12 [DOC ID 000001662352; GMNHTSA000211149].

> A significant plaintiff's verdict is likely under these unusual circumstances in which an apparent malfunction (sensing system anomaly) prevented airbag deployment in this severe frontal impact.[634]

Indeed, counsel warned that the "facts and circumstances surrounding the investigation" into the "anomaly" – that is that there were prior and still unresolved instances – could even lead to the award of punitive damages:

> … the facts and circumstances surrounding the investigation into the sensing system "anomaly" that may be present in some Cobalts could provide fertile ground for laying the foundation for an award for punitive damages, resulting in a significantly larger verdict.[635]

> **We recommend that General Motors LLC attempt to resolve this case at this time. In light of the foregoing technical assessments by our engineers, our understanding of the factual background, and input from Tennessee counsel (who reports that Nashville area jurisdictions are not "judicial hellholes"), a seven-figure verdict remains probable. Furthermore, the facts and circumstances surrounding the investigation into the sensing system "anomaly" that may be present in some Cobalts could provide fertile ground for laying the foundation for an award for punitive damages, resulting in a significantly larger verdict.**

The following month, on November 2, 2010, K&S updated its evaluation of the [redacted] matter and sent it to Palmer.[636] The report continued to warn of the likelihood of a "significant" plaintiffs' verdict under "these unusual circumstances" because "an apparent malfunction (sensing system anomaly) prevented airbag deployment in this severe frontal impact."[637]

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[634] [redacted] Case Evaluation (Oct. 7, 2010), at 12 [DOC ID 000001662352; GMNHTSA000211149].
[635] [redacted] Case Evaluation (Oct. 7, 2010), at 12 [DOC ID 000001662352; GMNHTSA000211149].
[636] Letter from Harold E. Franklin, Jr., King & Spalding, to Jaclyn C. Palmer, GM, and Annette Rigdon, ESIS (Nov. 2, 2010) [DOC ID 000001662359; GMNHTSA000211173].
[637] Letter from Harold E. Franklin, Jr., King & Spalding, to Jaclyn C. Palmer, GM, and Annette Rigdon, ESIS (Nov. 2, 2010), at 12 [DOC ID 000001662359; GMNHTSA000211173].

F. 2006 to 2010: Failure to Take Basic Steps

In sum, 2006 to 2010 saw five years of failures, including the failure to change the part number, multiple failures to share or gather basic facts (such as materials in GM's own files and in the public record), and, at the most fundamental level, the failure by investigators to understand how GM engineers had designed their own vehicle:

- In 2006, DeGiorgio changed the part but not the part number – an act that violated GM's policies and which would throw GM investigators off the track for years. Also in 2006, airbag non-deployment cases began to come into the GM Legal Department; none of the FPA investigators, outside counsel and in-house lawyers knew of the prior investigations into the Cobalt moving stall issue or the poorly worded TSB that was their outcome.

- In 2007, two different outsiders – Trooper Young of the Wisconsin State Patrol and the Indiana University study team – both arrived at the correct answer to the non-deployment problem, the same one GM engineers would adopt six years later in 2013. But GM personnel were unaware of these reports. They would not learn about the Indiana University study until 2012 when a plaintiff's expert brought it to their attention, and would not learn of the Wisconsin State Patrol report until this internal investigation began – even though the report had been sitting in GM's own files since 2007.

- In 2008, although non-deployment lawsuits continued to come in, both outside and in-house counsel and the FPA engineers were unaware, as they assessed and investigated these cases, of the TSB, the PRTSs, the earlier Product Investigation investigation, the Wisconsin State Patrol report, and the Indiana University study.

- In 2009, the FPA engineers had what one now calls an "aha" moment, leading him to suspect that the vehicle's power mode might be causing the non-deployment of airbags in multiple cases. Yet the investigation did not pick up speed, and no safety investigation was begun by the PI group. Although they were never able to create a "bounce" in testing, engineers hung onto this incorrect theory for years. Sprague did begin to notice patterns in the data suggesting that later model years of the Cobalt did not have a problem with non-deployments. When he directly asked DeGiorgio whether there had been a change in the Ignition Switch, DeGiorgio told him there had been none that would affect the vehicle power mode shutting off – throwing Sprague and others off the track for years. Even after identifying a pattern of airbag non-deployments and learning that the ignition switch may be involved, the issue was not elevated within GM.

- In 2010, as airbag non-deployment cases mounted, GM's outside counsel warned that GM was at risk of punitive damages because the investigation into non-deployment "anomalies" had not been completed. Outside counsel issued this warning not even

> aware of all the facts that would later emerge, including that GM investigators had missed the main issue in 2005 when they did not grasp the fact that their colleagues had designed the airbags not to deploy when the Ignition Switch was turned to Off or Accessory. In-house and outside counsel remained unaware of the PRTSs, the TSBs, the Wisconsin State Patrol report, and the Indiana University study.

The evidence showed that obtaining the TSB, the Wisconsin State Patrol report, and the Indiana University study would have shortened the investigation. As soon as the IU report and TSBs were made known (by a outside expert) to GM, the documents began figuring prominently in evaluations by outside counsel – both in terms of causation and in terms of the possibility of punitive damages. Sprague, who had neither the TSBs nor the Indiana University study, reported that both would have assisted in his investigation.[638] Kemp similarly said that the Wisconsin Safety Patrol report would have assisted, and was concerned that Trooper Young had understood the import of the 2005 TSB when GM's engineers had failed to do so.[639] Kemp said it is "always disappointing when someone outside the company knows more about your product than you do."[640] Other witnesses, however, stated that they saw less use in having them. Notably, Stouffer, the PI investigator who would take over the investigation in 2011, had the TSBs from the start of his investigation, and when he received the Indiana University study in 2012, he thought it failed to provide the correct answer.

G. 2011: Another Engineering Investigation Begins

In January 2011, after GM settled the first non-deployment case in which outside counsel had warned of the possibility of punitive damages, several GM lawyers wanted a meeting to find out more about the Cobalt Ignition Switch issue, but that meeting was not held for six months.

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[638] J&B Interview of John Sprague, May 15, 2014; J&B Interview of John Sprague, April 1, 2014.
[639] J&B Interview of William Kemp, May 16, 2014.
[640] J&B Interview of William Kemp, May 16, 2014.

When the meeting was finally held in July 2011, Kemp instructed Wachtel to open a PI investigation into the Ignition Switch issue. Wachtel assigned the investigation to Brian Stouffer, but conveyed no sense of urgency. As discussed below, the investigation that followed moved slowly, as engineers searched for the "root cause," and there was no timetable and no person accountable for bringing the investigation to a quick close. Stouffer's work was also made more difficult by continued misdirection from DeGiorgio's failure to remember that he had changed the Ignition Switch in 2006.

At the outset, Stouffer was given materials from the 2005 Cobalt moving stall investigation and quickly located the 2005 TSB. He thus had information that GM lawyers and FPA engineers working on airbag non-deployment cases had lacked for years. Stouffer also searched for TREAD data on airbag non-deployment incidents, but failed to include MY 2003-2004 Ions in his search, which caused him to miss numerous Ion airbag non-deployments, including fatal crashes from 2003 and 2004. His failure to collect this data meant that the Ion was left out of the FPE investigation, which would have adverse consequences in future years, including an initial recall in February 2014 that was limited to the Cobalt and the G5.

1. January 2011: Palmer Presents the [redacted] Case and Nowak-Vanderhoef Requests a Meeting That Does Not Occur

In January 2011, Jaclyn Palmer presented the [redacted] case to the Settlement Review Committee ("SRC").[641] The [redacted] SRC meeting was attended by, among others, Larry Buonomo, Michael Gruskin, Bill Kemp, Deb Nowak-Vanderhoef, and Ronald Porter.[642]

[641] E-mail from Jaclyn Palmer, GM, to Diane L. Rorai, GM (Jan. 6, 2011) [DOC ID 000006224224]; Jaclyn Palmer, GM, Settlement Review Committee/Case Summary (Jan. 11, 2011) [DOC ID 000006234239], attached to e-mail from Jaclyn Palmer, GM, to Diane L. Rorai, GM, *et al.* (Jan. 11, 2011) [DOC ID 000006234238].

Palmer presented the FPA's theory that the non-deployment of the airbag was due to a transient or intermittent dropping out of Ignition Switch inputs, likely during the off-road portion of the event; as a result, a power down message was sent from the BCM to the SDM.[643] She explained that the FPA engineers were unable to replicate this phenomenon in off-road tests and that the SDM supplier, Continental, had been engaged in reviewing the issue.[644] Nowak-Vanderhoef recalled Palmer presenting a case about an "anomaly" causing the airbag to not deploy and that this was when Nowak-Vanderhoef first became aware of the Cobalt Ignition Switch issue.[645] Buonomo did not recall whether he attended this meeting.[646] Gruskin did not recall the details of the [redacted] case, though he believed he attended the meeting based on the agenda/attendance sheet.[647] The case settled shortly thereafter.[648]

Shortly after the [redacted] SRC, on January 14, 2011, Palmer received an e-mail from Nowak-Vanderhoef, in which Nowak-Vanderhoef told Palmer that several people wanted to set up a meeting to further discuss the Cobalt: "Now that you've successfully resolved one of your

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[642] Michael Gruskin, GM, Settlement Review Committee Meeting Authority (Jan. 12, 2011) [DOC ID 000001662366]. Documents show the full list as being: Lawrence Buonomo, Michael Daar, Kristi Fielder, Frederick Fromm, Jr., Michael Gruskin, William Kemp Jr., Deborah Nowak-Vanderhoef, and Ronald Porter.
[643] Jaclyn Palmer, GM, Settlement Review Committee/Case Summary (Jan. 11, 2011), at 1 [DOC ID 000006234239], attached to e-mail from Jaclyn Palmer, GM, to Diane L. Rorai, GM, *et al.* (Jan. 11, 2011) [DOC ID 000006234238].
[644] Jaclyn Palmer, GM, Settlement Review Committee/Case Summary (Jan. 11, 2011), at 1 [DOC ID 000006234239], attached to e-mail from Jaclyn Palmer, GM, to Diane L. Rorai, GM, *et al.* (Jan. 11, 2011) [DOC ID 000006234238].
[645] J&B Interview of Jaclyn Palmer, April 24, 2014; Jaclyn Palmer, GM, Settlement Review Committee/Case Summary (Jan. 11, 2011), at 1 [DOC ID 000006234239].
[646] J&B Interview of Lawrence Buonomo, April 16, 2014.
[647] J&B Interview of Michael Gruskin, April 17, 2014.
[648] Jaclyn Palmer, GM, Settlement Review Committee/Case Summary (Jan. 11, 2011), at 1 [DOC ID 000006234239].

cases from this week's SRC, I know several of us would like to see some additional background about an 'anomaly' . . .".[649]

According to both Kemp and Nowak-Vanderhoef, at some time in 2011 Lucy Clark Dougherty attended a meeting at which airbag non-deployment was discussed and gave Kemp a direction as to how to proceed. Clark Dougherty was new to the company; she joined the SRC and moved into her role as Kemp and Nowak-Vanderhoef's boss in March 2011.[650] Although Kemp could not remember at what meeting this occurred, he described how Clark Dougherty directed him to have engineering look into the ignition/airbag deployment issue.[651] Kemp recalled this as having occurred at the end of an SRC meeting; he said it was "uncommon" for a technical issue to be directed to him at an SRC meeting, but that it did happen from time to time.[652] Kemp's recollection was corroborated by Nowak-Vanderhoef, who similarly remembered Clark Dougherty directing Kemp to have engineers investigate this issue.[653] For her part, Clark Dougherty stated that she did not remember such a conversation with Kemp, but she did not rule it out. She said it was possible that she had the conversation with Kemp but did not then understand the gravity of the situation or the full facts.[654]

Regardless of when or whether such a direction occurred, no meeting occurred in January 2011 pursuant to Nowak-Vanderhoef's e-mail or a direction from Clark Dougherty. Instead, the

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[649] E-mail from Jacyln Palmer, GM, to Deb Nowak-Vanderhoef, GM (Jan. 14, 2011) [DOC ID 000001745032 GMNHTSA000220386]; J&B Interview of Jaclyn Palmer, April 24, 2014.
[650] Before joining GM in 2010, Clark Dougherty had been in government service and before that private practice.
[651] J&B Interview of William Kemp, April 17, 2014. Kemp described the meeting as an SRC meeting. The only SRC meeting in 2011 in which we have verified that Cobalt airbag non-deployment was discussed, however, concerned [redacted] Clark Dougherty had not been assigned to Detroit by then.
[652] J&B Interview of William Kemp, April 17, 2014.
[653] Nowak-Vanderhoef reported that Clark Dougherty gave Kemp this instruction at an SRC meeting in 2011 at which Jaclyn Palmer presented, but then said she was uncertain and confused about the date. J&B Interview of Deborah Nowak-Vanderhoef, May 1, 2014.
[654] J&B Interview of Lucy Clark Dougherty, April 16, 2014.

meeting occurred in July 2011. Witnesses could not explain why six months passed before the meeting took place, but the delay again highlights the lack of urgency in addressing the issue.[655] Palmer believes that in the interim she talked to Sprague and Everest about obtaining Cobalt-related data and sharing the data with Kemp, Nowak-Vanderhoef and Carmen Benavides, Director of Product Investigations, Safety Regulations, Field Performance Assessment, and TREAD.

2. July 2011: [redacted] Evaluation and Another Warning About Punitive Damages

On July 26, 2011, a little over six months after the [redacted] SRC meeting, K&S submitted a case evaluation for the [redacted] matter.[656] As in [redacted] Palmer was the GM lawyer and Anderson and Sprague were the FPA engineers on the [redacted] matter. On February 13, 2011, [redacted] was driving her mother's 2007 Chevrolet Cobalt when she lost control of the vehicle, traveled off the roadway and ran head-on into a tree on the side of the road.[657] The airbag did not deploy.[658] [redacted] suffered significant injuries and was hospitalized for nine days.[659] The SDM data showed that at the time of the accident the vehicle's power mode status was in Accessory.[660]

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[655] J&B Interview of William Kemp, May 9, 2014. Kemp did not recall the dates of either the SRC or the July meeting.
[656] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011) [DOC ID 000005185394].
[657] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011) [DOC ID 000005185394].
[658] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011) [DOC ID 000005185394].
[659] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011) [DOC ID 000005185394].
[660] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011), at 8 [DOC ID 000005185394].

K&S's July 26, 2011 report again highlighted the "sensing anomaly" about which it had twice before written in the [redacted] evaluations, noting that jurors would expect the airbags to deploy in this case and even GM's own expert could not rule out the sensing "anomaly" as the cause.[661] K&S wrote about how Sprague had seen this problem before in "some Cobalt vehicles" and further noted that "the fact that the SDM data indicated that the car was in accessory mode at the time of the accident is clearly the most challenging aspect of this case."[662]

K&S warned of the possibility of punitive damages because of "the facts and circumstances" surrounding the Cobalt investigation:

> In addition, the facts and circumstances surrounding the investigation into the sensing system "anomaly" that may be present in some Cobalts could provide fertile ground for laying the foundation for an award of punitive damages, resulting in a significantly larger verdict.[663]

At the time, K&S, in-house counsel, and the FPA engineers were not aware of the 2005 TSB, the PRTS reports that led to the TSBs, the Wisconsin State Patrol report, or the Indiana University study.

The [redacted] matter was reviewed at an August 3, 2011 Roundtable, attended by Michael Gruskin and Jaclyn Palmer (who presented).[664] The Roundtable summary stated:

> The vehicle power mode status was recorded as Accessory which indicates the sensing algorithm could have been disabled from deploying the airbags. This would have to be confirmed by sending the SDM to the supplier for further interrogation. John Sprague indicates it is also possible the airbags did not

[661] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011), at 2 [DOC ID 000005185394].
[662] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011), at 14 [DOC ID 000005185394].
[663] Letter from Harold Franklin, King & Spalding, to Jaclyn Palmer, GM, and Annette Rigdon, ESIS (July 26, 2011), at 14 [DOC ID 000005185394].
[664] General Motors, Settlement Roundtable Case Summary (Aug. 3, 2011), at 1-2 [DOC ID 000001662599 GMHNTSA000212972].

deploy, because of the extended crash pulse. The subject vehicle was subject to the Cobalt power steering recall, which was performed prior to the crash.[665]

3. July 2011: Meeting to Kick Off the FPE Process

In July 2011, GM lawyers finally met with the Product Investigation team concerning the ongoing Cobalt airbag non-deployment matter.[666] According to participants, this was the meeting that Nowak-Vanderhoef had first requested in January after the [redacted] SRC.[667]

According to Bill Kemp, this was an "unusual" meeting. It was not, he said, in the normal course to pull that many people together to initiate the FPE process, and, indeed, he had never before seen a meeting like it.[668] For this issue, though, Kemp said he "wanted to make sure senior management had eyeballs on this and not let it flow through the normal process."[669] FPA supervisor Everest similarly reported that he understood the purpose of the July 27, 2011, meeting was for GM Legal to express to PI that certain Cobalt non-deployment cases represented a safety concern and that PI urgently needed to determine the root cause of the problem.[670] Palmer too expressed frustration that the process did not seem to be moving forward, and played an important role in putting together the presentation.[671]

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[665] General Motors, Settlement Roundtable Case Summary (Aug. 3, 2011), at 1-2 [DOC ID 000001662599 GMHNTSA000212972].
[666] Invitation from Jaclyn Palmer, GM, to Carmen Benavides, GM, *et al.* (June, 27, 2011) [DOC ID 000001745020]. Invitees included GM attorneys Deborah Nowak-Vanderhoef and Bill Kemp, Product Investigations personnel Carmen Benavides and Doug Wachtel, and engineers Matthew Jerinsky, James Churchwell, Brian Everest, and John Sprague. According to Palmer's invitation, "FPA will be the primary presenter during the meeting."
[667] J&B Interview of Jaclyn Palmer, April 24, 2014; J&B Interview of William Kemp, May 9, 2014; J&B interview of Deborah Nowak-Vanderhoef, May 1, 2014.
[668] J&B Interview of William Kemp, May 9, 2014.
[669] J&B Interview of William Kemp, May 9, 2014.
[670] J&B Interview of Brian Everest, March 27, 2014.
[671] J&B Interview of Brian Everest, March 27, 2014; J&B Interview of Jaclyn Palmer, April 24, 2014.

In advance of the meeting, Palmer met with Sprague to review the non-deployment cases and incidents and to discuss what would be presented to PI.[672] Palmer and Sprague settled on presenting three Cobalt non-deployment incidents: (1) the 2005 [redacted] crash; (2) the 2008 [redacted] crash; and (3) the 2009 [redacted] crash.[673] [redacted] was selected because it was the incident that NHTSA had brought to GM's attention in March 2007, and because data downloaded from the [redacted] SDM indicated that an airbag deployment would have been expected.[674] [redacted] too, was selected because the data downloaded off of the SDM indicated an airbag deployment would have been expected. [redacted] was also selected because the [redacted] SDM had been analyzed by Continental in 2009 and found to have had a disabled crash sensing algorithm at the time of the crash – a fact consistent with FPA's working theory that the non-deployments were caused by a change in the power-mode message received by the SDM.[675] Finally, [redacted] was selected because it was the incident that prompted the meeting in the first place and because pictures of the [redacted] crash showed a particularly significant impact.[676]

Witnesses describe attendees of the meeting as including, among others, Kemp, Palmer, Nowak-Vanderhoef, Sprague, Wachtel, Sevigny, and Carmen Benavides.[677] Although numerous

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[672] J&B Interview of John Sprague, May 15, 2014.
[673] J&B Interview of John Sprague, May 15, 2014.
[674] J&B Interview of John Sprague, May 15, 2014.
[675] J&B Interview of John Sprague, May 15, 2014.
[676] J&B Interview of John Sprague, May 15, 2014.
[677] J&B Interview of Jaclyn Palmer, April 24, 2014; J&B Interview of John Sprague, March 26, 2014; J&B Interview of Brian Everest, March 27, 2014. Invitation from Jaclyn Palmer, GM, to Carmen Benavides, GM, *et al.* (June, 27, 2011) [DOC ID 000001745020]. Invitees included GM attorneys Deborah Nowak-Vanderhoef and Bill Kemp, Product investigations personnel Carmen Benavides and Doug Wachtel, and engineers Matthew Jerinsky, James Churchwell, Brian Everest, and John Sprague. Invitation from Jaclyn Palmer, GM, to Brian Everest, GM, *et al.* (June, 27, 2011) [DOC ID 000002149006 GMNHTSA000220996]. Benavides stated that at the time, she was focused on why the airbag did not deploy – and therefore on potential problems with the SDM – rather than on the ignition. She also said that she understood that the legal department was handling the airbag non-deployment issue

witnesses described Watchel's presence – and comments that he made – Wachtel states he did not attend the meeting.[678]

At the meeting, Palmer presented the facts of the [redacted] and [redacted] crashes.[679] Then Sprague presented files and pictures from all three incidents and reviewed what FPA knew at that time, as well as the questions that remained unanswered.[680] Although he does not specifically remember, Sprague believed that fatalities were discussed; the deaths were apparent based on the files shared and pictures shown.[681] The urgency of the situation should have been manifest.

Sprague explained that there was a theory that the airbag non-deployments were connected to the SDM receiving a message that the vehicle power mode was in Accessory or Off.[682] One witness recalled that Sprague had thought these power-mode messages might be connected to the Ignition Switch.[683]

Several witnesses reported that, at the meeting, Wachtel, the Senior Manager of Product Investigations, expressed reluctance to take on the issue by opining that the incident rate was not high.[684] According to Palmer, Wachtel denied that PI had previously been alerted to the PI non-

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and that she should not discuss the content of the meeting with others to maintain attorney-client privilege. J&B Interview of Carmen Benavides, March 25, 2014.

[678] J&B Interview of Douglas Wachtel, May 22, 2014.

[679] J&B Interview of Carmen Benavides, March 25, 2014.

[680] J&B Interview of Jennifer Sevigny, March 27, 2014; J&B Interview of Deborah Nowak-Vanderhoef, May 1, 2014; J&B Interview of John Sprague, May 15, 2014.

[681] J&B Interview of John Sprague, May 15, 2014.

[682] J&B Interview of Jennifer Sevigny, March 27, 2014.

[683] J&B Interview of Jennifer Sevigny, March 27, 2014.

[684] J&B Interview of Deborah Nowak-Vanderhoef, May 1, 2014; J&B Interview of Brian Everest, March 27, 2014. Wachtel does not recall attending this meeting and stated that, in any event, he would have placed little emphasis on the incident rate because of the seriousness of the crashes. J&B Interview of Douglas Wachtel, May 22, 2014. Kemp, too, remembered someone making an observation about a low incident rate, but could not remember who. According to Kemp, he would have dismissed such a statement because he considered the potential severity of the accidents in addition to the incident rate. In addition, said Kemp, the view was "inconsistent with my view at the

deployment issue, which she believed was untrue.[685] Both Palmer and Everest reported being frustrated by Wachtel and the PI group's response.[686] As noted above, Wachtel denied attending the meeting at all, saying that he was told after the meeting to assign an investigator to the matter.[687]

According to witnesses, Kemp instructed Wachtel to put the Cobalt matter through the investigation process.[688] Everest reported that Wachtel appeared to understand and accept Kemp's instructions, and agreed to assign an investigator.[689]

Following the July 27 meeting, Wachtel conferred with Sprague.[690] Wachtel met with Sprague, Everest, and Jim Churchwell to discuss PI opening an investigation.[691] He then assigned PI investigator Brian Stouffer to investigate the matter and asked him to confer with Sprague. According to Everest, as a result of the meeting, the Cobalt investigation was "on [Wachtel's] list, but not top of his list."[692] According to Stouffer, Wachtel never told him that this was an urgent matter. Although Sprague continued to be involved in the matter, it was at this moment that a formal PI investigation began.

In sum, the hand-off to PI took place because GM lawyers were frustrated with the lack of progress being made by FPA, a group of engineers whose focus was on individual products liability cases, not safety investigations. By the account of each lawyer, they were seeing cases

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time plus the direction I had been given," a reference to his report to us that Clark Dougherty had directed him to have PI investigate the issue. J&B Interview of William Kemp, May 9, 2014.

[685] J&B Interview of Jaclyn Palmer, April 24, 2014; e-mail from Jaclyn Palmer, GM, to Douglas Wachtel, GM (July 27, 2011), forwarding an e-mail from Eric Buddrius, GM, to Jaclyn Palmer, GM (Jan. 11, 2011) [DOC ID 000001745053 GMNNHTSA000220997].

[686] J&B Interview of Jaclyn Palmer, April 24, 2014; J&B Interview of John Sprague, May 15, 2014.

[687] J&B Interview of Douglas Wachtel, May 14, 2014.

[688] J&B Interview of Brian Everest, March 27, 2014.

[689] J&B Interview of Brian Everest, March 27, 2014.

[690] J&B Interview of Douglas Wachtel, March 18, 2014.

[691] J&B Interview of Douglas Wachtel, May 14, 2014.

[692] J&B Interview of Brian Everest, March 27, 2014.

they did not understand, and wanted something more done. Indeed, the very fact of the "unusual" meeting to kick off an FPE process bespoke a sense of urgency.

But the meeting took six months to schedule – an unexplained delay that meant that more accidents were occurring while the investigation did not move forward. For their part, the lawyers felt they had done their job by emphasizing the importance of the issue to the engineers and moving the issue from the FPA engineers to the PI group. But, faced with a pattern of crashes that had resulted in fatalities and an unexplained "anomaly" that affected the deployment of airbags, they did not at the same time elevate the issues to the General Counsel and do not appear to have insisted on a quick and concrete timetable for the safety investigation.

Moreover, any urgency was lost at the moment of the hand-off to the PI group. Wachtel (who was one of the engineers able to recreate the Cobalt moving stall in 2005 before PI closed its investigation) demonstrated he was disinclined to open an investigation at all and then never imparted a sense of urgency to the investigator he assigned.

Wachtel's conduct is a demonstration of what Mary Barra described as the "GM nod": When everyone nods in agreement to a proposed plan of action, but then leaves the room and does little.[693] Without a timetable or a supervisor demanding action, the ensuing PI investigation proceeded at an inexcusably slow pace.

4. August 2011: Stouffer and Sprague Meet to Transition Files

In the fall of 2011, after Wachtel assigned Stouffer to the investigation, Sprague met with Stouffer and described that he had been tracking Cobalt non-deployment crashes in which

[693] J&B Interview of Mary Barra, April 14, 2014.

available data suggested an airbag should have deployed.[694] Sprague explained a working theory that the non-deployments were caused by the SDM receiving a power mode message of Off or Accessory immediately before or during the crash.[695] Sprague further noted that the non-deployment issue was not present in the MY 2008 and later Cobalts.[696] Stouffer understood from this early meeting that Sprague had previously examined all changes related to the Ignition Switch.[697]

At or around the time of their initial meeting, Sprague provided Stouffer with a flash drive of relevant materials.[698] Although Stouffer's and Sprague's respective memories differ on whether the flash drive included a copy of Sprague's then-current tracking spreadsheet,[699] at a minimum the drive contained information pertaining to the non-deployment events underlying Sprague's tracking spreadsheet.[700] Sprague also provided Stouffer with a list of work orders related to the Ignition Switch.[701]

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[694] J&B Interview of Brian Stouffer, May 9, 2014; J&B Interview of Brian Stouffer, May 24, 2014; J&B Interview of John Sprague, May 26, 2014.
[695] J&B Interview of Brian Stouffer, April 4, 2014.
[696] J&B Interview of Brian Stouffer, April 4, 2014.
[697] J&B Interview of Brian Stouffer, May 9, 2014.
[698] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of John Sprague, March 26, 2014.
[699] *Compare* J&B Interview of Brian Stouffer, April 4, 2014, *with* J&B Interview of John Sprague, March 26, 2014. Stouffer believes a version of Sprague's spreadsheet was included on the flash drive when it was initially provided to Stouffer in or around August 2011. A review of the flash drive's contents, however, reveals that the earliest tracking spreadsheet on the flash drive is dated to March 2012 – several months after Stouffer's initial meeting with Sprague.
[700] Sprague has no specific recollection of including the spreadsheet on the flash drive when he initially provided it to Stouffer. He nonetheless remembers providing information that supported the contents of his tracking spreadsheet. J&B Interview of John Sprague, March 26, 2014.
[701] J&B Interview of Brian Stouffer, May 9, 2014. Stouffer did not recall whether Sprague provided him with electronic versions of the EWOs or whether Stouffer collected copies of the EWOs after meeting with Sprague. While Stouffer recalls having copies of relevant PRTSs (including N172404 and N182276) on the flash drive, it is unclear whether those PRTSs were provided by Sprague. J&B Interview of Brian Stouffer, May 9, 2014. Sprague lacks direct access to the PRTS database and has never seen PRTSs relevant to the ignition switch. J&B Interview of John Sprague, May 15, 2014.

Despite the failed experiment at the Milford Proving Grounds, Sprague explained to Stouffer that he had a working theory (initially developed in mid-2009) that a "contact bounce" caused the Ignition Switch to "open up" and send an Accessory or Off signal to the SDM, resulting in non-deployment of the airbags.[702] Sprague described one fatality involving a girl who drove away from a party and crashed the vehicle she was driving.[703] During the course of his investigation, Stouffer learned about one additional fatality, but it occurred in the 2005-2006 timeframe, and Stouffer did not believe that fatalities were continuing to occur.[704]

Shortly after his meeting with Sprague, Wachtel gave or referred Stouffer to the file that had been created by FPE investigating engineer Elizabeth Kiihr in 2005. In obtaining that file, Stouffer immediately gained access to information that Sprague never had.[705] Kiihr's six-year-old file contained the scathing press articles at the Cobalt launch relating to moving stalls, customer complaints, and a copy of a February 2005 Preliminary Information on engine stall in the Cobalt.[706]

According to Stouffer, he did not view the materials he received as particularly significant because they did not explain two phenomena mentioned by Sprague that confounded Stouffer throughout his investigation:

1. The non-deployment phenomenon was absent in MY 2008 and later Cobalts and his belief that no relevant part changes had occurred to explain this, and

2. In almost half of the non-deployment cases, the SDM recorded the Ignition Switch as being in "Run."

[702] J&B Interview of Brian Stouffer, April 4, 2014.
[703] J&B Interview of Brian Stouffer, April 4, 2014.
[704] J&B Interview of Brian Stouffer, May 9, 2014.
[705] J&B Interview of John Sprague, May 23, 2014.
[706] J&B Interview of Brian Stouffer, May 9, 2014.

These two facts led Stouffer to believe that the low torque required to turn the Ignition Switch was not the "root cause" of the airbag non-deployment.[707] Thus, notwithstanding the conclusions drawn by the Wisconsin State Patrol report and the Indiana University study (the former of which Stouffer was never aware, and the latter of which he only became aware in July 2012), Stouffer's focus on these two facts paralyzed his ability to fully analyze the problem or revisit his preliminary conclusions.

5. Information Sharing Between FPA Engineers and the PI Group

Early in our investigation, we were told that Stouffer was denied access to information by Sprague because it was privileged, thus hampering Stouffer's investigation of the issue. Wachtel identified lack of information and data sharing by the FPA group, of which Sprague was a member, as one of the reasons the Cobalt airbag non-deployment investigation took so long.[708] Given the potentially serious implications of this statement, we investigated the issue exhaustively, including conducting multiple interviews of the two central figures, Stouffer and Sprague.

Stouffer said that he was never denied information he sought for privilege reasons.[709] Although he noted he might not have access to documents,[710] he does not recall ever being told by Sprague that he could not have access to certain information because it was protected by privilege.[711] Sprague has no specific recollection of rebuffing a Stouffer request on privilege grounds, and explained that, if Stouffer asked for information that was contained in a privileged

[707] J&B Interview of Brian Stouffer, May 9, 2014.
[708] J&B Interview of Douglas Wachtel, March 18, 2014.
[709] J&B Interview of Brian Stouffer, May 9, 2014.
[710] J&B Interview of Brian Stouffer, April 4, 2014.
[711] J&B Interview of Brian Stouffer, May 9, 2014; J&B Interview of Brian Stouffer, April 4, 2014.

document or source, Sprague would have provided the information to Stouffer, just not the privileged document itself.[712]

Jennifer Sevigny, the head of FPA, described her group's approach to privilege in a similar way: Because FPA works with GM attorneys on lawsuits and legal claims, much of the information and material the group has is privileged. If other GM employees, such as PI investigators, make a request for information from FPA for use in a PI investigation, FPA routes the request through the legal department for approval. Sevigny said that, when such requests for information are made, the legal department has generally been able to accommodate them, and FPA has in the past provided information in response to such requests.[713] In other words, if Stouffer requested information from Sprague, Sprague would give it to him.[714]

6. Summer to Fall 2011: Stouffer Analyzes TREAD Data

According to Stouffer, his first investigative step was to retrieve and analyze the relevant TREAD data to identify any additional airbag non-deployment incidents that matched the pattern observed by FPA.[715] Stouffer looked broadly for reports of airbag non-deployments with injuries.[716]

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[712] J&B Interview of John Sprague, May 23, 2014.
[713] J&B Interview of Jennifer Sevigny, March 27, 2014. One witness reported that FPA engineers are discouraged from sharing information about specific lawsuits, and another said that there is an "imperfect transfer from FPA engineers to FPE engineers due to privilege concerns." J&B Interview of Kathy Anderson, April 24, 2014; J&B Interview of Ronald Porter, April 30, 2014.
[714] Stouffer did not ask for, nor was he given, materials generated by lawyers that were presented to the Roundtable or SRC. Those materials, however, relied on the technical analyses of Sprague and others of the FPA group, and, as noted above, Sprague did provide technical information to Stouffer.
[715] J&B Interview of Brian Stouffer, April 4, 2014.
[716] J&B Interview of Brian Stouffer, April 4, 2014.

From the TREAD database, Stouffer retrieved instances of airbag non-deployment for the Cobalt from 2005 to 2007.[717] Stouffer, however, did not pull TREAD data on deaths and injuries, which is stored in a different part of the TREAD database.[718] Stouffer did not have access to the death and injury database, although he could have asked someone else to run those searches for him.[719] He did not know of the database's existence at the time. In January 2014, Davidson conducted full TREAD data searches and found additional fatalities and serious injuries connected to the Cobalt.[720] As many witnesses have noted, the TREAD database is extremely difficult to use and search, potentially resulting in valuable data being missed by those investigating potential safety or other problems. *See* Appendix E. GM has a dedicated team that performs such searches upon request. In this case, Stouffer's failure to fully search the TREAD data caused him to miss key pieces of information, serious injuries, and fatalities associated with the Cobalt.[721]

Stouffer's 2011 search for TREAD data also included a search for airbag non-deployments in MY 2005-2007 Ions. However, Stouffer mistakenly left out MY 2003-2004 Ions, causing him to miss several accidents, including accidents involving fatalities.[722] After the

[717] J&B Interview of Brian Stouffer, April 4, 2014. Stouffer did not pull TREAD data for the Ion until 2012. He did not recall whether he pulled the HHR data in 2011. In addition to the airbag bucket TREAD report, Stouffer also pulled the Cobalt power train bucket, ignition bucket, and electrical bucket from TREAD. Stouffer pulled this data because he was aware of the 2005 engine stall complaints and PRTSs.
[718] J&B Interview of Dwayne Davidson, April 22, 2014.
[719] J&B Interview of Brian Stouffer, May 9, 2014.
[720] J&B Interview of Dwayne Davidson, April 22, 2014; J&B Interview of Carmen Benavides, May 25, 2014.
[721] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Dwayne Davidson, April 22, 2014; J&B Interview of Carmen Benavides, March 25, 2014.
[722] J&B Interview of Brian Stouffer, April 4, 2014. In 2012, Stouffer pulled engine stall data for MY 2003-2007 Ions, but did not search for Ion airbag non-deployment data for these model years.

Cobalt recall was issued on February 7, 2014, Davidson pulled the full data for the Ion and discovered Ion fatalities that Stouffer had missed.[723]

According to Stouffer, he completed his first analysis of TREAD data on November 17, 2011.[724] He updated and summarized the TREAD data again on March 12, 2012.[725] After he reviewed the TREAD data, Stouffer identified what he recollects to be approximately 50 additional reports that he believed might fit the criteria of the crashes identified to date.[726] He shared this list of incidents with Sprague and asked Sprague to identify whether any on the list were crashes where Sprague would have expected the airbags to deploy but they did not.[727] Sprague responded to Stouffer that, in his view, none of the crashes on the list fit that description.[728]

According to Stouffer, from August 2011 to March 2012, he discussed the Cobalt investigation with Wachtel periodically, and Wachtel never told him to prioritize the investigation or proceed at a faster pace.[729] At the time, Stouffer did not personally feel that the investigation should be moving at a faster pace.[730] Stouffer understood that he was investigating crashes that had occurred several years ago, and his understanding was that the Cobalt non-deployments were not continuing to occur while he investigated this matter.[731] According to Kemp, he repeatedly spoke to Wachtel about the progress of the investigation. Kemp said that

[723] J&B Interview of Carmen Benavides, March 25, 2014.
[724] J&B Interview of Brian Stouffer, April 4, 2014.
[725] J&B Interview of Brian Stouffer, April 4, 2014.
[726] J&B Interview of Brian Stouffer, April 4, 2014. Those criteria were, according to Stouffer: the vehicle had had an off-road incident prior to the crash, there had been a front-end crash, and Sprague thought the airbags probably should have deployed based on Sprague's review of the available data. J&B Interview of Brian Stouffer, May 24, 2014.
[727] J&B Interview of Brian Stouffer, May 24, 2014.
[728] J&B Interview of Brian Stouffer, May 24, 2014; J&B Interview of John Sprague, May 26, 2014.
[729] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Brian Stouffer, May 9, 2014.
[730] J&B Interview of Brian Stouffer, April 4, 2014.
[731] J&B Interview of Brian Stouffer, April 4, 2014.

he had a "couple" of conversations in which he told Wachtel that GM needed to "get on this."[732] Kemp said that Wachtel repeatedly told him variations of: "There's something going on here we don't know."[733]

In sum, however, at the beginning of 2012, a full year after GM was warned of the possibility of punitive damages, and the GM legal team had requested a meeting to move an investigation into possible safety issues in the Cobalt forward, the investigation had moved not at all. There were no timetables, no meetings scheduled, and no progress. A new investigator was looking at the same data as Sprague, and he also had some additional information that had been in GM's files for years. But little else had changed, and GM was no closer to addressing the safety defect in the Cobalt.

H. 2012: The Search for the "Root Cause"

In the first part of 2012, mechanical engineers and electrical engineers debated how best to proceed. In the meantime, Cobalts with a safety defect stayed on the road, while GM engineers held more meetings.

In June 2012, the plaintiff's expert in an airbag non-deployment case located the Indiana University study and cited it in her report, bringing it to the attention of GM engineers and lawyers working on the Ignition Switch issue for the first time. The expert, Erin Shipp, concluded that the airbag non-deployments were being caused by the low torque of the Ignition Switch. Stouffer discounted the Indiana University study and the Shipp report because they did not explain airbag non-deployments in cases in which the Ignition Switch was in Run, and because they did not explain why the non-deployments were limited to pre-MY 2008 vehicles.

[732] J&B Interview of William Kemp, May 9, 2014.
[733] J&B Interview of William Kemp, May 9, 2014.

Having failed to make progress in his investigation, Stouffer enlisted the help of the Red X team, which likewise failed to make progress in the investigation.

1. February 2012: [redacted] Evaluation

On February 24, 2012, K&S submitted to GM lawyer Ron Porter its first case evaluation for the [redacted] matter.[734] The [redacted] case arose out of a two-car crash that occurred on March 10, 2010, in Georgia. [redacted] was driving her 2005 Cobalt through heavy rain when she encountered standing water in the roadway. [redacted] who the accident report said was driving too fast for the conditions, lost control of her car, veered sideways into the southbound travel lane, and was struck on the passenger side by another vehicle. [redacted] Cobalt then traveled rear first off the roadway and dropped approximately fifteen feet into a creek with rising water from the rain. According to the SDM data, at the time of the accident, the vehicle's power mode status was in Accessory.[735]

The plaintiff's counsel never alleged at any time during the litigation that the front airbag should have deployed. On the contrary, plaintiff's expert agreed that it should not have.[736] Even though the airbag was not at issue, the initial K&S evaluation – as in the [redacted] and [redacted] cases – pointed out "the Cobalt likely lost power approximately three seconds before the crash."[737]

The evaluation also reported extensive conversations with Sprague about the Ignition Switch being in the Accessory position, and why that might be:

> The SDM data also shows that the car was in "accessory" rather than the "run" mode immediately prior to the crash. Brian Everest and others at FPA have

[734] [redacted] Case Evaluation (Feb. 24, 2012) [DOC ID 000003895797; GMNHTSA000252849].
[735] [redacted] SDM Crash Data (March 22, 2011), at 48 [DOC ID 000002818612; GMNHTSA000224895].
[736] Deposition of Kelly Kennett (May 14, 2013), at 20 [DOC ID 000001771172; GMNHTSA000144290].
[737] [redacted] Case Evaluation (Feb. 24, 2012), at 19 [DOC ID 000003895797; GMNHTSA000252849].

> looked at the data and concluded that the car could have transitioned from "run" mode to "accessory" mode in one of three ways: (1) the car's after-market security system could have interrupted power in the ignition switch so that the car transitioned to accessory mode; (2) there could have been a "bounce" in the ignition switch caused by external factors like standing water or some other internal "anomaly" in the ignition that caused the transition from the run to the accessory mode; or (3) [redacted] could have intentionally or inadvertently turned the key from the run position to the accessory position as she was losing control of the car. Because the third option seems the least likely, our analysis at this point has focused on the after-market security system and a possible "bounce" anomaly in the Cobalt's ignition system.[738]

K&S observed that GM had seen this phenomenon before: "FPA engineers have seen instances in 2005-07 model year Cobalts where rough road conditions cause 'bounce' in the ignition switch."[739]

FPA supervisor Everest (who worked on the [redacted] technical evaluation) disputed that he or someone on his team could have drawn any definitive causal connections at the time the [redacted] evaluation was drafted;[740] rather Everest told K&S that contact bounce was one theory that was being explored.[741] He also stated that he would not have referred to the power issue as an "anomaly."[742] A few weeks later, on March 8, 2012, GM Legal Staff attorney Porter presented the [redacted] matter to the Roundtable.[743] In his summary, Porter outlined how the SDM data was "confusing" and specifically addressed the issue of how the power mode was recorded as being in Accessory:

> At this time we have identified 3 possible explanations for the accessory position data. 1. [redacted] turned the key to the acc position. This might have occurred if she was attempting to restart the engine after it stalled. 2. Ignition circuit "bounce." FPA has seen a few instances involving Cobalts operated on rough roads where

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[738] [redacted] Case Evaluation (Feb. 24, 2012), at 19 [DOC ID 000003895797; GMNHTSA000252849].
[739] [redacted] Case Evaluation (Feb. 24, 2012), at 19 [DOC ID 000003895797; GMNHTSA000252849].
[740] J&B Interview of Brian Everest, April 29, 2014.
[741] J&B Interview of Brian Everest, March 27, 2014.
[742] J&B Interview of Brian Everest, April 29, 2014.
[743] [redacted] Roundtable Case Summary (March 8, 2012), at 7-8 [DOC ID 000002818612; GMNHTSA000224895].

> the ignition circuit goes to the acc position due to vibration. 3. Interference from the poorly designed and poorly installed aftermarket alarm system. This might have been the cause of the stalling condition for which [redacted] took the car to [the dealer] several days before the crash.[744]

Among the Roundtable attendees were Jaclyn Palmer and Michael Gruskin.

That same day, Palmer e-mailed Nowak-Vanderhoef and Kemp, along with GM engineering and PI employees, to schedule a "meeting so that Product Investigations can update Legal, regarding the status of the investigation into Cobalt airbag nondeployments."[745] On March 15, 2012, Palmer met with Stouffer, Kemp, and others. According to Palmer, the other participants included Nowak-Vanderhoef, Wachtel, Everest, Sprague, and Benavides.[746] Palmer organized the meeting because she noticed the passage of time and had heard from Sprague that there was minimal progress.[747] Palmer was "concerned that nothing seemed to have been figured out."[748] At this point, neither Sprague nor the lawyers knew of the PRTS reports, the TSBs, the Wisconsin State Patrol report or the Indiana University study. Stouffer and Wachtel, on the other hand, had Elizabeth Kiihr's file from 2005, which contained (a) 2005 news articles from the *New York Times*, the *Cleveland Plain Dealer*, and the *Sunbury Times*; (b) several TREAD data reports regarding the Cobalt; (c) PowerPoint presentations, including presentations from the ISR and VAPIR in 2005; (d) a cost estimate for changing the design of the key; and (e) a copy of a PI Bulletin titled "Engine Stalls, Loss of Electrical Systems, and No DTCs."

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[744] [redacted] Roundtable Case Summary (March 8, 2012), at 7 [DOC ID 000002818612; GMNHTSA000224895].
[745] E-mail from Jaclyn Palmer, GM, to Deb Nowak-Vanderhoef, GM, *et al.* (March 8, 2012) [DOC ID 000001745056; GMNHTSA000221020].
[746] J&B Interview of Jaclyn Palmer, April 24, 2014
[747] J&B Interview of Jaclyn Palmer, April 24, 2014.
[748] J&B Interview of Jaclyn Palmer, April 24, 2014.

According to Palmer, after the meeting Kemp notified Palmer that he would seek out an "executive champion" to oversee the FPE process.[749] Kemp did not recall this meeting, but recalled seeking out an executive champion in the coming months.[750]

2. March 2012: The Visit to the Davison Junkyard and Re-Discovery of the TSBs

In his continuing support role, Sprague organized a trip on March 28, 2012, to the Auto Salvage Auction in Davison, Michigan (the "Davison Junkyard") with electrical engineers who had been working with Stouffer on theories related to an electrical root cause. The group, including John Dolan, Dolan's supervisor David Carey, Vipul Modi (the lead engineer responsible for airbag electronics) and Sprague, intended to extricate the BCM from the [redacted] crash 2006 Cobalt.[751] While moving cars into position to assess the BCM, one of the engineers turned a key in a Cobalt ignition and noticed that it turned extraordinarily easily.[752]

This discovery raised concerns. According to Dolan, the head of the Global Subsystem Leader Team on Passive Safety Control, the Ignition Switch turned so easily that the engineers decided that they should measure the force required to turn the key. But they had not brought

[749] J&B Interview of Jaclyn Palmer, April 24, 2014.
[750] J&B Interview of William Kemp, May 9, 2014.

[751] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014. Stouffer reported that he found out about the trip after it occurred. J&B Interview of Brian Stouffer, May 13, 2014; J&B Interview of John Dolan, March 21, 2014.
[752] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014; Cobalt Issue Activities Presentation, at 4 [DOC ID 000049367127; GMNHTSA000282633], attached to e-mail from John Dolan, GM, to David Carey, GM, *et al.* (May 15, 2012) [DOC ID 000049367126; GMNHTSA000282632]; J&B Interview of Vipul Modi, April 23, 2014; J&B Interview of David Carey, April 24, 2014; J&B Interview of Lisa Weber, April 24, 2014; J&B Interview of James Churchwell, March 21, 2014; J&B Interview of James Churchwell, April 24, 2014.

measuring tools with them.[753] They immediately dispatched an investigator to buy a fish scale from a local bait and tackle shop.[754]

Using the fish scale, the engineers measured the force necessary to move the key out of the Run position on a number of Cobalt vehicles at the junkyard.[755] Dolan recorded the results and, after the visit, put them into a table.[756] He was surprised by the measurements: if they were correct, the measurements suggested a driver could hit a pothole and the Ignition Switch might move out of the Run position.[757]

According to Dolan, the next day he went to the office and pulled the Cobalt warranty data to determine whether there were customer complaints regarding the Ignition Switch moving out of the Run position.[758] To his surprise, he discovered many customer complaints and also the TSB that described both the low torque and the phenomenon of knocking the Ignition Switch out of Run and into Accessory. That day, he elevated his discovery to Carey, who said that he presented the issue to Wachtel and to the Product Investigations group. According to Carey, he had a conversation with Wachtel in which he expressed that the torque issue could be significant to the ongoing Cobalt investigation;[759] Wachtel did not recall this conversation.[760] The team also sent the information to Stouffer, who started asking questions of component engineers.[761] Although Stouffer still continued to question the probative value of the TSBs, they were now

[753] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014.
[754] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014.
[755] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014.
[756] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014.
[757] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014.
[758] J&B Interview of John Dolan, March 21, 2014; J&B Interview of John Dolan, April 23, 2014.
[759] J&B Interview of David Carey, May 22, 2014.
[760] J&B Interview of Douglas Wachtel, May 22, 2014.
[761] J&B Interview of John Dolan, April 23, 2014.

known for the first time by Sprague, and they were made available to in-house and outside counsel.

3. April 2012: [redacted] Evaluation and Another Warning About Punitive Damages

On April 18, 2012, the law firm Eckert Seamans submitted a case evaluation to GM lawyer Jaclyn Palmer for the [redacted] case.[762] The FPA engineer assigned to the case was Sprague, who had been present at the Davison junkyard trip. This was the first evaluation for which outside counsel knew of the TSB – even though Stouffer had known of it since 2011 and Wachtel since 2005.

On December 13, 2009, [redacted], was in the right front passenger seat in a 2005 Cobalt when the driver lost control of the vehicle on "black ice." The Cobalt ran off the roadway to the right, traveling 60 feet off-road before striking two trees. The airbags failed to deploy and the SDM showed the vehicle in Accessory mode at the time of the accident.[763] The investigating officer concluded that [redacted] was unbelted. [redacted] sustained head injuries and rib fractures.

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[762] [redacted] Case Evaluation (April 18, 2012) [DOC ID 000001660990; GMNHTSA000221074].
[763] [redacted] SDM Crash Data (Jan. 20, 2010), at 1, 3, 5 [DOC ID 000001660887; GMNHTSA000308798].

CASE EVALUATION

[redacted]

v.

GENERAL MOTORS LLC; GENERAL MOTORS COMPANY;

The SDM recorded a non-deployment event.(A copy of the CDR Report is attached hereto as Exhibit "E"). **Since the Cobalt was in the Accessory Mode, instead of Run Mode at the time of the crash, the algorithm that the SDM runs to determine whether to deploy the airbags was disabled. Therefore, the SDM was incapable of deploying the airbags, regardless of the severity of the impact.** It recorded the event as a Non-Deployment Event, and would have recorded the event as such no matter how significant the crash event. In addition, John Sprague advises that much of the typical pre-crash data, such as vehicle speed, yaw rate, brake application, etc. is recorded as "invalid" on the CDR Report because the Cobalt was in Accessory Mode.

GM will be forced to explain that the airbags did not deploy in this crash because the Cobalt was in Accessory Mode. While the SDM responded appropriately to the input it received from the Body Computer, it is not the expected result for the customer. It will be difficult to explain why the ignition switch toggled to Accessory Mode simply from running off-road. GM will also be forced to contend with other incidents, some of which resulted in deaths, due to the non-deployment of the frontal airbags in the 2005-2007 Cobalt. Those other incidents put GM at risk for imposition of punitive damages in West Virginia.

Eckert & Seamans' case evaluation specifically noted the TSB.[764] The evaluation explicitly drew a link between the airbag non-deployment and the vehicle's power mode status of Accessory:

> GM issued [a Service Bulletin] to address the problem of the driver inadvertently turning off the ignition by bumping the key chain with his/her knee while turning the steering wheel if the steering wheel was adjusted too low. This Bulletin addresses a similar problem as that seen in the field where the key in the ignition switch in the 2005 Cobalt could toggle from the Run mode to the Accessory mode by traveling off-road or over rough terrain.[765]

The evaluation explained that airbags cannot deploy when the ignition is in the Accessory position:

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764 [redacted] Case Evaluation (April 18, 2012), at 4 [DOC ID 000001660990; GMNHTSA000221074].
765 Case Evaluation (April 18, 2012), at 4 [DOC ID 000001660990; GMNHTSA000221074].

> Since the Cobalt was in the Accessory Mode, instead of Run Mode at the time of the crash, the algorithm that the SDM runs to determine whether to deploy the airbags was disabled. Therefore, the SDM was incapable of deploying the airbags, regardless of the severity of the impact.[766]

The evaluation also explained that Sprague believed that the Cobalt switched from Run to Accessory mode when the car ran over rough ground before the impact.[767]

The evaluation further explained that there were other incidences of Cobalt airbag non-deployment in which "the system was not in Run Mode at the time of impact," thereby disabling the airbags.[768] The lawyer explained that "[i]t will be difficult to explain why the ignition switch toggled to Accessory Mode simply from running off-road."[769]

The lawyer pointed out that prior non-deployment events in 2005 to 2007 Cobalts "had resulted in deaths," putting GM "at risk" for a punitive damage award in this case:

> GM will also be forced to contend with other incidents, some of which resulted in deaths, due to the nondeployment of the frontal airbags in the 2005-2007 Cobalt. Those other incidents put GM at risk for imposition of punitive damages in West Virginia.[770]

A week later on April 25, 2012, Palmer presented the [redacted] case to the Roundtable.[771] Attendees included Larry Buonomo and Nabeel Peracha, a newly hired lawyer.[772] Palmer explained in the Roundtable summary that based on the SDM data, the Cobalt was in Accessory mode, which meant that the airbags could not deploy.[773]

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[766] [redacted] Case Evaluation (April 18, 2012), at 8 [DOC ID 000001660990; GMNHTSA000221074].
[767] Case Evaluation (April 18, 2012), at 8 [DOC ID 000001660990; GMNHTSA000221074].
[768] Case Evaluation (April 18, 2012), at 8 [DOC ID 000001660990; GMNHTSA000221074].
[769] Case Evaluation (April 18, 2012), at 19 [DOC ID 000001660990; GMNHTSA000221074].
[770] Case Evaluation (April 18, 2012), at 19 [DOC ID 000001660990; GMNHTSA000221074].
[771] Roundtable Case Summary (April 25, 2012) [DOC ID 000001660996; GMNHTSA000221078].
[772] Roundtable Case Summary (April 25, 2012), at 2 [DOC ID 000001660996; GMNHTSA000221078]; *see also* [redacted] Roundtable Case Summary (April 25, 2012) (bearing the handwritten notations of attendees), at 5 [DOC ID 000001662215; GMNHTSA000221151].
[773] [redacted] Roundtable Case Summary (April 25, 2012), at 2 [DOC ID 000001660996; GMNHTSA000221078].

Palmer also wrote that GM's PI group had been investigating the Cobalt issue "for the past year," and that there was a relevant service bulletin about "low ignition torque/effort":

> Product investigations has been investigating the Cobalt issue for the past year, but has not yet confirmed a root cause. There is a service bulletin related to the potential for the driver to inadvertently turn off the ignition (by contacting a large and/or heavy key chain with the knee) due to low ignition torque/effort, which is one theory that is currently being pursued. The possibility of a change in ignition status due to extreme off road events was previously explored.[774]

The Roundtable granted settlement authority but the case did not settle at that point.[775]

4. May 2012: Mechanical versus Electrical Root Cause

At this time, Stouffer was still working to determine the root cause of the Cobalt non-deployment issue and was investigating both electrical and mechanical components and subsystems, including the SDM and the Ignition Switch.[776] As part of Stouffer's ongoing investigation, he sought information about the Cobalt SDM from the engineers in the electrical department.[777] On May 2, 2012, Stouffer asked electrical engineers John Capp and Lisa Weber to meet with him and with Doug Wachtel.[778] Capp responded: "I don't have the history on this topic. . . , but my understanding is that [we] have taken the position that engineering does not support any further steps."[779] Capp was referring to a potential field solution that would modify

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[774] [redacted] Roundtable Case Summary (April 25, 2012), at 2 [DOC ID 000001660996; GMNHTSA000221078].
[775] [redacted] Roundtable Case Summary (April 25, 2012), at 2 [DOC ID 000001660996; GMNHTSA000221078].
[776] E-mail from Douglas Wachtel, GM, to David Carey, GM, *et al.* (March 29, 2012) [DOC ID 000000005003; GMNHTSA000221035].
[777] J&B Interview of John Capp, April 24, 2014.
[778] E-mail from Brian Stouffer, GM, to John Capp, GM, *et al.* (May 2, 2012) [DOC ID 000003248745; GMNHTSA000611841].
[779] E-mail from Brian Stouffer, GM, to John Capp, GM, *et al.* (May 2, 2012) [DOC ID 000003248745; GMNHTSA000611841].

the SDM to allow airbag deployment while the car was in "Accessory."[780] However, this proposed field solution did not gain traction within the electrical engineering group.[781]

The electrical engineers believed, correctly, that the SDM was working as it had been designed and feared any alterations to the SDM, a corporate common component, might cause problems in vehicle lines that were not experiencing the non-deployment issues.[782] Wachtel forwarded Capp's e-mail response to Carmen Benavides. Benavides, in turn, sent the e-mail chain to Bill Kemp, and asked "[c]an we discuss the attached. I was unaware that a decision was made to not support."[783]

At this time, Kemp took action and asked Terry Woychowski to "champion" the Cobalt non-deployment investigation.[784] Woychowski was Vice President of Global Quality and Vehicle Launch and a member of the committee in charge of recalls[785] – the Executive Field Action Decision Committee ("EFADC").[786] According to Woychowski, a "champion" is an executive who helps a team remove roadblocks and obtain resources.[787] Shortly after enlisting Woychowski, Kemp organized a meeting on May 15, 2012, regarding the "Cobalt Airbag Issue."

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[780] J&B Interview of John Capp, April 24, 2014.
[781] J&B Interview of John Capp, April 24, 2014; J&B Interview of Kristin Siemen, April 17, 2014.
[782] J&B Interview of John Dolan, April 23, 2014; J&B Interview of Lisa Weber, April 24, 2014; J&B Interview of David Carey, April 24, 2014; J&B Interview of Kristin Siemen, April 17, 2014.
[783] E-mail from Carmen Benavides, GM, to William Kemp, GM (May 2, 2012) [DOC ID 000003248745; GMNHTSA000611841] (emphasis in original).
[784] J&B Interview of William Kemp, May 9, 2014.
[785] J&B Interview of Terry Woychowski, March 21, 2014.
[786] J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Brian Everest, April 29, 2014.
[787] When asked, Woychowski stated he did not view himself as the "champion" for the Cobalt airbag/ignition switch issue, but numerous other individuals involved with the investigation identified Woychowski as the "champion." J&B Interview of Terry Woychowski, March 21, 2014; J&B Interview of William Kemp, May 9, 2014; J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Brian Stouffer, May 9, 2014. Benavides and Kent have described the appointment of a champion as "out of process" insofar as it was not proceeding through the ordinary course of the FPE steps. J&B Interview of Gay Kent, March 18, 2014; J&B Interview of Carmen Benavides, March 25, 2014. It appears that almost all of the same individuals who would have participated in the FPE process were involved, however, with the addition of a high-ranking "champion," *i.e.*, going "out of process" reflected more and higher-level attention, not less.

Attendees included personnel from PI and engineering, including: Kemp, Carmen Benavides, Doug Wachtel, Woychowski, John Dolan, Vipul Modi and others.[788] According to Modi, this was a meeting of high level managers and directors, and he and Dolan were not invited to present, but rather were asked to be there to lend their support and to answer any questions that might arise.[789]

In advance of the meeting, Dolan prepared a PowerPoint presentation for Dave Carey, his director.[790] The primary purpose of the PowerPoint presentation was to convey Dolan's theory that the Ignition Switch – not the SDM – caused the Cobalt airbag non-deployments. Dolan's understanding was that due to the low torque of the Ignition Switch, a pre-crash bump or jolt caused the key to move out of the Run position before the crash, thus leading to the airbag non-deployment at the time of impact. Dolan arrived at this conclusion based on (1) his observations as to how easy it was to turn the keys in the Cobalts at the Davison Salvage Yard; (2) the Technical Service Bulletin he discovered the day after his trip to Davison; and (3) his review of the portion of the SDM that records crash data and review of additional crash records.[791]

Dolan's PowerPoint included a possible explanation for why the Ignition Switch was recorded in the "Run" position for so many of non-deployment incidents – a point that confused Stouffer. A slide in the PowerPoint stated that "[i]n the vehicles where EDR recorded RUN power mode [. . .] the crash sensing algorithm [is] recorded as being inactive. The crash

[788] E-mail from Dawn Wands, GM, to Jeffrey Konchan, GM, *et al.* (May 9, 2012) [DOC ID 000005178995; GMNHTSA000221079]; J&B Interview of Lisa Weber, April 24, 2014.
[789] J&B Interview of Vipul Modi, May 21, 2014.
[790] Cobalt Issue Activities Presentation [DOC ID 000049367127; GMNHTSA000282633], attached to e-mail from John Dolan, GM to David Carey, GM, *et al.* (May 15, 2012) [DOC ID 000049367126; GMNHTSA000282632].
[791] J&B Interview of John Dolan, April 23, 2014; J&B Interview of John Dolan, May 16, 2014.

algorithm is inactive during the initial three seconds after transitioning from power mode OFF/ACC to RUN to run self diagnostics."[792]

Crash Records

- Review of EDR and Incident Reports
  - The SDM indicates that the vehicle power mode is ACC or OFF in the majority of reported incidents.
    - In the vehicles where EDR recorded RUN power mode have the crash sensing algorithm recorded as being inactive. The crash algorithm is inactive during the initial 3 seconds after transitioning from power mode OFF/ACC to RUN to run self diagnostics
  - All reviewed crash incidents had some form of pre-impact rough road input.
  - Some SDMs have no recorded history of an event – indicating that the module was asleep during the event.
- If a crash event has started while in power mode RUN, any transition from power mode RUN is ignored until the crash event is completed – and the power mode is recorded as RUN in EDR.
- The power mode behavior of this SDM is the same as all other SDMs in GM vehicles.

At the time Dolan created this presentation, he believed that accident vehicles whose power mode status was recorded as "Run" but whose airbags failed to deploy likely experienced a change in status from Run to Accessory, and then back to Run. Because Dolan understood that it still took three seconds after a move from Accessory back to Run for the airbag to become functional, Dolan believed that the crash event occurred within three seconds of the power mode changing back to Run, but before the SDM had time to reset and trigger airbag deployment.

Critically, Dolan's PowerPoint slide went on to say that "if a crash event has started while in power mode RUN, any transition from power mode RUN [to ACCESSORY] is ignored

[792] Cobalt Issue Activities Presentation, at 2 [DOC ID 000049367127; GMNHTSA000282633], attached to e-mail from John Dolan, GM to David Carey, GM, *et al.* (May 15, 2012) [DOC ID 000049367126; GMNHTSA000282632].

until the crash event is completed – and the power mode is recorded as RUN in EDR."[793] Neither the plain text of this bullet point nor its implications are crystal clear. On its face, the bullet point states that a transition from Run to Accessory would not be recorded if a crash began with the power mode in Run – the EDR would still record the key as being in Run. Dolan explains now that the point of this statement was to convey that if the Ignition Switch changed position from Run to Accessory at the moment of the crash (that is, actual impact with a large object), the SDM would ignore the change and still deploy the airbags.[794]

According to Dolan, these two bullet points were intended to articulate his view at the time that a *pre-impact* event caused a change in the ignition switch position from Run to Accessory and therefore airbag non-deployment. While the switch may have moved back to Run at some point prior to actual impact, it was too late for the SDM to finish resetting and trigger airbag deployment upon impact. Had it been otherwise, and even if the key moved out of Run at the time of impact, the airbags would still have deployed.

It is unclear whether this topic was the subject of any discussion at the May 15, 2012, meeting. Dolan recalls discussion of his presentation generally and of slide 2 specifically.[795] Stouffer does not recall any discussion of the slide or bullet points, but he does recall Dolan

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[793] Cobalt Issue Activities Presentation, at 2 [DOC ID 000049367127; GMNHTSA000282633], attached to e-mail from John Dolan, GM to David Carey, GM, *et al.* (May 15, 2012) [DOC ID 000049367126; GMNHTSA000282632].

[794] The reference to "crash event" in the bullet point refers to the vehicle hitting a tree or another large object. It does not refer to the vehicle hitting rough, off-road terrain or shrubs. J&B Interview of John Dolan, May 16, 2014. After the recall, GM developed a new theory as to why the SDMs recorded a run power mode in some of the Cobalt non-deployment incidents. GM's current understanding is because the Cobalt SDM records vehicle data in 1 second intervals or "snapshots," if an ignition change from Run to Accessory occurs between 1 second and 50 milliseconds (the time it takes the SDM to detect a change in power mode) before the crash, the SDM will record the vehicle as being in run, but the airbag will not deploy because the ignition switch is actually in accessory. This theory is currently being validated with the assistance of Continental. J&B Interview of John Dolan, May 16, 2014.

[795] J&B Interview of John Dolan, May 16, 2014.

presenting at the meeting.[796] By contrast, Carey and Modi remember the meeting as being a general introduction to the Cobalt problems as opposed to a formal presentation.[797] Carey recalled that he did not present the slides at the meeting, despite his role as director of the SDM group, and he also did not remember Dolan making a presentation at the meeting.[798] Modi does not believe the PowerPoint presentation was given at the meeting, rather the only slide Modi thinks may have been used by Stouffer in the meeting was Dolan's data slide from the first Davison Salvage Yard visit.[799] That slide (when the measurements are converted to Newton-centimeters) showed that the torque needed to turn the Ignition Switch was above specification on one vehicle, at specification on two, and below specification on four.[800]

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[796] J&B Interview of Brian Stouffer, May 9, 2014. Stouffer's current understanding of this bullet point is that it suggests that, if the power mode changes to Accessory from Run after the crash event starts, but before the airbag deploys, the SDM will record the power mode as Run. Because an airbag makes a decision as to whether to deploy within .017 seconds, Stouffer believes now that the scenario described in the bullet point seems like a very remote possibility. He believes now that it would be unlikely for the power mode to change nearly instantaneously at the time of the crash in each of the crash events in which the power mode was recorded as Run.

[797] J&B Interview of Vipul Modi, May 21, 2014. Carey does not recall a specific discussion about Dolan's presentation or slide 2 at the May 15, 2012 meeting. J&B Interview of David Carey, April 24, 2014. Specifically, Carey does not recall Dolan standing in the front of the room and giving a PowerPoint presentation. J&B Interview of David Carey, May 22, 2014.

[798] J&B Interview of David Carey, May 22, 2014.

[799] J&B Interview of Vipul Modi, May 21, 2014. Kemp recalls nothing whatsoever about the meeting. J&B Interview of William Kemp, May 22, 2014. John Zuzelski recalled attending the May 15, 2012 meeting, and thought it was possible that Brian Stouffer gave a PowerPoint presentation, but was not certain. J&B Interview of John Zuzelski, May 19, 2014. Kristin Siemen recalled attending one meeting on the Cobalt issue in the spring of 2012, but did not remember the date of the meeting or any presentation being shown there. J&B Interview of Kristin Siemen, May 21, 2014. Jeffrey Konchan did not recall the exact meeting date and did not recall the PowerPoint presentation at all. J&B Interview of Jeff Konchan, May 22, 2014. Terry Connolly does not know John Dolan and does not recall attending any meeting on May 15, 2012. J&B Interview of Terry Connolly, May 22, 2014. David DeFrain did not recall attending the May 15, 2012 meeting. J&B Interview of Dave DeFrain, May 22, 2014. Lisa Weber attended the May 15, 2012 meeting, but did not recall Dolan's slides being presented there. J&B Interview of Lisa Weber, May 22, 2014.

[800] Dolan explained that one can convert the force data (measured in pounds) that are reflected in his presentation to torque (measured in N-cm) by multiplying force by the distance from the center of the key to the edge of the key slot. J&B Interview of John Dolan, May 22, 2014. For original force measurements, see Cobalt Issue Activities Presentation, at 12 [DOC ID 000049367127; GMNHTSA000282633], attached to e-mail from John Dolan, GM to David Carey, GM, *et al.* (May 15, 2012) [DOC ID 000049367126; GMNHTSA000282632].

Regardless of the content of the meeting, Stouffer, according to Dolan, agreed at the time that the SDM was not the cause of the airbag non-deployments and that both he and Stouffer thought it did not make sense to look for solutions to the airbag non-deployments that were unrelated to the Ignition Switch.[801] Stouffer's investigation indeed began to shift its focus to mechanical root causes and the action items developed at the meeting reflect as much.[802]

Doug Wachtel's notes from the May 15, 2012, meeting entitled "Cobalt Ignition Switch – Assignments" were sent to Stouffer the following day, and reflect a recognition that the Ignition Switch could be the root cause of the non-deployment issue.[803] At the same time it was looking for root cause, the investigation also pursued solutions to the non-deployment issue. Namely, the SDM engineers were tasked with developing a means by which the SDM could remain active (*i.e.*, allow for airbag deployment) for some period of time after the power mode status moved out of Run.

5. May 2012: The Second Trip to the Davison Junkyard

One of the steps that emerged from the May 15, 2012, meeting was a trip to the Davison JunkYard on May 22, 2012, to measure the torque and pull down force associated with rotating the key in approximately 40 Cobalt, G5, HHR, and Ion vehicles. Stouffer and Sprague were

[801] J&B Interview of John Dolan, May 16, 2014.
[802] E-mail from Douglas Wachtel, GM, to Brian Stouffer, GM (May 16, 2012) [DOC ID 000000005007; GMNHTSA000221097], attaching Doug Wachtel's notes from the May 15, 2012 meeting [DOC ID 000000005008; GMNHTSA000221098].
[803] E-mail from Douglas Wachtel, GM, to Brian Stouffer, GM (May 16, 2012) [DOC ID 000000005007; GMNHTSA000221097], attaching Doug Wachtel's notes from the May 15, 2012 meeting [DOC ID 000000005008; GMNHTSA000221098].

accompanied by a summer intern, David Caples.[804] Before the trip, they obtained a list of available Cobalt, HHR, and Ion vehicles.[805]

At the salvage yard, Stouffer, Sprague, and Caples obtained measurements – this time using a genuine torque wrench rather than a fish scale – for the approximately 40 Cobalt, G5, HHR, and Ion vehicles.[806] Caples then graphed these measurements.[807] In a May 23, 2012 e-mail, Caples wrote that there "is a noticeable dip in the torque for Model Years 2005 and 2006." Stouffer responded on the same date, "I wasn't sure we would see any trends in the data, but you've obviously found one. This will be helpful as we work to determine root cause."[808] Stouffer observed that there was a slight upward trend in the data and that, to a certain extent, earlier model years had lower associated torque values than later model years.[809] However, Stouffer also observed fairly similar torque values for some vehicles in the 2007 and 2008 model years.[810]

According to Stouffer, because the torque values in the 2007 and 2008 vehicles were similar, he could not conclude that the Ignition Switch changed in 2008.[811] Because in Stouffer's

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[804] J&B Interview of Brian Stouffer, May 9, 2014.
[805] J&B Interview of Brian Stouffer, May 9, 2014; e-mail from John Sprague, GM, to Brian Stouffer, GM, *et al.* (May 17, 2012) [DOC ID 000000046011; GMNHTSA000221099].
[806] J&B Interview of Brian Stouffer, May 9, 2014; J&B Interview of David Caples, May 8, 2014.
[807] J&B Interview of David Caples, May 8, 2014; J&B Interview of Brian Stouffer, May 9, 2014.
[808] E-mail from Brian Stouffer, GM, to David Caples, GM, *et al.* (May 23, 2012) [DOC ID 000000005033; GMNHTSA000221122], attaching graph of ignition switch measurements [DOC ID 000000005034; GMNHTSA000221124]; J&B Interview of Brian Stouffer, May 9, 2014.
[809] J&B Interview of Brian Stouffer, May 9, 2014.
[810] J&B Interview of Brian Stouffer, May 9, 2014. In the fall of 2013, after receiving Subbaiah Malladi's report and the Commodity Validation Form from Delphi, Stouffer reexamined his Davison Salvage Yard data and mapped the vehicle build dates onto the crashes to try to determine whether there was a breakpoint in 2006 or 2007 after which GM could be confident that the switches installed in Cobalts had higher torque values. J&B Interview of Brian Stouffer May 9, 2014. Because several of the non-deployments occurred in later-built MY 2007 vehicles, Stouffer could not identify a breakpoint before MY 2008. Stouffer speculated that within MY 2007 vehicles, there may have been "mixed stock," meaning that the deficient switches may have been mixed with the good switches for the 2007 model years. J&B Interview of Brian Stouffer, May 9, 2014.
[811] J&B Interview of Brian Stouffer, May 9, 2014.

view, the Davison data did not explain the absence of the non-deployment condition in the 2008 model years, he was left continuing to look for the root cause.[812]

6. June 2012: Kemp Persuades Federico to Help

Two weeks after the May 15, 2012 meeting, Wachtel e-mailed Kemp, copying Benavides and Stouffer, stating, "[t]he action items that were identified at your meeting on 5/15 have been completed, and we are ready for a follow-up meeting."[813] The next meeting would occur on June 21, 2012.

In early June, after Woychowski retired, Bill Kemp asked executive director for Global Vehicle Integration Jim Federico (in his capacity as Chief Engineer) to replace Woychowski.[814] Although Kemp recalls asking Federico to step in as "champion" because he respected Federico and thought he would get things done, Federico did not remember Kemp using the term "champion," and understood his role to be "energiz[ing] the team" to find solutions for the Cobalt airbag non-deployment problem.[815] Federico also understood the purpose of his team was to be a "solutions" team, while a different investigation sought the root cause.[816] Federico asserted that had he been leading the investigation, and understood the matter was urgent, he

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[812] J&B Interview of Brian Stouffer, May 9, 2014. Stouffer was questioned about this salvage yard trip during his May 1, 2013 deposition in [redacted] Stouffer [redacted] Deposition Transcript at 33-39 [DOC ID 000001771251]. Plaintiff's counsel showed Stouffer the e-mail from Caples and asked whether Stouffer found "a noticeable dip in the torque for '05 and '06." Stouffer [redacted] Deposition Transcript at 38-39. Stouffer said "if you do an average, there's a dip from '03 to '05 and '06, there's a slight upward trend, but not complete separation for the rest of the years." Stouffer [redacted] Deposition Transcript at 33-39 [DOC ID 000001771251].
[813] E-mail from Douglas Wachtel, GM, to William Kemp, GM (May 30, 2012) [DOC ID 000002811396; GMNHTSA000463207]. *See also* e-mail from Douglas Wachtel, GM, to Brian Stouffer, GM (May 16, 2012) [DOC ID 000000005007; GMNHTSA000221097], attaching Doug Wachtel's notes from the May 15, 2012 meeting [DOC ID 000000005008; GMNHTSA000221098].
[814] J&B Interview of William Kemp, April 17, 2014; J&B Interview of William Kemp, May 9, 2014.
[815] J&B Interview of Jim Federico, May 9, 2014.
[816] J&B Interview of Jim Federico, May 9, 2014.

would have behaved differently – clearing his schedule and working aggressively to solve the problem.[817]

7. June 2012: The Stouffer Investigation Continues and He is Told There Are No Relevant Part Changes

By the spring or summer of 2012, Stouffer had asked DeGiorgio and Brian Thompson (DeGiorgio's supervisor) whether there had been any hardware changes to the switch. Both stated that they were confident that there had been no hardware changes to the switch.[818] At Stouffer's request, on June 25, 2012, Thompson and DeGiorgio sent Stouffer a spreadsheet which included comments on the effect of various work orders.[819] Although in 2006 DeGiorgio had authorized the redesign of the Ignition Switch to increase the torque using a work order for the electrical system, Thompson and DeGiorgio described that very work order as having "NO AFFECT ON THE ROTATIONAL TORQUE OF THE SWITCH/ OR LOCK HOUSING ASSEMBLY SYSTEM."[820]

Stouffer relied on their statement that no changes had been made.[821] He did not search for and review the Form 3660 that DeGiorgio signed that did specify the change in the detent and spring; this document, which had been in GM's system since June 1, 2006, showed that there was a change that would have affected the torque required to turn the Ignition Switch. Stouffer did, however, personally review the work orders related to the Ignition Switch on the GM

[817] J&B Interview of Jim Federico, May 9, 2014.
[818] J&B Interview of Brian Stouffer, April 4, 2014.
[819] J&B Interview of Brian Stouffer, April 4, 2014; e-mail from Brian Thompson, GM to Brian Stouffer, GM (June 25, 2012) [DOC ID000000005055; GMNHTSA000250057], and attached Annotated Spreadsheet of Ignition Switch Work Orders [DOC ID 000000005056; GMNHTSA000250060].
[820] Annotated Spreadsheet of Ignition Switch Work Orders at [DOC ID 000000005056; GMNHTSA000250060.], attached to e-mail from Brian Thompson, GM, to Brian Stouffer, GM (June 25, 2012) [DOC ID 000000005055; GMNHTSA000250057].
[821] J&B Interview of Brian Stouffer, April 4, 2014.

system, which he had obtained from Sprague when Stouffer began working on the investigation, and did not observe any that indicated that hardware changes were made to the switch.[822] The misinformation provided by DeGiorgio caused Stouffer to maintain his belief that the Ignition Switch alone could not be the root cause of airbag non-deployment. Stouffer further noted that his interpretation of the Davison Salvage Yard Study did not suggest to him that there had been a change to the switch between the 2007 and 2008 model years.[823]

Over the course of the summer and early fall, Stouffer asked the engineers responsible for the steering column and the lock/ignition cylinder whether there were any relevant hardware changes, including any changes that would have affected the torque required to turn the key in the Cobalt.[824] Stouffer was told by those engineers that no relevant changes were made to the steering column, ignition cylinder, or key. Although at this point, the investigation was primarily focused on exploring possible mechanical changes, in summer 2012, Stouffer also asked the BCM engineers to notify him of any relevant electrical changes.[825] Stouffer was similarly told that no relevant changes were made to that component.[826]

8. June 2012: The Shipp Expert Report Provides the Correct Answer

In June 2012, the plaintiff's expert in the [redacted] case, Erin Shipp, P.E., issued her report, which was provided to GM during the course of litigation.

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[822] J&B Interview of Brian Stouffer, April 4, 2014.
[823] J&B Interview of Brian Stouffer, April 4, 2014.
[824] J&B Interview of Brian Stouffer, April 4, 2014; e-mail from Peter Judis, GM, to Brian Stouffer, GM (June 28, 2012) [DOC ID 00000046058; GMNHTSA000320509]; e-mail from Brian Stouffer, GM, to Mark Beauregard, GM (Aug. 27, 2012) [DOC ID 000000005079; GMNHTSA000221166]; e-mail from Mark Beauregard, GM, to Brian Stouffer, GM (Sept. 4, 2012) [DOC ID 000000005086; GMNHTSA000221169].
[825] E-mail from Alexander Ballios, GM, to Brian Stouffer, GM (June 14, 2012) [DOC ID 00000046051; GMNHTSA000273952].
[826] E-mail from Alexander Ballios, GM, to Brian Stouffer, GM, (June 14, 2012) [DOC ID 00000046051; GMNHTSA000273952].

Although outside counsel and Palmer were aware of the Ignition Switch TSB at this time, Shipp had not been provided with discovery material at this stage.[827] Nonetheless, in preparing her report, Shipp located both the TSB and the 2007 Indiana University study, which was now known to GM lawyers and engineers working on the Ignition Switch issue for the first time.

As to the 2005/2006 TSB, Shipp wrote:

> General Motors knew that the design of the ignition switch was improper and could cause power interruption during [sic]. This would include the event as described in the bulletin [a knee striking the key or keychain], but also during events where the vehicle is subject to very rough terrain such as pre-crash events, it is likely that the driver will move within the cabin and those movements would include impact with interior components including the ignition key that is inserted in the ignition switch.[828]

She then pointed out that airbags will not deploy when the key is in the Accessory position, based on her review of wiring documents:

> I reviewed 2005 Chevrolet Cobalt wiring diagrams and have found the air bag system is active in the start/run and crank/run ignition positions but not active in the accessory position.[829]

Shipp also referenced the five-year old Indiana University study:

> [The data] indicates that between 2 and 1 seconds before the start of the impact the key was turned to the accessories position in the ignition switch. These indicators are in agreement with the data from the crash report from the NHTSA

[827] E-mail from Jennifer Brooks, outside counsel at Eckert Seamans, to Jaclyn Palmer, GM, enclosing Shipp Report (July 6, 2012) [DOC ID 000001662121]; DM Discovery Tracking Log for [redacted] [DOC ID 000001660978].
[828] Erin M. Shipp, Engineer's Report of [redacted] Crash, [redacted] *v. GM* (June 12, 2012), at 7 [DOC ID 000001662122; GMNHTSA000309665].
[829] Erin M. Shipp, Engineer's Report of [redacted] Crash, [redacted] *v. GM* (June 12, 2012), at 7 [DOC ID 000001662122; GMNHTSA000309665].

database by Indiana University.[830]

ENGINEER'S REPORT

of the

[redacted] crash

General Motors knew that the design of the ignition switch was improper and could cause power interruption during. This would include the event as described in the bulletin, but also during events where the vehicle is subject to very rough terrain such as pre-crash events, it is likely that the driver will move within the cabin and those movements would include impact with interior components including the ignition key that is inserted in the ignition switch.

I reviewed 2005 Chevrolet Cobalt wiring diagrams and have found the air bag system is active in the start/run and crank/run ignition positions but not active in the accessory position.

The CDR report of the [redacted] Cobalt shows "Vehicle Power Mode Status" as 'Accessory'. The pre-crash data reports all parameters except engine speed as "invalid". At -1 second the pre-crash data reports engine speed as "0" (zero).

This indicates that between 2 and 1 seconds before the start of the impact the key was turned to the accessories position in the ignition switch. These indicators are in agreement with the data from the crash report from the NHTSA database by Indiana University.

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Thus, Shipp concluded: "General Motors' improper design resulted in a vehicle that was defective in a manner that caused the airbag to not deploy in a crash that General Motors has determined should have had an airbag deployment."[831]

Outside counsel transmitted Shipp's expert report to Palmer on July 6, 2012, and to FPA Engineer Sprague on July 9, 2012.[832] Palmer read Shipp's report, saw the reference to the Indiana University study, and believes she then obtained a copy online.[833] The report made clear that an expert, with limited access to GM information, had made the connection between the Ignition Switch and airbag non-deployment before GM personnel.

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[830] Erin M. Shipp, Engineer's Report of [redacted] Crash, [redacted] *v. GM* (June 12, 2012), at 7 [DOC ID 000001662122; GMNHTSA000309665].
[831] Erin M. Shipp, Engineer's Report of [redacted] Crash, [redacted] *v. GM* (June 12, 2012), at 7 [DOC ID 000001662122; GMNHTSA000309665].
[832] E-mail from Jennifer Brooks, outside counsel at Eckert Seamans, to Jaclyn Palmer, GM, enclosing Shipp Report (July 6, 2012) [DOC ID 000001662121]; e-mail from Edward Gray, outside counsel at Eckert Seamans, to John Sprague, GM, and Michael Wendzinski, GM (July 9, 2012) [DOC ID 000206678020].
[833] J&B Interview of Jaclyn Palmer, May 8, 2014.

The Roundtable on [redacted] was scheduled for July 25, 2012.[834] E-mail correspondence shows that on July 23, 2012, Palmer asked outside counsel for another copy of the TSB, which she had previously received as an exhibit to the April 18, 2012 [redacted] case evaluation. Outside counsel retransmitted to her the Ignition Switch TSB and also a copy of Shipp's expert report referencing the TSB.[835]

On July 25, 2012, Palmer e-mailed to Wachtel, Kemp, Sprague, and Stouffer[836] the Indiana University study she had first obtained earlier that month. Palmer wrote, "Doug . . . for your reference, in case you have not already obtained a copy."[837] The same day, Palmer presented at the Roundtable for [redacted].[838] Attendees included Ron Porter, Jaclyn Palmer, Paul Widzinski, and Larry Buonomo.[839] Palmer's Roundtable case summary reported on Shipp's findings:

> Erin Shipp, PE submitted an engineering report prior to . . . mediation. She attributed the frontal airbag non deployment to the ignition being in the accessory mode, which she relates to the service bulletin involving the potential for the driver to inadvertently turn off the ignition by contacting a large and/or heavy key chain with the knee.[840]
>
> [GM's defense counsel] believes that if the case is tried, GM will lose and that, although the demand is high, as time goes, and the Cobalt investigation remains unresolved, the verdict exposure will increase and the defense of the case will become more complicated. I agree.[841]

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[834] [redacted] Roundtable Case Summary (July 25, 2012) [DOC ID 000001662215].
[835] E-mail from Jaclyn Palmer, GM, to Edward Gray, Jennifer Brooks, and Trish Jankowski, outside counsel at Eckert Seamans (July 23, 2012) (Eckert Seamans production) [DOC ID000002181723]; e-mail from Edward Gray, outside counsel at Eckert Seamans to Jaclyn Palmer, GM (July 23, 2012) [DOC ID000002179920].
[836] E-mail from Jaclyn Palmer, GM, to William Kemp, GM, *et al.* (July 25, 2012) [DOC ID 000002844791].
[837] E-mail from Jaclyn Palmer, GM, to William Kemp, GM, *et al.* (July 25, 2012) [DOC ID 000002844791].
[838] E-mail from Diane Rorai, GM, to GM USLEGL_Litigation Attys, *et al.* (July 24, 2007) [DOC ID 000002183172; GMNHTSA000481150].
[839] [redacted] Roundtable Case Summary (July 25, 2012), at 3 [DOC ID 000001662215].
[840] [redacted] Roundtable Case Summary (July 25, 2012), at 1 [DOC ID 000001662215].
[841] [redacted] Roundtable Case Summary (July 25, 2012), at 2 [DOC ID 000001662215].

One of the participants in the [redacted] Roundtable was GM in-house counsel Nabeel Peracha, who had been hired in April 2012. There was little formal training for Peracha, and he was told to ask questions frequently. At the [redacted] Roundtable, he did.[842] He asked at the meeting why GM had not issued a recall.[843]

Peracha said that the response from the other attorneys was that engineering did not know how to fix the problem, that the incident rate was low, and that "we told Engineering and they're looking into it."[844] Indeed, he was told that Engineering was "acutely aware" of this issue and he got the sense from the other lawyers that they had done "everything we could do."[845]

Having flagged the issue at the Roundtable where his supervisor, Larry Buonomo, was in attendance, Peracha did not pursue it further.[846]

The [redacted] matter settled.[847]

9. Summer 2012: Stouffer's Investigation Considers Potential Root Causes

Palmer also forwarded the Indiana University study to Stouffer on July 25, 2012.[848] Stouffer did not believe the Indiana University study solved the problem.[849] It did not explain

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[842] J&B Interview of Nabeel Peracha, May 21, 2014. There were two [redacted] Roundtables, one in April and one in July. Though he is not certain, Peracha believes it was the July Roundtable at which he asked this question, and certain handwritten notations on the agenda from that meeting tend to corroborate this belief. Specifically, on the Settlement Roundtable Case Summary, there is a handwritten note next to Peracha's approval of the settlement amount that reads "bulletin." [redacted] Roundtable Case Summary (July 25, 2012) [DOC ID 000001662215].

[843] J&B Interview of Nabeel Peracha, May 21, 2014; *cf.* J&B Interview of Paul Widzinski, May 21, 2014 (recalled Peracha asking about a recall, but was not certain which case or if it even involved a Cobalt). Widzinski believes this conversation occurred during a Roundtable meeting or shortly after it. He vaguely recalls other attorneys telling Peracha that Product Investigations was looking into it and that there is a process for ordering a recall. Buonomo also says that while he does not remember Nabeel Peracha asking whether there should be a recall during the [redacted] roundtable, he said it would not be surprising if he did because Peracha asked questions all the time because he was new. J&B Interview of Lawrence Buonomo, May 22, 2014.

[844] J&B Interview of Nabeel Peracha, May 21, 2014.

[845] J&B Interview of Nabeel Peracha, May 21, 2014.

[846] He said that the other attorneys were resigned to the fact that Engineering was acting slowly, and thought to himself, "this is how it works. We raise it with Engineering and they decide." J&B Interview of Nabeel Peracha, May 21, 2014.

[847] [redacted] Roundtable Case Summary (July 25, 2012) [DOC ID 000001662215].

why the airbag failed to deploy in the vehicles in which the SDM recorded that the Ignition Switch was in Run, nor did it explain the absence of the non-deployment problems in Cobalt model years after 2008.[850] This continued focus on trying to explain every single non-deployment led to continued inaction in terms of proceeding to a recall.

Stouffer recalled that the report was detailed and very interesting because it was one of the first reports that documented that a key was in the Accessory position (as opposed to the SDM recording a power mode of Accessory) at the time of a crash. Stouffer did not recall any other crashes in which the actual position of the key was documented. When Stouffer received the report, he was troubled because the report was so old and he had not seen it before; yet, no evidence was uncovered that efforts were made to seek out other publicly available materials that might have been relevant.

After receiving the report, Stouffer and Sprague tried to inspect a Cobalt in which the airbag had failed to deploy. Sprague acquired one of these vehicles in late August 2012, and they inspected it just before Labor Day, but the steering column and Ignition Switch were missing from the vehicle.[851] On September 4, 2012, Federico hosted a meeting at which Stouffer reported on the state of the investigation to date, including his analysis of the TREAD data and

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[848] E-mail from Jaclyn Palmer, GM, to Brian Stouffer, GM (July 25, 2012), at 2.
[849] J&B Interview of Brian Stouffer, April 4, 2014.
[850] J&B Interview of Brian Stouffer, April 4, 2014.
[851] J&B Interview of Brian Stouffer, April 4, 2014. Stouffer acknowledged that his September 4, 2012 presentation stated that the steering column and ignition switch were available, but he believes that this is not correct. Brian Stouffer, 2005-7 Cobalt/G5 Frontal Airbags (Sept. 4, 2012), at 7 [DOC ID 000000041032; GMNHTSA000250511]. This vehicle was from the [redacted] crash. E-mail from John Sprague, GM, to Brian Stouffer, GM, (July 31, 2012) [DOC ID 000000005060; GMNHTSA000328783].

his assessment of the 2007 Indiana University study.[852] Stouffer reported there were no part changes that would affect the torque needed to turn the key.[853]

The meeting participants also discussed possible solutions, including changing the Ignition Switch to increase torque, changing the key slot to a centered hole, and keeping the BCM and SDM alive after the car was turned off.[854] Attendees included Stouffer, Federico, Wachtel, Sprague, Dolan, and others.[855] Federico directed the team to go back to the drawing board and come back with information about what it would take to implement an electrical solution.[856] Action items coming out of this meeting included determining whether modification or replacement of the SDM would solve the problem, and initiating a Red X study to understand why the condition no longer occurred in 2008 and later models.[857]

10. September 2012: The Red X Investigation

Two days later, Stouffer implemented this second action item by engaging the Red X team, who were regarded as master problem solvers and experts at determining root cause.[858]

Red X is a standard engineering diagnostic.[859] When GM has two identical products that perform differently, the engineers conduct a Red X diagnostic to determine why.[860] They take one of the BOB ("Best of the Best") and one of the WOW ("Worst of the Worst") and run tests

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[852] J&B Interview of Brian Stouffer, April 4, 2014; *see also* Brian Stouffer, 2005-7 Cobalt/G5 Frontal Airbags (Sept. 4, 2012), at 7 [DOC ID 000000041032; GMNHTSA000250511].
[853] J&B Interview of Brian Stouffer, April 4, 2014; *see also* Brian Stouffer, 2005-7 Cobalt/G5 Frontal Airbags (Sept. 4, 2012), at 7 [DOC ID 000000041032; GMNHTSA000250511].
[854] J&B Interview of Brian Stouffer, April 4, 2014; *see also* Brian Stouffer, 2005-7 Cobalt/G5 Frontal Airbags (Sept. 4, 2012), at 7 [DOC ID 000000041032; GMNHTSA000250511].
[855] Meeting invitation sent from Cindy Mahan, GM (Aug. 21, 2012) [DOC ID 000000005068; GMNHTSA000221168] (invitees included Stouffer, Thompson, Benavides, Carey, Wachtel, Capp, Dolan, Sprague, Siemen, Weber, Modi, Kemp, and others).
[856] J&B Interview of Jim Federico, May 9, 2014.
[857] J&B Interview of Jim Federico, May 9, 2014.
[858] J&B Interview of Brian Stouffer, April 4, 2014.
[859] J&B Interview of Jim Federico, May 9, 2014.
[860] J&B Interview of Jim Federico, May 9, 2014.

on both vehicles to identify any differences in the two products.[861] The engineers who conduct the Red X diagnostic have to be certified in order to run the tests.

The Red X investigation began on September 6, 2012, when Stouffer e-mailed Red X North America manager Bill Merrill to request assistance "from the Red X team to examine changes on the Cobalt between 2007 and 2008 model years."[862] The Red X team was tasked with determining what changed in the Cobalt between 2007 and 2008 that put an end to the stalls.

Merrill assigned Stouffer's request to Dan Davis, GM Red X Global Lead.[863] Davis measured the force necessary to turn the Ignition Switch from Run to Accessory on five Cobalts and found that his data was largely consistent with Stouffer's.[864]

After Davis observed force measurements similar to those found by Stouffer, the next step in the Red X methodology was to examine a "WOW" sample, *i.e.* a crashed Cobalt in which the airbag had failed to deploy properly. Davis planned to compare the WOW with a "COW" ("Complete Opposite of the Worst") to isolate the potential causes of the airbag non-deployment.[865] According to Davis, he requested a WOW from Stouffer, and Stouffer said he had to check with GM Legal. However, Stouffer did not recall Davis ever asking him for assistance in identifying a vehicle, and stated that since Davis worked at Milford where GM maintains many of its vehicles, it would not be logical for Davis to ask Stouffer to find him a vehicle.[866] According to Davis, he eventually followed up with Stouffer, and Stouffer said that

[861] J&B Interview of Jim Federico (May 9, 2014).
[862] E-mail from Dan Davis, GM, to Brian Stouffer, GM (Sept. 17, 2012) [DOC ID 14030700139914; GMNHTSA000135996].
[863] E-mail from Dan Davis, GM, to Brian Stouffer, GM (Sept. 17, 2012) [DOC ID 14030700139914; GMNHTSA000135996].
[864] J&B Interview of Dan Davis, May 8, 2014.
[865] J&B Interview of Dan Davis, May 8, 2014.
[866] J&B Interview of Brian Stouffer, May 9, 2014.

he could not provide a WOW because crashed Cobalts, at the direction of GM Legal Staff, had been quarantined as a result of litigation. Gruskin, Buonomo, Porter, Kemp, and Palmer said that they did not tell (and were not aware of anyone else saying to) an engineer at GM that a Cobalt could not be tested, inspected, or examined because it was "quarantined."[867] Stouffer did not recall telling Davis that all of the Cobalts had been quarantined at GM Legal's direction.[868]

According to Davis, once he was told by Stouffer that a WOW could not be provided, he could not complete his work; Davis took no further action, eventually closing the Red X project in May 2013.[869] Whether Davis was following the Red X methodology or not, the failure of Davis, or anyone else, to push for a comparison of pre- and post-MY 2008 Ignition Switches at this time period was a critical error. The crux of the issue – a comparison of the switches – could have been accomplished by Davis or others, but was not. To be sure, the misinformation provided by DeGiorgio impeded the investigation, but Stouffer and other engineers did not take additional steps that would have moved the investigation forward. Even accepting DeGiorgio's statements, Stouffer did not investigate whether the supplier itself had made changes to the "black box" of the Ignition Switch that might have affected the torque. Had Stouffer taken that step, which he ultimately did more than a year later, he would have discovered that the Ignition Switch had indeed changed, albeit at the direction of DeGiorgio.

As will be discussed below, the plaintiff's expert in [redacted] did the exact comparison the Red X team was asked to undertake and uncovered the 2006 change. This was another missed opportunity for GM personnel to fully understand the issue and bring the matter to a conclusion.

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[867] J&B Interview of Michael Gruskin, May 23, 2014; J&B Interview of Lawrence Buonomo, May 23, 2014; J&B Interview of Ronald Porter, May 24, 2014; J&B Interview of Jaclyn Palmer, May 23, 2014; J&B Interview of William Kemp, May 24, 2014.
[868] J&B Interview of Brian Stouffer, May 9, 2014.
[869] J&B Interview of Dan Davis, May 8, 2014.

11. October 2012: Stouffer Asks DeGiorgio about a New Switch

On October 4, 2012, with the Red X investigation still underway, Federico hosted another meeting at which, Stouffer wrote in an e-mail, the primary discussion involved "what it would take to keep the SDM active if the ignition key was turned to the Accessory mode."[870] But Stouffer also noted that another solution was discussed, namely changing the Ignition Switch to increase torque when turning the key from Run to Accessory.[871]

Consequently, in an October 4, 2012 e-mail, Stouffer asked Ray DeGiorgio to "develop a high level proposal on what it would take to create a new switch for service with higher [torque]."[872] DeGiorgio responded, asking what torque value Stouffer desired.[873] Stouffer replied, stating that he did not know the desired torque value, but wanted a "high level" understanding of what it would take to create a new switch.[874] DeGiorgio replied that for the purposes of a high level proposal and "not knowing what my requirements are," he assumed that the new torque value should be 100 N-cm – five times the original and unmet specification for the MY 2005-07 Cobalts – and estimated that the lead time would be "18-24 months from issuance of GM Purchase Order and supplier selection."[875]

DeGiorgio understood that Stouffer's request was related to the Cobalt non-deployment matter, and DeGiorgio said he based his torque assumption on what would be necessary to prevent the Ignition Switch from being knocked out of run when struck by a driver's knee.[876] The time estimate of 18-24 months was based on the design and validation of an entirely new

[870] E-mail from Brian Stouffer, GM, to Raymond DeGiorgio, GM, *et al.* (Oct. 4, 2012) [GMNHTSA000274060].
[871] E-mail from Brian Stouffer, GM, to Raymond DeGiorgio, GM, *et al.* (Oct. 4, 2012) [GMNHTSA000274060].
[872] E-mail from Brian Stouffer, GM, to Raymond DeGiorgio, GM, *et al.* (Oct. 4, 2012) [GMNHTSA000274060].
[873] E-mail from Raymond DeGiorgio, GM, to Brian Stouffer, GM, *et al.* (Oct. 5, 2012) [GMNHTSA000274060].
[874] E-mail from Brian Stouffer, GM, to Raymond DeGiorgio, GM, *et al.* (Oct. 5, 2012) [GMNHTSA000274060].
[875] E-mail from Raymond DeGiorgio, GM, to Brian Stouffer, GM, *et al.* (Oct. 5, 2012) [GMNHTSA000274060].
[876] J&B Interview of Raymond DeGiorgio, March 14, 2014.

switch with a substantially higher torque requirement, far in excess of the torque requirement in the Cobalt specification.[877] After providing his estimate, DeGiorgio was not asked for any follow-up work or information about his estimate. DeGiorgio again did not disclose that, in fact, the Ignition Switch had already been redesigned and the torque required to turn the key had already been increased.

12. October 2012: [redacted] Evaluation, Providing the Correct Answer

On October 31, 2012, outside counsel Eckert Seamans submitted a brief case evaluation for the [redacted] matter.[878] On August 12, 2012, [redacted] was driving a 2005 Cobalt at "a high rate of speed" when the car left the roadway and struck a tree and a utility pole. [redacted] sustained multiple fractures requiring surgery. The Cobalt's frontal airbags did not deploy during the collision. SDM data indicated that the vehicle was in the Accessory mode at the time of the accident.

Eckert Seamans's case evaluation recognized the link between the vehicle's power mode in Accessory and the non-deployment of the airbags. Outside counsel e-mailed Palmer:

> It is pretty straightforward on the non deployment of the air bag. It is a deployment level event but the Vehicle Power Mode Status was in "Accessory" when AE occurred. It normally would be in the "Run" position.
>
> Somehow the key cylinder put the vehicle into "Accessory" mode which would cause the air bags not to deploy. GM has seen this is a few other matters. The

[877] J&B Interview of Raymond DeGiorgio, March 14, 2014. By contrast, because the stronger detent plunger approved by the April 2006 Commodity Validation Form had been previously validated and was already in production in the Catera, use of the Catera spring and plunger did not require as much lead time as redesigning the switch. J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

[878] E-mail from Edward Gray, outside counsel at Eckert Seamans, to Jaclyn Palmer, GM (Oct. 31, 2012) [DOC ID 000001662905; GMNHTSA000215108].

NHTSA has also commented on the type of situation in a Cobalt. GM has worked/is working on a fix for it.[879]

> Annette
>
> I have completed the file review and spoke with Mike Wendinski who did the ETA.
>
> It is pretty straightforward on the non deployment of the air bag. It is a deployment level event
> but the Vehicle Power Mode Status was in "Accessory" when AE occurred. It normally would
> be in the "Run" position.
>
> Somehow the key cylinder put the vehicle into Accessory mode which would cause the air bags
> not to deploy. GM has seen this is a few other matters. The NHTSA has also commented on the
> type of situation in a Cobalt.
>
> GM has worked/is working on a fix for it.

Roughly six weeks later on December 12, 2012, Palmer presented the [redacted] matter to the Roundtable, including Ron Porter.[880]

The Roundtable authorized settlement, Buonomo signed the authorization, and the case settled.[881]

13. November 2012: The Team Explores a Mechanical Solution

In conjunction with the search for the root cause, the engineers continued to search for both electrical and mechanical solutions.[882] In the fall of 2012, Stouffer began gathering information about possible changes to prepare for a Design for Six Sigma meeting ("DFSS") to be held the following January.[883] GM uses the DFSS process to improve the function of a

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[879] E-mail from Edward Gray, outside counsel at Eckert Seamans, to Jaclyn Palmer, GM (Dec. 12, 2012), forwarding an e-mail from Edward Gray to Annette Rigdon, ESIS (Oct. 31, 2012) [DOC ID000001662905].
[880] Settlement Roundtable Case Summary (Dec. 12, 2012) [DOC ID000001662910; GMNHTSA000215147]; Dawn Wands, Roundtable Agenda Invitation (Dec. 12, 2012) [DOC ID000014530472; GMNHTSA000481154].
[881] Settlement Roundtable Case Summary (Dec. 12, 2012) [DOC ID 00001662910]; Confidential Release, Settlement and Indemnity Agreement between [redacted] and General Motors LLC (July 26, 2013) [DOC ID000001663018; GMNHTSA000215635].
[882] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Jim Federico, May 9, 2014.
[883] J&B Interview of Brian Stouffer, April 4, 2014.

product.[884] Through DFSS, engineers compare the current state of the product with potential modifications to determine the best way to enhance it.[885]

Over the next few months, in anticipation of the DFSS, Stouffer reached out to a number of different component engineers to discuss possible solutions. One solution being contemplated involved a modification to the Cobalt steering column shroud (basically, a cover to guard the ignition from contact with the knee).[886] Specifically, one engineer suggested replacing the current Cobalt steering column shroud with a shroud that "provid[ed] more knee clearance."[887] The engineer suggested that the Ion column shroud "ha[d] these design elements," and replacement of the shroud might be a solution,[888] but others felt that the Ion might have the same Ignition Switch problem and changing the shroud to be similar to the Ion would not resolve the problem.[889] As noted above, this idea had been considered and rejected in 2005.

By early 2013, Sprague had identified two Ion non-deployments that he thought might be comparable to the Cobalt non-deployments.[890] However, because the Ion SDM did not record the signal position of the Ignition Switch at the time of the accident, Sprague and Stouffer were unable to determine whether the Ion SDMs received an "Off" or an "Accessory" signal at the time of a crash.[891] Neither Stouffer nor Sprague was confident that the two Ion incidents were

[884] J&B Interview of Brian Stouffer, April 4, 2014.
[885] J&B Interview of Brian Stouffer, April 4, 2014.
[886] J&B Interview of Terry Connolly, April 28, 2014.
[887] E-mail from Peter Judis, GM, to Mark A. Beauregard, GM, *et al.* (Oct. 11, 2012) [DOC ID 000000005108; GMNHTSA000221248].
[888] E-mail from Peter Judis, GM, to Mark A. Beauregard, GM, *et al.* (Oct. 11, 2012) [DOC ID 000000005108; GMNHTSA000221248]; J&B Interview of Brian Stouffer, April 4, 2014.
[889] J&B Interview of Brian Stouffer, April 4, 2014.
[890] J&B Interview of John Sprague, May 9, 2014; J&B Interview of Brian Stouffer, April 4, 2014.
[891] J&B Interview of John Sprague, May 9, 2014; J&B Interview of Brian Stouffer, April 4, 2014.

related to the Cobalt airbag non-deployments.[892] However, due to his concerns about the Ion, Stouffer did not agree with the suggestion to install an Ion-like shroud in the Cobalt.[893]

On November 14, 2012, Federico hosted a meeting at which Stouffer gave an update on his investigation[894] and the electrical team explained why finding an electrical solution was difficult, specifically, that changes the team would need to make to the SDM to fix the problem would violate federal compliance requirements.[895] The team then shifted the discussion to the mechanical solutions, and discussed various changes to the ignition cylinder and Ignition Switch to increase the torque required to turn the key as well as possible changes to the steering column.[896] To prepare for the DFSS, Stouffer hosted a brainstorming session on December 4, 2012, to identify potential mechanical solutions.[897] Following the meeting, Stouffer circulated a meeting invitation to Brian Thompson, Engineering Group Manager of Switches and Controls, Red X team member Dan Davis, DeGiorgio, and others for the January 8, 2013 DFSS meeting.[898] The meeting invite set forth a list of potential solutions that was generated at the November 14, 2012 meeting hosted by Federico and discussed again at the team's December 4, 2012 brainstorming session.[899]

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[892] J&B Interview of John Sprague, May 9, 2014; J&B Interview of Brian Stouffer, April 4, 2014.
[893] J&B Interview of John Sprague, May 9, 2014; J&B Interview of Brian Stouffer, April 4, 2014.
[894] J&B Interview of Brian Stouffer, April 4, 2014; e-mail from Peter Judis, GM, to Terrence E. Connolly, GM, *et al.* (Nov. 1, 2012), forwarding calendar information from Cindy Mahan, GM, on behalf of Brian Stouffer, GM [DOC ID 000000046119; GMNHTSA000343122].
[895] J&B Interview of Jim Federico, May 9, 2014.
[896] J&B Interview of Brian Stouffer, April 4, 2014.
[897] J&B Interview of Brian Stouffer, April 4, 2014.
[898] J&B Interview of Brian Stouffer, April 4, 2014; e-mail from Brian Stouffer, GM, to Brian Thompson, GM, *et al.* (Dec. 14, 2012) [DOC ID 000000013059; GMNHTSA000221393].
[899] J&B Interview of Brian Stouffer, April 4, 2014; e-mail from Brian Stouffer to Brian Thompson, *et al.* (Dec. 14, 2012) [DOC ID 000000013059; GMNHTSA000221393].

I. 2013: An Outsider Conclusively Demonstrates the Root Cause, But Still No Recall

In early 2013, Stouffer declared his two-year-old investigation "stuck,"[900] even though he now had the Indiana University study correctly identifying the cause of the airbag non-deployments.[901] Even when the plaintiff's expert in [redacted] showed in April 2013 that the Ignition Switch had in fact been redesigned in 2006[902] – answering one of the key outstanding questions in Stouffer's search for the "root cause" – GM hired an expert to reconfirm what it had already learned in [redacted] – an exercise that took another six months.[903] When Stouffer received the written report from GM's expert in late October 2013, Stouffer finally accepted the answer that Trooper Young and Indiana University had arrived at in 2007: that the Ignition Switch was inadvertently turning to Accessory, which disabled the airbags.[904] By the end of 2013, the Cobalt Ignition Switch had finally reached GM's committee that considers recalls (the EFADC), but once there, more questions were raised about root cause, and decision-makers were hamstrung by a lack of accurate data about what vehicles were affected and how many people may have been impacted by the defect.

1. January 2013: DFSS Meeting

The DFSS meeting was held on January 8, 2013.[905] Among others, Stouffer, DeGiorgio, and Dan Davis attended.[906] The DFSS team reviewed a presentation that contained various

[900] J&B Interview of Brian Stouffer, April 4, 2014.
[901] J&B Interview of Brian Stouffer, April 4, 2014.
[902] J&B Interview of Jaclyn Palmer, May 8, 2014.
[903] J&B Interview of Gay Kent, March 18, 2014.
[904] J&B Interview of Brian Stouffer, April 4, 2014.
[905] J&B Interview of Brian Stouffer, April 4, 2014.
[906] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Dan Davis, May 8, 2014.

background information to assist them in working through viable options.[907] In response to a question from Davis, DeGiorgio said that he could duplicate turning the ignition out of Run with his own knee, and that he could do so with both a hole and slot keyhead.[908]

The recommendation from DFSS was that the best possible solution was adding a retooled Ion column shroud to the Cobalt.[909] Changing the torque in the ignition switch was discussed but rejected due to the 18-24 months production estimate provided by DeGiorgio – again based on DeGiorgio's faulty premise that the target torque was 100 N-cm.[910] Again, DeGiorgio failed to disclose that the torque had been increased – by a far smaller amount – in a 2006 redesign, which had addressed the problem. Davis recalls they also discussed changing the key by eliminating the fob entirely by making the key neither a slot nor a hole so no keychain could be placed on it. However, the reaction of the group was that consumers would not like that design.[911] After the January 8, 2012 meeting, Stouffer and Sprague discussed the DFSS recommendation.[912] They agreed that adding the Ion column shroud was not an acceptable solution because they were uncertain as to whether that the Ion had the same problem with airbag non-deployment.[913]

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[907] J&B Interview of Brian Stouffer, April 4, 2014; *see generally* DFSS Cobalt Steering Column Presentation [DOC ID 000000000150; GMNHTSA000221395].
[908] J&B Interview of Dan Davis, May 23, 2014.
[909] J&B Interview of Brian Stouffer, April 4, 2014.
[910] J&B Interview of Brian Stouffer, April 4, 2014.
[911] J&B Interview of Dan Davis, May 23, 2014; J&B Interview of Dan Davis, May 8, 2014.
[912] J&B Interview of Brian Stouffer, April 4, 2014.
[913] J&B Interview of Brian Stouffer, April 4, 2014. They thought there were stalling complaints associated with the Ion and they suspected that there might be non-deployments associated with the Ion. They were unable to verify these suspected non-deployments, however, because the Ion uses a different SDM than the Cobalt and the Ion's SDM does not record crash data in the same way that the Cobalt does. Among other differences, the Ion SDM does not record the power mode at the time of the crash incident. J&B Interview of John Sprague, May 9, 2014; J&B Interview of Brian Stouffer, April 4, 2014.

2. February 2013: The FPE Investigation is "Stuck"

At this point in early 2013, Stouffer concluded that the investigation was "stuck."[914] DFSS had recommended a solution that did not appear likely to solve the problem, the Red X team had not moved the investigation forward, and none of his efforts to find solutions in the various component parts of the vehicle had borne fruit.

Stumped and frustrated, Stouffer and Wachtel asked Federico and Kemp to retain a consulting firm named Exponent and, in particular, a consultant named Subbaiah Malladi to assist the investigation. Multiple witnesses reported that Malladi is used only in the most difficult of GM's cases. A February 20, 2013 e-mail from Wachtel to Federico and Kemp, copying Benavides and Stouffer, stated, "we can not [sic] explain why there are non-deploy events on 2005, 06, 07 vehicles, while there are no known events on 2008, 09, 2012 vehicles . . . . I suggest that we ask Sabbiah [sic] from Exponent to be part of this brainstorming effort."[915] GM did not, however, then engage Malladi, and he did not begin work until May 2013.

[914] J&B Interview of Brian Stouffer, April 4, 2014.
[915] E-mail from Douglas Wachtel, GM, to Jim Federico, GM, *et al.* (Feb. 20, 2013) [DOC ID000003233128]. Wachtel claims Malladi was engaged shortly after Wachtel's February 20, 2013 e-mail and that he had a background call with Stouffer. J&B Interview of Douglas Wachtel, March 18, 2014.

From:	Doug Wachtel
To:	Jim Federico; William J. Kemp
CC:	Carmen Benavides; Brian Stouffer
BCC:	
Sent Date:	2013-02-20 22:32:00:000
Received Date:	2013-02-20 22:32:00:000
Subject:	Cobalt airbag non-deploy
Attachments:	

****Privileged and Confidential**** Prepared at the request of Councel

Jim,

Bill mentioned to you that I believe that we are still missing a key piece of information in this investigation.
We can not explain why there are non-deploy events on 2005, 06, 07 vehicles, while there are no known events on 2008, 09, 2010 vehicles.

I think we need to get our smartest folks from all involved SMTs back together to brainstorm this. I'm thinking of an off-site meeting so we can focus everyone's attention. And it would help to inject new blood to increase our ability to get to the bottom of this. I suggest that we ask Sabiah from Exponent to be part of this brainstorming effort.

Please let me know if you support this approach.

Doug

The reason for this delay is unclear because witness accounts concerning how and when Malladi was hired vary and are somewhat inconsistent. Kemp recalls that he needed approval from senior management to hire Malladi and that sometime after receiving Wachtel's February 20, 2013 e-mail he sought approval from John Calabrese, Vice President of Global Vehicle Engineering (GM's Chief Engineer), and a member of the EFADC, who was reluctant to incur several thousand dollars in expert fees.[916] According to Kemp, he suggested to Calabrese that Kemp could perhaps convince Porter and Phillip Holladay, outside counsel to GM on the [redacted] matter, to hire Malladi in connection with the [redacted] litigation, so that Engineering would not have to pay Malladi's fees and his work would be maintained as privileged under the work product doctrine.[917] Porter recalled Kemp contacting him in April (when Porter was preparing Stouffer for his deposition in the [redacted] case), and telling Porter that FPE intended to hire

[916] J&B Interview of William Kemp, May 9, 2014.
[917] J&B Interview of William Kemp, May 9, 2014.

Malladi, but that Kemp and Porter ultimately agreed to hire Malladi under the auspices of the [redacted] case to shield Malladi's analyses under the work product doctrine.[918] Holladay, however, recalled that he recommended to Porter and Kemp shortly after DeGiorgio's April 29, 2013 [redacted] deposition that GM hire Malladi.[919] For his part, Malladi recalls being contacted by Holladay in April or May 2013, and that his engagement was in connection with the [redacted] litigation, not the FPE investigation.[920]

In March 2013, Kemp asked Calabrese to appoint someone to replace Federico as "champion" of the Cobalt investigation because Federico's travel schedule and other responsibilities rendered him unable to devote sufficient time to the role. Calabrese assigned Gay Kent, the General Director of GM North America Vehicle Safety and Crashworthiness.[921] Kent, then in charge of the PI group, had been one of the engineers who had replicated the moving stall at the test track in 2005. Kent was the third "champion" in ten months.

The same month that Kent became champion, Stouffer provided her with an explanation of the investigation's progress.[922] On April 4, 2013, Kent met with Stouffer and Wachtel to obtain additional information about the investigation.[923] Stouffer did not conduct much work on the investigation in the spring of 2013; he felt he had hit a dead end and believed that Malladi would be assuming a more active role.[924]

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[918] J&B Interview of Ronald Porter, April 30, 2014.
[919] J&B Interview of Philip Holladay, April 25, 2014.
[920] J&B Interview of Subbaiah Malladi, May 7, 2014.
[921] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Gay Kent, March 31, 2014.
[922] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Gay Kent, March 31, 2014.
[923] J&B Interview of Gay Kent, March 31, 2014. Wachtel did not recall this meeting. J&B Interview with Douglas Wachtel, March 18, 2014.
[924] J&B Interview of Brian Stouffer, April 4, 2014.

3. April 2013: GM Lawyers Review the [redacted] Matter at the Roundtable

While the FPE investigation failed to make progress, litigation continued. The Cobalt issue reappeared when, on April 10, 2013, the Roundtable reviewed the [redacted] matter again. The Roundtable authorized settlement, which was approved by Buonomo, and the [redacted] matter settled.

4. April 2013: Depositions in the [redacted] Case Begin and There is a "Bombshell" at DeGiorgio's Deposition

In April 2013, Philip Holladay of K&S began preparing to defend a series of GM depositions in the [redacted] case. Holladay reported that in preparing for the upcoming depositions, he reviewed the FPE investigation performed by Stouffer (and the work of Sprague before him).

On April 29, Holladay defended DeGiorgio in a deposition at the Westin Hotel at the Detroit airport. According to an e-mail that Holladay sent to Porter from the deposition, plaintiff's counsel dropped a "bombshell,"[925] namely evidence that the switch had, indeed, been changed from 2005 to 2008 – evidence that had eluded GM engineers for years and that DeGiorgio testified, under oath, that he did not remember. Holladay reported that Ron Porter, the GM lawyer in charge of the [redacted] litigation, drove to the Westin on his way home to pick up photographs of the different sized plungers and caps that had been provided during the deposition.[926]

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[925] J&B Interview of Philip Holladay, April 25, 2014; e-mail from Philip Holladay, K&S, to Ronald Porter, GM (Apr. 29, 2013) [DOC ID 000004640060].

[926] J&B Interview of Philip Holladay, April 25, 2014. For his part, DeGiorgio said that after the deposition, he, indeed, took two switches apart and confirmed the difference. J&B Interview of Raymond DeGiorgio, March 14, 2014. He also told Brian Thompson, his supervisor, that he had been shown photographs of two different detent plungers of different lengths. DeGiorgio and Thompson then told their new group director, Craig Zinser. Zinser

Three days after the DeGiorgio deposition, Holladay participated in a telephone call with Porter and Bill Kemp. Holladay stated that GM uses Exponent and Subbaiah Malladi for its most important matters. During the call, Holladay recommended hiring Exponent and Malladi for two reasons. First, Exponent would assist with the case. Second, GM needed to bring the FPE investigation to closure without delay. Malladi became involved within days of the DeGiorgio deposition.[927]

5. May 2013: Kent's "Kick Off" Meeting

In the meantime, in early May, Kent, the PI "champion" since March, organized what she described as a "kick off" meeting that Kent, Ron Porter, Bill Kemp, and Jenny Sevigny attended.[928] Malladi and Holladay participated by phone.[929] The purpose of this meeting was to discuss the work conducted by Wachtel and Stouffer to date, and the information presented at this meeting was similar to what the investigators had presented to Kent at the April 4, 2012 meeting.[930] Although Kent also invited Sprague, Stouffer, and Wachtel to participate,[931] they did not recall attending the meeting. Sprague never interacted with Malladi directly, but came to be aware of Malladi's involvement through Sevigny, who would gather information from GM employees for Malladi's investigation.[932] Stouffer recalled that prior to the May 3, 2012

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told DeGiorgio and Thompson to let legal handle it. J&B Interview of Raymond DeGiorgio, March 19, 2014. Zinser had no recollection of this discussion with DeGiorgio and Thompson. J&B Interview of Craig Zinser, May 27, 2014.

[927] J&B Interview of Subbaiah Malladi, May 7, 2014.

[928] E-mail from William Kemp, GM, to Ronald Porter, GM (May 2, 2013) [GMNHTSA000445329; KSGM00016912] (K&S May 2013 Invoice); J&B Interview of Gay Kent, March 31, 2014.

[929] J&B Interview of Gay Kent, March 31, 2014.

[930] J&B Interview of Gay Kent, March 31, 2014.

[931] E-mail from William Kemp, GM, to Ronald Porter, GM (May 2, 2013) [GMNHTSA000445329; KSGM00016912] (K&S May 2013 Invoice); J&B Interview of Gay Kent, March 31, 2014.

[932] J&B Interview of John Sprague, May 15, 2014.

meeting, he and Wachtel were asked not to participate.[933] Porter confirmed that he asked Stouffer and Wachtel not to participate in the call with Malladi because he thought their presence would make it more difficult to assert privilege.[934] Although he did not attend the meeting, Stouffer walked by the conference room while it was taking place, and heard Holladay providing Malladi with a "download" on Stouffer's investigation.[935]

On May 10, 2013, Kent, Sevigny, Porter, Holladay, and Kemp met again on the Cobalt project, with Malladi participating by phone.[936] Stouffer and Wachtel again did not participate, and Kent understood that Stouffer did not attend because he was going to be deposed in the [redacted] case.[937]

There is disagreement about what Malladi was asked at this meeting to do. Kent says she tasked Malladi with determining why there were differences in the Cobalt's Ignition Switch torque across model years.[938] Kent also remembered requesting that Malladi conduct an investigation to determine the connection between the Ignition Switch and the non-deployment of the airbags,[939] but Malladi did not recall being asked to undertake such an investigation, and he did not act on such a request, if made; his report was narrower and focused on the issue of difference in torque across model years.[940] Malladi stated that he was not asked to and did not perform work to determine the root cause of the airbag non-deployment, and that he did not draw

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[933] J&B Interview of Brian Stouffer, April 4, 2014.
[934] J&B Interview of Ronald Porter, April 30, 2014.
[935] J&B Interview of Brian Stouffer, April 4, 2014.
[936] J&B Interview of Gay Kent, March 31, 2014; K&S May 2013 [redacted] Invoice (Jun. 28, 2013), at 4 [DOC ID 201405160003712] (showing participation by Kent, Sevigny, Malladi, Porter, and Holladay).
[937] J&B Interview of Gay Kent, March 31, 2014. Stouffer described that he and Wachtel were "no longer invited" to the Malladi meeting and he thought it was "odd," thinking that he would have better briefed Malladi than the lawyers. J&B Interview of Brian Stouffer, April 4, 2014.
[938] J&B Interview of Gay Kent, March 31, 2014.
[939] J&B Interview of Gay Kent, March 31, 2014.
[940] J&B Interview of Subbaiah Malladi, May 7, 2014; [redacted] *v. GM* presentation [GMNHTSA000466745].

any conclusion regarding whether the change in the Ignition Switch or the lower torque caused the SDM to read the power mode as Accessory or the non-deployment of the airbags.[941]

There is also disagreement about how Malladi's work on [redacted] intersected with work on the open FPE investigation. Malladi said he did not recall knowing that his work related to an open FPE investigation until after the [redacted] case settled in the fall of 2013.[942] Kent said that she communicated the urgency of the situation, but that she knew Malladi needed to finish some work on the [redacted] litigation before he could turn his full attention to the FPE project.[943] Holladay said that while part of his reason for hiring Malladi was to assist on the [redacted] case, Malladi's work on the [redacted] litigation was structured to ensure that the open FPE investigation moved towards closure without delay.[944] Whatever the instruction, after this meeting, Malladi focused solely on the issue that had already been considered by [redacted] expert witness – the question of differences in the Ignition Switch in different model years.[945]

Sevigny was designated to be the point of communication between Kent, the FPE investigators, and Malladi.[946] Going forward, Sevigny routinely provided updates on Malladi's progress and provided Malladi with data and information.[947]

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[941] J&B Interview of Subbaiah Malladi, May 7, 2014.
[942] J&B Interview of Subbaiah Malladi, May 7, 2014.
[943] J&B Interview of Gay Kent, March 31, 2014.
[944] J&B Interview of Philip Holladay, April 25, 2014.
[945] J&B Interview of Subbaiah Malladi, May 7, 2014; [redacted] *v. GM* presentation [GMNHTSA000466745].
[946] J&B Interview of Gay Kent, March 31, 2014.
[947] J&B Interview of Gay Kent, March 31, 2014. Malladi recalls Holladay telling him that DeGiorgio stated that no changes were made to the ignition switch plunger. Holladay told Malladi that the plaintiff's expert had said that a 2005 switch had a different plunger and spring than a service part switch obtained from a dealer. J&B Interview of Subbaiah Malladi, May 28, 2014.

6. May 2013: GM Lawyers and Outside Counsel Review The [redacted] Matter Again

On May 15, the week after Kent's "kick-off" meeting and about two weeks after the DeGiorgio deposition, GM lawyers reviewed the [redacted] matter at another Roundtable.[948] Porter's summary of the Roundtable included:

> NEW INFORMATION: Plaintiff claims the engine turned off because the Ignition switch moved from the run to the accessory position. The [redacted] switch requires about 8 N/cm to turn from Run to Accessory. The torque curve on the drawing works out to about 20 N/cm.[949]

The Roundtable gave settlement authority, but the case did not settle and discovery continued.

K&S submitted a second case evaluation for the [redacted] matter on July 22, 2013.[950] Holladay's evaluation included a conclusion that a jury would almost "certainly" find the Ignition Switch unreasonably dangerous, that low torque would lead to inadvertent shutting off of the engine:

> This case is a very poor trial candidate. A jury here will almost certainly conclude that the Cobalt's ignition switch is defective and unreasonably dangerous because the torque effort required to move the key from run to accessory is too low, which leads to inadvertent key movement and the engine shutting off with little or no warning.[951]

K&S warned that this was known virtually from the vehicle launch:

> This phenomena was identified almost immediately after the 2005 Cobalt went into production and there were several newspaper and trade publication articles shortly after the car's launch that flagged the issue. As discussed in more detail below, the issue was assessed internally in a series of investigations conducted as part of the Product Resolution Tracking System and ultimately addressed by

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[948] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013) [DOC ID 000002818612]; Roundtable Agenda [DOC ID 000162270688].
[949] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 4-5 (emphasis omitted) [DOC ID 000002818612].
[950] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 11 [DOC ID 000002818612].
[951] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 12-13 [DOC ID000002818612].

> issuing an Information Service Bulletin in the Fall of 2005 that provided a field service fix for customers who experienced an incident involving inadvertent key movement.[952]

The evaluation then catalogued the airbag non-deployment issue, even though airbag non-deployment was not an allegation in [redacted]

> More recently, this issue has surfaced again as part of an on-going FPE investigation into why frontal air bags have not deployed in certain high-speed multiple-impact frontal collisions involving 2005-2007 Chevrolet Cobalts. In more than half of those incidents, it appears the reason that the air bag did not deploy was because the car's ignition was in the accessory rather than the run position. While there is no allegation here that [redacted] frontal air bags should have deployed, the on-going investigation ties nicely into plaintiffs' expected theme that the original Information Service Bulletin was an inadequate "band-aid fix" for a significant safety issue that should have been addressed through a recall and design change. Given these facts, we believe that GM's defense here necessarily will have to focus almost exclusively on causation.[953]

Holladay warned of "a substantial adverse verdict."[954] Among the reasons he listed: "the ignition switch and key cylinder used on the 2005 Cobalt were problematic from the outset and plaintiffs will have little problem convincing most jurors that these components were sub-standard and defective."[955]

In concluding, Holladay wrote, "This case needs to be settled."[956] He warned that plaintiff would argue that GM had known of the defect from the time that Cobalts first "rolled off the assembly line" and yet it has "essentially done nothing to correct the problem for the last nine years":

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[952] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 12-13 [DOC ID000002818612].
[953] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 13 [DOC ID000002818612].
[954] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 13 [DOC ID000002818612].
[955] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 13 [DOC ID000002818612].
[956] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 36 [DOC ID000002818612].

> [T]here is little doubt that a jury here will find that the ignition switch used on [redacted] 2005 Cobalt was defective and unreasonably dangerous, and that it did not meet GM's own torque specifications. In addition, the PRTS documents referenced above and the on-going FPE investigation have enabled plaintiffs' counsel to develop a record from which he can compellingly argue that GM has known about this safety defect from the time the first 2005 Cobalts rolled off the assembly line and essentially has done nothing to correct the problem for the last nine years. He specifically will criticize GM for not doing more than implementing the field service campaign back in 2005, and point to GM's failure to take any action in the on-going FPE investigation that has now been dragging on for almost two years as proof positive of GM's conscience indifference and willful misconduct when it comes to the safety of its vehicles' occupants.[957]

EVALUATION AND RECOMMENDATION

This case needs to be settled. As outlined above, there is little doubt that a jury here will find that the ignition switch used on [redacted] 2005 Cobalt was defective and unreasonably dangerous, and that it did not meet GM's own torque specifications. In addition, the PRTS documents referenced above and the on-going FPE investigation have enabled plaintiffs' counsel to develop a record from which he can compellingly argue that GM has known about this safety defect from the time the first 2005 Cobalts rolled off the assembly line and essentially has done nothing to correct the problem for the last nine years. He specifically will criticize GM for not doing more than implementing the field service campaign back in 2005, and point to GM's failure to take any action in the on-going FPE investigation that has now been dragging on for almost two years as proof positive of GM's conscience indifference and willful misconduct when it comes to the safety of its vehicles' occupants.

7. July 2013: Malladi Presents His Findings Orally

On July 30, 2013, the week after GM received K&S's second case evaluation and about ten weeks after GM's May 10, 2013 meeting with Malladi, Malladi orally briefed Porter, Sevigny, Kemp, Kent, and a K&S lawyer.

According to Kent, Malladi reported that the Ignition Switches installed in '05 to '07 MY Cobalt vehicles did not meet GM's torque specifications.[958] Porter recalled that the call focused on the GM car dealer's expert witness, who thought the BCM was responsible for the crash, and

[957] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 36 [DOC ID 000002818612].
[958] J&B Interview of Gay Kent, March 18, 2014.

communications with co-counsel in the case.[959] Kemp recounted that Malladi reported on differences in the sizes of springs and switches uncovered through x-rays, and asked GM to obtain records from Delphi to confirm that part changes had been made.[960]

Malladi has no recollection of the July 30, 2013 phone call.[961]

8. August 2013: [redacted] SRC Meeting

On August 7, 2013, a week after hearing Malladi's results, Porter presented [redacted] to the Settlement Review Committee.[962] Buonomo, Gruskin, Kemp, and Nowak-Vanderhoef are listed as attending.[963] The Settlement Review Committee received the previous Roundtable summaries and Holladay's case evaluation. It also received a summary drafted by Porter that contained a list of factors impacting exposure.

Even though [redacted] was not an airbag case, Porter's exposure summary included a paragraph on the ongoing airbag investigation involving Cobalts produced before 2008:

> There is a continuing GM FPE investigation into airbag non-deployments in Cobalts which may be, at least partially, linked to the ignition switch issue. We know of approximately 20 non-deployments of frontal airbags in Cobalts where the crash forces are sufficient to have properly deployed the frontal SIR. In half of these crashes, the SDM printout indicates the ignition was in the "Acc" position. In the Cobalt, the airbag will not deploy with the key in "Acc." In the other cases, the SDM indicates "Run" and there is no known reason for the failure

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[959] J&B Interview of Ronald Porter, May 13, 2014.
[960] J&B Interview of William Kemp, May 9, 2014.
[961] J&B Interview of Subbaiah Malladi, May 27, 2014. Documentary evidence reflects, however, that Malladi told Porter he received a dial-in and planned to call in on July 30, 2013, [DOC ID 000004634434], and that on July 31, 2013, Susan Clare of K&S requested, in an e-mail to Malladi, "copies of the TSBs you mentioned yesterday related to the BCM." [DOC ID 000004634389].
[962] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013) [DOC ID 000002818612].
[963] [redacted] Settlement Review Committee Meeting (Aug. 7, 2013) [DOC ID 000120897828]. Evidence shows that, although she is listed on the settlement authority document as attending, Clark Dougherty, who was on maternity leave, did not attend in person or by phone, or access the meeting materials. J&B Interview of Lucy Clark Dougherty, April 16, 2014; SRC Package – [redacted] Doc# 4216521 Document History (May 22, 2014) [DOC ID 241263003]; Buonomo Meet Me Conference Call Log for Aug. 7, 2013 (May 20, 2014) [DOC ID 241263002].

of the airbag to deploy. All of these events involve Cobalts produced before 2008.[964]

The SRC authorized settlement, which was approved by Buonomo, and the case settled in September 2013 for $5 million, the maximum the SRC could authorize without the approval of the General Counsel.[965] The evidence shows that neither Kemp, Buonomo, Gruskin, Porter nor any other GM lawyer elevated Holladay's letter or specific issues related to the [redacted] case to General Counsel Michael Millikin prior to settlement.[966]

9. October 2013: Malladi's Written Presentation

Malladi presented his findings orally on a September 20, 2013 conference call. The meeting invitation to Benavides, Wachtel, Stouffer, Kent, Porter, Malladi, and Kemp noted: "FPA, Legal Staff and Subbaiah" had investigated "ignition switches on 2005-2010 Cobalt vehicles as a result of issues that arose in a product liability lawsuit. That case has resolved and we would like to review with you the work that was done and identify any remaining items that need to be completed."[967] After receiving the oral download of Malladi's report on September 20, 2013, which demonstrated that the ignition switch had been changed between MY 2006 and MY 2007, Stouffer started trying to find a contact at Delphi, the supplier of the Ignition Switch, to obtain additional information. Stouffer asked DeGiorgio and Porter for Delphi contacts before

[964] Ronald Porter, [redacted] Settlement Review Committee Case Summary (Aug. 8, 2013), at 2-3 [DOC ID 000002818612].
[965] [redacted] Settlement Review Committee Meeting (Aug. 7, 2013) [DOC ID 000120897828]; Michael Gruskin, GM, Legal Staff Settlement Review Processes (March 23, 2009) [DOC ID O_00016584].
[966] J&B Interview of Lawrence Buonomo, April 16, 2014; J&B Interview of William Kemp, April 17, 2014; J&B Interview of Jaclyn Palmer, April 24, 2014.
[967] E-mail from Jennifer Sevigny, GM, to Brian Stouffer, GM, *et al.* (Sept. 17, 2013) [DOC ID 000000027269].

recalling that GM had a Delphi contact on government investigations (Gary Greib) whom he could ask. Stouffer contacted Greib on October 23, 2013.[968]

About two weeks after the September 20, 2013 call with Malladi, on October 8, 2013, Wachtel e-mailed Benavides again, this time to tell her that he and Stouffer needed three main pieces of information to "bring the [ignition switch] issue forward": (1) "List of confirmed/suspected cases where non-deploy is suspected to have occurred from ignition being shut off – Brian has this"; (2) "Delphi information that shows dates that a new switch was substituted into production"; and (3) "A copy of the information Subaiah [sic] presented to us during our recent conference call. Jenny Sevigny and Bill Kemp have requested this from Ron Porter, but we do not have the information."[969]

About three weeks later on October 28, 2013, Malladi sent his written PowerPoint presentation to Porter and Holladay, copying Wachtel, and apologizing for the delay.[970] In an interview, Malladi explained that he did not respond with the slides right away because he realized that there were x-rays he wanted to complete first; he had the impression at that time that GM wanted to take "some field action" with respect to the vehicles at issue.[971] Wachtel forwarded the e-mail to Stouffer the following day.[972] Stouffer said he did not know why it took so long to get Malladi's results, and said Wachtel had asked Kemp for them.[973]

Malladi's 21-page slide deck reported two findings:

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[968] J&B Interview of Brian Stouffer, April 4, 2014; e-mail from Brian Stouffer, GM, to Ronald Porter, GM (Oct. 14, 2013) [DOC ID 000000108574].
[969] E-mail from Douglas Wachtel, GM, to Brian Stouffer, GM (Oct. 9, 2013) [DOC ID 000000108837; GMNHTSA000283360].
[970] E-mail from Subbaiah Malladi, Exponent, to Ronald Porter, GM, Phil Holladay, K&S, and Douglas Wachtel, GM (Oct. 28, 2013) [DOC ID 000004623644; GMNHTSA000466744]; *see* [DOC ID 000004623645; GMNHTSA000466745] for attachment to e-mail.
[971] J&B Interview of Subbaiah Malladi, May 7, 2014.
[972] E-mail from Douglas Wachtel, GM, to Brian Stouffer, GM (Oct. 29, 2013) [DOC ID 000000103466].
[973] J&B Interview of Brian Stouffer, April 4, 2014.

- One, there had been "a design change" in Cobalt ignition switch part #10392423 between MY 2006 and MY 2007 MY Cobalts (as the [redacted] expert had said some five months before).

- Two, "certain [Cobalt] ignition switches did not meet specifications."[974]

Malladi reported in an interview that he had not been asked to opine on whether that low torque was the cause of the Cobalt airbag non-deployments, which he described as a complicated issue because of multiple potential causes.[975]

10. November 2013: Stouffer Arrives at and Presents His Conclusions, Which Are the Same as Trooper Young's, the IU Investigators', and Erin Shipp's

With both the [redacted] plaintiff's expert and Malladi now having established that the Ignition Switch had changed, on October 29, 2013, Delphi provided documents to GM confirming that DeGiorgio had approved a change to the Ignition Switch spring and plunger in April 2006.[976] Wachtel reported that these documents helped GM identify the Ignition Switch as the source of the airbag non-deployment issue. Wachtel, who had overseen Stouffer's investigation for over a year by this point, believed that GM's investigation had been impeded by previous statements that the Ignition Switch had not changed.[977] Stouffer agrees.

In November 2013, Stouffer finally reached the same conclusion that Trooper Young had in 2007. An Investigation Status Review ("ISR") meeting took place on November 5, 2013.[978]

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[974] [redacted] *v. GM* presentation [DOC ID 000004623645; GMNHTSA000466745].
[975] J&B Interview of Subbaiah Malladi, May 7, 2014.
[976] E-mail from Douglas Wachtel, GM, to Jamie Morrison, GM, *et al.* (Oct. 3, 2013) [DOC ID 000000117060; GMNHTSA000466736]; e-mail from John Murawa, GM, to Mark Johnson, GM (Dec. 9, 2013) [DOC ID 000013664326; GMNHTSA000223721]; e-mail from Gary Greib, Delphi, to Brian Stouffer, GM (Oct. 29, 2013) [DOC ID 000000131995; GMNHTSA000002889]; *see* Presentation entitled "Engineering Change Support Information" [DOC ID 000000131996; GMNHTSA000002896]; Report entitled "Spring Dimensional [DOC ID 000000131997; GMNHTSA000002899]; Form [DOC ID 000000131998; GMNHTSA000002900].
[977] J&B Interview of Douglas Wachtel, March 18, 2014.
[978] Carmen Benavides was in attendance at the ISR on the Cobalt and believed at that time that there should be a recall. J&B Interview of Carmen Benavides, May 19, 2014. Two days later, she and Dale Furney presented to

Stouffer presented findings that indicated a relationship between the low torque in the Cobalt Ignition Switch and incidents of airbag non-deployment. In his PowerPoint presentation on the 2005 to 2007 Cobalt, he reported: "A review of selected Cobalt & G5 frontal crash events indicates some airbag non deploys have occurred where the ignition switch was in accessory or off . . . . The noted field events involve vehicles going off the road and/or hitting smaller objects before a more significant impact." He hypothesized that "during the off road event the driver's knee is interacting with the keys and/or the mass of the keys is causing the ignition to rotate."[979]

2005-7 Cobalt, G5, Pursuit, 2003-2007 Ion, 2006-2007 HHR

Condition:

A review of selected Cobalt & G5 frontal crash events indicates some airbag non deploys have occurred where the ignition switch was in accessory or off. The condition appears to be limited to 2005-07 Cobalt & G5 vehicles. The noted field events involve vehicles going off the road and/or hitting smaller objects shortly before a more significant impact.

Questions:

- Why no incidents on Ion or HHR
  - Ion is Class 2 architecture vs GM LAN on Cobalt
    - Both disable SDM with key off, but Cobalt will store ignition state and crash record while Ion will not
  - Ion has different column shroud which could affect potential for key interaction
  - Ion customers may be less likely to have the type of crash needed for the condition
  - Ion has different SDM and supplier than Cobalt
  - HHR has more clearance to the driver's knee
- Why no incidents on 2008-10 Cobalt?
  - Ignition switch was revised to have longer plunger and spring to increase effort (confirmed 10/29/13)
    - Part number not changed, so implementation date is unknown (Validation complete 4/26/06). Salvage yard samples included 2007 vehicles with longer plunger (unknown if any had been replaced in service).

Root Cause:

- The hypothesis is that during the off road event the driver's knee is interacting with the keys and/or the mass of the keys is causing the ignition to rotate

NHTSA on a number of pre-selected topics, including the conditions GM would analyze in connection with a "loss of propulsion." J&B Interview of Carmen Benavides, May 19, 2014; e-mail from Dale Furney, GM, to Carmen Benavides, GM (Feb. 18, 2014) [DOC ID 000005127381; GMNHTSA000442785]; Presentation [DOC ID 000005127383; GMNHTSA000442791]. In her May 19, 2014 interview, Benavides stated her belief that the Cobalt ignition switch problem was not relevant to the framework for assessing stalls in her November 7, 2013 NHTSA presentation; she reasoned that in the Cobalt situation, where the ignition was moved out of Run, the engine would be expected to shut off, and therefore the Cobalt condition was not a stall. J&B Interview of Carmen Benavides, May 19, 2014.

[979] *See* Presentation to ISR, at 1 [DOC ID 000003100829; GMNHTSA000250865; GMHEC000251168].

On November 19, 2013, Maureen Foley-Gardner e-mailed Alicia Boler-Davis, GM's Senior Vice-President of Global Quality and Customer Experience, to inform her of the issue with the Cobalt ignition switch. She noted in her e-mail that she wanted to provide a "[h]eads up on high dollar FPE issues," estimating that the issue would cost $35 million.[980] At this point, GM finally began its formal internal processes to commence a recall.

11. Conclusions: 2011 to 2013

The failures from 2011 to 2013 demonstrate a lack of urgency in the face of a pattern of airbag failures, an unwillingness by GM personnel to re-evaluate their conclusions, a lack of accountability or leadership in driving the investigations to a conclusion, and a continued reluctance to elevate issues. The 2011 failures include:

- In early January 2011, GM lawyers – including safety lawyers and product litigation lawyers – attended the [redacted] Roundtable and decided that it was important to meet to "see some additional information" about the airbag "anomaly." It took until July to schedule the meeting, a delay no witness could explain.

- In July 2011, GM lawyers called a meeting to make sure that senior engineering management had "eyeballs" on the issue and "not let it flow through the normal process." Yet, Wachtel opened the investigation and did little else. The investigation would remain open and unresolved for two-and-a-half years. Neither the lawyers nor the engineers elevated the issue to the top levels of management.

- When he was assigned the investigation in the summer of 2011, Stouffer obtained an old PI file (Kiihr's) with background on the 2005 moving stall investigation, and obtained the TSBs. Stouffer did not share this information with GM product liability lawyers or with Sprague. Stouffer now knew (1) that the Cobalt had a history of the Ignition Switch being turned accidentally to Accessory because of low torque, and (2) that airbags do not deploy when the Ignition Switch is in Accessory. Regardless of whether there were other issues affecting other model years, any driver who turned the Cobalt Ignition Switch off with a knee (a problem documented in the TSB) was disabling airbags. Instead of addressing this safety issue, he worked to find a solution that would solve the problem for all years and all positions of the Ignition Switch.

[980] E-mail from Maureen Foley-Gardner, GM, to Alicia Boler-Davis, GM (Nov. 20, 2013) [DOC ID 000003036088; GMNHTSA000223499]; J&B Interview of Alicia Boler-Davis, May 16, 2014.

The consequence of the failures of 2011 was delay. The unexplained gap between the [redacted] Roundtable and the July meeting (a meeting ostensibly to convey urgency) constituted a delay of a half a year. And the investigation that proceeded from that meeting moved forward without any sense of urgency, ultimately taking two-and-a-half years.

Failures in the Cobalt investigation continued in 2012:

- In March 2012, an electrical engineer found the TSB after a visit to a junkyard where he noticed that the keys turned extremely easily and doing his own search of GM records to see whether this was a documented problem. The TSB was forwarded to FPA engineers, in-house GM product liability lawyers and outside counsel. Based on the TSB, outside counsel reached the same conclusion that Trooper Young and Indiana University had five years earlier, and warned of the risk of punitive damages because "GM will be forced to contend with other incidents, some of which resulted in deaths, due to the non-deployment of the frontal airbags in the 2005-2007 Cobalt." No lawyer elevated the issue to the General Counsel.

- In May 2012, with the search for root cause making little progress, Kemp persuaded Terry Woychowski (a Vice President) to "champion" the issue, but Woychowski soon retired. Then Kemp recruited Federico (an Executive Director) to replace Woychowski as the second "champion," but Federico viewed himself as doing nothing but "energiz[ing] the team," not bringing the investigation to a conclusion. Neither Woychowski nor Federico elevated the issue up their chain of command.

- In June 2012, DeGiorgio once again told Stouffer, this time in writing, that there was no effect on the torque of the switch due to changes made in the Ignition Switch in 2006, again diverting investigative efforts.

- In June 2012, plaintiff's expert Erin Shipp located both the TSB and the Indiana University study and came to the same correct conclusion as the Indiana University team. Having been made aware of the Indiana University study by the expert, Palmer transmitted it to Wachtel, Stouffer, Sprague and Kemp in July. But still GM engineers did not accept the correct theory. Rather, there were more meetings and referral to yet another group, the Red X team (which made no progress whatsoever).

Finally, in 2013, now that another plaintiff's expert had provided GM engineers with photographs of how the MY 2008 ignition switch differed from earlier Cobalts, the response was referral to an outside expert and yet more meetings:

- In February 2013, Stouffer – after almost two years – declared himself "stuck," and he and Wachtel recommended hiring an outside expert, which did not happen until the "bombshell" at DeGiorgio's deposition in April 2013.

- In April 2013, GM lawyers and engineers received photographs from a [redacted] expert proving that DeGiorgio's statements had misled his colleagues for years; contrary to his repeated denials, there had been a part change years before that affected ignition switch torque. The plaintiff's expert had done what none of the GM engineers had done; he took apart two switches and compared them.

- The response to the revelation at the DeGiorgio deposition was to hire an expert. Gay Kent, who recently had become the third "champion," and who had personally replicated a moving stall eight years earlier in 2005, soon held what she called a "kick off meeting" that included the expert. It took six months after the DeGiorgio deposition for the expert to provide his written report concurring that the Ignition Switch had changed – just as the photographs had shown.

- In July 2013, outside counsel warned of a "compelling[]" case that GM had known about the defect since 2005 "and essentially has done nothing to correct the problem for the last nine years." Still, no GM lawyer apprised the General Counsel. The investigation under Kent awaited the completion of the outside expert's report. Delphi, GM's supplier which built the ignition switch, was not contacted until October.

- In November 2013, after receiving the written report from the outside expert verifying that the ignition switch had, indeed, changed in MY 2008 Cobalts, Stouffer finally reached the same conclusion that Trooper Young and Indiana University had in 2007: that the Ignition Switch was inadvertently being turned to Accessory and that, consequently, the airbags would not deploy. Stouffer's conclusion was reported to yet further committees, and it would not be until January 31, 2014 that the recall was ordered.

By this period, most of the information silos relating to the root cause had collapsed. A new set of failures became more predominant. One was the failure to revisit one's own conclusions. The GM investigator had been so focused on the SDM solution that he failed to act on what was right before his eyes – regardless of whether the Cobalt was in Run or Accessory

from MY 2008, drivers were kneeing off the power in Cobalts, as they had been since 2005, and in those instances airbags did not deploy by GM's own design. Stouffer failed to revisit his first conclusions, albeit after having been misled on multiple occasions by DeGiorgio's repeated denials. After conclusion of the long investigation, the next step was referral to more committees.

J. The 2013–2014 Recall Process

In mid-December 2013, the Cobalt Ignition Switch finally emerged from the FPE process and reached the Executive Field Action Decision Committee ("EFADC"), which is responsible for issuing recalls. The first EFADC meeting, however, ended without a recall decision and with a request for follow-up analysis to determine the root cause of the airbag non-deployments. The failure to issue a recall at this EFADC meeting was another missed opportunity, stemming from the continued, singular focus on finding the root cause, and from a lack of urgency due to a lack of awareness of fatalities among key decisionmakers.

The EFADC did not meet again until six weeks later – January 31, 2014 – and at that point issued a recall of MY 2005 – 2007 Chevrolet Cobalts and Pontiac G5s. The Saturn Ion and Chevrolet HHR were briefly discussed at the January 31, 2014 meeting. But EFADC members were incorrectly told, however, that although those models used the same ignition switch as the Cobalt, they were different in several material respects and – based on Stouffer's incomplete TREAD data pull in 2011, which had not been updated – had not experienced crashes involving airbag non-deployments.

It was not until the latter part of February, when EFADC member John Calabrese requested a fresh data pull, that the GM employees involved in the ignition switch issue

discovered numerous accidents involving the Ion and HHR in which the airbags did not deploy, including fatal Ion crashes in late 2003 and 2004. They also discovered numerous PRTS reports for the Ion related to moving stalls, some of which dated back to 2004. Calabrese called an emergency EFADC meeting for February 24, 2014, and the EFADC immediately expanded the recall to MY 2003-2007 Ion, HHR, Solstice and Sky vehicles. In the weeks that followed, it came to GM's attention that housing kits containing the defective Ignition Switch were used to repair some MY 2008–2011 Cobalt, G5, Ion, HHR, Solstice and Sky vehicles, necessitating yet another recall.

1. December 2013 "Mini"-FPERC Meeting

In early December 2013, the Cobalt reached the Field Performance Evaluation Recommendation Committee ("FPERC"), an executive committee that reviews the details of an FPE investigation and makes a recommendation to the EFADC.[981] An informal "small group" of FPERC members met on December 2, 2013; Stouffer presented at the meeting, and attendees discussed prior crashes, fatalities, and available warranty information.[982] Among the attendees were Benavides, Foley-Gardner, Kemp, Kent, Stouffer, Wachtel, and John Murawa, an FPE investigator who would be replacing Stouffer upon his retirement.[983]

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[981] Carmen Benavides, Product Investigations Topics presentation (July 25, 2013), at 2 [DOC ID 000003722007], attached to e-mail from Carmen Benavides to William J. Kemp, GM, *et al.* (July 25, 2013) [DOC ID 000003722006].

[982] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014.

[983] J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014; J&B Interview of Mark Johnson, April 23, 2014. There may have been other attendees as well, including Greg Hall. Kent could not recall whether she attended this meeting; others recalled that Kent did in fact attend. J&B Interview of Gay Kent, March 18, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014. There is some difference of opinion as to whether the first meeting on December 2, 2013 was a formal FPERC meeting or an informal meeting. Benavides and Mark Johnson recalled that this was not a formal FPERC meeting. J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Mark Johnson, April 23, 2014. Foley-Gardner recalled it as a "small group" rather than the usual FPERC attendees. J&B Interview of Maureen Foley-Gardner, March 26,

At that time, Stouffer claimed to know of only two fatal accidents that might be associated with the safety defect: the fatality Sprague had described to Stouffer in 2011, and the [redacted] fatality described in the Indiana University study that Palmer sent Stouffer in 2012.[984] This FPERC meeting was the first time Foley-Gardner learned of fatalities potentially associated with the Cobalt Ignition Switch.[985] According to Foley-Gardner, the Cobalt Ignition Switch issue went straight from the December 2, 2013 "mini" FPERC to the EFADC because there was a desire by the legal department and Benavides to get the issue to the EFADC.[986] It is unclear whether the FPERC considered recommending a recall of Delta and Kappa platform vehicles other than the Cobalt, even though those vehicles shared the same ignition switch and had been included in the 2005/2006 TSBs.[987] At that point, the FPE investigation was still relying on Stouffer's incomplete data collection efforts in 2011 and was not aware of numerous airbag non-deployment incidents involving the Ion and HHR, including several fatalities in Ion crashes.

Stouffer retired on December 4, 2013, and Wachtel left GM on December 20, 2013 (Wachtel had formally retired in August, but remained at GM as a contract employee into December). The Cobalt matter was transitioned to Murawa, who had less than two weeks to delve into the details of the lengthy FPE investigation before presenting to the EFADC on

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2014; e-mail from Maureen Foley-Gardner, GM, to William Kemp, GM, *et al.* (Nov. 20, 2013) [GMNHTSA000223511; DOC ID 000005057057].

[984] J&B Interview of Brian Stouffer, April 4, 2014. Stouffer was also aware of the [redacted] accident, but he did not believe it was a case in which the airbags should have deployed, regardless of the position of the ignition switch, because it was a side impact crash and there were no side impact airbags on the vehicle. J&B Interview of Brian Stouffer, April 4, 2014.

[985] J&B Interview of Maureen Foley-Gardner, March 26, 2014.

[986] J&B Interview of Maureen Foley-Gardner, May 19, 2014.

[987] At the December 2, 2013 meeting, Benavides asked Stouffer to track down the PPAP for the ignition switch from Delphi, and Stouffer contacted Griebe at Delphi later that day to request the PPAP. J&B Interview of Brian Stouffer, April 4, 2014.

December 17, 2013. Murawa consulted with Stouffer before and after his departure and met with DeGiorgio, Sprague, and Brian Thompson to understand the facts.[988]

The day before the EFADC, the Director of Global FPE e-mailed two colleagues saying that she was "not clear on the 'rush' for tomorrow's meeting," adding "[w]e have skipped the step in the process where we talk execution details" and that she hoped to have a discussion rather than a decision "so we can understand the service procedure and the part availability, etc."[989]

2. December 17, 2013 EFADC Meeting

On December 17, 2013, the Cobalt Ignition Switch finally reached the EFADC and its three decision-makers – John Calabrese, VP of Engineering, Alicia Boler-Davis, SVP, Global Quality & Customer Experience, and Gerald Johnson, VP of Manufacturing – who must be unanimous in order for a recall to be issued.[990] There are no minutes of EFADC meetings and notes are not taken, so we do not have any written record of the discussion.[991]

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[988] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of John Murawa, April 23, 2014. Benavides stated that Murawa became an expert in a very short period of time and that Stouffer's departure did not slow the pace of the FPE process. J&B Interview of Carmen Benavides, March 25, 2014. Both Benavides and Mark Johnson claim to be the one who chose Murawa to replace Stouffer. J&B Interview of Mark Johnson, April 23, 2014; J&B Interview of Carmen Benavides, March 25, 2014.

[989] J&B Interview of Maureen Foley-Gardner, May 19, 2014; e-mail from Maureen Foley-Gardner, GM, to Jeffrey Wrona, GM (Dec. 16, 2013); J&B Interview of Jeffrey Wrona, April 23, 2014.

[990] J&B Interview of Gay Kent, March 18, 2014; FPE Overview presentation (Feb. 2014), at 6-7 [DOC ID 000005129665], attached to e-mail from Deborah Nowak-Vanderhoef to Carmen Benavides (Jan. 30, 2014) [DOC ID 000005129664]. Boler-Davis joined the EFADC in 2012 and Johnson in July 2013. J&B Interview of Alicia Boler-Davis, March 21, 2014; J&B Interview of Gerald Johnson, May 15, 2014. Neither of them received any training regarding their EFADC duties. J&B Interview of Alicia Boler-Davis, March 21, 2014; J&B Interview of Gerald Johnson, March 20, 2014.

[991] J&B Interview of Alicia Boler-Davis, March 21, 2014. According to Boler-Davis, in April 2014, the EFADC began taking meeting minutes. J&B Interview of Alicia Boler-Davis, May 16, 2014.

EFADC members received a single PowerPoint slide on the day before the meeting, which did not include any information on fatalities or the length of the FPE investigation.[992] Calabrese attended in person, Boler-Davis sent Jeffrey Wrona as her proxy,[993] and it is unlikely that Johnson attended.[994] Other attendees included Benavides, Foley-Gardner, Kemp, Kent (by phone), Wachtel, and possibly others.[995] No one at the meeting questioned why the investigation had taken as long as it did.[996]

Murawa presented at the meeting, and went through a number of PowerPoint slides. Calabrese was dissatisfied with the evidentiary support Murawa and his team provided and raised a number of factual questions that he said required further analysis before a recall decision could be made. In particular, he believed that the FPE team had not yet identified a root cause for the airbag non-deployment.[997] He thought the FPE team should have been more prepared at the meeting.[998] In contrast, Murawa thought the EFADC had all the information necessary to

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[992] John Murawa, 2005-2007 Cobalt/Pursuit/G5 presentation [GMNHTSA100097398; DOC ID GMCB-000000712911], attached to e-mail from John Murawa, GM, to Maureen Foley-Gardner, GM (Dec. 16, 2013) [GMNHTSA100097397; DOC ID GMCB-000000712910]; e-mail from Chrystal Holmes, GM, to Foley-Gardner, GM, *et al.* (Oct. 4, 2013) [GMNHTSA000223969; DOC ID 000005115840]; J&B Interview of Maureen Foley-Gardner, May 19, 2014.

[993] Wrona could not recall any other time when he served as Boler-Davis's proxy at an EFADC meeting prior to December 17, 2013. J&B Interview of Jeffrey Wrona, April 23, 2014.

[994] J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014; J&B Interview of John Calabrese, March 28, 2014; J&B Interview of John Murawa, April 23, 2014; J&B Interview of Jeffrey Wrona, April 23, 2014. In one of his interviews, Johnson stated that he participated by phone and WebEx, but he later claimed he did not participate at all. J&B Interview of Gerald Johnson, March 20, 2014. According to records of the teleconference line used to host this meeting, Gerald Johnson did not dial in to the December 17, 2013 EFADC meeting. J&B Interview of Gerald Johnson, May 15, 2014.

[995] J&B Interview of Maureen Foley-Gardner, March 26, 2014; J&B Interview of John Calabrese, March 28, 2014. Wachtel recalled in his interview that Stouffer presented at the December 17, 2013 EFADC, but that is contradicted by other attendees and by the fact that Stouffer retired earlier in December. J&B Interview of Douglas Wachtel, March 18, 2014. Wachtel himself retired shortly after the December 17, 2013 EFADC, and had no further involvement in the recall process. J&B Interview of Douglas Wachtel, March 18, 2014.

[996] J&B Interview of John Murawa, April 23, 2014.

[997] J&B Interview of John Calabrese, March 28, 2014.

[998] J&B Interview of John Calabrese, March 28, 2014.

issue a recall.[999] Because answering Calabrese's questions about the root cause required additional work, the EFADC meeting ended without a recall decision.

Although it is possible that fatalities were mentioned at the meeting, they were not a focus of the discussion and they may not have been mentioned at all. Backup slides to Murawa's presentation referenced five fatalities and other serious injuries,[1000] but Murawa may not have presented those slides at the meeting. (Notably, Stouffer recalled that when he retired two weeks before the EFADC meeting he was aware of only two fatalities). Murawa stated that he did present that slide,[1001] while Calabrese, Wrona, and Foley-Gardner did not recall fatalities being discussed at the meeting.[1002] However, Wrona was aware at the time that fatalities were involved.[1003] Other attendees said they did not learn about fatalities until sometime after the meeting.[1004] Boler-Davis explained that in EFADC meetings generally, backup slides to presentations are not distributed and are not presented unless a particular backup slide includes information responsive to a question posed by an EFADC member.[1005] When interviewed, Boler-Davis stated that death and injury data should always be included in EFADC presentation materials provided to members and should not be considered backup.[1006]

It is also unclear whether the Ion or HHR were discussed at the December 17 EFADC.[1007] These models are referenced in some of the slides that Murawa prepared, but whether those

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[999] J&B Interview of John Murawa, April 23, 2014.
[1000] Presentation from December 17, 2013 EFADC Meeting, at 28 [DOC ID 000001788022; GMHEC000002899].
[1001] J&B Interview of John Murawa, April 14, 2014.
[1002] J&B Interview of John Calabrese, March 28, 2014; J&B Interview of Jeffrey Wrona, April 24, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1003] J&B Interview of Jeffrey Wrona, April 24, 2014.
[1004] J&B Interview of Alicia Boler-Davis, May 16, 2014.
[1005] J&B Interview of Alicia Boler-Davis, May 16, 2014.
[1006] J&B Interview of Alicia Boler-Davis, May 16, 2014.
[1007] Neither the Sky nor the Solstice was discussed at the meeting.

slides were actually shown is not clear.[1008] One witness recalled that the Cobalt was the primary vehicle discussed, but that there were questions about the Ion and HHR related to potential differences in the positioning, orientation, and operation of the ignition switches in those cars.[1009] Even if the Ion and HHR were discussed, the EFADC was not provided with accurate data regarding airbag non-deployment incidents in those vehicles. Murawa's presentation was based on Stouffer's incomplete data pull from 2011, in which Stouffer had erroneously omitted MY 2003-2004 Ions.[1010] Consequently, no information about the fatal Ion crashes involving airbag non-deployments was provided in the EFADC's materials.

When asked why he did not support an immediate recall given the fact that fatalities had occurred, Calabrese explained that, at this point, he did not see a reason to rush to a recall because the backup slides to the EFADC materials showed a strong downward trend in the occurrence of airbag non-deployments and he wanted the investigation to be done correctly so that the solution arrived at would actually fix the problem.[1011]

3. Developments Following December 17, 2013 EFADC Meeting

Boler-Davis learned about the meeting's outcome in a subsequent call on unrelated matters.[1012] Boler-Davis stated that had she known at the time of the December 17, 2013 EFADC meeting that fatalities were involved, she would have treated the issue with more urgency.[1013]

[1008] Kent did not recall a discussion as to whether other Delta Platform vehicles, including the Ion and the HHR, might also present a safety issue. J&B Interview of Gay Kent, March 18, 2014. Benavides recalls that the Ion and HHR were discussed. J&B Interview of Carmen Benavides, March 25, 2014.
[1009] J&B Interview of Jeffrey Wrona, March 20, 2014.
[1010] J&B Interview of Brian Stouffer, April 4, 2014; J&B Interview of Carmen Benavides, March 25, 2014.
[1011] J&B Interview of John Calabrese, March 28, 2014.
[1012] J&B Interview of Alicia Boler-Davis, March 21, 2014.
[1013] J&B Interview of Alicia Boler-Davis, March 21, 2014.

In late December 2013, Calabrese informed Mary Barra that the EFADC was considering a possible recall, but that more analysis was needed before a recall decision could be made. The conversation was brief, and Calabrese did not provide Barra with details about the issue.[1014] Barra told him to "get the right data; then do the right thing."[1015] This is the first time Barra learned of the Cobalt Ignition Switch issue. Kemp says that he raised with Clark Dougherty his disappointment that GM had not yet decided to recall the Cobalt and told her that GM would possibly face civil penalties from NHTSA.[1016]

The first time that Clark Dougherty spoke to General Counsel Michael Millikin about the Cobalt ignition switch issue was in December 2013.[1017] She told interviewers that at that time she did not understand the seriousness of the issue because she did not have the key facts.[1018] As a result, she merely told Millikin that there was an issue with the Cobalt and that Engineering was looking into it.[1019] Around Christmas, she told Millikin she would give him a full update after the holidays.[1020]

4. January 31, 2014 EFADC Meeting

The EFADC met a second time on January 31, 2014, and considered information prepared in response to Calabrese's questions.[1021] Calabrese and Boler-Davis attended in person;

[1014] J&B Interview of Mary Barra, April 14, 2014.
[1015] J&B Interview of Mary Barra, April 14, 2014.
[1016] J&B Interview of William Kemp, April 17, 2014.
[1017] J&B Interview of Lucy Clark Dougherty, April 16, 2014.
[1018] J&B Interview of Lucy Clark Dougherty, April 16, 2014.
[1019] J&B Interview of Lucy Clark Dougherty, April 16, 2014.
[1020] J&B Interview of Lucy Clark Dougherty, April 16, 2014.
[1021] Presentation from January 31, 2014 EFADC Meeting [DOC ID 000013312002; GMNHTSA000324650]; J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Gerald Johnson, March 10, 2014; J&B Interview of Gary Altman, March 14, 2014; J&B Interview of Gay Kent, March 18, 2014; J&B Interview of William Kemp, May 9, 2014.

Johnson likely did not attend.[1022] Murawa presented once again, and other attendees included Altman, Benavides, Foley-Gardner, Federico, Kemp, Kent, Thompson, and possibly others.[1023] According to Boler-Davis, six weeks was not an unusually long time to wait for an FPE investigative team to complete additional research requested by the EFADC.[1024] However, Foley-Gardner stated that it was not typical for that much time to elapse between EFADC meetings.[1025] There had been an EFADC meeting earlier in January, but Murawa was not ready to present at that meeting.[1026]

At the January 31, 2014 EFADC meeting, Murawa presented (1) evidence that there was a statistically significant difference between the torque on pre-MY 2008 and post-MY 2008 Cobalts, consistent with the part change by Delphi; (2) evidence that during rough driving conditions, the mass of the keys could exert enough force to turn the Ignition Switch from Run to Accessory or Off; and (3) the results of his comparison of knee clearance and key cylinder position across GM's vehicles, showing that the Cobalt was not an outlier among GM's fleet, and that therefore knee clearance and key cylinder position were not the root cause.[1027] Calabrese concluded that the FPE team had sufficiently established a root cause to warrant a

[1022] In one of his interviews, Johnson stated that he participated by phone and WebEx, but he later claimed he did not participate at all. J&B Interview of Gerald Johnson, March 10, 2014; J&B Interview of Gerald Johnson, March 20, 2014. *See also* J&B Interview of Carmen Benavides, March 25, 2014 (stating that Johnson did participate); J&B Interview of Maureen Foley-Gardner, March 26, 2014 (noting that Johnson did not attend and that she reached out to Johnson later that day to obtain his vote in support of the recall).
[1023] J&B Interview of Gay Kent, March 18, 2014; J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1024] J&B Interview of Alicia Boler-Davis, March 21, 2014. She noted that Kemp sometimes called her to convey a sense of urgency regarding matters before the EFADC, but that he did not do so in connection with the Ignition Switch. *Id.* at 6.
[1025] J&B Interview of Maureen Foley-Gardner, May 19, 2014.
[1026] Foley-Gardner said that she had reached out to Murawa in early January to schedule a follow-up EFADC, but that he said he was not ready yet. J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1027] J&B Interview of John Calabrese, March 28, 2014; J&B Interview of John Murawa, April 23, 2014.

recall.[1028] Boler-Davis agreed, and Johnson gave his approval by phone later that day.[1029] The recall covered MY 2005 to MY 2007 Chevy Cobalt and Pontiac G5 vehicles.

It is not clear whether fatalities were discussed at this EFADC meeting.[1030] The EFADC debated whether to recall any model years of the Ion or HHR, and decided not to because the available data did not indicate that an airbag non-deployment problem existed in those vehicles.[1031] That information was erroneous; it was based on Stouffer's incomplete data collection efforts in 2011. Based on that faulty premise, the EFADC was also told that various factors could account for the lack of airbag non-deployment events in the Ion and HHR, including the vehicle suspension system and the angle of the steering column.[1032]

Boler-Davis informed Mary Barra of the recall on the same day the EFADC issued its decision.[1033] She later observed that had she known about fatalities, her communication to Barra would have been "totally different," and she would have included the Ion and HHR in the recall.[1034]

[1028] J&B Interview of Gay Kent, March 18, 2014; J&B Interview of John Calabrese, March 28, 2014.
[1029] J&B Interview of Alicia Boler-Davis, March 21, 2014; J&B Interview of Maureen Foley-Gardner, May 19, 2014.
[1030] By this time, Davidson had pulled death and injury data relating to the Cobalt and provided it to Murawa. J&B Interview of Dwayne Davidson, April 22, 2014. Benavides recalled that fatality data was presented at the meeting, while Foley-Gardner stated that it was not. J&B Interview of Carmen Benavides, March 25, 2014; J&B Interview of Maureen Foley-Gardner, May 19, 2014.
[1031] J&B Interview of John Calabrese, March 28, 2014. The Solstice and Sky were not addressed at the January 31, 2014 EFADC.
[1032] J&B Interview of Alicia Boler-Davis, March 21, 2014; J&B Interview of Alicia Boler-Davis, May 16, 2014; J&B Interview of John Calabrese, March 28, 2014. Kent stated that it was her understanding based on the January 31, 2014 meeting that "the Ion and HHR had a 'different electrical architecture,' such that the deficient ignition switch did not present a safety issue in these vehicles." J&B Interview of Gay Kent, March 18, 2014. She further noted that on January 31, 2014, she did not have accurate data on the crashes and claims associated with those models. *Id.*
[1033] J&B Interview of Alicia Boler-Davis, March 21, 2014.
[1034] J&B Interview of Alicia Boler-Davis, March 21, 2014.

On February 7, 2014, GM informed NHTSA of a safety recall for MY 2005-2007 Cobalts and 2007 Pontiac G5s, approximately 780,000 vehicles at an estimated cost of $32.3 million.[1035] The recall included all MY 2007 Cobalts because the company could not identify the "break point" during MY 2007 when the redesigned switch began to be installed in vehicles.[1036]

5. Developments Following January 31, 2014 EFADC Meeting/February 7, 2014 Recall Letter

Boler-Davis said that she first learned of fatalities only in early February during a leadership call including Barra, Millikin, and Reuss.[1037] In the same period, Kemp disclosed the Ignition Switch issue to Millikin for the first time. He could not explain why he did not raise it with Millikin earlier and in hindsight says he probably should have.[1038]

Kemp also met with Calabrese and Kent in early February, and they discussed the Cobalt investigation and the need to identify process failures at GM and what could have been done differently.[1039] Kent and Kemp mentioned that it was difficult to conduct an investigation when there is ongoing litigation regarding the same issue (*i.e.*, the [redacted] case).[1040]

On February 17, 2014, a journalist sent a series of questions to Alan Adler asking why the other model vehicles cited in the TSBs were not recalled as part of the MY 2005-2007 Cobalt and Pontiac G5 recall.[1041] On February 19, 2014, during the course of preparing a chronology for submission to NHTSA, Calabrese was asked about the Solstice and Sky and why they had

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[1035] GM Recall 573 Letter (Feb. 7, 2014) [DOC ID 000002796457; GMNHTSA000439255].
[1033] E-mail from Alicia Boler-Davis, GM, to Maureen Foley-Gardner, GM, *et al.* (Feb. 6, 2014) [DOC ID 000000080008; GMNHTSA000373278]; e-mail from Maureen Foley-Garner, GM, to Alicia Boler-Davis, GM, and Gerald Johnson, GM (Feb. 5, 2014) [DOC ID 000001738002/ GMNHTSA000224617]; J&B Interview of Alicia Boler-Davis, March 21, 2014.
[1037] J&B Interview of Alicia Boler-Davis, March 21, 2014.
[1038] J&B Interview of William Kemp, April 17, 2014.
[1039] J&B Interview of Gay Kent, March 18, 2014.
[1040] J&B Interview of Gay Kent, March 18, 2014.
[1041] E-mail from James Healey, USA Today, to Alan Adler, GM (Feb. 17, 2014) [DOC ID 000002819087; GMNHTSA000325271].

not been included in the initial recall. He was troubled and requested a data sweep for those and other Delta and Kappa Platform vehicles that shared the same Ignition Switch.[1042] The next day, the *New York Times* published an article criticizing GM for not recalling all of the Delta and Kappa platform vehicles included in the 2005/2006 TSBs.[1043]

Calabrese and others met on Friday, February 21, 2014, and over the weekend to review the data. They reviewed a full TREAD data pull for Delta and Kappa vehicles, as well as the results of a PRTS search.[1044] Although they found no incidents involving non-deployments in the Solstice or Sky, they identified 22 incidents in Ions, and six for the HHR.[1045] This is the first time that anyone involved in the investigation realized that Stouffer's 2011 data collection was incomplete and that Stouffer had missed key information about Ion and HHR airbag non-deployment incidents.[1046]

Calabrese called an emergency EFADC meeting for February 24, 2014, to consider expanding the recall.

6. February 24, 2014 EFADC Meeting

The EFADC met a third time on February 24, 2014, and expanded the recall to the Chevrolet HHR and Pontiac Solstice for MY 2006–2007, the Saturn Ion for MY 2003–2007, and

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[1042] J&B Interview of John Calabrese, March 28, 2014.
[1043] E-mail from Alan Adler, GM, to Lucy Clark Dougherty, GM, *et al.*, forwarding a *New York Times* article entitled *G.M. Recalls Some Cars, But Not All, With Ignition Switch Problem* (Feb. 20, 2014) [DOC ID 000005082754; GMNHTSA000290643].
[1044] In response to Calabrese's request for a data search, Brian Thompson "obtained special priviledges [sic] in the PRTS system to access 'legal' incidents such as FPRs. These are not available to the typical system user." Murawa explained in a February 23, 2014 e-mail that running an ordinary search without these privileges "would potentially not get all documents, but we would assume averything [sic] available was in our possession. This could have been what happened to Stouffer." E-mail from John Murawa, GM, to Mark Johnson, GM (Feb. 23, 2014) [DOC ID GMCB-000000713224; GMNHTSA100105396].
[1045] J&B Interview of John Calabrese, March 28, 2014.
[1046] J&B Interview of John Calabrese, March 28, 2014; J&B Interview of Brian Thompson, April 23, 2014; e-mail from John Calabrese, GM, to Mark Reuss, GM, *et al.* (Feb. 23, 2014) [DOC ID 000002693074; GMNHTSA000225149].

the Saturn Sky for MY 2007.[1047] Attendees included Calabrese, Boler-Davis, and Johnson (by phone), as well as Foley-Gardner.[1048] The EFADC included the Solstice and Sky in the recall because the EFADC did not have any information indicating that the Ignition Switch did not pose a similar risk in the Solstice and Sky.[1049] A presentation prepared for the meeting noted that adding all of these models, approximately 842,000 vehicles, to the recall would increase the cost of the recall by an estimated $34.3 million.[1050]

7. March 2014 Service Parts Recall

In the weeks that followed, GM personnel discovered that the original Ignition Switch may have been used to repair certain MY 2008-2011 Cobalt, G5, Ion, HHR, Solstice and Sky vehicles.[1051] As a result, on March 28, 2014, GM extended its January 31 and February 28 recalls to include replacing all Ignition Switches in the MY 2008–2011 population of models covered by those recalls, adding approximately 970,808 additional vehicles, at a projected cost of $39.7 million.[1052]

VII. GM'S LEADERSHIP, THE TONE AT THE TOP, AND GM CULTURE

This section addresses a number of issues that do not fit neatly into a chronology, but that broadly affected the entire company during the relevant period. Below we address the role of the current senior leadership at GM and the Board; the extent of their knowledge of the issues discussed above; the messages sent by senior leadership and the environment that they created

[1047] Presentation from EFADC Meeting (Feb. 24, 2014) [DOC ID 000001731002; GMHEC000002735].
[1048] J&B Interview of Maureen Foley-Gardner, March 26, 2014; J&B Interview of Gerald Johnson, March 20, 2014.
[1049] J&B Interview of Alicia Boler-Davis, March 21, 2014; J&B Interview of John Calabrese, March 28, 2014.
[1050] Presentation from EFADC Meeting (Feb. 24, 2014) [DOC ID 000001731002; GMHEC000002735].
[1051] J&B Interview of Cindy Hassein, April 1, 2014; J&B Interview of Nancy McLean, April 2, 2014; J&B Interview of Gary Smits, April 2, 2014; J&B Interview of Deb Nowak-Vanderhoef, April 3, 2014; J&B Interview of Carmen Benavides, April 4, 2014; J&B Interview of Greg Hall, April 3, 2014; J&B Interview of Matthew Schroeder, April 3, 2014.
[1052] GM 573 Letter regarding recall N14092 (March 28, 2014) [DOC ID 000050895592].

for employees ("tone at the top"); and GM's culture and the impact that it may have had on how GM's employees responded to the Cobalt's problems.

A. Current Senior Leadership

The current CEO Mary Barra, the current Executive Vice President, Global Product Development, Purchasing & Supply Chain Mark Reuss, and the current General Counsel Michael Millikin did not learn about the Ignition Switch's safety issues and the lengthy delay in addressing them until after the EFADC decided to issue the recall on January 31, 2014. A few weeks earlier, in December 2013, Ms. Barra and Mr. Millikin had been provided limited information that data was being reviewed that could lead to a recall.

As part of Jenner's engagement, we were asked to prioritize our review of the involvement, if any, of these three current senior leaders in the events that led to the belated Ignition Switch recall. We conducted a thorough investigation that included (a) review of a large number of documents collected from numerous custodians, including potentially relevant e-mails any of the three senior leaders sent or received at pertinent times; (b) interviews of GM employees in the three leaders' respective chains of reporting who might have discussed Cobalt-related issues with them; and (c) interviews of each of Mary Barra, Mark Reuss and Michael Millikin. All of the evidence we reviewed corroborated the conclusion that none of the three current leaders had knowledge of the problems with the Cobalt's Ignition Switch or non-deployment of airbags in the Cobalt until December 2013 at the earliest.

Before becoming GM's CEO on January 15, 2014, Mary Barra had served for the preceding nearly three years as Senior Vice President and then Executive Vice President for Global Product Development, Purchasing & Supply Chain. Before becoming responsible for

Global Product Development in February, 2011, Barra had served in other capacities that did not typically involve recalls or the recall decision-making process.[1053] As head of the Product Development organization, Barra had responsibility for the global vehicle engineering function, headed by John Calabrese, as well as the global quality function headed by Terry Woychowski and then Alicia Boler-Davis.[1054] The engineering and quality functions encompassed many of the personnel involved in the FPE process as well as the members of the EFADC. Barra became well acquainted with the recall process when the issues involving the Chevrolet Volt's lithium-ion battery arose in 2011. Based on that experience and others she believed that recall issues were addressed with appropriate urgency and that the recall decision-making process worked well.[1055]

Barra first began to learn of some aspect of the Cobalt's Ignition Switch issue in December 2013, when she was told by Calabrese that the company was working on an analysis that might lead to a decision to recall the Cobalt. She did not learn more about the matter until shortly after the EFADC made the recall decision on January 31, 2014.[1056]

Our review of contemporaneous e-mails and other documents corroborated these recollections. In that connection, we investigated certain e-mails that raised issues with the Cobalt or with moving stalls with Barra before year-end 2013, but those e-mails all concerned other issues, not the Ignition Switch. First, in March, 2010, Barra was among many recipients of an e-mail invitation to an FPE team meeting attaching information about a power steering

[1053] J&B Interview of Mary Barra, April 14, 2014.
[1054] In mid-2013 then-CEO Daniel Akerson shifted the reporting line for Boler-Davis as Senior Vice President of Global Quality and Customer Experience directly to the CEO.
[1055] J&B Interview of Mary Barra, April 14, 2014.
[1056] J&B Interview of Mary Barra, April 14, 2014; J&B Interview of Alicia Boler-Davis, March 25, 2014.

problem in the Cobalt.[1057] By that date Barra had become Vice President of Global Human Resources and had no role in such a meeting or its subject matter; she does not recall the e-mail or its attachment, which concerned a separate power steering issue, not the Ignition Switch.[1058]

Second, on October 3, 2011, after Barra had become Senior Vice President for Global Product Development, the then-Vice President for Global Quality sent her a press report about a power steering problem in the Ion and questioning whether it should have been included in GM's recall of the Cobalt a year earlier for a similar issue.[1059] Again, nothing in this report mentioned any problem with the Ignition Switch, moving stalls, or airbag non-deployment in either the Ion or the Cobalt.

Third, on April 22, 2012, Barra was one of two recipients of an e-mail from a former GM employee reporting a moving stall in his Buick that he described as an "isolated/freak" incident attributable to the key design and suggesting that the company investigate and perhaps issue a service bulletin. Barra forwarded the e-mail to the VP for Global Quality, Terry Woychowski, and asked him to investigate the matter.[1060] Barra's e-mail was then forwarded within the company and an e-mail discussion ensued ultimately involving eight people, but no longer including Barra. In one such subsequent entry in the e-mail string, Wachtel mentioned that early Cobalts had a similar issue but a design change to the key had addressed the issue.[1061] Barra was not copied on any of the subsequent e-mails and did not learn of the Cobalt issue at that time.[1062]

[1057] J&B Interview of Mary Barra, April 14, 2014.
[1058] J&B Interview of Mary Barra, April 14, 2014.
[1059] J&B Interview of Mary Barra, April 14, 2014.
[1060] J&B Interview of Mary Barra, April 14, 2014.
[1061] J&B Interview of Mary Barra, April 14, 2014. Barra stated that none of the subsequent e-mails in the chain, following her April 22, 2012 e-mail, had ever come to her attention. *Id.* Barra did not recall anyone communicating to her a resolution of the concern she forwarded to Woychowski on April 22, 2012. *Id.* She also stated that neither Carmen Benavides nor Maureen Foley-Gardner – both of whom are copied on Doug Wachtel's April 23, 2012 e-

Finally, on November 19, 2013, Alicia Boler-Davis responded to an e-mail from Maureen Foley-Gardner that had alerted Boler-Davis to a likely Cobalt field action involving its Ignition Switch and airbag non-deployment, by saying that Foley-Gardner should send her a quick summary that she would then share with Barra.[1063] Barra was not copied on that e-mail, and Boler-Davis reports that she did not share any information with Barra about the Cobalt issue until January 31, 2014. None of these e-mails is evidence that Barra was informed about the Cobalt Ignition Switch issues before Calabrese alerted her in December to the analysis that was being undertaken on that subject.

Mark Reuss succeeded Barra as EVP for Global Product Development, Purchasing & Supply Chain, when she became CEO. Before that he had been President of GMNA from 2009 through 2013, and before heading GMNA he had served in various engineering positions within GMNA except for brief periods when he led GM's business in Australia and New Zealand in 2008-09 and a short stint in 2009 as Global Vice President of Engineering.[1064] He joined GM in 1986. He did not have engineering responsibility for the Cobalt in any of his positions.[1065]

As President of GMNA, Reuss was typically informed of recalls after the EFADC had made its decisions. He learned of the Cobalt recall after the EFADC made its decision on

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mail – brought the Cobalt complaints referenced in Wachtel's email to her attention, or ever spoke to her about issues with the Cobalt during the time period of this email. *Id.* We confirmed in interviews or through counsel that neither Wachtel's April 23, 2012 e-mail describing 2005 Cobalt complaints nor the historical complaints themselves were brought to Barra's attention. Wachtel confirmed that he did not speak to Barra about his email or the topic of the 2005 Cobalt complaints, of which – per his email – he heard none after 2005. Terrence Connolly also confirmed that he never discussed the email with Barra. J&B Interview of Terrence Connolly, April 28, 2014. Carmen Benavides did not recall the e-mail and did not recall having any discussions with Barra about it. Maureen Foley-Gardner said she would not have paid close attention to the e-mail because she was just coming into her role, and she did not recall any follow-up to the e-mail. J&B Interview of Maureen Foley-Gardner, May 19, 2014. Jeffrey Konchan did not recall the e-mail. J&B Interview of Jeff Konchan, May 7, 2014.

[1062] J&B Interview of Mary Barra, April 14, 2014; J&B Interview of Alicia Boler-Davis, March 25, 2014.

[1063] J&B Interview of Mary Barra, April 14, 2014.

[1064] J&B Interview of Mark Reuss, April 15, 2014.

[1065] J&B Interview of Mark Reuss, April 15, 2014.

January 31, 2014.[1066] None of the documents we reviewed or interviews we conducted identified any evidence that is inconsistent with Mr. Reuss' recollection.

Michael Millikin became General Counsel in July 2009, after more than three decades in various positions in GM's Legal Department. Between 2000 and 2009 he had responsibility in various positions for coordinating GM's global legal processes and did not have any role in recalls, product liability matters or safety-related issues in the United States. Until the recall decision was made in 2014, he had not been informed of the lengthy review of the Cobalt's Ignition Switch issue in which GM lawyer Bill Kemp had participated for years. He also had been unaware of the litigation involving fatal accidents by Cobalt drivers, such as the [redacted] case.[1067]

Millikin's direct and indirect subordinates, who at various times before 2014 became aware of the problems with the Cobalt, confirmed in interviews that they did not bring them to Millikin's attention.[1068] The [redacted] case had been settled for $5 million, the highest amount for which his subordinates had authority to resolve a litigation without obtaining his approval. In December, 2013, the General Counsel of GMNA, Lucy Clark Dougherty, mentioned to Millikin that a possible recall was under consideration.[1069] Kemp and Clark Dougherty reported the recall decision to Millikin and the facts underlying it for the first time on February 6, 2014.[1070] Kemp acknowledged that he could not explain why he had not raised the Cobalt safety issues with

[1066] J&B Interview of Mark Reuss, April 15, 2014.
[1067] J&B Interview of Michael Millikin, April 4, 2014; J&B Interview of Lawrence Buonomo, April 16, 2014.
[1068] J&B Interview of William Kemp, April 17, 2014; J&B Interview of Lawrence Buonomo, April 16, 2014; J&B Interview of Lucy Clark Dougherty, April 16, 2014; J&B Interview of Jaclyn Palmer, April 24, 2014; J&B Interview of Ronald Porter, April 30, 2014.
[1069] J&B Interview of Michael Millikin, April 4, 2014; J&B Interview of Lucy Clark Dougherty, April 16, 2014.
[1070] J&B Interview of Michael Millikin, April 4, 2014; J&B Interview of Lucy Clark Dougherty, April 16, 2014.

Millikin before then.[1071] Our investigation did not identify any documents that were inconsistent with these recollections of Millikin or the lawyers who reported to him.

B. The Board

To investigate the Board's role in the oversight of safety issues and the information that the Board received, we interviewed several current and former outside directors and chief executive officers, as well as many of the GM executives who made pertinent reports to the Board during the 11-year period from 2003 to early 2014. We also reviewed written materials provided to the Board during that period.

The Board's oversight of vehicle safety had multiple facets; no single committee of the Board was responsible for all vehicle safety-related issues, and the Board and its committees received a wide variety of reports that related at least in part to vehicle safety. Those reports included information in an aggregate form and did not discuss individual safety issues or individual recalls except in rare circumstances. Typically, neither the Board nor any of its committees reviewed the Company's response to specific product defects, which were the subject of hundreds of product investigations globally each year, culminating in an average of approximately 30 recalls each year.[1072]

As discussed in more detail below, the Board and various committees reviewed information from management on a variety of different safety-related issues:

a) evaluations of the quality and safety of GM's vehicles by third parties such as *Consumer Reports* and *JD Power* (the full Board);

[1071] J&B Interview of William Kemp, April 17, 2014.
[1072] *See* Recall Data from NHTSA, ODI website, *available at* http://www-odi.nhtsa.dot.gov/downloads/flatfiles.cfm.

b) the Company's interactions with NHTSA (the full Board);

c) recalls and warranty costs (the full Board);

d) the annual internal audit plan, which on two occasions during the relevant period included audits that encompassed the recall decision-making process (the Audit Committee);

e) risk management matters generally, which potentially could have raised issues relating to vehicle safety (the Audit Committee); and

f) the Company's public position on potential legislation and other public policy matters, which also could have touched on vehicle safety (Public Policy Committee).

As described elsewhere in this report, the slow pace of the Cobalt investigation and the emerging pattern of accidents potentially related to the safety defect were not escalated to the Company's most senior executives who from time-to-time met with the Board. The Board of Directors was not informed of any problem posed by the Cobalt ignition switch until February 2014.

1. Board Oversight Process

a. The Full Board

During the period in question, the Board as a whole received three different types of periodic reports that related to safety issues.

i. Periodic Reports

Quality Reports. One means by which the Board exercised oversight of safety-related issues was its review of information from management concerning vehicle "quality" issues. GM had a Vice President of Quality who oversaw a group that interacted with the engineers on

quality issues; worked to reduce GM's warranty costs; tracked how GM's vehicles were evaluated by publications like *Consumer Reports* and *JD Power*; identified areas for improvement, including potential solutions or best practices used by other OEMs; and participated in evaluations of potential defects and recall decisions.[1073] The Company considered safety issues to be partly the responsibility of this quality function, along with the engineering and manufacturing functions, because proper design and protection against production defects should ensure safe vehicle operation, and minimize safety issues resulting from product failures.[1074] The Board recognized that "quality" encompassed safety.[1075]

During the period 2003-2014, the Board regularly received reports from management on the quality of GM's vehicles.[1076] In the earlier part of this period, the reports focused on specific regions,[1077] and in the later years, after the Company had globalized its quality function, the reports were typically more detailed and often included a focus on GMNA.[1078] These reports were often accompanied by an oral presentation by the Vice President of Quality or another

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[1073] J&B Interview of Kevin Williams, May 7, 2014; J&B Interview of James Hresko, May 7, 2014.
[1074] *See, e.g.*, J&B Interview of Mary Barra, April 14, 2014; *see also* J&B Interview of Phil Laskawy, May 20, 2014; J&B Interview of Daniel Akerson, May 15, 2014; J&B Interview of Kevin Williams, May 7, 2014.
[1075] *See, e.g.*, J&B Interview of Phil Laskawy, May 20, 2014; J&B Interview of Erroll Davis, May 20, 2014; J&B Interview of Daniel Akerson, May 15, 2014.
[1076] *See, e.g.*, Quality Update Presentation to General Motors Board of Directors (Oct. 10, 2013) [DOC ID 000240787014]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Oct. 9-10, 2013), at 10 [DOC ID 000240787013]; 2011 Quality Performance Summary Presentation from Boardbook for the General Motors Board of Directors Meeting (Jan. 10-11, 2012) [DOC ID 000240752013]; Consumer Reports Presentation from Boardbook for the General Motors Board of Directors Meeting (Feb. 2-3, 2009) [DOC ID 000240757047]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (Feb. 2-3, 2009), at 3 [DOC ID 000240787010]; GM North America Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (June 1-2, 2004) [DOC ID 000240757010]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (June 1-2, 2004), at 2 [DOC ID 000240787006].
[1077] *See, e.g.*, GM Asia Pacific Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (Feb. 2-3, 2004) [DOC ID 000240757007]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (Feb. 2-3, 2004), at 2 [DOC ID 000240787005].
[1078] *See, e.g.*, 2011 Quality Performance Summary Presentation from Boardbook for the General Motors Board of Directors Meeting (Jan. 10-11, 2012) [DOC ID 000240752013]; Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (Dec. 6-7, 2010) [DOC ID 000240757074]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Dec. 6-7, 2010), at 3-4 [DOC ID 000240787012].

knowledgeable executive.[1079] Similar presentations were made at the regular meetings held among the CEO and his/her direct reports.[1080]

These GMNA quality reports typically included information on three broad topics, all of which related in part to safety. First, these reports focused on GM's rankings in buyers' guides like *Consumer Reports* and *JD Power*.[1081] Because these publications are highly respected by consumers and often play a part in buying decisions, GM personnel believed it was important to compete with other manufacturers in this forum, and the Board was particularly focused on these issues.[1082] *Consumer Reports* and *JD Power* both include important safety-related information. For example, *Consumer Reports* includes evaluations of each car's "accident avoidance" (based on testing of braking and steering systems) and crash test performance (based on NHTSA and Insurance Institute of Highway Safety testing).[1083] *JD Power* reported on initial quality (how

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[1079] *See, e.g*, Quality Update Presentation to General Motors Board of Directors (Oct. 10, 2013) [DOC ID 000240787014]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Oct. 9-10, 2013), at 10 [DOC ID 000240787013]; Global Quality Process from Boardbook for the General Motors Board of Directors Meeting (April 16-17, 2012) [DOC ID 000240752012]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (April 16-17, 2012), at 2-3 [DOC ID 000238341259]; Quality Update from Boardbook for the General Motors Board of Directors Meeting (Aug. 20-21, 2012) [DOC ID 000240752011]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Aug. 20-21, 2012), at 5 [DOC ID 000238341262]; President's Report Quality Overview Presentation from Boardbook for the General Motors Board of Directors Meeting (Oct. 6, 2009) [DOC ID 000240757054]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Oct. 5-6, 2009), at 2 [DOC ID 000240787011].

[1080] *See, e.g.,* Global Quality Update to GM Executive Operations Committee (Dec. 18, 2012) [DOC ID 000240756004]; J&B Interview of Daniel Akerson, May 15, 2014.

[1081] *See, e.g.,* 2011 Quality Performance Summary Presentation from Boardbook for the General Motors Board of Directors Meeting (Jan. 10-11, 2012) [DOC ID 000240752013]; Consumer Reports Presentation from Boardbook for the General Motors Board of Directors Meeting (Feb. 2-3, 2009) [DOC ID 000240757047]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (Feb. 2-3, 2009), at 3 [DOC ID 000240787010]; GM North America Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (June 1-2, 2004) [DOC ID 000240757010]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (June 1-2, 2004), at 2 [DOC ID 000240787006].

[1082] *See, e.g.,* J&B Interview of George Fisher, May 21, 2014; J&B Interview of Daniel Akerson, May 15, 2014; J&B Interview of Thomas Stephens, May 7, 2014; J&B Interview of Erroll Davis, May 20, 2014; J&B Interview of James Hresko, May 7, 2014.

[1083] *See* Consumer Reports, "Compare Safety Ratings" (last updated Feb. 2014), *available at* http://www.consumerreports.org/cro/2012/12/compare-safety-ratings/index htm; *see also* General Motors,

many defects were reported in the first three months after purchase)[1084] as well as dependability over time.[1085]

The reports to the Board concerning the rankings of GM's cars in *Consumer Reports* and *JD Power* made it clear that GM had ample room for improvement in those evaluations, but they did not identify that GM's vehicles were unsafe or less safe than those manufactured by GM's competitors.[1086]

Second, the quality reports included information about recalls. That information typically did not reference specific vehicles or individual recall decisions, but rather represented aggregate data about GM's recalls over time. More specifically, management typically provided the Board with data concerning the costs it incurred annually for "field actions," which included recalls, as well as the actual number of recalls GM issued each year and the number of vehicles

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Consumer Reports Presentation from the GM Board of Directors Director's February 2009 Session Boardbook (Feb. 2-3, 2009), at 3-5 [DOC ID 000240757047].

[1084] *See, e.g.*, J.D. Power, "2013 Initial Quality Study – Car Ratings & Rankings," *available at* http://autos.jdpower.com/ratings/quality htm; *see also* General Motors Quality Review Presentation from the GM Board of Director's June 2004 Session Boardbook (June 1-2, 2004), at 3-5 [DOC ID 000240757010].

[1085] *See, e.g.*, J.D. Power, "2013 U.S. Vehicle Dependability Study" (Feb. 13, 2013), *available at* http://autos.jdpower.com/content/press-release/bTiXte5/2013-u-s-vehicle-dependability-study.htm [DOC ID 000240787039]; *see also* General Motors Quality Update Presentation to the General Motors Board of Directors (Oct. 10, 2013), at 12 [DOC ID 000240787014].

[1086] *See, e.g.*, General Motors, Quality Update Presentation to General Motors Board of Directors (Oct. 10, 2013) [DOC ID 000240787014]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Oct. 9-10, 2013), at 10 [DOC ID 000240787013]; 2011 Quality Performance Summary Presentation from Boardbook for the General Motors Board of Directors Meeting (Jan. 10-11, 2012) [DOC ID 000240752013]; Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (Dec. 6-7, 2010) [DOC ID 000240757074]; J.D. Power Survey Review/Quality Update Presentation from Boardbook for the General Motors Board of Directors Meeting (June 2-3, 2008) [DOC ID 000240757043]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (June 2-3, 2008), at 3 [DOC ID 000240787009]; Consumer Reports Review from Boardbook for the General Motors Board of Directors Meeting (Dec. 3-4, 2007) [DOC ID 000240757038]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (Dec. 3-4, 2007) [DOC ID 000240787008]; J.D. Power Survey Review Presentation for the General Motors Board of Directors Meeting (June 4-5, 2007) [DOC ID 000240757035]; Minutes of the Regular Meeting of the Board of Directors of General Motors Corporation (June 4-5, 2007), at 2 [DOC ID 000240787007]; GM North America Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (June 1-2, 2004) [DOC ID 000240757010].

encompassed by those recalls.[1087] Those numbers varied from year-to-year, sometimes significantly. For example, in December, 2010, the Board received a presentation from the Vice President for Quality showing that GM's field actions had increased that year; management committed to "turn this around while protecting the customer."[1088] The Board also reviewed the same annual recall-related statistics for GM's principal competitors. Based on the recall-related information they received over the years, the Board members and executives we interviewed believed that GM's recall process was functioning appropriately.[1089]

Third, the quality reports focused on GM's warranty cost experience, which was also an indicator of whether its vehicles were safe to drive.[1090] Warranty claims originate with customers experiencing real-world issues with their vehicles. And while warranty claims are by no means limited to problems with safety equipment or that otherwise reflect a vehicle's safe operation, a lower warranty cost generally indicates that a vehicle is dependable and reliable, which tends to mean the vehicle is safer as well.[1091] As described earlier in this report, GM's engineers also viewed warranty claims as one source of information about possible safety issues.

Litigation Reports. In addition to the quality reports, the full Board received a second regular report concerning safety issues: The Board received, in connection with essentially every

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[1087] *See, e.g.,* 2011 Quality Performance Summary Presentation from Boardbook for the General Motors Board of Directors Meeting (Jan. 10-11, 2012) [DOC ID 000240752013]; Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (Dec. 6-7, 2010) [DOC ID 000240757074]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Dec. 6-7, 2010), at 3-4 [DOC ID 000240787012].
[1088] Quality Review Presentation from Boardbook for the General Motors Board of Directors Meeting (Dec. 6-7, 2010), at 15. [DOC ID 000240757074].
[1089] *See, e.g.,* J&B Interview of George Fisher, May 21, 2014; J&B Interview of Erroll Davis, May 20, 2014; J&B Interview of Phil Laskawy, May 20, 2014; J&B Interview of George ("Rick") Wagoner, May 12, 2014; J&B Interview of Mary Barra, April 14, 2014.
[1090] *See, e.g.,* President's Report Quality Overview Presentation from Boardbook for the General Motors Board of Directors Meeting (Oct. 6, 2009) [DOC ID 000240757054]; Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Oct. 5-6. 2009), at 2 [DOC ID 000240787011].
[1091] J&B Interview of George ("Rick") Wagoner, May 12, 2014.

meeting, a written legal update on pending or recent legal matters, encompassing not only product liability litigation but also other types of disputes including antitrust, environmental, and employment matters.[1092] Prior to GM's bankruptcy, the Board also received an Annual Report on Product Liability Litigation that described both accident cases and asbestos matters.[1093] In general, these reports summarized the number, severity, complexity and subject matter of product liability claims that GM had experienced in the most recent period. Both types of reports highlighted claims that were noteworthy for some reason, for example, claims involving unusually large verdicts.[1094] These reports included safety-related information to the extent that safety issues were alleged and at issue in certain litigated matters, such as rollover risks or seat belt system failures.[1095] No claim, settlement, or other aspect of any litigation involving the

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[1092] *See, e.g.,* Legal Review and Update, from Boardbook for the General Motors Board of Directors Meeting (Feb. 3-4, 2003) [DOC ID 000240757002]; Legal Review and Update, from Boardbook for the General Motors Board of Directors Meeting (Feb. 6, 2006) [DOC ID 000240757022]; Legal Report, from Boardbook for the General Motors Board of Directors Meeting (Sept. 8-9, 2009). [DOC ID 000240757053]; Legal Report to GM Board of Directors, from Boardbook for the General Motors Board of Directors Meeting (Oct. 10-12, 2012) [DOC ID 000240787040].

[1093] *See, e.g.,* Legal Review and Update, from Boardbook for the General Motors Board of Directors Meeting (Feb. 3-4, 2003) [DOC ID 000240757002]; Legal Review and Update, from Boardbook for the General Motors Board of Directors Meeting (Feb. 2-3, 2004) [DOC ID 000240787047]; Legal Review and Update, from Boardbook for the General Motors Board of Directors Meeting (Jan. 31–Feb 1, 2005) [DOC ID 000240787048]; Legal Review and Update, from Boardbook for the General Motors Board of Directors Meeting (Feb. 6, 2006) [DOC ID 000240757022].

[1094] *See, e.g.*, Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Feb. 2-3, 2004) [DOC ID 000240787047]; \Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Jan. 31–Feb. 1, 2005) [DOC ID 000240787048]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (March 1, 2005) [DOC ID 000240787048]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (May 9, 2005) [DOC ID 000240787045]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (May 2, 2006) [DOC ID 000240787046].

[1095] *See, e.g.,* Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Feb. 3-4, 2003), at 13 [DOC ID 000240757002]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Dec. 2, 2003) [DOC ID 000240787043]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Feb. 2-3, 2004) [DOC ID 000240787047]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Jan. 31–Feb 1, 2005) [DOC ID 000240787048]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Feb. 6, 2006), at 8 [DOC ID 000240757022]; Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (May 2, 2006) [DOC ID 000240787046].

Ignition Switch, airbags, or moving stalls in the Cobalt vehicles was specifically referenced in any of the litigation reports provided to the Board.

Regulatory Reports. The third type of safety-related report received by the full Board concerned the regulatory environment, including matters such as responses to the passage of the TREAD Act, GM's NHTSA obligations, and various safety-related initiatives that had been proposed. As requirements under the TREAD Act and GM's obligations to NHTSA evolved, at times the Board received additional reports about these matters,[1096] including a 2004 report that the Company had agreed to pay a $1 million fine to resolve a disagreement with NHTSA.[1097] This fine was reported to the Board as follows:

> Over the past two years, GM has disagreed with the federal traffic safety agency (NHTSA) over whether certain windshield wiper problems in 2002 and 2003 SUVs and certain engine stalling issues involving recent model Saabs posed an unreasonable risk to safety and should be recalled for that reason. To apply pressure on GM, the agency issued a civil penalty demand letter to GM alleging that GM had violated the Traffic Safety Act by not providing timely notification of and remedy for these alleged defects. This led to high-level discussions which toned down the rhetoric and resolved a number of other open issues on a basis satisfactory to GM. However, as part of this resolution, GM agreed to pay a one million dollar penalty relating only to the windshield wiper issues. The agency agreed to downplay the penalty and forego any press release. Through a continuation of the high-level dialogue between agency officials and GM's top engineers, GM will endeavor to minimize and avoid such situations in the future.[1098]

[1096] Overview of General Motors North America Legal Issues and Activity, from Boardbook for the General Motors Board of Directors Meeting (Feb. 29, 2004), at 9 [DOC ID 000240787055]; U.S. Legislative and Regulatory Issues from Boardbook for the General Motors Board of Directors Meeting (April 5-6, 2009), at 8 [DOC ID 000240787064]; Legislative and Regulatory Issues Update and Regulatory Issues Primer from Boardbook for the General Motors Board of Directors Meeting (Nov. 2-3, 2009), at 6-7 [DOC ID 000240787049].
[1097] Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Aug. 3, 2004), at 10 [DOC ID 000240787042].
[1098] Legal Review and Update from Boardbook for the General Motors Board of Directors Meeting (Aug. 3, 2004), at 10 [DOC ID 000240787042].

In contrast, in 2013, the Board, including the then-CEO, was not informed that NHTSA had recently criticized GM's responsiveness regarding several specified recalls, service bulletins, and investigations.[1099]

ii. Specific Reports

In unusual circumstances, management also reported about specific safety-related events. In one such case, in June, 2011 a Chevrolet Volt, GM's first production vehicle with an electric propulsion system, suffered what was described as a "thermal event" three weeks after being subjected to severe NHTSA crash testing.[1100] Management reported to the Board on the status of GM's response to the Volt event,[1101] and kept the Board apprised thereafter as discussions with NHTSA over the appropriate resolution proceeded.

The Board also received a report on the Toyota unintended acceleration problems in 2010.[1102] GM's management had conducted a "deep dive" to determine whether any GM vehicles (other than the Pontiac Vibe, which was developed and produced with Toyota) were susceptible to a similar risk of unintended acceleration, and determined that they were not.[1103] Management's report to the Board in March 2010 indicated that Toyota's problem was not shared by GM or other major manufacturers.[1104]

[1099] E-mail from Michael J. Robinson, GM, to Gay Kent, GM (July 24, 2013) [DOC ID 000240755008].
[1100] *See* NHTSA "Chevrolet Volt Battery Incident Overview Report" (Jan. 2012), *available at* www nhtsa.gov/staticfiles/nvs/pdf/Final_Reports.pdf [DOC ID 000240787024].
[1101] *See* Minutes of the Regular Meeting of the Board of Directors of General Motors Company (Dec. 13, 2011). [DOC ID 000240752007]; J&B Interview of Phil Laskawy, May 20, 1014; J&B Interview of Daniel Akerson, May 15, 2014.
[1102] Legislative and Regulatory Issues Update from Boardbook for the General Motors Board of Directors Meeting (March 1-2, 2010), at 1 [DOC ID 000240757064]; *see also* J&B Interview of Phil Laskawy, May 20, 2014.
[1103] E-mail from Michael P. Millikin, GM, to Deborah Nowak-Vanderhoef, GM (Feb. 17, 2010) [DOC ID 000006293898].
[1104] *See* Legislative and Regulatory Issues Update from Boardbook for the General Motors Board of Directors Meeting (March 1-2, 2010), at 1 [DOC ID 000240757064].

b. Board Committees

In addition to the reports to the full Board described above, two Board committees – the Public Policy Committee and the Audit Committee – had specific responsibilities that related to some aspects of vehicle safety.

i. Public Policy Committee

The Public Policy Committee, as its name suggests, focused on the positions GM adopted on public policy issues, and on GM's activities with respect to pending legislation and regulation that affected GM. The scope of the Public Policy Committee's responsibility in the period from 2003 through mid-2013 encompassed the "social and political" issues that might affect the Company's business and reputation; the list of such issues included "automotive safety" but also encompassed other issues such as corporate social responsibility, diversity, environmental matters, education, employee health and safety, trade, and philanthropic activities.[1105] In mid-2013, the Public Policy Committee revised its charter to make clearer that its focus was on issues, including vehicle safety, only to the extent they affected the Company's reputation in the legislative and regulatory arenas.[1106] In clarifying its charter, the Public Policy Committee noted

[1105] General Motors Company Public Policy Committee Charter (Nov. 15, 2011) [DOC ID M_00206123]; General Motors Company Public Policy Committee Charter (Oct. 6, 2009) [DOC ID 000240757055]; *see also* General Motors Corporation Proxy Statement (April 17, 2003), at 7 [DOC ID 000240787056]; General Motors Corporation Proxy Statement (April 29, 2005), at 7 [DOC ID 000240787057]; General Motors Corporation Proxy Statement (April 25, 2008), at 12 [DOC ID 000240787058]; General Motors Company Proxy Statement (April 26, 2012), at 22 [DOC ID 000240787059].

[1106] *See* Proposed Public Policy Committee Responsibilities, from Materials for the General Motors Company Public Policy Committee Meeting (June 5, 2013), at 1 [DOC ID 000240755006]; *see also* General Motors Company Public Policy Committee Charter (June 6, 2013) [DOC ID 000240755007]; Other GM Board Committees – Risk Management Responsibilities, from Materials for the General Motors Company Finance and Risk Policy Committee (Oct. 4, 2010), at 1-4 [DOC ID 000000018172].

that with respect to "Product Safety," the oversight responsibility already resided with the "Full Board."[1107]

Consistent with these iterations of its charter, the Public Policy Committee did not have oversight responsibility for the recall decision-making process, nor did it undertake to review management's processes for ensuring compliance with NHTSA's regulatory requirements concerning recalls.

ii. Audit Committee

The Audit Committee, in addition to its core function overseeing GM's financial reporting process and systems of disclosure and internal controls, was also responsible for oversight of GM's external and internal auditors, and its risk management process.[1108] These aspects of the Audit Committee's work provided two oversight mechanisms for the Audit Committee to receive information about processes that related to vehicle safety, among many other subjects.

First, each year the Audit Committee reviewed the annual internal audit plan that had been prepared by the internal audit function in conjunction with management.[1109] Prior to that review, the chairman of the Audit Committee typically personally reviewed the proposed plan in

[1107] J&B Interview of Erroll Davis, May 20, 2014; Proposed Public Policy Committee Risk Assignments, from Materials for the General Motors Company Public Policy Committee Meeting (June 5, 2013), at 2 [DOC ID 000240755006]; e-mail from Michael Millikin, GM, to Daniel Akerson, GM (Feb. 4, 2013) (noting that the Quality risk received regular attention by the Board of Directors) [DOC ID 000240752014]; Minutes of the Public Policy Committee (June 12, 2012), at 2 [14051500011905]; Memorandum from Bob Ferguson to Members of the Public Policy Committee and Daniel Akerson (Oct. 11, 2011) [DOC ID 000240757081]; Finance and Risk Committee Meeting Presentation (March 14, 2011), at 4-5 [DOC ID 000000018343].
[1108] Audit Committee Charter (Nov. 15, 2011) [DOC ID 000240752021].
[1109] *See, e.g.*, 2010 Global Audit Plan, from Boardbook for the General Motors Board of Directors Meeting (Nov. 30–Dec. 1, 2009) [DOC ID 000240787061]; 2009 Global Audit Plan, from Materials for the General Motors Audit Committee Meeting (Dec. 1, 2008) [DOC ID 000240787060]; Minutes of Meeting of the Audit Committee (Dec. 3, 2007), at 4 [DOC ID 000240787053].

detail at a special half-day meeting with senior internal audit staff.[1110] The internal audit plan covered a broad array of topics affecting the global enterprise; the internal auditors have conducted on average more than 100 internal audits each year over the past decade.[1111]

During that period, two internal audits included a review of GM's process concerning field actions and recalls or Field Performance Evaluations. An audit of the Global Quality organization in 2013 identified modest opportunities for process enhancement, but did not find any problem with the process by which safety issues were identified or addressed (and did not refer to any specific vehicle issue).[1112] In 2006, internal auditors conducted a similar audit of GM-Europe's quality function, which it found satisfactory.[1113] Thus, the internal audit function reviewed GM's process for evaluating possible defects or for making recall decisions, and that review was subject to the Audit Committee's oversight.

Second, the Audit Committee oversaw GM's risk management process, including reviewing the "risk factors" described in GM's public disclosures,[1114] and meeting regularly with the Chief Risk Officer in the years his work was overseen by the Committee.[1115] In recent years,

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[1110] *See, e.g.*, General Auditor's Report (March 3, 2008) [DOC ID 000240787027]; J&B Interview of Phil Laskawy, May 20, 2014.
[1111] *See, e.g.*, Audit Status Report – All Closed Audits 2003-2014 [DOC ID 000240794002]; Minutes of the Audit Committee (Dec. 1, 2008), at 2 [DOC ID 000240787052].
[1112] Audit Report on Global Quality (Nov. 25, 2013) [DOC ID 000240755011].
[1113] Report on Audit of General Motors Europe Quality (Planning and Operations) (April 12, 2006) [DOC ID 000240757023].
[1114] *See, e.g.*, Enterprise Risk Management, from Boardbook for the General Motors Board of Directors Meeting (Nov. 30–Dec. 1, 2009), at 3-4 [DOC ID 000240787026]; Minutes of Meeting No. 443 of the Audit Committee (Oct. 1, 2007), at 4 [DOC ID 000240787051].
[1115] Agenda of the Regular Meeting of the Board of Directors of General Motors Corporation (Nov. 18, 2013), at 2 [DOC ID 000240787017]; Agenda of the Regular Meeting of the Board of Directors of General Motors Corporation (March 18, 2013), at 2 [DOC ID 000240787016]; Agenda of the Regular Meeting of the Board of Directors of General Motors Corporation (Aug. 20-21, 2012), at 2 [DOC ID 000240787015]; J&B Interview of Brian Thelen, May 2, 2014. For a two-year period between mid-2010 and mid-2012, the Board had a "Finance and Risk" committee to which oversight of general risk management was allocated. Finance and Risk Policy Committee Charter, from Materials for Meeting of the Finance and Risk Policy Committee (Oct. 1, 2010), at 14-16 [DOC ID 000000018172]; Finance and Risk Committee Meeting Presentation (May 16, 2011), at 3 [DOC ID 000000018399].

the Company's internal "Enterprise Risk Management" ("ERM") process has identified "quality" as an important risk and defined it as: "[m]ajor or chronic product problems could occur, resulting in negative public image, large product recall campaigns and/or significant, unexpected increases in warranty expenses."[1116] Management and the Board have addressed this risk through their emphasis on quality improvement,[1117] and no specific vehicle safety issue was brought to the Audit Committee's attention as part of its oversight of risk management other than a risk associated with lithium ion batteries.[1118]

2. The Cobalt Ignition Switch

a. The Board's Lack of Knowledge

Before 2014, none of the written reports to the Board included any information concerning the Ignition Switch. We have not identified any evidence that the Board was otherwise informed of this problem, of GM's delay in addressing it, or of the fatalities or accidents associated with it. Moreover, none of the executives we interviewed who presented on quality or recall issues at Board meetings in the pertinent period were aware of the Ignition Switch problem.

Before and after that period, the Audit Committee had general oversight responsibility for risk management. General Motors Company, 2013 Proxy Statement (April 25, 2013), at 23 [DOC ID 000240787029]; Audit Committee Charter within General Motors Corporation, 2006 Proxy Statement (April 28, 2006), at A-1 – A-3 [DOC ID 000240787028].

[1116] 2013 Key Risk Classification (Dec. 18, 2012), at 16 [DOC ID 000240752016]; Audit Committee Meeting Documents (Aug. 19, 2013), at 155-159 [DOC ID 000000028582]; *see also* General Motors Company, 2013 Annual Report (Form 10-K) (Feb. 6, 2014), at 23 [DOC ID 000240787033]; General Motors Company, 2012 Annual Report (Form 10-K) (Feb. 15, 2013), at 25 [DOC ID 000240787031]; General Motors Company, 2011 Annual Report (Form 10-K) (Feb. 27, 2012), at 25-26 [DOC ID 000240787032]; General Motors Company, 2010 Registration Statement (Form S-1) (Aug. 18, 2010), at 24 [DOC ID 000240787062]; General Motors Company, 2010 Annual Report (Form 10-K) (March 1, 2011), at 38 [DOC ID 000160743288]; General Motors Company, 2009 Annual Report (Form 10-K) (April 7, 2010), at 31 [DOC ID 000240787031].

[1117] J&B Interview of Phil Laskawy, May 20, 2014; J&B Interview of George ("Rick") Wagoner, May 12, 2014.

[1118] Materials for the General Motors Company Audit Committee Meeting (March 18, 2013), at 117 [DOC ID 000240787039].

As noted above, the Board did not typically receive reports on the subject of individual defects or individual recalls; the Board also did not receive data about traffic fatalities associated with GM's vehicles, except in the context of some of the regular litigation update reports that referenced a small number of cases unrelated to the Cobalt.

b. The March 5, 2009 Body/Exterior SMT VPR Update Slide Deck

In March 2009, CEO Rick Wagoner may have viewed a slide deck that included, in a "back-up" slide, a reference to the Cobalt's inadvertent cut-off issue. That slide, in a 72-slide presentation, described the then-recent change in the Cobalt's key design from a slot to a hole.[1119] The back-up slide focused solely on warranty cost reduction and did not characterize the matter as a safety issue or mention airbag non-deployment, accidents or fatalities.[1120] Wagoner does not recollect reviewing any part of the slide deck.[1121]

Because the slide deck was found in the data collected from Wagoner's computer, and the potential importance of Wagoner's possible review of the back-up slide, we conducted an extensive investigation of its origin and of the meetings in which it was discussed to determine whether Wagoner was informed of the change or of the unmentioned safety implications. The background to the slide deck follows.

As discussed above, in early 2009, GM personnel implemented a change to the design of the Cobalt's ignition key to a hole from a slot beginning with production of the Cobalt's 2010

[1119] Body/Exterior SMT, VPR Update Plan/Performance (March 5, 2009), at 34 [DOC ID W_00607350].
[1120] Body/Exterior SMT, VPR Update Plan/Performance (March 5, 2009), at 31, 34 [DOC ID W_00607350].
[1121] J&B Interview of George ("Rick") Wagoner, May 12, 2014.

model year in mid-2009. Wagoner did not attend the meeting in January 2009 at which the key-hole design change to save warranty cost was discussed.[1122]

About six weeks later, certain slides that had been used in the January meeting were included among 57 "back-up" slides that appeared in a 72-slide deck that in turn was used for one of nine separate presentations made at a meeting on March 5, 2009, of the Vehicle Program Review ("VPR") team, which met on a close-to-weekly basis.[1123] The presentation that included the back-up slides focused on both material and warranty cost reductions achieved by the "Body/Exterior SMT," one of the "system management teams" that focused on cost, quality and related issues with respect to eight separate systems across all GM vehicle platforms.[1124] The presentation's primary slides addressed such actions as "supplier workshops" and a new "week of claim tool" devised to expedite issue identification; some of the many back-up slides in the presentation focused on "side closure" issues, and in turn the back-up slides to the "side closure" back-up slides included the January 2009 slides about changing the Cobalt's key head design from a slot to a hole.[1125]

Wagoner did not attend the March 5, 2009 meeting or, at least typically, any other of the VPR meetings.[1126] He and more than 20 other executives were routinely e-mailed summaries of the discussion after each week's VPR meeting ended, and they may have had access to the slide

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[1122] J&B Interview of Gary Altman, May 20, 2014.
[1123] *See* Gary Altman, Program Quality Sufficiency Review (Jan. 29, 2009), at 38-40 [DOC ID 000007551904; GMNHTSA000281704]; Body/Exterior SMT, VPR Update Plan/Performance (March 5, 2009), at 30-34 [DOC ID W_00607350]; e-mail from Ran Charby, GM, to Anthony Brown, GM, et. al. (Feb. 27, 2009) [DOC ID 000106626436]; VPR Meeting Notes (March 5, 2009) [DOC ID H_00262247], attached to e-mail from Richard Ceppos, GM, to George ("Rick") Wagoner, GM, et. al. (March 5, 2009) [DOC ID H_00262244]; VPR Meeting Notes (March 5, 2009) [DOC ID H_00262247]; e-mail from Richard Ceppos, GM, to Edward Whitacre, GM (Dec. 17, 2009) [DOC ID W_00000480].
[1124] J&B Interview of Gary Altman, May 20, 2014; J&B Interview of James Hentschel, May 27, 2014.
[1125] Body/Exterior SMT, VPR Update Plan/Performance (March 5, 2009) [DOC ID W_00607350].
[1126] J&B Interview of George ("Rick") Wagoner, May 12, 2014; J&B Interview of Richard Ceppos, May 21, 2014; J&B Interview of James Hentschel, May 27, 2014; J&B Interview of Laurie Huizar, May 23, 2014.

deck presentations on a shared internal website.[1127] The engineer who believes he presented the Body/Exterior SMT's information at the VPR meeting states that the back-up slides concerning the Cobalt key design change were not discussed at the VPR meeting, and the summary of the March 5, 2009 meeting does not mention that subject.[1128]

Forensic analysis indicates that the Body/Exterior SMT presentation was opened on the evening of March 5, 2009, on Wagoner's computer, located in two files in a temporary folder bearing generic names. The presentation was not found in the data of the other custodians whose electronic files were collected in the investigation. There is no forensic evidence that Wagoner reviewed any specific slide within the presentation. As noted, Wagoner does not recollect viewing the presentation or the back-up slides; about three weeks later, on March 29, 2009, Wagoner agreed to resign as CEO at the request of the U.S. government's Auto Task Force.[1129] Contemporaneous e-mails he exchanged with the person who provided the summary notes of the meeting do not mention the Cobalt issue or any other specific topic.[1130]

3. Other Board Activities

One way in which the Board expressed its commitment to improving the quality of GM's vehicles was through the design of the short-term incentive compensation – bonus – plans that applied not only to corporate officers but also to employees at the executive, director, manager, and supervisor levels. With a single exception in the past decade, the annual targets GM had to

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[1127] *See e.g.*, E-mail from Ran Charby, GM, to Anthony Brown, GM, et. al. (Feb. 27, 2009) [DOC ID 000106626436]; e-mail from Richard Ceppos, GM, to George ("Rick") Wagoner, GM, et. al. (March 5, 2009) [DOC ID H_00262244]; e-mail from Richard Ceppos, GM, to Ed Whitacre, GM (Dec. 17, 2009) [DOC ID W_00000480].
[1128] J&B Interview of James Hentschel, May 27, 2014; VPR Meeting Notes (March 5, 2009) [DOC ID H_00262247], attached to e-mail from Richard Ceppos, GM, to George ("Rick") Wagoner, GM, et. al. (March 5, 2009) [DOC ID H_00262244].
[1129] J&B Interview of George ("Rick") Wagoner, May 12, 2014.
[1130] E-mail from George ("Rick") Wagoner, GM, to Richard Ceppos, GM (March 6, 2009) [DOC ID W_00037388]; e-mail from George ("Rick") Wagoner, GM, to Richard Ceppos, GM (March 8, 2009) [DOC ID W_00041634].

achieve before any bonus would be payable included improvement of the quality of GM's vehicles. The quality component in the annual target constituted 10% of the overall calculation, and three financial and sales components accounted for the balance for each year in the past decade except 2010, when the target's components were limited to the three financial and sales metrics.[1131] In about mid-2013, Alicia Boler-Davis, the head of Global Quality, became a direct report to then-CEO Dan Akerson (having previously reported to Mary Barra as EVP of Global Product Development, Purchasing & Supply Chain) and proposed an increase in the relative weighting of the "quality" factor in the incentive plan to 25%. The Board's Executive Compensation Committee approved the increased importance of quality improvement in determining the extent of bonuses, effective this year.[1132]

Similarly, the annual performance objectives for the CEO set by the Board's Executive Compensation Committee included quality improvement as among the many factors by which the CEO's performance would be assessed by the Board.[1133]

C. Tone at the Top on Safety

It is impossible to catalog all possible directives and management actions that might generally have influenced how GM employees viewed their roles and responsibilities. It is even more difficult to ascertain how the general tone set by senior leadership affected specific decisions made by individuals. Where individuals referenced specific management directives as the cause of their actions, we have identified them. In most circumstances, however, we could

[1131] J&B Interview of Janice Uhlig, May 12, 2014 & May 16, 2014.
[1132] J&B Interview of Janice Uhlig, May 12, 2014 & May 16, 2014.
[1133] J&B Interview of Janice Uhlig, May 12, 2014 & May 16, 2014.

not ascribe a particular management action or policy directive from a senior executive as the reason for any specific action.

But the tone set at the top is relevant background for assessing GM's approach to the issues discussed in this report. Repeated throughout the interview process we heard from GM personnel two somewhat different directives – "when safety is at issue, cost is irrelevant" and "cost is everything." It is worth examining how those two messages collided.

GM personnel were quite consistent in saying that they understood that safety was a critical priority and that, if they identified a safety problem, cost should not be a factor in deciding whether and how to address the safety problem. For example, a senior manager in Accessories Engineering said that safety is the top pillar at GM.[1134] Training material and directives that have been located for FPE process, the key engineering process for reviewing safety issues, make no references to cost-benefit analyses.[1135] Indeed, an "FPE Sensitivity and TREAD Training" presentation from May 2004 by Kevin Williams, GM North America Vice President of Quality, notes:

> The harsh reality is - we are competing in a new world, one that demands a culture where there is no tolerance for defects at any point during in [sic] the vehicle development and manufacturing process. Because the marketplace has zero tolerance for defects, this organization will have no tolerance for defects. If I sound alarmed, I am. . . . You must also become gatekeepers of quality. Consider every issue a potential defect and risk to the customer. I like to say 'stand in front of the train'. Stop the problems from flowing downstream! If, despite your best efforts, you cannot stop a problem, your next action is to pull your andon [sic] and escalate the issue up to someone who can. We have escalation systems in place for this very reason so don't hesitate to use them.[1136]

Messages such as this are consistent with what we heard from many employees.

[1134] J&B Interview of Khris Lee, April 3, 2014.
[1135] *See, e.g.,* New GMPT FPE Director's Orientation (Jan. 10, 2008) [DOC ID GMHEC000384265; GMNHTSA000383962; DOC ID 000001345940].
[1136] Kevin Williams, FPE Sensitivity and TREAD Training (May 2004), at 68 [DOC ID 000087206552].

That said, the 2000s was a time of extraordinary cost-cutting at GM. The messages from top leadership at GM – both to employees and to the outside world – as well as their actions were focused on the need to control costs. We heard repeatedly from GM personnel about the focus on cost-cutting and the problems it caused. For example, an engineer stated that an emphasis on cost control at GM "permeates the fabric of the whole culture."[1137]

Cost-cutting impacted all aspects of the business. Keeping projects on time – because of the impact on cost – became a paramount concern. One witness expressed concern that the cost- and time-cutting principles known as the "Big 4" emphasized timing over quality.[1138] Those principles were introduced to GM in the early 2000s.[1139]

Those responsible for a vehicle were responsible for its cost, but if they wanted to make a change that incurred cost and affected other vehicles, they also became responsible for the costs incurred in the other vehicles.[1140] For example, if the Cobalt team wanted an ignition switch replaced, the other vehicle lines that used the ignition switch would request that the cost for their new switches be paid for by the Cobalt team because the Cobalt team requested the change.[1141]

Reductions in staff, especially in Engineering, meant that employees were forced to do more with less. In the time leading up to the bankruptcy, one cost-cutting measure was to decrease the Engineering headcount by adding to the responsibilities of the Design Release Engineer (the position held by Ray DeGiorgio).[1142] Witnesses stated that the reduction in force

[1137] J&B Interview of Philip Horton, March 31, 2014.
[1138] J&B Interview of Mark Reuss, April 15, 2014.
[1139] J&B Interview of Mark Reuss, April 15, 2014.
[1140] J&B Interview of Steve Oakley, April 23, 2014.
[1141] J&B Interview of Steve Oakley, April 23, 2014; J&B Interview of Sarah DeVries, May 13 & May 16, 2014.
[1142] J&B Interview of Mark Reuss, April 15, 2014.

created a difficult environment in which people were overworked and the quality of work suffered.

The cost-cutting naturally flowed through to suppliers. One cost-cutting measure in the time leading up to GM's bankruptcy was to source parts routinely to the lowest bidder, even if they were not the highest quality parts.[1143]

We have uncovered no evidence that any employee made an explicit trade-off between safety and cost in the investigation of the Cobalt. To be sure, the Cobalt engineers working in the 2004-2006 timeframe rejected various fixes to the moving stall issue because there was "no acceptable business case," but those engineers' error was that they failed to understand the connection to airbags and the safety issue that they were facing. Having wrongly identified the issue as a customer convenience issue, cost considerations that would otherwise have been immaterial became part of their calculus.

That noted, we cannot conclude that the atmosphere of cost-cutting had no impact on the failure of GM to resolve these issues earlier. As discussed above, GM was under tremendous cost pressure, and it was imposing tremendous pressure on its suppliers to cut costs. Engineers did not believe that they had extra funds to spend on product improvements. Staff was cut dramatically. It is not feasible for three to do a job as effectively as eight (in the case of the team charged with pulling TREAD data), and there were specific impacts. As noted above, the responsibility of the DREs was increased. The group charged with the TREAD database "pared down" their affirmative searches to look for trends because of their reduced headcount.[1144]

[1143] J&B Interview of Mark Reuss, April 15, 2014.
[1144] J&B Interview of Dwayne Davidson, May 6, 2014. The TREAD database team was originally approximately sixteen or seventeen employees as GM worked to develop its TREAD database, but that number was reduced to

When belts are tightened, most functions are impacted in some way, and we cannot assume that safety was immune.

D. Culture

1. Resistance to Raising Issues

Some witnesses said that there was resistance or reluctance to raise issues or concerns in the GM culture. For example, a Red X Manager said that, if an employee tried to raise a safety issue five years ago, the employee would get pushback.[1145] Mary Barra explained that problems occurred during a prior vehicle launch as a result of engineers being unwilling to identify issues out of concern that it would delay the launch.[1146] Similarly, an employee survey reflected an issue related to speaking up. In a Corporate Executive Board Company survey administered at GM in 2013, GM participants' rate of reporting misconduct they observed was below the benchmark rate developed by the Compliance and Ethics Leadership Council based on the responses and experiences of participating companies.[1147] A small number of participants also suggested a fear of retaliation.

While the survey comments were unconnected to safety questions, issues of culture cannot be easily confined. Some witnesses provided examples where culture, atmosphere, and the response of supervisors may have discouraged individuals from raising safety concerns, including, in a different context than the Cobalt, supervisors warning employees to "never put

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approximately eight after this start-up period. J&B Interview of Dwayne Davidson, May 6, 2014. The subsequent reduction to three employees was due to cost cutting. J&B Interview of Dwayne Davidson, May 6, 2014.

[1145] J&B Interview of Bill Merrill, March 18, 2014.

[1146] J&B Interview of Mary Barra, April 14, 2014.

[1147] The Corporate Executive Board Company, 2013 RiskClarity Report – Findings and Next Steps (March 20, 2014) [DOC ID 000145003510.]. In a more recent workforce survey administered by GM's Human Resources function to all salaried employees, conducted only weeks ago, there was significant improvement in the responses concerning willingness to "speak up" and trust in management over a similar survey conducted in 2012. GM "Workplace of Choice" Survey Results, May 20, 2014.

anything above the company"[1148] and "never put the company at risk."[1149] The former Cobalt Brand Quality Manager said that he felt that GM "pushed back" on describing something as a safety issue during a relevant time period.[1150]

Whether general "cultural" issues are to blame is difficult to ascertain, but the story of the Cobalt is one in which GM personnel failed to raise significant issues to key decision-makers. Senior attorneys did not elevate the issue within the Legal chain of command to the General Counsel – even after receiving the [redacted] evaluation in the summer of 2013 that warned of the risk of punitive damages because of a "compelling[]" argument that GM had "essentially . . . done nothing to correct the problem for the last nine years."[1151] Engineers, too, failed to elevate the issue. Starting in mid-2012, there were three high-level managers brought in as "champions" – Woychowski, Federico, and Kent. The very reason they were brought in was to help resolve an unexplained pattern of airbag non-deployments in an expeditious manner. But they did not elevate the issue to their superiors, and the common thread was to hold more meetings and refer the matter to additional groups or committees.

Similarly on the issue of culture, GM employees received formal training as to how to write about safety issues.[1152] A PowerPoint presentation from 2008 warned employees to write

[1148] J&B Interview of Dan Davis, March 14, 2014.
[1149] J&B Interview of Christina Connor, March 19, 2014.
[1150] J&B Interview of Steve Oakley, May 7, 2014.
[1151] [redacted] Settlement Review Committee Roundtable Case Summary (July 22, 2013), at 36 [DOC ID 000002818612]; J&B Interview of Ronald Porter, April 30, 2014; J&B Interview of William Kemp, April 17, 2014; J&B Interview of Lawrence Buonomo, April 16, 2014; *see also* J&B Interview of Michael Millikin, April 4, 2014.
[1152] J&B Interview of Mickey Sabol, April 24, 2014.

"smart," and not to use "judgmental adjectives and speculation."[1153] Employees were given a number of words to avoid, with suggested replacements:

- "Problem = Issue, Condition, Matter"
- "Safety = Has Potential Safety Implications"
- "Defect = Does not perform to design"[1154]

Employees were also given examples of sentences not to use, including "Dangerous . . . almost caused accident" and "This is a safety and security issue . . . ."[1155] And they were told, in what the author described as an attempt at humor, not to use phrases such as "Kevorkianesque," "tomblike," or "maniacal," or "rolling sarcophagus."[1156] The "actual examples" provided in the presentation described how a plaintiff's lawyer had used a memo from a senior manager at another automaker warning that a risk of conducting a survey about a problem was that it could provide "product liability credence to a hypothesis we have long ignored."[1157]

In addition to being trained on how to write, a number of GM employees reported that they did not take notes at all at critical safety meetings because they believed GM lawyers did not want such notes taken. No witness was able to identify a lawyer who gave such an instruction, no lawyer reported having given such an instruction, and we have found no documents or e-mails reflecting such an instruction. The no-notes direction, however, reached

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[1153] 2008 Q1 Interior Technical Learning Symposium Soft Trim Breakout Session (2008), at 34 [GMNHTSA000258573].
[1154] 2008 Q1 Interior Technical Learning Symposium Soft Trim Breakout Session (2008), at 42 [GMNHTSA000258573].
[1155] 2008 Q1 Interior Technical Learning Symposium Soft Trim Breakout Session (2008), at 39 [GMNHTSA000258573].
[1156] 2008 Q1 Interior Technical Learning Symposium Soft Trim Breakout Session (2008), at 42 [GMNHTSA000258573]. The employee who presented the training was later told by a lawyer who saw a version of this training to remove the slide listing words never to be used. J&B Interview of Mickey Sabol, April 24, 2014.
[1157] 2008 Q1 Interior Technical Learning Symposium Soft Trim Breakout Session (2008), at 37 [GMNHTSA000258573].

the status of an urban myth that was followed, an instruction passed from GM employee to GM employee over the years. Thus, as we learned in our investigation, for many meetings – of GM's many committees – there are no clear records of attendance or of what was discussed or decided.

Leadership at GM has tried to counter this culture with clear messages that employees should raise issues. "Winning With Integrity" (the code of conduct) instructs employees to raise problems (although it does not explicitly reference vehicle safety) and ensure they receive proper attention, and to conduct themselves with the highest ethical standards. Recommendations as to how to do this better are found below.

2. The "GM Salute" and the "GM Nod"

A cultural issue repeatedly described to us and borne out by the evidence is a proliferation of committees and a lack of accountability.

The Cobalt Ignition Switch issue passed through an astonishing number of committees. We repeatedly heard from witnesses that they flagged the issue, proposed a solution, and the solution died in a committee or with some other *ad hoc* group exploring the issue. But determining the identity of any actual decision-maker was impenetrable. No single person owned any decision. Indeed, it was often difficult to determine who sat on the committees or what they considered, as there are rarely minutes of meetings.

One witness described the GM phenomenon of avoiding responsibility as the "GM salute," a crossing of the arms and pointing outward towards others, indicating that the responsibility belongs to someone else, not me.[1158] It is this same cabining of responsibility, the sense that someone else is responsible, that permeated the Cobalt investigation for years.

[1158] J&B Interview of Andrew Brenz, April 22, 2014; J&B Interview of Alberto Manzor, May 27, 2014.

Similarly, Mary Barra described a phenomenon known as the "GM nod."[1159] The GM nod, Barra described, is when everyone nods in agreement to a proposed plan of action, but then leaves the room with no intention to follow through, and the nod is an empty gesture.[1160] It is an idiomatic recognition of a culture of that does not move issues forward quickly, as the story of the Cobalt demonstrates.

3. Failure to Share or Gather Knowledge/Information Silos

Repeatedly, over a decade, GM personnel failed to search for, share or gather knowledge, and that failure had serious consequences. There are multiple components to these failures, involving individual mistakes, organizational dysfunction, and systems inaccessible to some and impenetrable to many.

In 2004 and 2005, when complaints of moving stalls came in, the engineers who considered the issue did not know that the vehicle was designed so that the airbags would not deploy when the ignition switch was in Accessory. As a consequence, the engineers failed to recognize the stalls as a safety issue and resolve the problem quickly. Even the committees (VAPIR and CPIT) that were designed to have cross-disciplinary members did not connect the dots. Other examples of failure to share information and gather information include:

- In 2006, DeGiorgio did not change the part number, a system that by its very design is intended to share information with engineers – namely the critical piece of information that a part's fit, form or function had changed. DeGiorgio compounded the matter by later telling his colleagues that there was no change. As a consequence, for years engineers investigating the matter thought that the Ignition Switch was not to blame for airbag non-deployments.

- In 2007, when Sprague was directed to start tracking airbag non-deployments, no one shared with him (and he did not find) all of GM's prior work on the Cobalt moving stall

[1159] J&B Interview of Mary Barra, April 14, 2014.
[1160] J&B Interview of Mary Barra, April 14, 2014.

issue – not the PRTSs and not the TSB. As a consequence, he did not have an opportunity to connect the non-deployments with the problem of low torque in the Ignition Switch.

- From 2007 on, GM employees failed to find publicly available materials. This included the Indiana University study, which a plaintiff's expert reportedly found on the NHTSA website.[1161] It also included GM's own TSBs, which were available both internally and publicly.

- In 2011, Stouffer failed to check the TREAD database correctly, and thus did not obtain all of the information available on it. As a consequence, he missed the Ion and HHR fatalities, which were not discovered until February 2014 – after the first recall.

- From 2011 on, the fact that the Cobalt accidents led to fatalities was not shared with all relevant decision-makers. These individuals say that, as a consequence, they lacked a sense of urgency.

In contrast, some of the mechanisms to share information did work, but still did not yield results. One reason for this was the use of "root cause" as a trigger for action.

4. "Root Cause"

There are two dates at which critical information resided in a single place, and yet action was not taken. Witnesses state that the reason for this lack of action at either time was that the "root cause" was not known with certainty or that a full solution had not been devised.

- In 2011, shortly after Stouffer was assigned the investigation, he knew: (1) that the MY 2005 and 2006 Cobalts had a history of the Ignition Switch being turned accidentally to Accessory because of low ignition torque (he had the TSBs); and (2) that airbags do not deploy when the Ignition Switch is in Accessory. In other words, regardless of whether other later model year Cobalts performed better, any time a MY 2005 or 2006 Cobalt Ignition Switch was inadvertently turned to Accessory, the airbags were turned off. Instead of addressing this repeating problem, the investigators worked to find an ultimate solution that would solve the problem for all years and for every permutation of the Ignition Switch. The consequence was a two-and-a-half year delay.

[1161] Erin M. Shipp, P.E., *Engineer's Report of the* [redacted] *Crash*, Robson Forensic (June 12, 2012), at 5 [DOC ID 000001662122]. We have been unable to determine whether the Indiana University study was available on the NHTSA website in 2007.

- In late April 2013, after the DeGiorgio deposition, engineers and GM Legal Staff knew: (1) that the Cobalt had a history of the Ignition Switch being turned accidentally to Accessory because of low torque (they had the TSB, the Indiana University study, and two reports from plaintiffs' experts); (2) that airbags do not deploy when the Ignition Switch is in Accessory; and (3) that the Ignition Switch had changed for MY 2008 Cobalts (they had seen photographs during DeGiorgio's deposition). In other words, even the difference between early Cobalts and MY 2008 Cobalts was now explained. The recall did not occur until February 2014, approximately nine months later. In the interim, GM employees confirmed what plaintiff's expert had told them, researched additional issues, and worked on a field solution.

At both of the times described above, there was a view that no action should be taken until the "root cause" of the problem was fully understood and a solution developed. To be sure, GM needed to investigate to understand the problem in the Cobalt. But the search for root cause became a basis for doing nothing to resolve the problem for years. The lengthy search for root cause thus diverted GM from its obligations and failed to produce the required urgency to bring the matter to fast closure. Indeed, it still took nine months after DeGiorgio's deposition for GM to order a recall and, even then, not all affected model years were included.

VIII. RECOMMENDATIONS

As described throughout this report, there were multiple, interrelated factors that led to GM's decade-long failure to recognize the safety defect in the Cobalt and initiate a recall. It is critical that GM minimize the risk of this happening again. Because of the multiplicity of causal factors, there is no simple solution, but the lessons learned from this failure can lead to a reexamination of the Company's policies, procedures, and culture, and provide the Company with an opportunity not only to improve but to innovate and become an industry leader in the processes used to ensure consumer safety.

We made preliminary recommendations to GM as the investigation was proceeding. With the benefit of further investigation and analysis, this section elaborates on and revises those

recommendations. It describes a variety of measures that, working together, can improve the speed and manner in which GM addresses safety issues and help bring GM to the forefront of the industry in its approach to safety.

A. Organizational Structure

A successful overhaul of processes begins with examination of the organizational structure, which influences the degree of coordination between groups with interrelated responsibilities and the extent of emphasis the Company places on key priorities, including safety. Recommendations as to organizational structure include:

1. Ensure that the responsibilities of the Vice President of Global Vehicle Safety[1162] are appropriately defined to comprehensively cover safety and compliance issues, and ensure that sufficient resources are made available to allow this executive to comprehensively address safety and compliance issues. Ensure that this executive has direct access to the CEO and the Board and is required to make reports to the Board at least quarterly.

2. Ensure that all departments, divisions, or groups that have substantial responsibilities concerning the identification, investigation, or remediation of safety issues have a direct or indirect reporting line that leads up to the Vice President of Global Vehicle Safety. These groups include, for example, FPA, Quality, the CPITs and the VAPIRs. Ensure that Global Vehicle Safety also coordinates with the Legal Staff and is aware of safety issues arising through matters handled by the Legal Staff.

3. Review the activities of all organizational departments, divisions or groups that have safety-related responsibilities (such as FPA, PI, and Quality) for the purpose of identifying any areas where multiple groups have similar or overlapping functions such as investigating or resolving safety issues. Where overlap is identified, consolidate or coordinate those functions to ensure, for example, that Quality and PI do not have independent and parallel responsibility for identifying and resolving a safety defect but rather that each group is aware of, and not duplicating, the other's activities. To the extent that areas of overlap remain, ensure that a clear owner is identified.

[1162] The Vice President of Global Vehicle Safety is a new position created in the wake of the Ignition Switch recall. Jeff Boyer has been appointed to this position.

B. Cultural Emphasis on Safety

An organizational emphasis on, and commitment to, safety is a critical component to mitigating the risk of a situation like this recurring. To ensure that a commitment to consumer safety is a prominent part of the Company's culture and is embedded in the fabric of the organization, we recommend the following:

1. Implement regular communications with employees about safety to raise awareness and reinforce the tone at the top, for example by issuing periodic bulletins from the Vice President of Global Vehicle Safety and/or the CEO that include updates or reminders on safety issues, or including a column on safety in an employee newsletter. Ensure that employees understand that they have an obligation to raise any concerns they have about safety or compliance, and to continue to raise those concerns if they do not believe those concerns have been resolved.

2. We understand that GM has created a new "Speak Up For Safety" program to encourage employees to raise safety issues, and we recommend that GM promote that program through visible communications, such as posters on employee bulletin boards. Bulletins or newsletters could include features recognizing employees who have raised safety issues and highlight the significance of the potential safety problem averted by the escalation of the issue.[1163]

3. Consistent with ¶ 19 of the May 16, 2014 NHTSA Consent Order, visibly promote and rigorously enforce the non-retaliation policy, including for employees who report concerns regarding actual or potential safety-related defects or potential non-compliance with the Federal Motor Vehicle Safety Standards.

4. Regularly communicate to suppliers the importance of safety and GM's expectation that suppliers will promptly and accurately identify any potential safety issues. Provide suppliers with access to the Speak Up for Safety hotline or a similar mechanism for raising such safety issues.

5. Consistent with ¶ 20 of the May 16, 2014 NHTSA Consent Order, explicitly communicate to employees that they should not be reluctant to classify issues as safety issues or potential safety issues, including in written work, and eliminate any language in any guidelines, training decks, or policies that suggest otherwise or that caution against using specific words or phrases that might be deemed too

[1163] We understand that this is in progress with feature stories on GM's internal website.

sensitive or inflammatory. Communications to employees on safety policy issues like this should come from the level of the Vice President of Global Vehicle Safety or higher.

6. Develop protocols for escalating potential safety issues to appropriate levels of management. Such protocols should include identification of the types of issues to be escalated (based for example on their severity, frequency, or the amount of time they have been open) and the level to which they should be escalated. The protocols should make clear that employees who are aware of unresolved safety issues should escalate them, and should define circumstances in which the concerns should be raised to the level of the Vice President of Global Vehicle Safety and, ultimately, the CEO. The protocols should also define other circumstances in which the CEO should be made aware of safety issues, including instances in which safety issues rise to a certain level of severity or in which an investigation has not been resolved within a defined period of time.

7. As agreed to in ¶ 19 of the May 16, 2014 NHTSA Consent Order, continue to review and strengthen the process for expeditious reporting by employees of potential or actual safety issues and non-compliance. This includes the development and roll-out of training programs instructing employees on how to identify safety issues and how to raise them with supervisors and executives (see more discussion on training below).

8. Ensure that supplier quality issues that may raise safety concerns for vehicles in production are reported as safety issues and are not addressed solely as supplier quality issues. Implement specific procedures for personnel dealing with quality issues to track and report to the safety organization those quality issues that raise safety concerns, and train quality personnel on those procedures.

C. Individual Accountability

All employees have responsibility for raising safety issues, and many employees have responsibility for addressing safety issues once they have been identified. The Company should take steps to ensure that employees are aware of their safety-related responsibilities and that individuals are accountable for addressing the safety issues for which they are given responsibility. Specific recommendations are as follows:

1. Identify clear owners of safety and compliance issues to increase accountability. Clarify internal roles by defining responsibilities and accountability for those involved in processes relating to the evaluation and resolution of safety issues,

including responsibilities for feeding items into the FPE process, such as from VAPIR and CPIT meetings. Clarify the role of committees such as CPITs and VAPIRs in identifying safety issues and referring them to the FPE process. Designate one person on each such committee as a safety liaison with specific responsibility for elevating safety issues.

2. Include appropriate identification, elevation, and resolution of safety and compliance issues as a factor in employee performance evaluations.

3. Require employees to certify annually that they have reported any safety issues of which they are aware and to identify, as part of that certification, any safety issues they are aware of that have not been resolved.

D. Communications Between and Within Groups

Breakdowns in communication between and within groups were a critical part of the failures described in this report. Consistent with GM's commitment in ¶ 21 of the May 16, 2014 NHTSA Consent Order to improve processes for the purpose of encouraging and improving information-sharing across functional areas and disciplines, many of the recommendations throughout this section are intended to address inadequate communication. Specific additional recommendations are:

1. Provide regular written or oral updates by the Legal Staff for relevant engineering groups on alleged or potential defects.

2. Formalize coordination between and among PI, Legal Staff, FPA, FPE, the new "emerging issues" group, and relevant engineering teams with accountability for safety and compliance issues, for example by implementing a cross-functional committee to track and review potential safety issues and set clear action items. This coordination should include the sharing across groups of information concerning significant FPA matters, FPE investigations, serious or high-volume warranty claims, trends or patterns identified, and NHTSA interactions.

3. Conduct an assessment of the adequacy of mechanisms for ensuring coordination between groups handling different subsystems of the same vehicle regarding safety-related information and items that may affect safety performance, and implement improvements as necessary. For example, ensure those working on the ignition switch understand how it interacts with airbag deployment. Similarly, ensure that committees such as the VAPIR and CPIT are structured with sufficient

cross-functional expertise to ensure that safety issues are properly identified and addressed.

4. Assign the Global Ethics and Compliance Center ("GECC") to oversee the review of issues raised through the new Speak Up For Safety program. This will have the benefit of ensuring that review of issues raised through the Speak Up For Safety program is coordinated with review of issues raised to the compliance organization, and to ensure that internal inquiries and investigations prompted by the Speak Up For Safety program are appropriately tracked and handled consistent with GECC procedures.

E. Communications with NHTSA

NHTSA should be viewed not only as a regulator but also an ally in the effort to ensure that the Company's vehicles are as safe as they can be. Interactions with NHTSA should be consistent with that type of relationship. Specific recommendations for maintaining an appropriate relationship are:

1. As required by ¶ 21 of the May 16, 2014 NHTSA Consent Order, improve communication with NHTSA regarding safety-related defects. Consent Order ¶¶ 25-28 require the Company to have monthly and quarterly meetings with NHTSA and to be prepared to address various issues at those meetings. As part of this effort, the Company should ensure that both the quality and the frequency of NHTSA communications are sufficient to keep NHTSA fully informed of safety-related issues. The individual responsible for implementing this item should report directly or indirectly to the Vice President of Global Vehicle Safety.

2. Create a centralized database for all communications with NHTSA and train individuals who communicate with NHTSA to file their communications in this database.

3. Ensure timely notification to NHTSA of safety-related defects. Evaluate and clearly define, consistent with federal law, the trigger for the NHTSA five-day reporting requirement.

F. Role of Lawyers

The Legal Staff can and should play a critical and unique role in assisting with the identification, analysis, and resolution of safety issues that have given rise to customer claims. To ensure that Legal Staff play this critical role effectively, we recommend the following steps:

1. Hold regular discussions between each product litigation attorney and the Practice Area Manager and Global Process Leader for Litigation regarding whether the attorney has observed trends or potential safety issues in lawsuits or not-in-suit matters ("NISMs").

2. Designate a member of the Legal Staff as a liaison to provide regular reports (and real-time reports where matters are particularly significant or urgent) to the Global Vehicle Safety organization on safety-related issues identified in matters handled by Legal Staff. Hold regular meetings between the Global Vehicle Safety group and the Legal Staff liaison. During these meetings, the Global Vehicle Safety organization will present to the Legal Staff significant or unresolved safety issues, and the Legal Staff liaison will report on any issues identified in matters handled by Legal Staff that the liaison has not already communicated.

3. Hold monthly meetings between the GM Legal Staff and FPA engineers responsible for each specialty (*e.g.*, non-deployment litigation, rollover/roof crush, power steering, etc.) to discuss observed trends and potential safety issues in that specialty area. Include in these meetings the ESIS claim administrator with the most experience in that specialty area. If any trends or safety issues are identified, ensure that the Global Process Leader for Litigation is informed, and that the trends or safety issues are discussed at the next scheduled Roundtable meeting and elevated as appropriate.

4. Ensure that at the onset of litigation, the Legal Staff and FPA generate a list of all PRTSs, FPRs, TSBs, recalls, product investigations, and issues in the FPE process for the subject vehicle make and model. Include this information in the new suit package provided to outside counsel at the onset of litigation. Ensure that the early technical assessment ("ETA") reflects consideration of whether there are relevant PRTSs, FPRs, TSBs, recalls, product investigations, and issues in the FPE process that affect the integrity of the make and model involved.

5. Include in the Roundtable case summary form a category for any safety issues, trends, lawsuits and NISMs similar to the case discussed at the Roundtable.

6. Institute a process to elevate unresolved technical issues expeditiously. If an FPA engineer is unable to determine any reason for a component failure following a vehicle inspection and technical analysis, require the FPA engineer to initiate a conference call with in-house and outside counsel within a defined period to discuss the issue and appropriate follow-up. Depending on the circumstances, appropriate follow-up might include referring the issue to the PI or FPE processes.

7. Provide specific guidance concerning the types of issues that should be elevated to the General Counsel. Those issues should include serious safety issues and safety issues that are not being resolved expeditiously, and more broadly, any concerns that could have a significant impact on the Company, its customers, or its shareholders. Explain in this guidance that lawyers should request the General Counsel's assistance when important processes are not progressing with appropriate speed. Include such guidance in the orientation program for all new hires to the Legal Staff.

8. Consistent with "Winning with Integrity" and other prior internal guidance, ensure that in-house counsel are aware of the expectation that they will respond appropriately if they become aware of any threatened, on-going, or past violation of a federal, state or local law or regulation, a breach of fiduciary duty, or violation of GM policy, including the expectation that if they raise such an issue and believe it has not been addressed appropriately, they will bring the situation to the attention of their supervisors, and if they believe their supervisors have not addressed it appropriately, to higher levels including the General Counsel if necessary. Ensure that this expectation extends to issues of safety. Communicate similar expectations to outside counsel in written guidelines.

9. Consistent with the "Winning with Integrity" guidelines for employee conduct, specifically memorialize in writing for in-house and outside counsel the expectation that they will report to appropriate Legal Staff any observed violation of law or GM policy, including possible violations of policies pertaining to the recall decision-making process. Circulate this policy to Legal Staff on a regular basis, and circulate the policy to any outside attorneys to whom the policy applies. Include this policy in orientation programs provided to in-house lawyers when they join the Company.

9. Provide guidance for product liability attorneys on how to recognize and communicate safety issues to ensure that they are properly addressed notwithstanding ongoing litigation or claims activity, while fulfilling their obligations to defend the Company in litigation and appropriately protect attorney-client privilege.

G. Interactions with Suppliers

The Company's interactions with suppliers should reflect the significance that supplier quality control has on vehicle safety. Specific recommendations for enhancing supplier relationships are as follows:

1. Ensure that procedures are in place so that supplier quality issues that may impact safety in production vehicles are communicated to appropriate personnel with vehicle safety responsibility.

2. Identify all responsible units and personnel who are accountable for monitoring and resolving concerns with supplier quality, and ensure that they have a direct or indirect reporting line up to the Vice President for Global Vehicle Safety.

3. Conduct an assessment of the adequacy of measures taken to ensure identification of any supplier parts that do not meet GM specifications, both by the time of launch and periodically during production, including independent testing in appropriate circumstances.

4. Ensure that appropriate procedures are in place for addressing parts, including parts provided by suppliers, that do not satisfy GM specifications. These procedures should include a specific protocol for reviewing authorizations of out-of-specification parts, tracking out-of-specification parts, identifying who should be notified of them, and identifying and elevating any potential safety issues that might be associated with the use of out-of-specification parts. Require high-level review for approval to use the part.

5. Ensure that the Company receives and maintains, as part of its own files, all supplier design change and work order documents relating to supplier parts.

6. Work with suppliers to increase GM's access to stored and recorded data on SDMs, CDRs, and EDRs used in GM products.

H. Data Storage, Retrieval, and Analysis

Several of the problems discussed in this report could have been avoided or resolved much more quickly if the individuals involved had timely searched for or received accurate and complete data that in many cases was already in GM's possession. Accordingly, the Company has committed, in ¶ 22 of the May 16, 2014 NHTSA Consent Order, to revise its product quality

analytics to improve its ability to identify safety consequences and the severity of those consequences, as well as to assess the number or rate of allegations, complaints, incidents, reports and/or warranty claims relating to potential safety-related defects. Specific recommendations to fulfill these commitments and to improve the Company's ability to store, retrieve, and analyze data in a way that promotes identification of safety issues are as follows:

1. Ensure that the Global Vehicle Safety organization monitors all safety-related databases (including TREAD, CVEP,[1164] GART, PRTS, ESIS, CTF, etc.) as well as public sources, such as NHTSA and other crash investigation reports, for trends or patterns of issues that may raise safety concerns. This entails two sub-issues. First, monitor the databases actively so that there is a mechanism for identifying patterns of defects or incidents that raise potential safety concerns, as opposed to searching the databases only when a perceived need arises. Second, establish mechanisms for coordinating the monitoring of these databases to ensure that patterns of similar defects and incidents across different databases will be visible and receive attention.

2. Establish a standardized process for the regular monitoring of safety recalls by other manufacturers, and for the mapping of these recalls to existing internal and external investigations by PI.

3. Ensure that staffing levels in the TREAD group and elsewhere are sufficient to allow proactive monitoring of data for safety issues. Similarly, ensure that staffing levels of personnel responsible for other company databases, for information technology, and elsewhere are sufficient to ensure accuracy and completeness of the information in Company databases.

4. Improve the search functions in the databases to make it easier to locate and review data. Determine whether improvements can also be made to increase the accuracy of searches, by minimizing irrelevant data captured by searches while maximizing the ability of searches to retrieve data that is relevant even though it may have been captured from different sources using different language and different fields. In addition, address difficulties in searching across several databases, for example by consolidating the databases or improving the search mechanism, and ensure that relevant personnel are trained on search methods.

[1164] The Company Vehicle Evaluation Program ("CVEP") database collects information provided by employees who drive company-owned vehicles.

5. Work with data analytics suppliers to identify and implement available automated tools, or commission new ones if appropriate, that will enhance the Company's ability to monitor, retrieve and analyze safety-related data.

6. Provide product investigators and related personnel direct access to relevant databases where appropriate, and provide indirect access to any databases that require special expertise, such as TREAD.

7. Ensure that relevant analytics, procedures, and policies focus on severity and identification of potential safety-related consequences of a defect, even where the defect is infrequent.

8. Conduct an assessment of the adequacy of processes for dealers to identify and report safety-related issues that do not otherwise get reported through the warranty data collection process. Ensure that GM's expectations for dealers to report safety issues are clearly defined.

9. Accept NHTSA's offer to consult with GM about industry best practices for identifying safety-related defects through the screening of data.

10. Require that ESIS monitor its data concerning alleged safety defects for patterns and trends and bring such patterns and trends to the Company's attention.

I. Engineering Processes and Databases

Functions such as the PRTS and EWO processes are critical to execution of GM's engineering functions, and also to tracing prior engineering decisions when product investigations are conducted. Recommendations to improve these processes are as follows:

1. Ensure adequacy of current processes for transparency, tracking, and, where appropriate, elevation of issues being dealt with in the PRTS system. Ensure that the processes focus on quality and safety.

2. Ensure adequacy of process for determining the correct severity classification, including review by supervisory personnel of initial severity determinations. In addition, when a PRTS has been open for a set amount of time (such as 60 days), implement a review of its severity level based on any newly available information or analysis. Establish a process through which PRTSs categorized as level 1 (safety issues) are automatically elevated for additional review, in coordination with a member of the Global Vehicle Safety organization.

3. Ensure that the standard for closing PRTSs without action is clearly defined and sufficiently rigorous. Ensure that a PRTS cannot be closed without action absent clear sign-off by named individuals and appropriate levels of review. Re-affirm that the lack of an "acceptable business case" is not an acceptable reason for closing out a PRTS if the PRTS involves a safety issue.

4. Require sign-off by a validation engineer on all EWOs, with the validation engineer to consider any impact on safety and compliance as to both the design change itself and other affected subsystems in the vehicle.

5. In any processes and databases (such as PRTS and GART) where severity levels are assigned, review the criteria used to determine whether problems are identified as safety issues to ensure that those criteria adequately encompass all defects that have the potential to adversely affect consumer safety. In addition, GM should ensure that individual decisions about severity levels are reviewed, so that a single engineer does not make the decision.

J. Product Investigation Process

The product investigation of the Cobalt Ignition Switch began nearly a decade before any recall was initiated. Multiple failures contributed to that extraordinary delay. We recommend the following specific steps to improve the Product Investigations process:

1. Standardize the process for collecting and reviewing information that gives rise to product investigations. As part of this standardization, identify the categories of source information that should be reviewed during any investigation. Train investigators on the revised process.

2. Establish clear criteria for the process for assigning PIs and for documenting those assignments (or the reasons for not making an assignment) to ensure that PIs are assigned in a manner that ensures that the requisite expertise and resources are applied to each matter.

3. Formalize other procedures governing the PI process, including how issues are escalated within the process and who is responsible and accountable for monitoring the progress and bringing the investigation to a conclusion. Ensure expedited review and escalation of investigations involving injuries and fatalities, and any other investigations where at any point a safety or compliance issue is implicated.

4. Ensure that there are adequate mechanisms to enable product investigators to identify and review any prior Company investigations regarding the same condition, in the same or other models.

5. Establish clear deadlines for each element of the PI process such that any missed deadline results in increased attention. For example, for any investigation that is not resolved within a defined time period, such as 60 days, ensure that the progress of the investigation is monitored and documented, and in appropriate circumstances, escalated.

6. Standardize the processes for creating documentation reflecting the progress and results of investigations. Documentation might be on a tracking form and/or on a separate progress reporting form, and it should include such information as major investigative activities conducted since the last report, current conclusions or hypotheses, open issues, and next steps.

7. Ensure that the PI group is staffed sufficiently to address these recommendations.

K. FPE Process

GM has agreed in ¶ 21 of the May 16, 2014 NHTSA Consent Order to increase the speed with which recall decisions are made, including by clarifying the recall decision-making process to decrease the number of steps prior to making the final decision of whether to conduct a recall. We recommend that GM review its processes and implement changes consistent with that agreement. Specific recommendations are as follows:

1. Create a specific form for initiating the FPE process that clearly identifies the issue(s) to be investigated, lists the parts that could be implicated, identifies the suppliers of those parts, lists the potentially impacted vehicle models and years, identifies the source of the information that triggered the investigation, identifies the investigator who will have responsibility for the investigation, and identifies the individual who will be responsible for monitoring the matter and bringing it to conclusion.

2. The Company has committed, in ¶ 24 of the May 16, 2014 NHTSA Consent Order, that it shall not delay holding any meeting to decide whether or not to recommend or conduct a safety recall because the Company has not yet identified the precise cause of a defect, determined a remedy for the defect, or prepared a plan for remedying the defect. In order to comply with that commitment, develop

and adopt policies and procedures that implement this commitment and train relevant employees on those policies and procedures.

3. The Company has committed, in ¶ 24 of the May 16, 2014 NHTSA Consent Order, that it shall ensure that the decision-makers for recalls are informed of safety-related concerns in a reasonably expeditious manner, including by ensuring that GM's corporate structure enables its safety organization to promptly bring safety-related issues to the attention of committees and individuals with authority to make safety recall decisions. Accordingly, in conjunction with its review of the FPE process, the Company should assess whether the current organizational structure – including the appointment of the Vice President for Global Vehicle Safety and the restructuring of the groups that report to him – fulfills this commitment.

4. In ¶ 21 of the May 16, 2014 NHTSA Consent Order, GM agreed to increase the speed with which recall decisions are made, including by clarifying the recall decision-making process to decrease the number of steps prior to making the final decision of whether to conduct a recall.[1165] As GM revises this process, formalize other procedures governing the process, including how the process is initiated, who may initiate the process, how issues are escalated within the process, who is responsible and accountable for monitoring the progress and bringing the matter to a conclusion, and the chain of command throughout the process. Maintain a written policy governing this process that clearly defines the procedural steps in the process and the role of each participant. Ensure that part of the FPE process includes identification and review of any prior FPE processes regarding the same condition in the same or other models.

5. Establish clear deadlines for each element of the FPE process such that any missed deadline results in increased attention. For example, for any issue that is not resolved within a short, defined time period, such as 60 days, ensure that the progress of the issue is monitored and, in appropriate circumstances, escalated.

6. Standardize and improve documentation of decision points during the FPE process, including documentation of decisions made and attendees present at those decision points. In particular, require that FPE participants document potential defects and remedies that are rejected during or as the result of the FPE process, such as root causes that are considered and rejected and model years that are examined but not included in a final recall.

7. For any investigation that is not resolved within a defined time period, such as 60 days, ensure that the progress of the investigation is documented. Documentation might be on a tracking form and/or on a separate progress reporting form, and it

[1165] We understand that this is in progress.

should include such information as major investigative activities conducted since the last report, current conclusions or hypotheses, open issues, and next steps. Document the conclusion of an investigation on a form that records the conclusions reached, the action recommended, and the reasons supporting the conclusions and recommended action.

8. Ensure that systems are in place for maintaining and organizing documentation of agendas, presentations, summaries, decision memoranda, and other documents reflecting the steps in the FPE process, and implement improvements as necessary to ensure that those materials are organized, maintained, and accessible.

9. Establish guidelines governing the ability of an investigator to remove an issue from the FPE process because PI determines it is unrelated to safety.

L. Policies and Training

In many instances in this Report, personnel were not aware of a relevant policy to govern their decisions or did not sufficiently understand an existing policy, and many employees reported receiving little to no training on policies and substantive issues relevant to their roles. As GM fulfills its training-related obligations in the May 16, 2014 NHTSA Consent Order, we recommend that it undertake the following specific steps to ensure that appropriate policies are in place and that sufficient training is provided:

1. Review policies and procedures that bear on safety issues to ensure that they are easily understood and readily accessible. In particular, revise the GRC 3.1.1 policy on determining when a new part number must be assigned. Clarify the policy to require assignment of a new part number whenever a design change alters the expected performance of a supplied part, and remove the "legitimate business case" language.

2. Review GM's compliance policies and procedures to identify revisions to ensure adequate, appropriate, and consistent treatment of safety issues. For example, make clear that Winning With Integrity covers the identification and raising of safety issues, or issue a companion policy covering those issues.

3. Improve or create standards for elevating safety issues and ensure that training covers these standards. The standards should cover, for example, situations where GM engineers are unable to determine why a product failed to perform appropriately.

4. Ensure that personnel, including legal personnel, personnel responsible for IT systems and databases, and personnel who are assigned to monitor data streams or identify emerging issues and trends, have appropriate backgrounds and training. For example, high-level legal personnel may benefit from background or training in product litigation issues and recalls. Similarly, employees with responsibility for IT systems and databases would benefit from background or training in the relevant systems or databases, and employees who monitor and digest warranty data may benefit from engineering backgrounds.

5. Train employees to recognize and elevate safety issues. Emphasize that safety issues should be actively identified and addressed regardless of whether vehicles are in the design phase or the production phase.

6. Provide employees with appropriate function-specific training to recognize safety issues and respond appropriately. This training should include, among other things, what constitutes a safety issue and the role of various organizational units and processes in handling safety issues. For engineers, training should include the safety and compliance ramifications of design changes.

7. Train PIs and FPA engineers, and related personnel, on sources of data that are publicly available and may have information relevant to particular investigations and possible safety issues.

8. Train Legal Staff who deal with safety issues on the NHTSA recall process.

9. Extend training on safety issues to supplier employees embedded within GM where appropriate.

10. Train engineers on policies that explain the circumstances under which an engineer may deviate from a Component Technical Specification when approving a part for production, and how such a deviation must be documented.

11. Train employees on lessons learned from the Cobalt investigation.

12. Communicate to employees that a low frequency of occurrence should not prevent an issue from being escalated for appropriate investigation and review if it otherwise presents a potential safety issue.

13. Educate employees that shielding senior executives or other employees from information in order to allow them to deny knowledge is not acceptable; on the contrary, employees should err on the side of elevating potential safety issues.

M. Compliance, Auditing, and Oversight

To ensure proper implementation of remedial measures discussed above, we recommend the following:

1. After Speak Up For Safety has been in place for a year, survey employees to assess their attitudes toward safety and their willingness to raise safety concerns. In addition, within a reasonable time (perhaps one year) after the date of this Report, have a source outside of the safety organization (such as GM Audit Services) conduct an audit to assess the progress and effectiveness of the remedial measures implemented. Also, implement regular audits of the recall decision-making process to ensure that it is functioning as intended and identify improvements. For example, audits should address whether issues that are safety-related are being appropriately designated as such.

2. Ensure that the Global Ethics and Compliance Center monitors relevant aspects of the safety program, including investigation of Speak Up For Safety complaints, the recall decision-making process, training on safety and recall issues, and periodic evaluation of safety procedures and metrics, in conjunction with the regular audits described in item 1 above.

3. Require the Global Vehicle Safety organization to document the improvements it is making related to safety, and its implementation of these recommendations, to facilitate review of those improvements.

4. Ensure that the Board receives regular reports from the Vice President of Global Vehicle Safety on at least a quarterly basis and, after one year, evaluates the Company's progress in implementing the commitments made in the May 16, 2014 NHTSA Consent Order and any recommendations in this Report the Company decides to implement; and take such other steps as the Board may find useful to monitor management's compliance with global vehicle safety-related obligations and Company vehicle safety-related policies.

N. Recordkeeping

Adequate recordkeeping will enhance the ability of product investigators and others with safety responsibilities to review past engineering and investigative measures that may impact current investigations, and will also facilitate subsequent reconstruction of investigative steps when necessary. In addition to the recommendations identified in connection with specific

processes, as discussed above, recommendations to improve the Company's record-keeping relating to safety issues are the following:

1. Document the discussions during Settlement Roundtables and Settlement Review Committee meetings, including follow-up from those meetings, and not just the final decisions.

2. Maintain all significant engineering records documenting design decisions, including documentation of all design changes within a model year on a particular platform.

3. Document FPE decision points, as well as decisions made at CPITs and VAPIRs, specifically including decisions not to take suggested field actions or to downgrade the type of action taken.

4. Document, on the EWO form, whether a proposed EWO involves a change to fit, form, or function.

5. Ensure that all results of safety and compliance testing are adequately documented.

6. Ensure that all electronic documents relating to safety issues that are maintained in GM's records (including records maintained by Global Vehicle Safety and the Legal Staff) are kept in a searchable format to the extent technologically possible. For example, perform optical character recognition ("OCR") on PDF documents before storing them.

O. Conclusion

GM has begun undertaking some of the measures discussed above. Under the direction of Jeff Boyer, who has assumed the recently created role of Vice President for Global Vehicle Safety, the Company has instituted a Speak Up For Safety program designed to encourage employees to identify, report, and elevate safety issues, and train them how to do so. Staffing has been increased substantially to allow more issues to be investigated and expedite the investigation process. A new emerging issues group has been created to monitor and analyze data streams, and that group is working with data analytics suppliers to assess the suppliers' capabilities and develop recommendations for appropriate systems to employ. We recommend

that GM continue to implement these measures, implement the additional steps identified above, and use the self-examination prompted by the Ignition Switch failures, so that the Company is an industry leader in the way it handles consumer safety issues.

APPENDIX A: NHTSA Reporting Requirements

This Appendix summarizes GM's various reporting obligations to NHTSA under the Safety Act and TREAD Act during the relevant time period.

Reporting a "Defect . . . Related to Motor Vehicle Safety"

The Safety Act requires that a motor vehicle manufacturer notify NHTSA when it "learns" one of its vehicles contains a "defect" that is "related to motor vehicle safety."[1166] NHTSA's implementing regulation likewise provides: "[e]ach manufacturer shall furnish a report to the NHTSA for each defect in his vehicles or in his items of original or replacement equipment that he or the Administrator determines to be related to motor vehicle safety."[1167] NHTSA has further specified that the Defect Information Report must be submitted "not more than 5 working days after a defect in a vehicle or item of equipment has been determined to be safety related."[1168]

NHTSA has not promulgated a comprehensive definition of "defect," choosing instead a "common sense" approach that looks to the facts of each particular case.[1169] The statute defines a defect "related to motor vehicle safety" as a defect that creates an "unreasonable risk" of an

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[1166] 49 U.S.C. § 30118(c)(1).
[1167] 49 C.F.R. § 573.6(a).
[1168] 49 C.F.R. § 573.6(b).
[1169] A case entitled *United States v. General Motors Corp.*, 518 F.2d 420 (D.C. Cir. 1975) ("*Wheels*"), established the standard for determining whether a malfunction in a motor vehicle constitutes a "defect" under § 30118(c)(1):

> [A] vehicle or component 'contains a defect' if it is subject to a significant number of failures in normal operation, including failures either occurring during specified use or resulting from owner abuse (including inadequate maintenance) that is reasonably foreseeable (ordinary abuse), but excluding failures attributable to normal deterioration of a component as a result of age and wear. . . . [I]n all cases the manufacturer may prove, as an affirmative defense, that the failures resulted from unforeseeable owner abuse (gross abuse) or unforeseeable neglect of vehicle maintenance.

Id. at 427. A "significant number" of failures according to the court is "non-*de minimis*," but also "normally will not be a substantial percentage of the total number of components produced." *Id.* at 438 n.84.

accident, or of a risk of injury or death as the result of an accident.[1170] As with the term "defect," NHTSA has not defined "motor vehicle safety," believing "any attempt to define safety related defect would be ill-advised. . . . The fact that [safety] determinations may encompass a wide variety of factual situations, and may consequently be difficult to make, does not mean that it is necessary, desirable, or even possible to replace the decision with a simple formula."[1171]

Some defects such as total loss of control of a vehicle or an engine fire create a *per se* unreasonable risk.[1172] For other defects, however, courts look to statistical and other evidence to determine whether the circumstances in which the defect occurs (or could occur) actually pose an unreasonable risk of accident or injury.[1173] Courts have rejected the notion that any risk to vehicle safety – no matter the cost required to eliminate the risk – is automatically an "unreasonable" risk.[1174]

Finally, regarding what it means for a manufacturer to "learn" of a safety-related defect to trigger the reporting and recall requirement, neither the statute nor NHTSA regulations provide an explicit standard. However, in interpreting the predecessor statutory provision courts

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[1170] 49 U.S.C. § 30102(a)(8).
[1171] NHTSA, Resp. to Pet. for Reconsideration of Defect Notification Regs., 38 Fed. Reg. 9509, 9510 (April 17, 1973).
[1172] *See, e.g.*, *United States v. General Motors Corp.*, 561 F.2d 923, 928 (D.C. Cir. 1977) (holding that an unreasonable safety risk occurred when part of the steering mechanism of the car failed causing sudden and complete loss of steering control); *United States v. General Motors Corp.*, 565 F.2d 754, 757 (D.C. Cir. 1977) ("[W]e can see no question but that engine fires . . . are extremely dangerous for all involved and should be considered an unreasonable risk to safety.").
[1173] *See, e.g.*, *Smith v. Ford Motor Co.*, 749 F. Supp. 2d 980, 991 (N.D. Cal. 2010) (finding that an ignition failure that could prevent a vehicle from being started did not constitute a threat to motor vehicle safety because "[p]laintiffs offer no evidence that the ignition-lock defect causes engines to shut off unexpectedly or causes individuals to stop their vehicles under dangerous conditions.").
[1174] *See, e.g.*, *Center for Auto Safety v. Peck*, 751 F.2d 1336, 1344 n.5 (D.C. Cir. 1985) ("The principle that an 'unreasonable risk' provision requires even insignificant risks to be eliminated if that can be done at (presumably) insignificant cost would turn many areas of regulation into unending pursuit of the trivial."); *United States v. General Motors Corp.*, 656 F. Supp. 1555, 1579 (D.D.C. 1987) ("[I]f the only 'remedies' are ineffective, prohibitively expensive, or affirmatively detrimental to public safety, even a significant risk may nevertheless be 'reasonable' as a matter of law.").

have made clear that constructive rather than actual knowledge is effectively required, and this knowledge may be inferred when a manufacturer receives sufficient customer complaints or warranty claims concerning the defect at issue.[1175]

EWRs and Quarterly Reviews

The TREAD Act requires automobile manufacturers to submit quarterly reports, known as Early Warning Reports ("EWRs"), to NHTSA.[1176] For car manufacturers, the data must include counts of property damage claims; warranty reports; consumer complaints; and field reports broken down by make, model, and model year and by system category (*e.g.*, steering, braking).[1177] Manufacturers must also submit summaries of each claim against the company for death or injury allegedly related to a defect.[1178] NHTSA mines these reports for possible safety defects that may warrant a formal investigation.[1179] We do not understand that GM is alleged to have violated its obligation to submit these EWRs, and such routine reporting is not the focus of this investigation.

[1175] *See, e.g.*, *United States v. General Motors Corp.*, 656 F. Supp. 1555, 1559 n.5 (D.D.C. 1987) (finding that manufacturer cannot evade its reporting requirement by intentionally failing to reach determination that a defect is safety-related); *United States v. General Motors Corp.*, 574 F. Supp. 1047, 1050 (D.D.C. 1983) (manufacturer incurs reporting obligation when it "actually determined or should have determined" that a safety-related defect exists). *See also Doll v. Ford Motor Co.*, 814 F. Supp. 2d 526, 537 -38 (D. Md. 2011) (requiring duty to report safety defect where Ford had received "customer complaints filed directly with Ford, Ford's authorized dealerships, NHTSA, internet websites, and other public venues"); *In re Porsche Cars North America, Inc.*, 880 F. Supp. 2d 801, 816-17 (S.D. Ohio 2012) (same); *Great Western Casualty Co. v. Volvo Trucks North America*, No. 08-CV-2872, 2010 WL 422294, at *2 (N.D. Ill. Oct. 20, 2010) (finding a plaintiff had alleged sufficient facts by claiming "Volvo knew that the truck was defective because it had received several fire-related liability claims and warranty claims since August 2003").
[1176] 49 C.F.R. § 573.7.
[1177] 49 U.S.C § 30166(m)(3)(A)(i); 49 C.F.R. § 573.6(c)(2)-(8).
[1178] 49 U.S.C § 30166(m)(3)(A)(i).
[1179] *See* Statement of the Honorable David Friedman, Acting Administrator, NHTSA, Before the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance (April 2, 2014), at 5, *available at* http://www nhtsa.gov/Testimony [DOC ID 000162977022].

Recalls

A recall can arise either from a manufacturer's determination that a safety or compliance defect exists (*i.e.*, "self-generated") or from an order by NHTSA requiring a recall (*i.e.*, "influenced") during or after a NHTSA investigation. As noted, when a manufacturer learns that a safety defect exists that requires a recall, it must file a defect information report within five days with NHTSA under 49 C.F.R. Part 573, known in the industry as a "573 Report."[1180] The 573 Report must identify the line of vehicles or equipment under recall, the number of affected vehicles or pieces of equipment, a description of the defect, and a description of the remedy. The manufacturer must also include a chronology of its own investigation and decision-making process.[1181] If NHTSA has concerns that the manufacturer's action was untimely, it may open a Timeliness Query ("TQ") to learn more about that process.[1182]

Under 49 C.F.R. Part 577, manufacturers are required to notify owners of vehicles and vehicle equipment under recall.[1183] The "577 Letter" must state that the manufacturer has determined that there is a safety defect in a vehicle or piece of equipment; where and when a remedy to the defect can be obtained; and that the remedy will be provided free of charge.[1184]

[1180] 49 C.F.R. § 573.6(b).
[1181] 49 C.F.R. § 573.6(c)(6).
[1182] Statement of the Honorable David Friedman, Acting Administrator, NHTSA, Before the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance (April 2, 2014), at 7, *available at* http://www.nhtsa.gov/Testimony [DOC ID 000162977022].
[1183] 49 C.F.R. § 577 *et. seq.*
[1184] 49 C.F.R. § 577.5(e), (g)(1); Statement of the Honorable David Friedman, Acting Administrator, NHTSA, Before the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance (April 2, 2014), at 7, *available at* http://www.nhtsa.gov/Testimony [DOC ID 000162977022].

The manufacturer must then track how many of the items under recall receive the remedy ("recall completion") and report the numbers to NHTSA for six quarters.[1185]

NHTSA's Office of Defects Investigation administers TREAD Act requirements, and investigates defects brought to its attention by manufacturers or by members of the public.[1186]

[1185] See Statement of the Honorable David Friedman, Acting Administrator, NHTSA, Before the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance (April 2, 2014), at 7, *available at* http://www nhtsa.gov/Testimony [DOC ID 000162977022].
[1186] *See* Statement of The Honorable David Friedman, Acting Administrator, NHTSA, Before the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee on Consumer Protection, Product Safety, and Insurance (April 2, 2014), at 4, *available at* http://www nhtsa.gov/Testimony [DOC ID 000162977022].

APPENDIX B: GM's Vehicle Investigations Processes

Problems with the Cobalt were identified and investigated through three different established GM processes: one within the engineering and program development area; one under a dedicated investigative function; and one in the context of addressing product liability claims against GM. This Appendix describes how those processes worked during the relevant time period.

A. Investigations in Engineering and Program Development Process

Customer satisfaction and safety issues were tracked and addressed through a variety of systems and committees discussed in this section.

1. Problem Resolution Tracking System ("PRTS")

PRTS is a database used by GM to document and track engineering problems identified in testing, in manufacturing, or through warranty data and customer feedback. PRTS issues could originate from GM employees in a number of areas: Engineering, Industrial Engineering, Service, Worldwide Purchasing, and Assembly Manufacturing.[1187] A PRTS issue is generally addressed by engineers in the functional area(s) involved – for example, with regard to the Cobalt Ignition Switch, by engineers responsible for the steering column or for the ignition switch.[1188] A large number of PRTS issues are opened for every vehicle. According to one witness, it is typical for a vehicle to have had 500 to 600 PRTS issues opened before launch.[1189]

[1187] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 3 [DOC ID GMCB-000000977278].
[1188] J&B Interview of Joseph Manson, March 19, 2014; J&B Interview of Doug Parks, March 18, 2014.
[1189] J&B Interview of John Hendler, April 25, 2014; *see also, e.g.*, GMX001 VAPIR Meeting Agenda (Jan. 18, 2005) attaching a spreadsheet of sixty-five open PRTS issues for the Cobalt [DOC ID 14021301695327; GMNHTSA000227763].

After identifying the issue, the originator of a PRTS report selects a severity level for the problem.[1190] The severity level is a significant factor in the priority given to a PRTS report, with more severe issues addressed more urgently.[1191] The originator selects the severity level from a drop-down menu that includes brief descriptions of what each level signifies. Prior to 2010, there were four severity levels that could include problems impacting the customer:[1192]

Code 1: Possibly Safety / Regulatory Issues / Walk Home / No Build

Code 2: Major Issues – an issue that would cause the customer to immediately return the vehicle to the dealership or cause excessive cost or labor impact at the assembly plant

Code 3: Moderate Issues – fix on the next trip to dealership or cause moderate cost or labor impact at the assembly plant

Code 4: Annoyance / Continuous Improvement[1193]

A fifth option, "Code $," was used for Cost Reduction Issues.[1194] In March 2010, Code 3 was revised to "Moderate Build Concern (Assembly productivity, Part substitution request, etc.) with NO CUSTOMER IMPACT."[1195] The memo announcing that change explained that all issues affecting customers should now be rated either level 1 or level 2 "to focus the organization on fixing every customer issue."[1196] Prior to 2010, an issue could be seen as "moderate" or an "annoyance," and thus given a low priority, even if it directly affected customers.

[1190] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 10-14 [DOC ID GMCB-000000977278].
[1191] Dennis Korinek, GM, Priority Drivers and the Prioritization Formulas Used in PRTS+ (revised Nov. 11, 2005), at 2, 32 [DOC ID GMCB-000000977300]; J&B Interview of Yvonne Cummings, April 3, 2014; J&B Interview of Alberto Manzor, May 1, 2014; J&B Interview of Gregory Schone, April 2, 2014.
[1192] GM, Memo Definition # 20100330 (March 2010) [DOC ID 000240765039].
[1193] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 14 [GMCB-000000977278].
[1194] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 14 [GMCB-000000977278].
[1195] GM, Memo Definition # 20100330 (March 2010) [DOC ID 000240765039].
[1196] E-mail from Kathy Doher, GM, to WW_VBE Staff, GM, *et al.* (March 30, 2010) [DOC ID 000007716693].

Safety-related issues may be elevated out of the PRTS process for immediate review by the Field Performance Evaluation ("FPE") process, discussed below.[1197] In the 2005 timeframe, when an engineer was assigned to serve as the initial "Champion" for a PRTS report, the e-mail announcing the assignment directed the engineer to the FPE procedure for potential safety issues.[1198] The CPIT was responsible for officially opening and reviewing the PRTS reports, including deciding the appropriate severity designation.[1199] Some witnesses have indicated that the severity level of a PRTS report was reviewed in committee meetings or by program engineers.[1200]

There are five steps in the PRTS process: identification of the issue; identification of the root cause; identification of a solution; implementation of the solution; and feedback.[1201] At each step, a "Champion" is assigned to resolve and close that step.[1202] The Champion may assign a "Champion Designee" to document the required information for that step.[1203] The Champion is typically someone with functional experience with the parts involved, such as the Design Release Engineer or Engineering Group Manager.[1204] The 2006 training module included a process for assigning a new Champion if the Champion has been incorrectly assigned,

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[1197] J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Lori Queen, May 12, 2014.
[1198] *See, e.g.,* E-mail from PRTS Restricted@GMAPP , GM, to Kevin Gannon, GM (May 25, 2005) [DOC ID 000011020033; GMNHTSA000218751].
[1199] J&B Interview of Joseph Manson, April 22, 2014.
[1200] J&B Interview of Steve Longman, March 24, 2014; J&B Interview of Joseph Manson, April 22, 2014.
[1201] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 15 [DOC ID GMCB-000000977278].
[1202] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 15 [DOC ID GMCB-000000977278]; PRTS+ 2.0 Overview Trifold (Nov. 2, 2006) [DOC ID GMCB-000000977276].
[1203] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 15 [DOC ID GMCB-000000977278].
[1204] J&B Interview of Joseph Manson, March 19, 2014.

although it did not include a process for changing the severity level assigned to the PRTS report.[1205]

There was a timetable for taking a PRTS report from initiation to conclusion, but witness reports differ as to what the precise timetable was. One witness said the timing guidelines varied over time, and recalled that the goal in 2009 was to resolve a PRTS issue within 90 days.[1206] Other witnesses reported that a PRTS inquiry was usually completed in 30-35 days.[1207] Engineering meetings allotted time to PRTS issues that were more than 35 days old and still in the early stages of investigation.[1208]

Typically, a PRTS report would be closed at the end of the Feedback step, after a solution had been implemented and it had been confirmed to have addressed the concern.[1209] However, a PRTS report could also be closed at an earlier stage, "Without Action," with the approval of the Current Production Improvement Team ("CPIT") (discussed below).[1210] The PRTS forms did not necessarily reflect that approval process when the PRTS was closed without action.[1211] Witnesses differed as to whether a Program Engineering Manager ("PEM") could close a PRTS report on his own; most witnesses said that the approval of either the CPIT or the Vehicle Chief Engineer ("VCE") was required, depending on the severity level of the issue in the PRTS.[1212]

[1205] *See* GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 18 [DOC ID GMCB-000000977278].
[1206] J&B Interview of Yvonne Cummings, April 3, 2014.
[1207] J&B Interview of Alberto Manzor, May 1, 2014; J&B Interview of Rajiv Mehta, April 3, 2014.
[1208] *See, e.g.*, GMX001 VAPIR Meeting Agenda (Jan. 18, 2005) [DOC ID 14021301695327].
[1209] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 22 [DOC ID GMCB-000000977278].
[1210] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 23 [DOC ID GMCB-000000977278].
[1211] *See, e.g.*, PRTS N172404 (Nov. 19, 2004) [DOC ID 000001771143; GMNHTSA000142658]; PRTS N182276 (May 16, 2005) [DOC ID 14021301731575].
[1212] *See, e.g.*, J&B Interview of Joseph Manson, March 19, 2014 (CPIT approval was required to close a PRTS report); J&B Interview of Alberto Manzor, May 1, 2014 (closing a PRTS without action required Chief Engineer's

Under the GM policy in effect at the time, the PEM did not have authority to close the PRTS report; the CPIT had to approve the closure of a non-safety related PRTS when no action was taken.[1213]

2. Vehicle and Process Integration Review ("VAPIR") Meetings

Possible PRTS solutions would be discussed at weekly Vehicle and Process Integration Review ("VAPIR") meetings, attended by program engineers responsible for the vehicle. VAPIR meetings would include the Vehicle Program Manager, the Vehicle Architecture Manager, the Business Manager, and Vehicle System Engineers ("VSEs") for various components of the vehicle.[1214] The PEM and sometimes the VCE would also attend. The VSEs acted as liaisons between the program engineers, who would be responsible for a particular vehicle program (like the Cobalt), and system engineers, who would be responsible for a system (like Electrical or Chassis).[1215] Safety engineers typically would attend VAPIR meetings during the development phase of a vehicle, but would attend meetings after production began only if a safety-related topic were on the agenda.[1216]

The purpose of VAPIR meetings was to discuss engineering solutions, to keep issues moving in accordance with PRTS timelines, and to overcome engineering roadblocks.[1217] Over the life of a vehicle program, the content of VAPIR meetings would change, focusing first on

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approval and would trigger scrutiny at the CPIT and Vehicle and Process Integration Review ("VAPIR") meetings); J&B Interview of Doug Parks, March 18, 2014 (PEM could close a PRTS report himself).
[1213] "Closed Without Action" Approval Guidelines By Issue Type & Closure Code [DOC ID S006897_000000629].
[1214] *See, e.g.*, GMX001 VAPIR Meeting Agenda (Jan. 18, 2005) [DOC ID 14021301695327].
[1215] J&B Interview of John Hendler, April 25, 2014.
[1216] J&B Interview of Alberto Manzor, May 1, 2014; *see also* J&B Interview of Joseph Manson, April 22, 2014 (explaining that safety engineer would attend a CPIT meeting, if there was a safety issue before the CPIT).
[1217] J&B Interview of Joseph Manson, April 22, 2014.

development issues, then on validation issues, then on plant or build issues.[1218] Although VAPIR meetings would focus on engineering solutions, they still would consider cost when deciding which solutions to recommend, if the issue presented did not relate to safety.[1219] The notes from VAPIR meetings are minimal and not consistently recorded. To the extent we have them, the notes are limited to a sentence or two entered next to an item on the agenda.[1220]

3. Cross-VAPIR Meetings

Engineering leaders for different vehicle programs would come together in less frequent Cross-VAPIR meetings to discuss issues affecting multiple vehicle programs, such as a proposed part change that would impact vehicles on more than one vehicle platform.[1221] One witness said Cross-VAPIR meetings would occur once or twice a month.[1222] The Cross-VAPIR attendees would vary depending on the parts and vehicles on the agenda for discussion.[1223]

4. Current Production Improvement Team ("CPIT") Meetings

For vehicles in production, PRTS issues and solutions were presented to the Current Production Improvement Team ("CPIT"), which managed business plan objectives for vehicles in production.[1224] Each vehicle line would have its own CPIT, responsible for deciding which

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[1218] J&B Interview of John Hendler, April 25, 2014.
[1219] J&B Interview of Gary Altman, March 14, 2014; *see also, e.g.*, GMX001 VAPIR Meeting Agenda (Sept. 20, 2005) [DOC ID 15032000612752; GMNHTSA000329532] ("Trush to advise Joe on possible cost reduction otherwise will stop").
[1220] *See, e.g.*,GMX001 VAPIR Meeting Agenda (Jan. 18, 2005) [DOC ID 14021301695327; GMNHTSA000227763]; GMX001 VAPIR Meeting Agenda (April 12, 2005) [DOC ID 14032600001274].
[1221] J&B Interview of John Hendler, April 25, 2014; J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Alberto Manzor, May 1, 2014; J&B Interview of Steven Oakley, April 23, 2014.
[1222] J&B Interview of Joseph Manson, April 22, 2014.
[1223] J&B Interview of John Hendler, April 25, 2014; J&B Interview of Alberto Manzor, May 1, 2014.
[1224] GM, CPIP and PRTS+ Process Overview (last modified March 30, 2006), at 3 [DOC ID GMCB-000000977278].

improvements to make to that vehicle, and approving PRTS solutions proposed by engineers.[1225] The CPIT is chaired by the Vehicle Line Director ("VLD") on behalf of the Vehicle Line Executive ("VLE") function.[1226] The VLE would review issues left unresolved by the CPIT.[1227] CPIT meetings would typically be attended by the Program Engineering Manager for the vehicle program, the Plant Manager, the Project Work Engineer, the Supplier Quality Engineer, the Brand Quality Manager, the Quality Assurance Manager, and the Quality Engineering Manager.[1228] There are no consistent records of who attended each CPIT meeting.

5. Program Execution Team ("PET")

The Program Execution Team ("PET") is above the CPIT in the vehicle program hierarchy.[1229] The PET would consider platform-wide business decisions and included representatives from marketing and planning, as well as leadership from the CPIT and VAPIR processes.[1230] The PET made commercial decisions and brought a marketing perspective to engineering issues.[1231] For example, it may be advantageous from an engineering standpoint to standardize a component across vehicle models, but the PET could make a decision based on its knowledge of customer preferences for different vehicles.[1232] The VLE, who was described by one witness as the "top of the food chain," has ultimate authority for cost decisions made at the PET.[1233]

[1225] J&B Interview of John Hendler, April 25, 2014; J&B Interview of Eric Kenar, March 25, 2014; J&B Interview of Joseph Manson, April 22, 2014.
[1226] Global Current Product Improvement Process (updated April 17, 2009), at 11 [DOC ID GMCB-000000977307].
[1227] J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Steven Oakley, April 23, 2014.
[1228] Cobalt CPIT Weekly Agenda (June 3, 2005) [DOC ID S007116_000008738].
[1229] J&B Interview of Chris Berube, April 22, 2014; J&B Interview of Alberto Manzor, May 1, 2014.
[1230] J&B Interview of Chris Berube, April 22, 2014; J&B Interview of John Hendler, April 25, 2014; J&B Interview of Alberto Manzor, May 1, 2014.
[1231] J&B Interview of John Hendler, April 25, 2014.
[1232] J&B Interview of John Hendler, April 25, 2014.
[1233] J&B Interview of Joseph Manson, April 22, 2014.

6. Field Performance Evaluation ("FPE") and Product Investigations

The Field Performance Evaluation ("FPE") process was a dedicated investigation process used to evaluate safety, compliance, emission, and customer satisfaction issues, and to determine whether a field action is necessary. FPE is a separate process from the PRTS process, although an FPE issue may (but does not necessarily) arise out of the PRTS system.[1234] The FPE process is run by the FPE Director in GM's Global Quality and Customer Experience division, separate from the Engineering function.

Issues referred to the FPE process could arise from virtually any part of the company and be based on a problem identified by any source.[1235] One avenue to elevate an issue through the FPE process is through an internal investigation conducted by the Product Investigations ("PI") group, a designated group of engineers devoted to such investigations.[1236] After the PI group's investigation, its findings could be elevated through the FPE process to determine whether a field action was appropriate.[1237] Investigators had a target goal of bringing an issue through the FPE process within 40 days of the matter being assigned to PI, but there was no specific consequence to missing that deadline.[1238] For example, as long as an investigator kept the supervisor apprised of an investigation's progress, it was acceptable for an investigation to last more than 40 days.[1239] There was also a perception that an issue could not proceed to the decision-making

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[1234] J&B Interview of Joseph Manson, April 22, 2014; J&B Interview of Alberto Manzor, March 21, 2014.
[1235] General Motors Global FPE Process (Feb. 2, 2009), at 3 [DOC ID 000001556206], attached to e-mail from Douglas Wachtel, GM, to Carmen Benavides, GM (Jan. 13, 2013) [DOC ID 000001556205].
[1236] Maureen Foley-Gardner, Reinvention of FPE (Aug. 2012), at 13, 16 [DOC ID 000051944665] (showing that Product Investigations handles the initial analysis/investigation in a "Traditional FPE"); J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1237] Maureen Foley-Gardner, Reinvention of FPE (Aug. 2012), at 13, 16 [DOC ID 000051944665] (showing that Product Investigations handles the initial analysis/investigation in a "Traditional FPE"); J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1238] J&B Interview of Brian Stouffer, May 9, 2014.
[1239] J&B Interview of Brian Stouffer, May 9, 2014.

levels of FPE until a root cause was determined.[1240] A flow chart from 2005 shows "Determine Root Cause" as a step before deciding to conduct a safety field action.[1241]

The first place where the PI group would present its findings was at one or more Information Status Review ("ISR") meetings, held weekly and attended by the FPE Director and the Product Investigations Director, as well as by representatives from the Legal Department, Customer Care and After Sales, FPE, and Product Investigations.[1242] On occasion, a PI engineer might bring an issue to ISR to draw attention to the case or to present difficult issues raised by the investigation, before determining the root cause.[1243] However, issues presented at an ISR meeting were usually referred to the next level for further review and recommendation – suggesting that issues did not typically go to ISR until the investigation was fairly far along.[1244]

For most issues, the next stage after the ISR would be a meeting of the Field Performance Evaluation Team ("FPET"), which could recommend possible field actions (including recalls) to address the problem.[1245] After FPET, the issue would move to the Field Performance Evaluation Review Committee ("FPERC") to determine whether to recommend a field action to the Executive Field Action Decision Committee ("EFADC").[1246] The EFADC would make the final decision regarding recalls and other field actions for GM. The decision-makers on the EFADC are the Senior Vice President for Global Quality and Customer Experience, the Global Vice

[1240] J&B Interview of Brian Stouffer, May 9, 2014.
[1241] FPE Process (June 22, 2005), at 2 [DOC ID S_01318916].
[1242] J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1243] J&B Interview of Brian Stouffer, May 9, 2014.
[1244] J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1245] Maureen Foley-Gardner, Reinvention of FPE (Aug. 2012), at 20 [DOC ID 000051944665]; J&B Interview of Maureen Foley-Gardner, March 26, 2014.
[1246] Maureen Foley-Gardner, Reinvention of FPE (Aug. 2012), at 20 [DOC ID 000051944665]; J&B Interview of Maureen Foley-Gardner, March 26, 2014.

President for Engineering, and the Global Vice President for Manufacturing.[1247] In order to issue a recall, the three EFADC members needed to be unanimous.

[1247] J&B Interview of Maureen Foley-Gardner, March 26, 2014.

APPENDIX C: GM's Approach to Potential Safety Problems Through Vehicle Development Process

In the 2000s, GM utilized a number of processes to assure safety and quality in the development of a vehicle and its component parts.

1. The Vehicle and Component Development Process

Since at least the early 2000s, new GM vehicles go through GM's Global Vehicle Development Process ("GVDP").[1248] The GVDP guides pre-production vehicles through a series of "milestones," described by GM employees as "gates" or "checkpoints," along the path from vehicle design, through component and vehicle validation, to vehicle launch and production.[1249] At each step of the GVDP, GM engineers work to ensure that a vehicle and all of its parts satisfy all applicable requirements and specifications.[1250]

2. Technical Specifications

In the early 2000s, as they do now, technical specifications served as a foundation for the vehicle and component development process. GM maintained both Vehicle Technical Specifications ("VTS") and Component Technical Specifications ("CTS").[1251] VTS contained standard requirements for all GM vehicles, including requirements mandated by the Federal Motor Vehicle Safety Standards ("FMVSS").[1252] CTS contained detailed descriptions of the

[1248] Plans in Motion: The GVPD Workshops (2001), at 9 [DOC ID 000140632991].
[1249] Plans in Motion: The GVPD Workshops (2001) [DOC ID 000140632991]; J&B Interview of Doug Parks, May 1-2, 2014; J&B Interview of Lori Queen, May 12, 2014. GM has employed varying names and terminology for the steps and features of this process since the early 2000s. *See* J&B Interview of Chris Berube, April 22, 2014. Wherever possible, this Report employs the terminology used contemporaneously with the events it describes.
[1250] J&B Interview of Chris Berube, April 22, 2014.
[1251] J&B Interview of Doug Parks, May 1-2, 2014.
[1252] J&B Interview of Chris Berube, April 22, 2014; J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Doug Parks, May 1-2, 2014.

requirements to build the part, as well as a Validation Testing Plan for the component.[1253]

3. Design Release Engineers and the Product Development Team

GM's Design Release Engineers ("DREs") had responsibility for working with GM's suppliers to develop specific vehicle components for use in particular GM vehicles – their "design" responsibilities – and to ensure that those components satisfied GM's requirements and specifications before ultimately approving the part for use in a GM vehicle – "releasing" the part.[1254] The DRE was the primary point of contact with a supplier during the part development process.[1255] A supplier selected to develop a vehicle component received from GM the relevant CTS, along with any other vehicle-specific requirements for the part.[1256] The supplier then worked to design and develop a part that satisfied all GM's requirements and specifications.[1257] DREs held regular Product Development Team ("PDT") meetings with the supplier.[1258] Other GM engineers, such as Validation Engineers ("VEs") and Supplier Quality Engineers ("SQEs") occasionally participated in these meetings.[1259] At PDT meetings, a DRE provided feedback on work done by the supplier, including the results of any tests the supplier performed on the part.[1260] If either the DRE or the supplier wanted to make a change to a part, the proposed change would be discussed at a PDT meeting.[1261]

4. Prototype Parts and Validation Testing

Validation testing, the process through which GM verified that its vehicles and their

[1253] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[1254] J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[1255] J&B Interview of Thomas Utter, April 24, 2014.
[1256] J&B Interview of Thomas Utter, April 24, 2014.
[1257] J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1258] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1259] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Ernie McCutchen, May 16, 2014.
[1260] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Ernie McCutchen, May 16, 2014.
[1261] J&B Interview of Andrew Brenz, April 23, 2014.

component parts met GM requirements and specifications, was a key component of the GVDP.[1262] At multiple stages in the vehicle development process, GM and its suppliers conducted validation testing on both individual vehicle components and on integrated pre-production vehicles.[1263]

Validation testing was conducted in two general stages: Design Validation ("DV") and Production Validation ("PV").[1264] During the DV stage, GM's suppliers produced prototype parts and prototype vehicles for use in conducting validation testing.[1265] Early prototype parts and vehicles, commonly referred to as "Beta-level" parts or vehicles, were assembled by hand using prototype tools made of aluminum, referred to as "soft tools."[1266] Conducting DV testing on prototype parts allowed GM to learn about any problems with the parts – either as standalone parts or as components of an integrated vehicle – that required redesign as early in the process as possible.[1267] Later in the GVDP, GM and its suppliers conducted PV testing on components and vehicles manufactured using production tools, in the facilities where the vehicle would eventually be produced for sale, in order to prove that the individual components, as well as the vehicle as a whole, met requirements and specifications.[1268]

GM employed Validation Engineers responsible for overseeing the validation process and approving the results.[1269] As explained further below, the role and scope of involvement of

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[1262] J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[1263] J&B Interview of Thomas Utter, April 24, 2014.
[1264] J&B Interview of Thomas Utter, April 24, 2014.
[1265] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1266] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1267] J&B Interview of John Hendler, May 20, 2014
[1268] J&B Interview of John Hendler, May 20, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1269] J&B Interview of Eugene Carnago, May 15, 2014; J&B Interview of Ernie McCutchen, May 16, 2014.

Validation Engineers varied between 2000 and the present.[1270]

5. Component-Level Validation Testing

Since the early 2000s, GM's suppliers have been primarily responsible for conducting component-level validation testing.[1271] Suppliers communicated the results of component-level validation testing to GM in an Analysis/Development/Validation Plan & Report ("ADVP&R").[1272] ADVP&Rs tracked the specific validation plan laid out in the CTS, and provided test results on sample parts that showed whether the part met the specifications required by the CTS.[1273] DV stage ADVP&Rs also contained the results of the supplier's component-level Design Failure Mode and Effects Analysis ("DFMEA"), a process intended to identify potential failures that might occur in a part, evaluate the risk of such an occurrence, and determine whether the part could be designed to compensate for such a failure, as well as of the supplier's Process Failure Mode and Effects Analysis ("PFMEA"), an analysis like a DFMEA for manufacturing processes.[1274]

In the early 2000s, ADVP&Rs containing the results of component-level validation testing would have been reviewed by the DRE responsible for the part.[1275] In order to approve a part for production, the DRE was required to sign a Commodity Validation Sign-off form, also

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[1270] J&B Interview of Eugene Carnago, May 15, 2014; J&B Interview of Ernie McCutchen, May 16, 2014.
[1271] J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1272] J&B Interview of Doug Parks, May 1-2, 2014.
[1273] J&B Interview of Thomas Utter, April 24, 2014; *see, e.g.*, Analysis/Development/Validation Plan & Report ("ADVP&R") for Suppliers for Delta Z Ignition Switch (Jan. 10, 2002) [DOC ID 000051786004; GMNHTSA000257781]; Analysis/Development/Validation Plan & Report ("ADVP&R") for Suppliers for Delta Z Ignition Switch (May 21, 2002) [DOC ID 000051786005; GMNHTSA000257795].
[1274] J&B Interview of James Federico, March 20, 2014; J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Andrew Brenz, April 23, 2014.
[1275] J&B Interview of Raymond DeGiorgio, March 14, 2014; J&B Interview of Doug Parks, May 1-2, 2014; J&B Interview of Matthew Schroeder, April 2, 2014.

known as Form 3660.[1276] It is unclear whether, in the early 2000s, a GM Validation Engineer with responsibility for an individual component would also have been assigned to review and approve ADVP&R results; witnesses interviewed differed as to this fact.[1277] By 2006, however, GM undoubtedly employed Validation Engineers with component-level responsibilities, who also were required to sign off on Form 3660 approvals.[1278] If the ADVP&R showed that a part did not meet specifications, the DRE and VE would generally work with the supplier at PDT meetings to address the issue.[1279]

Witnesses similarly provided differing accounts of whether, in the early 2000s, a DRE could have unilaterally approved a part for production that was out of specification, and how this approval would have been documented. Several GM personnel interviewed thought that, even in 2001 or 2002, a DRE would have required the approval of at least an Engineering Group Manager ("EGM") or Validation Engineer to approve an out-of-spec part.[1280] Two validation engineers, however, thought that, in the early 2000s, a DRE had the ability to approve a part that did not pass component-level validation testing.[1281] While some witnesses thought that a deviation from specification could have been documented on GM Form 1411, others thought that, in the early 2000s, Form 1411 was used as an interim approval, to give the supplier additional time to satisfactorily complete validation testing.[1282]

[1276] J&B Interview of Eugene Carnago, May 15, 2014; J&B Interview of Ernie McCutchen, May 16, 2014.
[1277] *Compare* J&B Interview of Ernie McCutchen, May 16, 2014, *with* J&B Interview of Eugene Carnago, May 15, 2014.
[1278] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Eugene Carnago, May 15, 2014.
[1279] J&B Interview of Ernie McCutchen, May 16, 2014.
[1280] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[1281] J&B Interview of Eugene Carnago, May 15, 2014; J&B Interview of Michael Berden, May 27, 2014.
[1282] *Compare* J&B Interview of Doug Parks, May 1-2, 2014; J&B Interview of Gary Altman, May 8, 2014, *with* J&B Interview of Ralf Nickel, March 26, 2014; J&B Interview of William Skelton, April 25, 2014.

7. TALC and Human Factors Review

Before receiving final approval, some component parts were also reviewed by GM's Touch, Appearance, Lighting, and Control ("TALC") team and/or Human Factors group.[1283] The TALC team assigned to the vehicle worked with the vehicle's Chief Engineer to make sure that the vehicle and its components had a consistent feel and appearance.[1284] TALC testing would occur at both the prototype phase of a car's development and also the production phase.[1285]

The Human Factors engineers evaluated a vehicle from a customer's perspective with a focus on four criteria: (1) sense, (2) reach, (3) understand, and (4) manipulate.[1286] Their work focused on, for example, reachability of items on the dashboard from the driver's seat, or making sure there was adequate clearance around the ignition switch for a driver's hand to turn.[1287] When evaluating a program and providing input, typically two Human Factors engineers would evaluate a vehicle together.[1288] They used specific forms, called Human Factor Criteria Inventory ("HFCI") forms.[1289] The forms contained a list of criteria to evaluate the vehicle, or a specific component within the vehicle, and the engineers gave it a letter grade from A to F.[1290] These evaluations were presented at vehicle program team meetings with comments explaining

[1283] J&B Interview of Joan Hertley, May 14, 2014; J&B Interview of Matthew Schroeder, April 2, 2014; J&B Interview of William Skelton, April 25, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1284] J&B Interview of Matthew Schroeder, April 2, 2014. Some employees interviewed thought the TALC team was focused most on appearance and lighting rather than feel. *See* J&B Interview of Joan Hertley, May 14, 2014.
[1285] J&B Interview of William Skelton, April 25, 2014.
[1286] J&B Interview of Joan Hertley, May 14, 2014.
[1287] J&B Interview of Joan Hertley, May 14, 2014.
[1288] J&B Interview of Joan Hertley, May 14, 2014.
[1289] J&B Interview of Joan Hertley, May 14, 2014.
[1290] J&B Interview of Joan Hertley, May 14, 2014.

the scores.[1291] If a low grade was given, there was typically discussion with the program team about how to address the Human Factors engineers' concerns.[1292]

8. Vehicle-Level Validation Testing

GM also conducted system- and vehicle-level validation testing to ensure vehicle components functioned properly when integrated, and that the vehicle as a whole satisfied durability standards and applicable regulations. A vehicle's PEM was responsible for preparing an Analysis/Development/Validation ("ADV") Plan for his or her vehicle that included all of the requirements contained in GM's VTS, as well as a validation testing plan for the vehicle, and for ensuring that the vehicle as a whole was in fact fully validated.[1293] Vehicle-level validation engineers became involved in the vehicle development process as soon as there was a prototype car to validate and possibly earlier, to help develop the validation testing plan.[1294]

To coordinate and oversee vehicle-level validation testing, each vehicle had a lead Validation Engineer responsible for the validation of the vehicle as a whole, as well as system-level Validation Engineers representing and responsible for the various subsystems of the vehicle, such as electrical, chassis, powertrain, and interiors.[1295] Vehicle-level validation engineers coordinated with the engineers responsible for vehicle technical specifications to ensure that tests required by the vehicle-level technical specifications relevant to the electrical system were performed on the vehicles, and to further ensure that all required certification testing – such as for FMVSS compliance – was performed.[1296]

[1291] J&B Interview of Joan Hertley, May 14, 2014.
[1292] J&B Interview of Joan Hertley, May 14, 2014.
[1293] J&B Interview of Doug Parks, May 1-2, 2014.
[1294] J&B Interview of Ernie McCutchen, May 16, 2014.
[1295] J&B Interview of Ernie McCutchen, May 16, 2014.
[1296] J&B Interview of Ernie McCutchen, May 16, 2014.

Development Engineers who worked at the Milford Proving Grounds actually performed validation test driving.[1297] Vehicle-level Validation Engineers supervised the Development Engineers performing the tests that related to their particular subsystem.[1298] In addition to subsystem-specific tests, each vehicle had Validation Engineers with responsibility for performing durability testing.[1299] As part of durability testing, in addition to putting a vehicle through driving tests at Milford, Validation and Development Engineers, along with DREs, supported cross-country ride trips for 8-10 cars to test the vehicle during hard driving over long distances and ensure that the performance of all vehicle features could be tested.[1300]

Vehicle issues identified during validation testing were documented in the PRTS system.[1301] Pre-production issues captured in a PRTS report would be resolved throughout the PV stage and monitored by the program team executives, including the VAPIR committee and the Vehicle Line Executive, as the vehicle moved closer to launch.[1302] Approximately 10 weeks before a vehicle went into production, any PRTS reports that remained unresolved were presented during launch meetings.[1303] All PRTS reports classified as severity level 1 had to be resolved before launch.[1304]

[1297] J&B Interview of Ernie McCutchen, May 16, 2014.
[1298] J&B Interview of Ernie McCutchen, May 16, 2014.
[1299] J&B Interview of Ernie McCutchen, May 16, 2014.
[1300] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Chris Skaggs, May 20, 2014.
[1301] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[1302] J&B Interview of Lori Queen, May 12, 2014.
[1303] J&B Interview of Lori Queen, March 17, 2014.
[1304] J&B Interview of Lori Queen, May 12, 2014; J&B Interview of Doug Parks, March 18, 2014.

At the end of the validation process, the Chief Engineer or Program Engineering Manager must sign a Product Validation Complete Letter ("PVCL") certifying that the vehicle complies with all applicable specifications and is ready for production.[1305]

9. Captured Test Fleets

As launch approached, late-stage pre-production vehicles also underwent Captured Test Fleet ("CTF") testing, in which vehicles were given to program team executives to drive.[1306] The cars were built at the assembly plant, given VIN numbers, test run for three months, and then sold as used cars.[1307] Problems that arose during Captured Fleet Testing were reported in field reports submitted by the employees and recorded in a separate database maintained by the Quality Group.[1308] The CTF reports could contain reports of malfunctions, but the reports were intended to contain anything that the driver did not like about the vehicle (driver preference). The reports would be reviewed, summarized and grouped into recurring categories by the Quality Group. These groupings and summaries would be entered into a spreadsheet, which was e-mailed to the chief engineer, the Program Engineering Manager ("PEM"), and the program team. The program team held weekly meetings at which this information was discussed.[1309]

10. The Company Vehicle Evaluation Program ("CVEP")

Later, as part of the Company Vehicle Evaluation Program ("CVEP"), several hundred additional salable vehicles would be made available for GM employees to drive in order to help identify potential problems.[1310] CVEP programs are different from CTF programs, but they can

[1305] J&B Interview of Ernie McCutchen, May 16, 2014; J&B Interview of Doug Parks, May 1-2, 2014.
[1306] J&B Interview of Lori Queen, May 12, 2014.
[1307] J&B Interview of Joseph Taylor, May 16, 2014.
[1308] J&B Interview of Lori Queen, May 12, 2014; J&B Interview of Joseph Taylor, May 16, 2014.
[1309] J&B Interview of Joseph Taylor, May 16, 2014.
[1310] J&B Interview of Gary Dowd, May 8, 2014; J&B Interview of Joseph Taylor, May 16, 2014.

be run concurrently. CTF was pre-production, and CVEP was post-production. CVEP cars were only provided to individuals with the program team. Any incident reports with a CVEP vehicle would go to GM's service engineering. The CVEP cars were treated like cars sold to real customers in that a customer would take his or her car to a dealer, but CVEP vehicles were taken to GM's service engineering garage. Warranty reports from dealers based on CVEP reports generated from the service engineering garage would go into a master warranty database. The actual CVEP reports (from the drivers), as well as the CTF reports, were only seen by the program team.[1311]

[1311] J&B Interview of Joseph Taylor, May 16, 2014.

APPENDIX D: Production Part Approval Process ("PPAP")

Before any component part (new or modified) can be used in a production vehicle, it is required to pass through the Production Part Approval Process ("PPAP"). The part approval staffs at Chrysler, Ford, and General Motors, working under the auspices of the Automotive Division of the American Society for Quality Control ("ASQC") and the Automotive Industry Action Group ("AIAG"), developed standardized PPAP guidelines.[1312] The purpose of the PPAP is "to determine if all customer design record and specification requirements are properly understood by the supplier and that the process has the potential to produce product consistently meeting these requirements during an actual production run at the quoted production rate."[1313]

A PPAP "package" consists of 19 required categories of documents/inputs. These include: (1) design records of saleable product; (2) engineering change document; (3) General Motors Commodity Validation Sign-Off (Form 3660); (4) design failure mode and effects analysis ("DFMEA"); (5) process flow diagrams; (6) process failure mode and effects analysis ("process FMEA"); (7) control plan (pre-launch control plan GP-12, plus production control plan); (8) measurement systems analysis studies; (9) dimensional results; (10) material, performance test results; (11) initial process study; (12) qualified laboratory documentation; (13) appearance approval report (if applicable); (14) sample product; (15) master sample; (16) checking aids; (17) records of compliance to customer specifics; (18) part submission warrant; and (19) bulk material requirements checklist.[1314]

[1312] AIAG PPAP Manual (3d ed. Aug. 2000), at v [DOC ID 000123252680].
[1313] AIAG PPAP Manual (3d ed. Aug. 2000), at 1 [DOC ID 000123252680].
[1314] GM Global Supplier Quality Manual (Sept. 2008), at 22 [DOC ID 000049740003].

The Part Submission Warrant ("PSW") represents the supplier's confirmation that the inspection and tests of production parts conform to GM's requirements.[1315] GM's "Commodity Validation Sign Off" (Form 3660) serves as GM's engineering approval for the part.[1316] Under current GM practice, both the DRE responsible for the part and a component level Validation Engineer must sign off on the Form 3660 to authorize the change.[1317]

The PPAP Manual provides:

> Any results that are outside specification are cause for the supplier not to submit the parts, documentation and/or records. Every effort shall be made to correct the process so that all design record requirements are met. If the supplier is unable to meet any of these requirements, the customer shall be contacted for determination of appropriate corrective action.[1318]

In certain cases, specifications may be changed to resemble the actual performance of the part (*i.e.*, the part provides the desired feel), and those changes can be memorialized in the component technical specifications for the part.[1319] However, some GM employees described a separate deviation process that allows a component to be used in production vehicles notwithstanding noncompliance with GM's specifications.[1320] Under this process, to approve a nonconforming part for production, the DRE must sign off on the deviation on the validation paperwork and obtain approval from at least the Validation Engineer, and, potentially, the DRE's

[1315] AIAG PPAP Manual (3d ed. Aug. 2000), at 90 [DOC ID 000123252680].
[1316] J&B Interview of Ralf Nickel, March 26, 2014.
[1317] *See* General Motors Commodity Validation Sign-Off (Form 3660) (May 3, 2007) [DOC ID 000004253531; GMNHTSA000223928].
[1318] AIAG PPAP Manual (3d ed. Aug. 2000), at 90 [DOC ID 000123252680].
[1319] J&B Interview of Doug Parks, May 1-2, 2014; J&B Interview of Thomas Utter, April 24, 2014.
[1320] J&B Interview of Thomas Utter, April 24, 2014; J&B Interview of Raymond DeGiorgio, May 7-8, 2014.

supervisor, the EGM.[1321] It is unclear whether such a process for the approval of deviations from specifications existed in 2002 because GM protocols previously were not as well defined.[1322]

If a supplier is unable to satisfy the PPAP requirements and must submit an action plan to achieve full PPAP approval, the supplier is responsible for providing a GM Form 1411 to the GM Supplier Quality Engineer for sign off and, depending on the issue, may have to obtain additional approvals, including from the DRE.[1323] Form 1411 contains a section entitled "Supplier Performance and Validation Requirements."[1324] This section sets forth three choices to describe the PPAP status: (1) "Performance/validation requirements met, signed copy of GM 3660 submitted in package"; (2) "Performance/Validation requirement items 1 & 5 on GM 3660 completed satisfactorily"; and (3) "Performance requirements NOT fully met; status acceptable to move to a Saleable status" (but "SMT Director and/or SMT Validation Director signature required").[1325] The supplier also must set forth in the Form 1411 an action plan to obtain full PPAP approval.[1326]

The supplier, not GM, is responsible for maintaining the complete PPAP package.[1327] Specifically, the AIAG PPAP Guidelines provide that the supplier "shall" maintain a PPAP part file for the documentation associated with the PPAP package and make "readily available for

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[1321] J&B Interview of Raymond DeGiorgio, May 7-8, 2014; J&B Interview of Doug Parks, May 1-2, 2014; Analysis/Development/Validation Plan & Report (May 3, 2007) [DOC ID 000009486444; GMNHTSA000223801].
[1322] J&B Interview of Raymond DeGiorgio, May 7-8, 2014.
[1323] GM Global Supplier Quality Manual (Sept. 2008), at 23 [DOC ID 000049740003]; J&B Interview of Doug Parks, May 1-2, 2014.
[1324] GM, PPAP Worksheet (GM 1411) (March 6, 2005) [DOC ID 000116935005].
[1325] GM, PPAP Worksheet (GM 1411) (March 6, 2005) [DOC ID 000116935005].
[1326] GM, PPAP Worksheet (GM 1411) (March 6, 2005) [DOC ID 000116935005].
[1327] AIAG PPAP Manual (3d ed. Aug. 2000), at 3 [DOC ID 000123252680]. GM Global Supplier Quality Manual provides that under the current system, GM maintains in GQTS copies of the Part Submission Warrant, Dimensional Report, Material and Performance Test Report, AAR, Form 1411 and Form 3660. GM's Global Supplier Quality Manual (Sept. 2008), at 22 [DOC ID 000049740003].

customer use" sample production parts, master samples, or checking aids.[1328] The AIAG requires suppliers to retain the PPAP package for "the length of time that the part is active . . . plus one calendar year" and requires suppliers to ensure that any superseded PPAP packages are included or referenced in the new PPAP packages.[1329]

[1328] AIAG PPAP Manual (3d ed. Aug. 2000), at 3 [DOC ID 000123252680].
[1329] AIAG PPAP Manual (3d ed. Aug. 2000), at 17 [DOC ID 000123252680].

APPENDIX E: GM's TREAD Database

After the TREAD Act (the "Act") became law in 2000, GM developed a database, known as "TREAD," to house the data required to be reported quarterly to NHTSA under the Act.[1330] In addition, GM investigators can pull data from TREAD on an *ad hoc* basis to support GM investigations.[1331] Since 2003, TREAD has been the principal database used by GM to track incidents related to its vehicles.[1332]

The TREAD database is organized to track and report data in categories created by NHTSA covering each of 24 different systems in a vehicle (*e.g.*, steering or airbags) as well as two additional data categories: fire and rollover.[1333] The database draws information primarily from seven sources of data from within GM:

- Service Requests ("SRs") in the Customer Assistance Center ("CAC") Database – CAC data is comprised of all customer claims opened as SRs. These data include structured data (*i.e.*, fixed codes entered by customer service agents, VIN numbers, make/model/model year information, etc.) and unstructured data (*i.e.*, verbatim descriptions of events).
- Technical Assistance Center ("TAC") – The TAC tracks repair orders from dealers which can include verbal commentary regarding the repair at issue.
- Surveys – Surveys comprised internal and external surveys.[1334]
- Field Reports – Field reports include reports from company employees driving GM vehicles sold to them as well as from the captured fleet used to test a vehicle prior to release.
- OnStar – This call center receives complaints from customers and other information regarding their vehicles.
- Team Connect (formerly called Legal Pack) – The GM Legal Staff maintains this database to track structured data concerning complaints filed in court.

[1330] J&B Interview of Dwayne Davidson, May 6, 2014.
[1331] J&B Interview of Dwayne Davidson, May 6, 2014.
[1332] J&B Interview of Dwayne Davidson, May 6, 2014.
[1333] J&B Interview of Dwayne Davidson, April 22, 2014; J&B Interview of Dwayne Davidson, May 6, 2014.
[1334] EQF (Early Quality Feedback) was GM's own survey, conducted by the Quality group. Until September 2013, GM included JD Power consumer reports in TREAD data. In September 2013, GM replaced JD Power with Compass. *See* J&B Interview of Dwayne Davidson, April 22, 2014.

The TREAD database does not include and is not linked to GM's PRTS or Service Bulletin databases or to several other sources of data within GM discussed below.[1335]

Since its inception, GM has had a TREAD Reporting team assigned to manage and query the TREAD database to prepare the NHTSA-required reports as well as internal requests for data from GM investigators.[1336] Access to the TREAD database is controlled by the TREAD Reporting team manager and, prior to 2014, was granted only to that team and to a small number of engineer investigators and attorneys at GM.[1337] In 2014, to better ensure the integrity of the data used by GM to analyze and assess incidents involving its vehicles, GM has required the Product Investigations investigators to request data from the TREAD Reporting team rather than run searches themselves.[1338]

From approximately 2003 until 2007 or 2008, that team had approximately eight employees.[1339] On a monthly basis, the team would mine the TREAD data and prepare scatter graphs for each of the 24 categories of data in an effort to identify any spikes in the number of accidents or complaints.[1340] Those reports were provided to a review panel and, in certain instances, spawned investigations by PI investigators to determine if any safety defect existed.[1341] In or around 2007 or 2008, GM reduced the size of this team to three employees, and this monthly data mining process was pared down.[1342] In 2010, GM restored two people to this

[1335] J&B Interview of Dwayne Davidson, May 22, 2014.
[1336] J&B Interview of Dwayne Davidson, May 6, 2014.
[1337] J&B Interview of Dwayne Davidson, May 22, 2014.
[1338] J&B Interview of Dwayne Davidson, May 22, 2014.
[1339] J&B Interview of Dwayne Davidson, May 6, 2014.
[1340] J&B Interview of Dwayne Davidson, May 6, 2014.
[1341] J&B Interview of Dwayne Davidson, May 6, 2014.
[1342] J&B Interview of Dwayne Davidson, May 6, 2014.

team principally to review Vehicle Owner Questionnaires ("VOQ") downloaded from the NHTSA website to identify potential defects.[1343]

In addition, until 2014, the TREAD Reporting team did not have sufficient resources to obtain any of the advanced data mining software programs available in the industry to better identify and understand potential defects.[1344] In 2014, GM has determined to infuse additional resources into the software and staffing resources of this team.[1345]

Although the database is organized into the 24 systems-based categories, the ignition switch is not one of those categories.[1346] A defect such as the recall condition here may be found in at least five different categories: Airbags, Electrical, Engine and Engine Cooling, Steering, and Brakes.[1347] The only method to search for incidents that may have involved the recall condition would be to search by key word in each section of the database.[1348] However, the TREAD database does not allow Boolean searches; in other words, there is no way to limit the records retrieved based upon the relative placement of different terms in relation to each other (*e.g.*, "stall w/20 ignition") or based upon their frequency or common appearance in a single record (*e.g.*, "stall *and* airbag").[1349] Accordingly, all of the records in which any of the key words selected appear will be retrieved.

In 2014, each record contains a "verbatim" description of the problem as recorded by the dealer, technician, customer service representative, or GM employee.[1350] Prior to 2007,

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[1343] J&B Interview of Dwayne Davidson, May 6, 2014.
[1344] J&B Interview of Dwayne Davidson, May 6, 2014.
[1345] J&B Interview of Dwayne Davidson, May 6, 2014.
[1346] J&B Interview of Dwayne Davidson, May 6, 2014.
[1347] J&B Interview of Dwayne Davidson, May 15, 2014.
[1348] J&B Interview of Dwayne Davidson, May 15, 2014.
[1349] J&B Interview of Dwayne Davidson, May 15, 2014; J&B Interview of Dwayne Davidson, May 22, 2014.
[1350] J&B Interview of Dwayne Davidson, May 14, 2014.

verbatims for warranty claims were not readily available to GM.[1351] The database would indicate the action taken (*e.g.*, replacement of the ignition switch), but would not explain the problem experienced by the customer. Prior to 2007, GM would have to follow-up with the dealer to get additional information.[1352]

In order to determine whether a record involved the ignition switch defect, an investigator would be required to review each of these "verbatim" descriptions manually.[1353] Typical descriptions are limited in length and diagnostic value, and are often unclear as to the source and impact of the problem as a result.[1354]

Once a record is identified as describing a potentially relevant incident, the investigator must obtain the additional material, if any exists, from the underlying database from which the TREAD record was derived. Only after an investigator has obtained and reviewed those materials (and possibly made additional inquires for information) can it be determined whether an incident is related to a particular defect in the vehicle or, instead, just describes an issue with features similar to those seen in incidents known to be caused by the defect.[1355]

[1351] J&B Interview of Dwayne Davidson, May 14, 2014.
[1352] J&B Interview of Dwayne Davidson, May 14, 2014.
[1353] J&B Interview of Dwayne Davidson, May 14, 2014.
[1354] J&B Interview of Dwayne Davidson, May 14, 2014.
[1355] J&B Interview of Dwayne Davidson, May 14, 2014.

APPENDIX F: Captured Test Fleet Reports

Captured Test Fleet ("CTF") vehicle reports were obtained for the Cobalt, Ion, Solstice, HHR, and Sky for Model Years 2003-2011. In total, there were 14,249 reports. The following search terms were run through those 14,249 reports in an effort to identify any reports related to the Ignition Switch: "stall," "knee," "fob," "ignition," "loose," "switch," "turn," "rotate," "key," "accessory," "power," "shut," "failure," "stop," "idle," "die," and "bump." Those search terms yielded 18 results (listed in the table below). Because of the way in which the CTF drivers reported incidents, it is unclear whether all 18 of the results outlined below are related to the Ignition Switch issue.

Model Year	Model	Report Date	VIN #	Description	Comments
2003	ION 3 SEDAN AUTO-MATIC	9/13/2002	1G8AL52F X3Z100272	"Stumbles/hesitates/dies-Where-Stops/go driving"	"one incident - engine stalled at stop light. [I]mmediate restart."
2003	ION 3 SEDAN AUTO-MATIC	9/17/2002	1G8AL52F7 3Z100326	"Stumbles/hesitates/dies-Where-Stops/go driving"	"Engine stalled one time when I was in stop and go traffic (50 miles) and engine was hot"
2003	ION 3 SEDAN AUTO-MATIC	12/5/2002	1G8AL52F3 3Z100128	"Other features and controls problems"	"The position of the ignition key leaves it vulnerable to being bumped by your knee while driving and shutting off the engine. I've accidently done this twice while driving on the expressway. I'm concerned the steering wheel may lock up too. There should be a finger lock on the key to keep it from accidently turning."
2003	ION - MANUAL LEV 3 S	10/8/2002	1G8AK52F X3Z100114	"Other engine problems"	"Engine stopped twice after revving throttle moderately to evaluate. . . . "First stop at highway speed about 5 minutes after revving. Second stop 5 minutes later than first stop. At about 2000 odo."

Model Year	Model	Report Date	VIN #	Description	Comments
2003	ION	12/18/2002	1G8AM12F 63Z0163EX	"Stumbles/hesitates/dies-Where-Stops/go driving"	"While turning a corner (on a green arrow), the engine started to stall - only happened that once (AC on, radio on, lights on)."
2004	ION	9/24/2003	1G8AW12F 54Z100049	"'Check engine light' indicates a problem-When-Engine hot"	"After driving about 10 mins, I hit a pothole in the road (not big) with the right fr[o]nt wheel. Engine did not stall, but the entire warning lights came on including coolant warning. I pulled to the side, checked the vehicle, and re-started the car and all warning lights re-set like normal operation. No indication of problem after that."
2005	COBALT	12/22/2004	1G1AL12F1 57500369	"Stumbles/hesitates/dies-Where-Stops/go driving"	"Inadvertent engine shut off when driving - key switch is easily turned from run to off when you knee touches the key ring. This has occur[r]ed twice, once at freeway speeds I75 when I went to brake in traffic and then when I was making a low speed RH turn in my subdivision appox 20mph when I went to brake. Possible low torque on lock cylinder rotation. Key ring 1fob, 6house keys, 1 car,+4small"
2005	COBALT	12/28/2004	1G1AL52F X57500121	"Stumbles/hesitates/dies-When-Engine hot"	"After refueling I pulled out of the gas station and the engine stalled. I shifted into neutral and restarted, but it seemed to be in a "reduced power" mode (theft deterrent?) I shifted into park, removed the key from the ignition, and started up the car in the normal sequence. It seems to run okay now. No messages on the DIC or lights (idiot) that I noticed."
2005	COBALT	3/21/2005	1G1AL12F1 57500369	"Stumbles/hesitates/dies-When-Engine hot"	"Intermittent stall at freeway speeds. This was due to my knee/leg lightly touching my key rings when braking. 11 keys on double key ring in addition to the vehicle key and one key fob. I didn't even feel myself contact the keys during this braking maneuver where I lifted my right foot off the gas to apply the

Model Year	Model	Report Date	VIN #	Description	Comments
					brake. Tachometer and speedo went to zero. Engine restarted fine."
2005	COBALT	12/3/2004	1G1AL14F7 57503483	"Stumbles/hesitates/dies-Where-Steady highway driving"	"While on the highway, the engine shut off with accessories still on. I coasted to the side of the highway. After further review, my knee had hit the GM Brown leather key holder and caused the ignition to rotate ccw past the ignition detent but not past the accessory. I am able to repeat this condition. Feel the ignition key detent load is too low allowing for movement ccw and shutoff the engine."
2005	ION	8/20/2004	1G8AZ52F7 5Z100053	"Other ride/handling/braking problems"	"Steering wheel seems too far forward. To get a comfortable arm feel, knees are too close to ignition keys and lower instrument panel."
2005 [1356]	COBALT	12/1/2004	1G1AL52F7 57500321	"Trip computer/navigation system is not working properly (non-OnStar)"	"All values reset to --- except odometer. Driving condition: 70MPH, rain. Related problems: Earlier, speedo. & fuel gauge dropped to 0. Digital display indicated "Fuel Low" and "Power Steering". Also had very rough shifting, brakes shuddered, engine stalled. Note: Problem disappeared after waiting 2 hours and restarting vehicle."
2005	COBALT	12/1/2004	1G1AL52F7 57500321	"Stumbles/hesitates/dies-When-Engine hot"	"Engine stalled. Could restart, but died when put into gear. Repeated 5 times. Waited a few minutes, and then managed to proceed. Driving condition: 30MPH, rain. Related problems: Earlier, speedo. & fuel gauge dropped to 0. Trip computer reset all values to ---. Digital display indicated "Fuel Low" and "Power Steering". Also had very rough shifting, brakes shuddered."
2005	COBALT	12/1/2004	1G1AL52F7 57500321	"Fuel gauge inaccurate/doesn't work properly"	"Fuel gauge suddenly dropped to 0MPH. Tank was filled to full approx. 25 miles earlier. Driving

[1356] This entry and the next two entries have the same report date and the same VIN number. It appears, accordingly, that the three entries represent one vehicle and one incident, not three.

Model Year	Model	Report Date	VIN #	Description	Comments
					condition: 70MPH, rain. Related problems: At same time, speedometer also dropped to 0. Digital display indicated "Fuel Low" and "Power Steering". Also had very rough shifting, brakes shuddered, engine stalled. Note: Problem disappeared after waiting 2 hours and restarting vehicle."
2006	SOLSTICE	6/2/2005	1G2MB33B 96Y100008	"Other features and controls problems"	"Vehicle ignition system turns off when my knee hits the accessories attached to the key ring. I don't know how this happens, but I have turned the car off several times while driving. In every case I simply turned the key on and the car started without an incident."
2006	COBALT	7/26/2005	1G1AM58B 567600081	"Other engine problems"	"Driving at highway speed, car "turned off" all dash lights cycled, moved key to aux position then back to start engine reengaged. Told I must have bumped key."
2006	ION	6/20/2005	1G8AL58B 16Z100010	"Stumbles/hesitates/dies-Where-Stops/go driving"	"As I was driving about 35-40 mph I hit a pavement change (bump). I let off the accelerator and prior to braking the engine died. It restarted i[m]mediately once I was in neutral with no further issue. The engine was warm/hot and the outside temperature was approx. 80 degrees."
2007	SOLSTICE	2/10/2006	1G8MB33B 97Y0024EX	"Other exterior problems"	"Accidently hit ignition switch with knee switching car off. (need more leg room)"

APPENDIX G: Glossary

Term / Acronym	Full Name
ADVP&R	Analysis/Development/Validation Plan & Report
BCM	Body Control Module
CAB	Change Approval Board
Continental	Siemens Continental
CPIT	Current Product Improvement Team
CTF	Captured Test Fleet
CVEP	Company Vehicle Evaluation Program
Delphi	Delphi Mechatronics
DFMEA	Design Failure Mode Effects Analysis
DFSS	Design for Six Sigma
DRE	Design Release Engineer
EDR	Event Data Recorder
EFADC	Executive Field Action Decision Committee
EGM	Engineering Group Manager
EWO	Engineering Work Order
FMVSS	Federal Motor Vehicle Safety Standards
FPA	Field Performance Assessment
FPE	Field Performance Evaluation
FPERC	Field Performance Evaluation Recommendation Committee
FPET	Field Performance Evaluation Team
FPR	Field Performance Report
GQTS	Global Quality Tracking System
GVDP	Global Vehicle Development Process
IPTV	Incidents Per Thousand Vehicles
ISR	Investigation Status Review
IU	Indiana University
Jenner	Jenner & Block LLP
K&S	King & Spalding
MY	Model Year
NHTSA	National Highway Traffic Safety Administration
NISM	Not In Suit Matter
PCB	Printed Circuit Board
PEM	Program Engineering Manager
PET	Program Execution Team
PI	Product Investigations
PPAP	Production Part Approval Process
PRTS	Problem Resolution Tracking System
PV	Production Validation
SDM	Sensing Diagnostic Module
SRC	Settlement Review Committee
TAC	Technical Assistance Center

Term / Acronym	Full Name
TREAD	Transportation Recall Enhancement, Accountability and Documentation Act
TSB	Technical Service Bulletin
VAPIR	Vehicle And Process Integration Review
VCE	Vehicle Chief Engineer
VLE	Vehicle Line Executive
VSE	Vehicle Systems Engineer