GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

Inter-Organization

Date: February 7, 2005

GM-669 (PE04-075)

On The Cover:

GM Assigned IR Number
NHTSA Assigned Evaluation Number
Number of Books
Allegation Title, Model Year and Make
Date Received from NHTSA
GM Reply Date

Book 1:

Tab (1).....GM Response Letter to NHTSA
Tab (2)..... NHTSA Letter
Tab (3)..... Attachment 1 with (1) CD
Tab (4)..... Attachment 2 with confidential information removed and sent to the Office of Chief Counsel
Tab (5)..... Delphi Attachment 3 with (1) CD

GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

February 7, 2005

Jeffrey L. Quandt, Chief
Vehicle Control Division
Office of Defects Investigation
NHTSA Safety Assurance
Room #5326
400 Seventh Street, S.W.
Washington, D.C. 20590

GM-668

NVS-213kmb
PE04-075

Dear Mr. Quandt:

This letter is General Motors (GM) response to your information request (IR), dated December 17, 2004, regarding allegations of engine stalling and poor restarting on certain model year (MY) 2004 Pontiac Aztek and Buick Rendezvous vehicles.

The subject vehicles for this inquiry include all MY 2004 and 2005 Pontiac Aztek and Buick Rendezvous model vehicles. The subject component is the ignition relay used on the subject vehicles. The GM response includes information related to the subject component and the alleged defect.

GM has learned through warranty analysis that subject vehicles manufactured between October 2003 and March 2004 exhibit a higher rate of ignition relay replacement than those manufactured in other months. Accordingly, the GM response includes specific information relating to the ignition relay, where possible.

Your questions and our corresponding replies are as follows:

1. **State, by model and model year, the number of subject vehicles GM has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by GM, state the following:**

   a. **Vehicle identification number (VIN);**
   b. **Make;**
   c. **Model;**
   d. **Model Year;**
   e. **Date of manufacture;**
   f. **Date warranty coverage commenced; and**
   g. **The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease).**

   Provide the table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

General Motors is providing a summary of the number of subject vehicles produced for sale or lease in the United States by model and model year in Table 1 below:

PRODUCTION DATA

MODEL	MY 2004	MY 2005	TOTAL
Pontiac Aztek	20,853	10,197	31,050
Buick Rendezvous	68,041	32,822	100,863
TOTAL PRODUCTION	88,894	43,019	131,913

TABLE 1

The specific production information requested in 1a-1g is provided in Attachment 1 GM, folder labeled "Response for Q1;" refer to the Microsoft Access 2000 file. The GM database that contains Vehicle Identification Number (VIN) information does not include information on the state where an individual vehicle was sold. GM is providing the state where the vehicle was shipped in response to request 1g. For some of the subject vehicles, the GM warranty system does not contain a warranty start date or state where the vehicle was shipped and therefore these fields are blank.

2. **State the number of each of the following, received by GM, or of which GM is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:**

   a. **Consumer complaints, including those from fleet operators;**
   b. **Field reports, including dealer field reports;**
   c. **Reports involving a crash, injury, or fatality, based on claims against the manufacturer involving a death or injury, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle, property damage claims, consumer complaints, or field reports;**
   d. **Property damage claims;**
   e. **Third-party arbitration proceedings where GM is or was a party to the arbitration; and**
   f. **Lawsuits, both pending and closed, in which GM is or was a defendant or codefendant.**

For subparts "a" through "d," state the total number of each item (e.g., consumer complaints, field reports, etc.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint).

In addition, for items "c" through "f," provide a summary description of the alleged problem and causal and contributing factors and GM's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "e" and "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed.

Table 2A below summarizes records that may relate to the subject condition.

REPORT BREAKDOWN

TYPE OF REPORT	COUNT (INCLUDING DUPLICATES)	GM REPORTS	GM REPORTS MATCHING NHTSA REPORTS	LOCATION OF REPORTS (ATTACHED)	NUMBER OF PROPERTY DAMAGE REPORTS	NUMBER OF CRASH INCIDENT REPORTS	NUMBER OF REPORTED INJURIES*	FIRES
Owner Reports	98	93	5	2A	0	0	0	0
Field Reports and Technical Assistance System Reports	119	118	1	2B	1	2	1	0
Not-In-Suit Claims	0	0	0	N/A	0	0	0	0
Subrogation Claims	0	0	0	N/A	0	0	0	0
Third Party Arbitration Proceedings	0	0	0	N/A	0	0	0	0
Product Liability Lawsuits	0	0	0	N/A	0	0	0	0
Total (Including Duplicates)	217	211	6	N/A	1	2	1	0
Total (Excluding Duplicates)	208	203	5	N/A	1	2	1	0

TABLE 2A

N/A Not Applicable

* There are no reported fatalities. There is one report with a minor injury

The sources of the requested information and the last date the searches were conducted are tabulated in Table 2C below.

DATA SOURCES

SOURCE SYSTEM	LAST DATE GATHERED
Corporate Central File	January 19, 2005
Customer Assistance Center (CAC)	January 31, 2005
Technical Assistance Center (TAC)	January 26, 2005
Field Information Network Database (FIND)	January 20, 2005
Problem Resolution Tracking System (PRTS)	January 14, 2005
Company Vehicle Evaluation Program (CVEP)	December 31, 2005
Captured Test Fleet (CTF)	January 13, 2005
Early Quality Feedback (EQF)	January 14, 2005
Field Product Report Database (FPRD)	January 20, 2005
Legal / Employee Self Insured Services (ESIS)	January 7, 2005
Lawpack	January 7, 2005

TABLE 2B

3. **Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:**

   a. **GM's file number or other identifier used;**
   b. **The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, etc.);**
   c. **Vehicle owner or fleet name (and fleet contact person), address, and telephone number;**
   d. **Vehicle's VIN;**
   e. **Vehicle's make, model and model year;**
   f. **Vehicle's mileage at time of incident;**
   g. **Incident date;**
   h. **Report or claim date;**
   i. **Whether a crash is alleged;**
   j. **Whether property damage is alleged;**
   k. **Number of alleged injuries, if any; and**
   l. **Number of alleged fatalities, if any.**

   Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

   The requested information for 3 a-l for the additional reports identified in this response is provided in Attachment 1 CD GM, folder labeled "Response for Q3;" refer to the Microsoft Access 2000 file.

4. **Produce copies of all documents related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method GM used for organizing the documents.**

   Copies of the records summarized in Table 2 are provided in Attachment 1 CD GM; folder labeled "Response for Q3," refer to the Microsoft Access 2000 file. GM has organized the records by the GM file number within each attachment.

5. **State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by GM to date that relate to, or may relate to, the alleged defect in the subject vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.**

   Separately, for each such claim, state the following information:
   a. **GM's claim number;**
   b. **Vehicle owner or fleet name (and fleet contact person) and telephone number;**
   c. **VIN;**
   d. **Repair date;**
   e. **Vehicle mileage at time of repair;**
   f. **Repairing dealer's or facility's name, telephone number, city and state or ZIP code;**
   g. **Labor operation number(s);**
   h. **Problem code(s);**
   i. **Replacement part number(s) and description(s);**
   j. **Concern stated by customer; and**
   k. **Comment, if any, by dealer/technician relating to claim and/or repair.**

Provide this information in Microsoft Access 2000, or a compatible format, entitled "WARRANTY DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

The regular warranty claims that may relate to the subject condition are provided in 1 CD GM, folder labeled "Response for Q5;" refer to the Microsoft Access file. Table 5A below summarizes the total number of regular warranty claims processed on the subject vehicles through January 19, 2005. As of January 18, 2005 there were no extended warranty claims that are responsive to this request.

IGNITION RELAY: REGULAR WARRANTY

	MY 2004	MY 2005	Total
Pontiac Aztek	229	3	232
Buick Rendezvous	967	7	974
Total	1,196	10	1,206

TABLE 5A

The relay used in the ignition circuit is also used on other electrical circuits in the subject vehicles, including those for the cooling fan, starter solenoid, retained accessory power, rear defroster, and accessory. There are an additional 208 warranty claims involving the same part number replaced under 35 other labor codes. These claims are also provided in the attachment referenced above.

GM searched the GM North America Claim Adjustment Retrieval Database (CARD–regular warranty), the Motors Insurance Corporation (MIC–extended warranty), and the Universal Warranty Corporation (UWC–extended warranty) databases to collect the warranty data for this response. The warranty data was last gathered on January 19, 2005.

The information requested in 5b is not being provided, as GM's warranty database does not contain the vehicle owner's name or telephone number. Relative to 5i and 5j, some of the replacement part numbers, part descriptions, and customer concern code descriptions are not included in the GM warranty database. GM is providing a field labeled "Verbatim Text" in response to request 5k (dealer/technician comment). The verbatim text is an optional field in the GM warranty system for the dealer to enter any additional comments that may be applicable to the warranty claim. The verbatim text field is not required to be completed for every warranty claim.

The MIC extended warranty system does not contain the following information: repairing dealer code, vehicle owner information, trouble code, trouble code description, part number, part description or verbatim. The UWC extended warranty system does not use the GM labor code or labor code description and it does not contain the repairing dealer code, trouble code or trouble code description.

The warranty data provided has limited analytical value in analyzing the field performance of a motor vehicle component. The warranty records do not contain sufficient information to establish the condition of the part at the time of the warranty correction; and service personnel may not consistently use the appropriate labor and trouble codes. Warranty records represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers.

6. **Describe in detail the search criteria used by GM to identify the claims identified in response to Request No. 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make and model year, the terms of the new vehicle warranty coverage offered by GM on the subject vehicles (i.e., the number of months and mileage for which coverage is provided and the vehicle systems that are covered). Describe any extended warranty coverage option(s) that GM offered for the subject vehicles and state by option, model, and model year, the number of vehicles that are covered under each such extended warranty.**

The GM regular warranty data was collected by searching GM CARD for the labor codes and trouble codes that may relate to the subject condition. A list of the labor codes used in this search is provided below in Table 6A. The corresponding trouble codes for each of these labor codes is identified in Attachment 1 CD GM; folder labeled "Response to Q6;" refer to the Microsoft Excel file.

LABOR CODES USED FOR REGULAR WARRANTY CLAIMS SEARCH

LABOR CODE	DESCRIPTION
N2619	RELAY, IGNITION SYSTEM - REPLACE

TABLE 6A

In addition, GM warranty data was collected under other labor codes that identified the subject component, part number 15328884, in the claim. A table containing a list of these labor codes, 35 in all, is provided in Attachment 1CD GM, folder labeled "Response for Q6;" refer to the Microsoft Excel file.

There was only one vehicle with an extended warranty claim in the MIC and UWC data and the claim did not relate to engine stalling or the ignition relay.

All models and model years of the subject vehicles are covered by a bumper-to-bumper new vehicle warranty for three years or 36,000 miles, whichever occurs first. In addition, many different extended warranty options are available through GM dealerships. They are offered at different prices and for varying lengths of time, based on the customer's preference, up to 7 years from the date of purchase or up to a total of 100,000 vehicle miles. The General Motor's warranty system does not contain information on the number of vehicles that have extended warranty coverage.

7. **Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles, that GM has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins, advisories, informational documents, training documents, or other documents or communications, with the exception of standard shop manuals. Also include the latest draft copy of any communication that GM is planning to issue within the next 120 days.**

GM has issued one service communication regarding intermittent crank, no start, or stalls on the subject vehicles involving the ignition relay. This bulletin was released to assist in the proper diagnosis and repair of a malfunctioning ignition relay. A copy of this communication is provided in Attachment 1 CD GM, folder labeled "Response for Q7;" refer to the Microsoft Word document.

GM issued an Engineering Change Authorization on January 4, 2005 to use Omron relay part number 12177236 as a substitute for the Daesung relay. GM is planning to release a Special Return Bulletin the week of February 7, 2006, requesting the return of any and all dealer stock of the Daesung relay part number 15328884.

This information was last gathered on January 31, 2005.

8. **Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, GM. For each such action, provide the following information:**
   a. **Action title or identifier;**
   b. **The actual or planned start date;**
   c. **The actual or expected end date;**
   d. **Brief summary of the subject and objective of the action;**
   e. **Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and**
   f. **A brief summary of the findings and/or conclusions resulting from the action.**

   For each action identified, provide copies of all documents related to the action, regardless of whether the documents are in interim, draft, or final form. Organize the documents chronologically by action.

This response covers actions that relate to the ignition relay. Many of the "actions" were performed by the supplier, Delphi Automotive, and this response is based in part on information and documents supplied by Delphi. Table 9 below summarizes the actions performed by GM, Delphi Automotive, and Daesung as requested in 8a-e. Documents and additional supporting information are provided in the attachments as noted in the table.

SUMMARY OF ACTIONS RELATED TO THE SUBJECT CONDITION

Action: GM Problem Resolution Tracking System (N168919 and N168908) **Start Date:** September 27, 2004 **End Date:** Continuing in feedback stage **Engineering Group:** GM Engineering **Attachment:** Attachment 2 CD GM Confidential, folder labeled "Response to Q8" (Microsoft Word file) **Description:** Open and assign issue to GM Engineering for resolution **Summary of Action:** Issue open and assigned to GM Engineering for resolution and follow-up.
Action: Evaluation of Relays Returned From Warranty **Start Date:** September 17, 2004 **End Date:** January 12, 2006 **Engineering Group:** Delphi Relay Engineering and Daesung Engineering **Attachment:** Attachment 3 CD Delphi, folder labeled "Response for Q8" (Adobe Acrobat file) **Description:** Functional, electrical, visual, and contamination analysis of field returns **Summary of Action:** 60 parts analyzed; all parts exhibited varying amounts of electrical instability and contained silica deposits in contact area.
Action: Scanning Electron Microscope (SEM) Analysis **Start Date:** September 1, 2004 **End Date:** November 29, 2004 **Engineering Group:** Delphi Relay Engineering and Daesung Engineering **Attachment:** Attachment 3 CD Delphi, folder labeled "Response for Q8" (Adobe Acrobat file) **Description:** SEM analysis of contact area **Summary of Action:** Silica detected in the arc area of the contacts

Action: Review Relay Subcomponent Materials and Processes **Start Date:** September 2, 2004 **End Date:** December 15, 2004 **Engineering Group:** Daesung Quality Assurance **Attachment:** Attachment 3 CD Delphi, folder labeled "Response to Q8" (Adobe Acrobat file) **Description:** Review material and process records for sources of silicone within the value stream **Summary of Action:** Lubricant applied to coil wire during winding confirmed as largest source of silicone
Action: Review Daesung relay Assembly Process **Start Date:** September 2, 2004 **End Date:** December 15, 2004 **Engineering Group:** Daesung **Attachment:** Attachment 3 CD Delphi, folder labeled "Response to Q8" (Adobe Acrobat file) **Description:** Review material specifications and conduct chemical and SEM analysis on product and shipping materials **Summary of Action:** No additional sources of silicone found beyond those used in coil and bobbin processes
Action: Review Body Electrical Center (BEC) Components, BEC assembly, Wiring, and Vehicle Assembly **Start Date:** September 2, 2004 **End Date:** December 15, 2004 **Engineering Group:** Daesung **Attachment:** Attachment 3 CD Delphi, folder labeled "Response to Q8" (Adobe Acrobat file) **Description:** Review BEC component and vehicle assembly processes for presence of silicone **Summary of Action:** No additional sources of silicone found in these processes
Action: ESCA / XPS Analysis **Start Date:** October 15, 2004 **End Date:** January 12, 2005 **Engineering Group:** Daesung Engineering and Delphi Relay Engineering **Attachment:** Attachment 3 CD Delphi, folder labeled "Response to Q8" (Adobe Acrobat file) **Description:** Measure atomic percent of various elements on a thin layer on the contact surface area to determine source of silicone, characterize silicone migration, and quantify silicone levels within the relay **Summary of Action:** Confirmed source of silicone to be within the relay assembly
Action: GM Field Performance Evaluation (FPE) **Start Date:** January 13, 2005 **End Date:** February 7, 2005 **Engineering Group:** GM Engineering **Attachment:** Attachment 2 CD GM Confidential, folder labeled "Response to Q8" (Microsoft Word file) **Description:** FPE investigation summary **Summary of Action:** Document findings of field performance evaluation

TABLE 8

Delphi Automotive and Daesung Electric Co., Ltd. began investigating the cause for a rise in ignition relay warranty part returns in September 2003. In the descriptions associated with these repairs, customers stated there were problems starting the vehicle or problems with vehicle stalling. Further engineering analysis of the field returns indicated insulating silica (SiO_2) deposits on the contacts were causing electrical instability in the relays. It was also determined that electrical instability in the relay results in instability in the voltage supplied through the relay to various engine control components and can result in an intermittent no-start or stall condition in some cases.

Material and process reviews were conducted on assembly and shipping processes of the component manufacturer and material suppliers. Silicone products were found in the drawing, winding, and molding processes for the coil wire and in the molding process for the bobbins used in the relay assembly. It was also determined that these silicone products were the source of the silica deposits that formed on the contacts. Silicone present in the relay assembly is broken down into silica by the heat and energy of the electrical arc generated when the relay switches, it is broken down into silica.

Additional reviews of the body electrical center, wiring, and vehicle assembly processes were conducted and no other sources of silicone were found.

Corrective action to remove silicon sources from relay production began on September 20, 2004 and was completed on November 19, 2004. On January 4, 2005, General Motors Service Parts Operations issued an engineering change authorization (ECA) to purge existing stock of the Daesung relay, part number 16328864, and temporarily substitute an Omron relay, part number 12177236, due to inadequate service part availability through Daesung. (The Omron relay was previously validated to GM specifications.)

GM is providing the information requested in 8a-f in Attachment 3 CD Delphi, folder labeled "Response to Q8;" refer to the Adobe Acrobat file.

9. **Describe all modifications or changes made by, or on behalf of, GM in the design, material composition, manufacture, quality control, supply, or installation of the subject components, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:**
   a. **The date or approximate date on which the modification or change was incorporated into vehicle production;**
   b. **A detailed description of the modification or change;**
   c. **The reason(s) for the modification or change;**
   d. **The part numbers (service and engineering) of the original component;**
   e. **The part number (service and engineering) of the modified component;**
   f. **Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;**
   g. **When the modified component was made available as a service component; and**
   h. **Whether the modified component can be interchanged with earlier production components.**

   Also, provide the above information for any modification or change that GM is aware of which may be incorporated into vehicle production within the next 120 days.

   GM is providing information that it received from Delphi Automotive on the engineering and manufacturing changes associated with the control of the usage of silicone products in Attachment 3 CD Delphi, folder labeled "Response for Q9;" refer to the Adobe Acrobat file. GM is also providing schematics that describe the electrical mechanization of the ignition 1 circuit for the LA1 and LY7 applications. The LY7 engine option was introduced for the 2005 model year.

10. **Produce one of each of the following:**
    a. **Exemplar samples of each design version of the subject components; and**
    b. **Field return samples of the subject components exhibiting the subject failure mode.**

GM is providing the following samples in response to 10 a-b:

EXEMPLAR SAMPLES

SAMPLE NO.	PART NUMBER	MFG DATE	SUPPLIER	TYPE / DESCRIPTION
E1	15328864	6/18/2004	Daesung	New, unused
E2	15328864	10/11/2004	Daesung	New, unused
E3	15328864	11/19/2004	Daesung	New, unused
Omron	12177238	7/21/04	Omron	New, unused
215	15328864	7/25/2004	Daesung	Warranty return

TABLE 10

Sample number 215 was manufactured in July 2004 and was originally installed in VIN 3G5DA03E14S540470, which was on 10/30/2003. The owner of this vehicle complained of a crank, no-start condition and the dealership diagnosed the problem as an ignition relay problem. Additional information regarding these parts, including a copy of the warranty claim, is provided in Attachment 1CD, folder labeled "Response for Q10;" refer to the Adobe Acrobat file.

11. State the number of subject components that GM has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model, model year, and VIN ranges of the vehicles in which it is used and month/year of sale (including the cut-off date for sales, if applicable):

For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number) Also identify by make, model, model year, and VIN ranges of any other vehicles of which GM is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

A summary table of the requested service part information for the subject component is provided in Attachment 1 CD GM, folder labeled "Response for Q10;" refer to the Microsoft Excel file. The data was last gathered on January 24, 2004.

These sales numbers represent sales to dealers in the US and Canada. This data has limited analytical value in analyzing the field performance of a motor vehicle component because the records do not contain sufficient information to establish the reason for the part sale. It is not possible from this data to determine the number of these parts that have been installed in the subject vehicles or the number remaining in dealer or replacement part supplier inventory.

This table contains service part numbers, part description, part usage information, part sales figures by month and calendar year and the supplier's name and address, contact name and phone number. Six or more of these relays are used in each of the subject vehicles for a variety of functions as described in the response to question 6. In addition, the same part number relay is used in other GM models. Therefore, the sales volumes reflect purchases for many applications other than the ignition relay in the subject vehicles.

12. Furnish GM's assessment of the alleged defect in the subject vehicles, including:

a. The causal or contributory factor(s);
b. The failure mechanism(s);
c. The failure mode(s), including, but not limited to:

i) The vehicle operating states that exist when the stalling condition most frequently occurs (e.g., at idle or during acceleration or deceleration, or at steady state cruising, etc.);
ii) The ability to immediately restart the vehicle after engine stall and the frequency at which subject vehicles affected by the alleged defect can be immediately restarted; and
iii) The effect on vehicle control systems and the ability to safely and adequately control the vehicle.

d. The estimated probability and frequency at which the alleged defect may continue into the future;
e. The risk to motor vehicle safety that it poses;
f. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning; and
g. The reports included with this inquiry.

Silica build-up on the contacts of the relay resulted from the use of silicone products in the relay manufacturing and assembly processes. Silica is a glass-like, insulating material that can cause high resistance between the contacts, resulting in large voltage drops or inconsistent voltage supplied by the relay to components in the engine management system. Voltage fluctuations in the relay may lead to intermittent stalling or no starting on certain vehicles. Silicone within the relay can be converted to silica on the contacts through the intense localized heat generated by the electrical arc present during the relay switching process.

The rate of silica build-up depends upon several factors, including: the type and amount of silicone present, location of the silicone within the relay, temperature, frequency of relay contact switching, and the arc energy on opening and closing of the relay contacts. Silica on the contacts may also be eroded away through subsequent arcing within the relay. The arc energy of the relay is related to the electrical load current and load inductance, which is unique to every circuit on the vehicle.

Engine stalling that is the result of silica within the ignition relay may occur randomly, under various vehicle operating states. GM is unable to ascertain an exact frequency at which affected vehicles may be restarted. However, the owner reports provided with this inquiry suggest the majority of the vehicles can be restarted. In five of the owner reports the customer clearly stated the vehicle could be restarted. In eight others, neither the owner reports, nor the warranty history indicated that towing was required. There are only two reports where the customer stated there was difficulty restarting the vehicle.

GM has demonstrated that steering and braking control can be maintained in the event of an engine stall. Unassisted steering efforts are generally within the capability of a 5th percentile female. Full power assisted braking is generally available for several brake applications following an engine stall.

The mechanisms by which silicone within the relay migrates into the contact area and is converted to silica are complex, which makes it difficult to accurately predict the probability and frequency at which the alleged defect may occur in the future. A lognormal failure analysis model developed by Delphi Engineering indicates the frequency of occurrence may continue to climb for an additional period. This model predicts that vehicles built between October 2003 and January 2004, months with the highest frequency of occurrence, may reach 219 IPTV at 36 months in service, an additional 176 IPTV over the current level. A copy of Delphi's analysis is provided in Attachment 3 CD Delphi, folder labeled "Response for Q12;" refer to the Adobe Acrobat file.

The actual warranty for the same period shows the failure rate builds through 210 days of exposure and then declines to an incremental rate of around 0.8 IPTV per month at 420 days exposure. If the incremental rate were to continue at that level, the frequency may only reach 63 IPTV at 36 months in service, an additional 18 IPTV over the current level. The warranty information used in this analysis is provided in Attachment 1 CD GM, folder labeled "Response for Q12;" refer to the Adobe Acrobat file.

NHTSA has provided a total of 17 Vehicle Owner's Questionnaires with this request, representing 15 vehicle owners. All of the reports alleged vehicle stalling and may relate to the subject component. Warranty histories for the 13 available VINs were examined and 4 had the ignition relay replaced. Of the other 9 vehicles, the dealer was either unable to duplicate the condition (4 VINs) or performed multiple repairs (5 VINs) in an attempt to remedy the condition. Five of the complaints were from vehicles built in October 2003, the only month with greater than one complaint.

General Motors recognizes that vehicle stalling may introduce additional risk to motor vehicle safety. However, GM does not believe the alleged defect here poses an unreasonable risk to motor vehicle safety and offers the following reasons:

- The condition is intermittent and the majority of owners are able to restart their vehicles.
- Only those vehicles built between October 13, 2003 and March 8, 2004 show elevated complaint and warranty rates (total population 39,078)
- The highest monthly complaint rate within this period is low at 4.2 IPTV
- The cumulative warranty rate for vehicles built between October 2003 and January 2004 (43.2 IPTV @ 12 months in service) is low when compared to recent GM safety recalls involving engine stalling.
- The incremental warranty rate for vehicles built between October 2003 and January 2004 remains low beyond 12 months in service (0.8 IPTV)

* * *

This response is based on searches of General Motors Corporation (GM) locations where documents determined to be responsive to your request would ordinarily be found. As a result, the scope of this search did not include, nor could it reasonably include, " all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of GM (including all business units and persons previously referred to), who are or, in or after January 1, 2001, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

a. Design, engineering, analysis, modification or production (e.g. quality control);
b. Testing, assessment or evaluation;
c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers.

This response was compiled and prepared by this office upon review of the documents produced by various GM locations, and does not include documents generated or received at those GM locations subsequent to their searches.

Please contact me if you require further information about this response or the nature or scope of our searches.

Sincerely,

Gay P. Kent
Director
Product Investigations

Attachments

GM-668

DEC 17 2004

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

Wayne Kaufman

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Gay P. Kent, Director
Product Investigations
General Motors Corporation
Mail Code 480-111-E18
30200 Mound Road
Warren, MI 48090-9010

NVS-213kmb
PE04-075

Original Received
1-3-05
w/CD

Dear Ms. Kent:

As you know, the Office of Defects Investigation (ODI) of the National Highway Traffic Safety Administration (NHTSA) has opened a Preliminary Evaluation (PE04-075) to investigate allegations of engine stall in certain model year (MY) 2004 Buick Rendezvous and Pontiac Aztek vehicles manufactured by General Motors Corporation (GM). The purpose of this letter is to request certain information about these and other vehicles manufactured by GM.

This office has received 17 reports of engine stall while driving in 15 subject vehicles. An electronic copy of each of the Vehicle Owner's Questionnaires (VOQ) is enclosed for your information. In addition, ODI has reviewed GM field reports related to engine stall in the subject vehicles. Ignition relay replacement was identified as the repair in most of the field reports; restart difficulties were cited in approximately 90% of the field reports studied.

Unless otherwise stated in the text, the following definitions apply to these information requests:

- **Subject Vehicles:** All MY 2004 through current production Buick Rendezvous and Pontiac Aztek vehicles manufactured for sale or lease in the United States.
- **Subject Components:** All ignition relays manufactured for use on the subject vehicles.
- **GM:** General Motors Corporation, all of its past and present officers and employees, whether assigned to its principal offices or any of its field or other locations, including all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of GM (including all business units and persons previously referred to), who are or, in or after

January 1, 2001, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

a. Design, engineering, analysis, modification or production (e.g. quality control);
b. Testing, assessment or evaluation;
c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers.

- **Alleged Defect:** The failure, malfunction, or other unsatisfactory performance of the engine control (i.e. fuel, ignition and/or electronic control) system, which may result in engine stalling in subject vehicles.

- **Document:** "Document(s)" is used in the broadest sense of the word and shall mean all original written, printed, typed, recorded, or graphic matter whatsoever, however produced or reproduced, of every kind, nature, and description, and all non-identical copies of both sides thereof, including, but not limited to, papers, letters, memoranda, correspondence, communications, electronic mail (e-mail) messages (existing in hard copy and/or in electronic storage), faxes, mailgrams, telegrams, cables, telex messages, notes, annotations, working papers, drafts, minutes, records, audio and video recordings, data, databases, other information bases, summaries, charts, tables, graphics, other visual displays, photographs, statements, interviews, opinions, reports, newspaper articles, studies, analyses, evaluations, interpretations, contracts, agreements, jottings, agendas, bulletins, notices, announcements, instructions, blueprints, drawings, as-builts, changes, manuals, publications, work schedules, journals, statistical data, desk, portable and computer calendars, appointment books, diaries, travel reports, lists, tabulations, computer printouts, data processing program libraries, data processing inputs and outputs, microfilms, microfiches, statements for services, resolutions, financial statements, governmental records, business records, personnel records, work orders, pleadings, discovery in any form, affidavits, motions, responses to discovery, all transcripts, administrative filings and all mechanical, magnetic, photographic and electronic records or recordings of any kind, including any storage media associated with computers, including, but not limited to, information on hard drives, floppy disks, backup tapes, and zip drives, electronic communications, including but not limited to, the Internet and shall include any drafts or revisions pertaining to any of the foregoing, all other things similar to any of the foregoing, however denominated by GM, any other data compilations from which information can be obtained, translated if necessary, into a usable form and any other documents. For purposes of this request, any document which contains any note, comment, addition, deletion, insertion, annotation, or otherwise comprises a non-identical copy of another document shall be treated as a separate document subject to production. In all cases where original and any non-identical copies are not available, "document(s)"also means any identical copies of the original and all non-identical copies thereof. Any document, record, graph, chart, film or photograph originally produced in color must be provided in color. Furnish all documents whether verified by GM or not.

If a document is not in the English language, provide both the original document and an English translation of the document.

- **Other Terms:** To the extent that they are used in these information requests, the terms "claim," "consumer complaint," "dealer field report," "field report," "fire," "fleet," "good will," "make," "model," "model year," "notice," "property damage," "property damage claim," "rollover," "type," "warranty," "warranty adjustment," and "warranty claim," whether used in singular or in plural form, have the same meaning as found in 49 CFR 579.4.

In order for my staff to evaluate the alleged defect, certain information is required. Pursuant to 49 U.S.C. § 30166, please provide numbered responses to the following information requests. Insofar as GM has previously provided a document to ODI, GM may produce it again or identify the document, the document submission to ODI in which it was included and the precise location in that submission where the document is located. When documents are produced, the documents shall be produced in an identified, organized manner that corresponds with the organization of this information request letter (including all individual requests and subparts). When documents are produced and the documents would not, standing alone, be self-explanatory, the production of documents shall be supplemented and accompanied by explanation.

Please repeat the applicable request verbatim above each response. After GM's response to each request, identify the source of the information and indicate the last date the information was gathered.

1. State, by model and model year, the number of subject vehicles GM has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by GM, state the following:
   a. Vehicle identification number (VIN);
   b. Make;
   c. Model;
   d. Model Year;
   e. Date of manufacture;
   f. Date warranty coverage commenced; and
   g. The State in the United States where the vehicle was originally sold or leased (or delivered for sale or lease).

   Provide the table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

2. State the number of each of the following, received by GM, or of which GM is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:
   a. Consumer complaints, including those from fleet operators;
   b. Field reports, including dealer field reports;

c. Reports involving a crash, injury, or fatality, based on claims against the manufacturer involving a death or injury, notices received by the manufacturer alleging or proving that a death or injury was caused by a possible defect in a subject vehicle, property damage claims, consumer complaints, or field reports;
d. Property damage claims;
e. Third-party arbitration proceedings where GM is or was a party to the arbitration; and
f. Lawsuits, both pending and closed, in which GM is or was a defendant or codefendant.

For subparts "a" through "d," state the total number of each item (e.g., consumer complaints, field reports, etc.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint).

In addition, for items "c" through "f," provide a summary description of the alleged problem and causal and contributing factors and GM's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "e" and "f," identify the parties to the action, as well as the caption, court, docket number, and date on which the complaint or other document initiating the action was filed.

3. Separately, for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:

a. GM's file number or other identifier used;
b. The category of the item, as identified in Request No. 2 (i.e., consumer complaint, field report, etc.);
c. Vehicle owner or fleet name (and fleet contact person), address, and telephone number;
d. Vehicle's VIN;
e. Vehicle's make, model and model year;
f. Vehicle's mileage at time of incident;
g. Incident date;
h. Report or claim date;
i. Whether a crash is alleged;
j. Whether property damage is alleged;
k. Number of alleged injuries, if any; and
l. Number of alleged fatalities, if any.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

4. Produce copies of all documents related to each item within the scope of Request No. 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method GM used for organizing the documents.

5. State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by GM to date that relate to, or may relate to, the alleged

defect in the subject vehicles: warranty claims; extended warranty claims; claims for good will services that were provided; field, zone, or similar adjustments and reimbursements; and warranty claims or repairs made in accordance with a procedure specified in a technical service bulletin or customer satisfaction campaign.

Separately, for each such claim, state the following information:

a. GM's claim number;
b. Vehicle owner or fleet name (and fleet contact person) and telephone number;
c. VIN;
d. Repair date;
e. Vehicle mileage at time of repair;
f. Repairing dealer's or facility's name, telephone number, city and state or ZIP code;
g. Labor operation number(s);
h. Problem code(s);
i. Replacement part number(s) and description(s);
j. Concern stated by customer; and
k. Comment, if any, by dealer/technician relating to claim and/or repair.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "WARRANTY DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table which provides further details regarding this submission.

6. Describe in detail the search criteria used by GM to identify the claims identified in response to Request No. 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make and model year, the terms of the new vehicle warranty coverage offered by GM on the subject vehicles (i.e., the number of months and mileage for which coverage is provided and the vehicle systems that are covered). Describe any extended warranty coverage option(s) that GM offered for the subject vehicles and state by option, model, and model year, the number of vehicles that are covered under each such extended warranty.

7. Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles, that GM has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins, advisories, informational documents, training documents, or other documents or communications, with the exception of standard shop manuals. Also include the latest draft copy of any communication that GM is planning to issue within the next 120 days.

8. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, GM. For each such action, provide the following information:

   a. Action title or identifier;

b. The actual or planned start date;
c. The actual or expected end date;
d. Brief summary of the subject and objective of the action;
e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and
f. A brief summary of the findings and/or conclusions resulting from the action.

For each action identified, provide copies of all documents related to the action, regardless of whether the documents are in interim, draft, or final form. Organize the documents chronologically by action.

9. Describe all modifications or changes made by, or on behalf of, GM in the design, material composition, manufacture, quality control, supply, or installation of the subject components, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:

   a. The date or approximate date on which the modification or change was incorporated into vehicle production;
   b. A detailed description of the modification or change;
   c. The reason(s) for the modification or change;
   d. The part numbers (service and engineering) of the original component;
   e. The part number (service and engineering) of the modified component;
   f. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
   g. When the modified component was made available as a service component; and
   h. Whether the modified component can be interchanged with earlier production components.

   Also, provide the above information for any modification or change that GM is aware of which may be incorporated into vehicle production within the next 120 days.

10. Produce one of each of the following:

   a. Exemplar samples of each design version of the subject components; and
   b. Field return samples of the subject components exhibiting the subject failure mode.

11. State the number of subject components that GM has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model, model year, and VIN ranges of the vehicles in which it is used and month/year of sale *(including the cut-off date for sales, if applicable)*:

   For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number) Also identify by make, model, model year, and VIN ranges of any other vehicles of which GM is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

12. Furnish GM's assessment of the alleged defect in the subject vehicles, including:

a. The causal or contributory factor(s);
b. The failure mechanism(s);
c. The failure mode(s), including, but not limited to:
   i) The vehicle operating states that exist when the stalling condition most frequently occurs (e.g., at idle or during acceleration or deceleration, or at steady state cruising, etc.);
   ii) The ability to immediately restart the vehicle after engine stall and the frequency at which subject vehicles affected by the alleged defect can be immediately restarted; and
   iii) The effect on vehicle control systems and the ability to safely and adequately control the vehicle.
d. The estimated probability and frequency at which the alleged defect may continue into the future;
e. The risk to motor vehicle safety that it poses;
f. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning; and
g. The reports included with this inquiry.

This letter is being sent to GM pursuant to 49 U.S.C. § 30166, which authorizes NHTSA to conduct any investigation that may be necessary to enforce Chapter 301 of Title 49 and to request reports and the production of things. It constitutes a new request for information. GM's failure to respond promptly and fully to this letter could subject GM to civil penalties pursuant to 49 U.S.C. § 30165 or lead to an action for injunctive relief pursuant to 49 U.S.C. § 30163. (Other remedies and sanctions are available as well.) Please note that maximum civil penalties under 49 U.S.C. § 30165 have increased as a result of the recent enactment of the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act, Public Law No. 106-414 (signed November 1, 2000). Section 5(a) of the TREAD Act, codified at 49 U.S.C. § 30165(b), provides for civil penalties of up to $5,000 per day, with a maximum of $15 million for a related series of violations, for failing or refusing to perform an act required under 49 U.S.C. § 30166. This includes failing to respond to ODI information requests.

If GM cannot respond to any specific request or subpart(s) thereof, please state the reason why it is unable to do so. If on the basis of attorney-client, attorney work product, or other privilege, GM does not submit one or more requested documents or items of information in response to this information request, GM must provide a privilege log identifying each document or item withheld, and stating the date, subject or title, the name and position of the person(s) from, and the person(s) to whom it was sent, and the name and position of any other recipient (to include all carbon copies or blind carbon copies), the nature of that information or material, and the basis for the claim of privilege and why that privilege applies.

GM's response to this letter, in duplicate, together with a copy of any confidentiality request, must be submitted to this office by February 7, 2005. Please refer to PE04-075 in GM's response to this letter. If GM finds that it is unable to provide all of the information requested within the time allotted, GM must request an extension from me at (202) 366-5207 no later than

five business days before the response due date. If GM is unable to provide all of the information requested by the original deadline, it must submit a partial response by the original deadline with whatever information GM then has available, even if an extension has been granted.

If GM claims that any of the information or documents provided in response to this information request constitute confidential commercial material within the meaning of 5 U.S.C. § 552(b)(4), or are protected from disclosure pursuant to 18 U.S.C. § 1905, GM must submit supporting information together with the materials that are the subject of the confidentiality request, in accordance with 49 CFR Part 512, as amended (69 Fed. Reg. 21409 et seq; April 21, 2004), to the Office of Chief Counsel (NCC-113), National Highway Traffic Safety Administration, Room 5219, 400 Seventh Street, S.W., Washington, D.C. 20590. GM is required to submit two copies of the documents containing allegedly confidential information (except only one copy of blueprints) and one copy of the documents from which information claimed to be confidential has been deleted.

If you have any technical questions concerning this matter, please call Mr. Kyle Bowker of my staff at (202) 366-9597.

Sincerely,

for J. Quandt.
12/17/2004

Mr. Jeffrey L. Quandt, Chief
Vehicle Control Division
Office of Defects Investigation

Enclosure 1, One CD-ROM titled Data Collection Disc containing three Microsoft Access files and electronic copies of the seventeen subject VOQs.

Subject VOQ ODI numbers (17): 10100826, 10100750, 10100279, 10098846, 10098845, 10097830, 10097431, 10095479, 10095091, 10093084, 10088327, 10086601, 10083785, 10083230, 10080297, 10074801, 10074322.

GM668
PE04-075

ATTACHMENT "1"

GM668
PE04-075

ATTACHMENT "2"

CONFIDENTIAL GM MATERIAL HAS BEEN REMOVED FROM THIS ATTACHMENT AND SUPPLIED TO THE OFFICE OF THE CHIEF COUNSEL

GM668
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ATTACHMENT "3"