

August 7, 2009

Scott Yon, Chief
Vehicle Integrity Division
Office of Defects Investigation
National Highway Traffic Safety Administration
1200 New Jersey Ave., S. E., Room W46-409
Washington, D.C. 20590

N090152

NVS-212jfa
PE09-028

Dear Mr. Yon:

This letter is General Motors' (GM) response to NHTSA preliminary evaluation request (PE), dated March 5, 2009, regarding allegations of gasoline leaking from the fuel pump in 2002 model year (MY) Saturn L Series vehicles manufactured by General Motors Corporation, and to request certain information. As requested, GM is providing information for all (2000 – 2005 MY) Saturn L Series vehicles.

As was agreed upon in a discussion between GM and NHTSA ODI on July 9, 2009, this letter responds to Questions 8-10.

Your questions and our corresponding replies are as follows:

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, and all other MY Saturn L series 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.

Product Investigations

Mail Code: 480-210-G11 • 30001 Van Dyke • Warren, MI 48090
PE09-028 N090152 Q 8_10 PE Response.doc

Action 8-1: Design, Validation, Manufacturing and emails regarding the MRA assembly Start Date: 1998 End Date: 2004 Engineering Group: Continental Attachments: Att_3_Continental_CONF Disk in the folder Response to Question 8 and Att_4_Continental_NON CONF Disk in the folder Response to Question 8. Description: The information includes the design, validation, manufacturing information for the MRA used in the subject vehicles. Also included are drawings, test results and email correspondence regarding proposed changes to the MRA assembly. Summary: The information includes design validation and test results regarding the MRA assembly.
Action 8-2: Saturn L Series Production Validation (PV) Testing Start Date: March 11, 2002 End Date: September 4, 2002 Engineering Group: TI Automotive Group Attachment: Att_5_TI Group_CONF Disk Description: GM production validation testing of fuel tank and MRA assembly. The components passed validation.
Action 8-3: GM Investigation/Vehicle Testing, VOQ review/notes and warranty analysis/projections Start Date: July 2009 End Date: ongoing Engineering Group: GM Engineering Attachment: Att_1_GM and Att_2_GM_CONF Disk Description: GM is obtaining MRA units and fuel lines from field vehicles located in different states to analyze and verify the long term performance of the components. The project includes material processing verification, FEA analysis and additional component/vehicle testing. GM also contacted VOQ customers and discussed the fuel system complaint to obtain additional information regarding the issue. GM has initiated an Engineering Investigation bulletin through dealers to obtain MRAs from the field that allege leaks or odors. (This is an update to GM's prior response to Question 7 dated July 24, 2009.)
Action 8-4: Saturn L Series vehicle MRA photos and under body CAD drawings Start Date: July 2009 End Date: July 2009 Engineering Group: GM Engineering Attachment: Att_1_GM Description: Photos and drawings of Saturn L Series field vehicles under body component location and MRA removal.

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 component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles, and all other MY Saturn L series 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 vehicles production within the next 120 days.

GM is providing a summary of the product engineering information requested in 9(a-h) on the Att_1_GM disk in the folder labeled "Q_9"; refer to the file labeled, "PE09-028 Q9 Modifications.xls".

GM is not planning to incorporate any modifications or changes into production of the subject vehicles that relate to the alleged defect within the next 120 days.

10. Furnish GM's assessment of the alleged defect in the subject vehicles and all other MY Saturn L series vehicles, including:

- a. The causal or contributory factor(s);**
- b. The failure mechanism(s);**
- c. The failure mode(s);**
- d. The risk to motor vehicle safety that it poses;**
- e. What warnings, if any, that the alleged defect was occurring or that the subject component was malfunctioning; and**
- f. The reports included with this inquiry.**

The MRA (module reservoir assembly) for the 2000 MY Saturn L-series vehicles is a different design (refer to GM's response to Q9 for the detailed description of the design differences) compared to those built in 2001-2005 MY vehicles. Data for the 2000 MY vehicle's is included in the responses to Q1 – Q9. However since the incident rate for these vehicles is much lower than that for 2001-2005 vehicles, the data analysis for the 2000 MY vehicles is excluded in Q10.

General Motors has not received any MRAs from the field that exhibited any form of leak. As part of the current investigation, GM initiated a search for high mileage original equipment MRAs from vehicles in Michigan and Arizona. To date, 9 MRAs have been obtained from vehicles with mileage ranging from 62,500 to 198,000 miles. Preliminary assessments of material characteristics showed no evidence of abnormal material property degradation or reduction in functional performance from a sealing perspective. GM is in the process of analyzing these MRAs and has observed some minute cracks (visible only through magnification) at the low pressure return port. None of these units exhibited any liquid or vapor leaks prior to removal from customer vehicles, nor would the presence of minute surface cracks necessarily result in a future leak. GM continues to attempt to obtain MRAs in the field that demonstrate evidence of leaks.

Although GM has not identified a root cause of the alleged defect, the overall incident rate for vehicles exhibiting an odor or leak for 2001-2005 MY vehicles is very low at 0.5 IPTV at 3 years exposure. The Weibull projections based on regular and extended service contract claims for MRA leaks and odors is 3.9 IPTV at 5 years exposure. The warranty claim data indicates that incident rates are higher in states with higher ambient temperatures. The Weibull projection for 10 of the highest states (AZ, CA, FL, GA, HI, LA, NM, NV, TX, UT) within the 2001-2005 MY population is low at 1.0 IPTV at 3 years and 9.2 IPTV at 5 years exposure. The Weibull analysis is included on the Att_1_GM_CONF disk in response to Action 8-3.

GM reports, warranty and extended service contract claim records indicate that most customers have noticed fuel odors associated with the alleged condition prior to any noticeable fuel leakage. In general, for any fuel system leak path, fuel vapors can pass through a 0.005" opening which is sufficient for the vehicle operator to notice a fuel odor well in advance of any fuel seepage as written in 10 of 11 VOQs and as described by the 11th customer in a telephone conversation.

The MRA in the Saturn L Series vehicles is installed in the fuel tank in the center of the vehicle. Several factors in the vehicle design minimize the potential for fuel contact with vehicle ignition sources:

- The fuel tank shield wraps around the sides of the tank, such that if a MRA fuel leak were to occur, it would travel down the sides of the tank and be contained within the shield, and then drain from the bottom of the shield onto the ground through drain holes.
- The fuel tank heat shield is designed such that it extends above the height of the fuel tank and into the prop shaft tunnel.
- The exhaust system is located on the passenger side of the vehicle and is routed around the outside portion of the fuel tank away from the MRA (see attached photos and drawings on the ATT_1_GM disk in response to action 8-4).
- GM has found that during high temperature thermal vehicle testing (GMN9545) that the exhaust component surface temperatures near the fuel tank is less than 400°C. This is well below the hot surface ignition temperature (801-843 °C) of gasoline.
- The fuel tank is designed such that the MRA is installed in a depression on the top, middle surface of the fuel tank. The MRA ports face rearward away from the hottest part of the exhaust system.

GM reviewed the 11 incident reports (VOQs) included with this inquiry and has found that 9 of the 11 VOQs may be related to the subject condition. In all 11 cases, the vehicle operator noticed a fuel odor in advance of any fuel seepage. Two customers stated that their leaks were not related to the MRA. GM has not examined any of the MRA modules that are the subject of the VOQs; therefore, GM is not able to determine if a common root cause is related to each of the alleged failures. GM is providing a summary of the VOQ information including notes from

telephone conversations with vehicle owners on the Att_1_GM disk in response to Action 8-3. Refer to the file labeled, "PE09-028 VOQ VINs.xls".

In summary, General Motors has not identified a root cause for the alleged condition and is continuing to obtain MRAs from the field. However, GM believes that the alleged defect does not pose an unreasonable risk to motor vehicle safety for the following reasons:

- Owners have noticed fuel odors associated with the alleged condition prior to any noticeable fuel leakage from the MRA.
- The vehicle design minimizes the potential for fuel contact with any vehicle ignition sources.
- The Weibull projections for 2001 – 2005 MY Saturn L Series vehicles based on regular warranty and extended service contract claims for MRA leaks and odors (identified by owners) are very low at 0.5 IPTV at 3 years and 3.9 IPTV at 5 years. The Weibull projection for 10 of the highest states (AZ, CA, FL, GA, HI, LA, NM, NV, TX, UT) within the 2001-2005 MY population is low at 1.0 IPTV at 3 years and 9.2 IPTV at 5 years exposure.
- There are no reports of fire, injuries or crashes.

* * * *

General Motors requested assistance and documents from suppliers in responding to item 8 and this response includes those documents received from suppliers.

This response is based on searches of General Motors (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 their 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 2000, 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

Attachment

■