[redacted] GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

January 8, 2004

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-647

NVS-213cla
PE03-050

Dear Mr. Quandt:

This letter is General Motors' (GM) response to your information request (IR), dated November 6, 2003, regarding alleged engine fuel rail assembly leaks in 1995 through 1997 Model Year (MY) Oldsmobile Aurora vehicles equipped with 4.0L V8 engines and Cadillac DeVille, Seville, and Eldorado vehicles equipped with 4.6L V8 engines.

Your questions and our corresponding replies are as follows:

1. **State, by model and model year, the number of vehicles GM has manufactured for sale or lease in the United States equipped with the subject fuel rail assemblies. 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;**
   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 that provides further details regarding this submission.

   The number of subject vehicles GM has manufactured for sale or lease in the United States is shown in Table Q1-1. An electronic summary of the production data is provided on the CD in Attachment 1; refer to the Microsoft Access 2000 file in the folder labeled "Response for Q1 - PRODUCTION DATA." This data was collected from GM Claims Analysis Retrieval Database (CARD) on December 3, 2003.

Vehicle	[illegible]	[illegible]	[illegible]	Total
Oldsmobile Aurora	45,693	22,349	25,579	93,621
Cadillac DeVille	15,776	107,613	95,080	218,469
Cadillac Seville	35,571	33,607	37,140	106,318
Cadillac Eldorado	24,510	20,043	19,308	63,861
Cadillac Commercial	0	0	1,006	1,006
Total	121,550	183,612	178,112	483,274

Table Q1-1 Production Data Summary

2. State the number of each of the following, received by GM, or of which GM are otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles identified in response to Request No. 1:

   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. Reports involving a fire, 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;
   e. Property damage claims; and
   f. Third-party arbitration proceedings where GM is or was a party to the arbitration; and
   g. Lawsuits, both pending and closed, in which GM is or was a defendant/or codefendant.

   For subparts "a" through "d. / e," 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 "d./e/g," 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 f and g, 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 Q2-1 summarizes the reports to GM that could relate to the subject condition.

Type of Report	Count (Including Duplicates)	GM Reports	GM Reports Corresponding to NHTSA Reports	Number of Reports Alleging Property Damage	Number of Reports Alleging a Crash	Number of Reports Alleging Injuries/ Fatalities*	Number of Reports with Fire	Location of Reports (Attachment)
Owner Reports	84	78	6	0	0	0	2	2A
Field Reports	33	31	2	2	0	2	23	2B
Not-In-Suit Claims	5	5	0	3	0	1	5	2C
Subrogation Claims	8	8	0	0	0	0	8	2D
3rd Party Arbitration Proceedings	0	0	0	0	0	0	0	Not Applicable
Product Liability Lawsuits	2	2	0	0	0	1	2	2E
Total (Including Duplicates)	132	124	8	5	0	4	40	Not Applicable
Total (Excluding Duplicates)	127	119	8	3	0	3	35	Not Applicable

* GM is not aware of any fatalities related to the subject condition.

Table Q2-1: Reports for GM647/PE03-050

The sources of the requested information and the last date the searches were conducted are tabulated in Table Q2-2 below.

Source System	Last Date Gathered
Corporate Central File	12/03/2003
Customer Assistance Center	11/19/2003
Technical Assistance Center	11/20/2003
Field Information Network Database (FIND)	11/11/2003
Company Vehicle Evaluation Program (CVEP)	11/19/2003
Captured Test Fleet (CTF)	11/19/2003
Early Quality Feedback (EQF)	11/24/2003
Field Product Report Database (FPRD)	11/11/2003
Legal / Employee Self Insured Services (ESIS)	12/03/2003

Table Q2-2: Data Sources

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 a fire is alleged;
k. Whether property damage is alleged;
l. Number of alleged injuries, if any; and
m. 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 that provides further details regarding this submission.

An electronic summary of the records included in item 2 is provided on the CD in Attachment 1; refer to the Microsoft Access 2000 file in the folder labeled "Response to Q3 – REQUEST NUMBER TWO DATA." GM has organized this summary by GM file number within each attachment.

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.

Refer to the Table Q2-1 above. The reports are provided in Attachments 2A – 2E. GM has organized the reports by 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 vehicles identified in response to Request No. 1: 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;
h. Problem code;
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 that provides further details regarding this submission.

A summary of warranty claims that may relate to the subject condition on GM vehicles for sale or lease in the U.S. is provided on the CD in Attachment 1; refer to the Microsoft Access 2000

files in the folder labeled "Response to Q5 – WARRANTY DATA." There are 1868 regular and 662 extended warranty reports for the subject vehicles that may be related to the subject condition. GM searched Claims Analysis Retrieval Database (CARD - regular warranty), Motors Insurance Corporation (MIC – extended warranty) and Universal Warranty Corporation (UWC – extended warranty) databases. Searches were completed on December 4, 2003.

GM's warranty database does not contain the following information: vehicle owner's name or telephone number, replacement part number description, repairing dealer's city or ZIP code, customer concern statement, or dealer/technician comment. In addition to GM's warranty database exclusion, MIC database does not contain the following information: dealer's phone number, problem code, or part number. The verbatim text is an optional field, not required to be completed for every warranty claim. It is for the dealer to enter any additional comments that may be applicable to the warranty claim.

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 numbers 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 regular warranty data was collected from the GM CARD database by searching for the labor codes and trouble codes listed in Tables Q6-1 and Q6-2. Extended warranty data was collected from MIC by searching for the labor codes listed in Table Q6-1.

LABOR CODE	DESCRIPTION
J0969	Rail, fuel - replace
J6128	Rail, common fuel – Replace

Table Q6-1: Labor Codes Used in CARD & MIC Search

TROUBLE CODE	DESCRIPTION
1D	BROKEN
1K	CRACKED
1L	CUT
1Z	RUPTURE
2G	IMPROPERLY CUT
2K	IMPROPERLY SEALED
2P	INSUFFICIENT SEALANT
2V	LEAK
3F	NOT CONNECTED
3R	PUNCTURE

3W	PUNCTURED
3Z	RUPTURED
4H	TORN
4Q	WEAK
4X	WORN
6C	COMPONENT-INOPERATIVE
6N	CONNECTOR-PARTIAL CONNECT
6P	CONNECTOR-SEAL DAMAGED

Table Q6-2: Trouble Codes in CARD Search

UWC extended warranty data were collected by searching for any repair involving a subject vehicle using the UWC repair codes listed in Table Q6-3.

LABOR CODE	DESCRIPTION
J5860	Rail, fuel - replace
J6129	Rail, common fuel – Replace

Table Q6-3: Repair Codes Used in UWC Search

The subject vehicles are covered by a bumper-to-bumper new vehicle warranty for four years or 50,000 miles whichever occurs first. This component is also covered by emissions warranty for 7 years or 70,000 miles in California and, for 1996-1997MY, Massachusetts and New York. Many extended warranty options are available through GM dealerships. They are offered at different prices and for varying lengths of time, based on customer's preference, up to 7 years from the date of purchase or up to a total of 100,000 vehicle miles. Extended warranties were issued for 67,108 vehicles through MIC and 2,565 vehicles through UWC.

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 numbers represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers.

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 not identified any service bulletins, advisories, or other communications to dealers, zone offices, or field offices that pertain to the alleged defect in the subject vehicles.

GM has not identified any such draft communications that GM is planning to issue within the next 120 days.

The preceding information was collected from GM Service Operations. The data collection was completed on December 1, 2003.

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. Per 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.

   An electronic summary of actions and documents is provided on the Attachment 1 CD; folder labeled "Response for Q8" except the response in 8C and 8E. The response in 8C and 8E are contained in Attachment 2 CD GM Confidential; folder labeled "Response for Q8 GM Confidential." The preceding information was collected from GM Product Engineering and Delphi Automotive. The data collection was completed on January 7, 2004.

   In order to assist General Motors in responding to this NHTSA Information Request, Delphi Automotive Systems has provided responsive information for questions 8 through 12. The information is contained on Attachment 3 CD identified as "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Redacted" for questions 8 through 12 except the response in 8 with Engineering drawings.

   Delphi requests that some of this information stamped "Confidential Information" included on the engineering drawings, be afforded confidential treatment by the NHTSA. The response in 8 with Engineering drawings is contained in Attachment 4 CD Delphi Confidential; folder labeled "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Confidential." This information is not customarily made public by Delphi and contains trade secrets and commercial information which is privileged or confidential under 5 U.S.C. Section 552(b)(4), 49 CFR Part 512 and 49 U.S.C Section 30167(a). The engineering drawings are accompanied by a written claim for confidentiality and a Certificate in support of Delphi's request for confidentiality.

   8A
   a. Warranty and Extended Warranty analysis of 1998 – 1997 Premium V8 Fuel Rail Assemblies.
   b. July, 2002
   c. November, 2002
   d. Warranty information was reviewed to determine if the data suggested any trends related to mileage, geographical location, and time exposure on subject vehicles during the regular warranty period and the extended warranty period.
   e. GM Powertrain, Delphi Energy and Engine Management.
   f. The cumulative warranty claims increased during the warranty period, and the highest warranty incidents per Thousand Vehicles (IPTV) observed was 2.5. The highest cumulative extended warranty claim rate observed was 3.6 IPTV. The geographical analyses showed that the level of incident claims were different for northern states versus southern states.

8B
a. Part Sales analysis of 1995 – 1997 Premium V8 Fuel Rail Assemblies.
b. September, 2002
c. Ongoing
d. Part sales information is reviewed monthly to identify trends.
e. GM, Delphi Energy and Engine Management, Dana Corp.
f. The cumulative part sales showed a two-step trend. The first trend is the same as the warranty claims during the warranty period. The second trend, after the regular warranty period, shows higher sales than warranty claims. The part sales increase during the summer months and then decrease in the winter.

8C
a. Material analysis of failed field returned fuel rails from the 1995 – 1997 Premium V8 Engine.
b. August, 2002
c. February, 2003
d. To complete root cause of the failure and Failure Effect Analysis (FEA) analyses on field returned parts.
e. GM Powertrain, Delphi Energy and Engine Management.
f. Materials testing showed that the phenomenon of Environmental Stress Cracking (ESC) was responsible for the field failures of the subject component. The ESC is a result of heat, time, alcohol-blended fuel, fuel pressure cycling, and designed-in stressors (steam-bent tubing). The relative contribution of each factor in the ESC is not completely understood. Failure Effect Analysis (FEA) also showed that the highest stress area in the tubing is at the apex of the bend on the individual jumper tubes (Nylon 12 tubes connecting fuel injector rods). See Attachment 2 CD GM Confidential under folder "Response to Q8 GM Confidential".

8D
a. Thermal testing to determine the operating temperature of the Nylon 12 jumpers at various locations around the Fuel Rail done at the GM Desert Proving Grounds in Mesa, AZ.
b. September, 2002
c. September, 2002
d. To determine the operating temperature of the Nylon 12 jumpers at various locations on the fuel rail during different driving/soak conditions at elevated ambient temperatures.
e. GM Powertrain
f. Thermal testing was completed using a 1997 Cadillac SLS with a 4.6L V8 (LD8) Engine. The vehicle was tested in various driving conditions from highway driving in 24°C ambient temperatures to severe city driving in 35°C ambient temperatures. The temperature of fuel rail nylon 12 tubing indicated that tube locations on the driver side of engine were warmer than the passenger side. Maximum tube temperatures ranged from 60°C – 70°C during the drive portion of the testing to 80°C – 95°C during the soak portion.

8E
a. Evaluation of field performance, failure modes, design considerations, and manufacturing process.
b. Various Start Dates (See specific Report)
c. Evaluation of the field performance is ongoing.
d. Perform root cause analyses and studies for the subject component.
e. GM Powertrain
f. Fuel rail background information, manufacturing process, service part trends, fuel leak locations, failure stages, design criteria used, validation results, and program timing. The

latest draft Field Performance Evaluation entry document is included. See Attachment 2 CD GM Confidential under folder "Response to Q8 GM Confidential".

8F

a. Various subject material tests and analysis reports.
b. Various Start Dates (See specific Report)
c. Various End Dates (See specific Report)
d. Perform various measurement, analyses, tests, and studies for the subject component.
e. Delphi and DeGussa (Independent test lab)
f. Findings and conclusions are summarized and provided on Attachment 3 CD identified as "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Redacted" for questions 8 through 12. The response in 8 with Engineering drawings is contained in Attachment 4 CD Delphi Confidential; folder labeled "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Confidential."

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.

a. No modifications were made to the production fuel rail assembly that relate to the alleged defect. Fuel rail assembly modifications were made to accommodate engine compartment packaging requirements for each model year.
b. None
c. None
d. See response to question 12 for the part numbers. The part number drawings are attached in Attachment CD 2 GM Confidential; folder labeled "Response for Q9".
e. None
f. In model year 1998, the Premium V8 fuel rail jumper tube material was changed from nylon 12 to M-Bond (Multi-Layer polytetrafluoroethylene (PTFE) and nylon 12) to meet evaporative emissions permeation requirements. In September 2001, Dana, the Tier 2 fuel rail supplier, moved the service part assembly equipment from Kendallville, IN to Paris, TN. All service parts produced in Paris, TN use M-Bond tubing instead of monolayer nylon 12 tubing in their construction, including the 1998 – 1997 model year service rails.

   The original service fuel rail assembly tube material was changed to M-Bond between end-of-production 1997 and September 2001. Dana made the tubing material change without

approval from GM or Delphi (Tier 1).. According to Dana, they have no records that indicate the exact date when this change occurred. The part numbers did not change.

g. Approximately end-of-production 1997 thru September 2001.
h. Parts are interchangeable.

The subject fuel rail assembly (mono-layer Nylon 12) is no longer in production. The preceding information was collected from GM Product Engineering and Delphi Automotive. The data collection was completed on January 7, 2004.

In order to assist General Motors in responding to this NHTSA Information Request, Delphi Automotive Systems has provided responsive information for questions 8 through 12. The information is contained on Attachment 3 CD identified as "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Redacted" for questions 8 through 12.

10. Provide the following information relating to the subject fuel rail assemblies:
    a. Identify the material composition of each polymer used in the assembly by common name, trade name, and ASTM abbreviation;
    b. State the heat resistance and fuel resistance capabilities of each polymer identified in 10.a;
    c. State the maximum temperature that each polymer identified in 10.a is exposed to in each of the subject vehicles during: (1) severe driving cycles (state conditions); and (2) hot soak;
    d. Provide copies of all hot soak temperature vs. time plots that have been done by or for GM in the subject vehicles;
    e. Provide copies of the GM specifications for the fuel resistance, heat resistance, and durability of the subject fuel rail assemblies; and
    f. Provide a table listing all other motor vehicles produced by GM with fuel rail assemblies constructed from the same polymer material used in the subject assemblies. Provide this information by model, engine, and model year range.

    a. 1. Common Name: Nylon 12, Trade Name: Polyamid 12, ASTM Abbreviation: PA12.
    2. Common Name: Nylon 66 33%Glass Filled Heat Stabilized, Trade Name: Polyamid 66, ASTM Abbreviation: PA66.
    b. 1. Nylon 12: Heat resistance: long term in air temperature 90°C – 110°C, short term in air temperature: 140°C based on BMS specification (file name: Grilamid_BMS_ tds.pdf).
    Fuel resistance: GM gave no specification for the fuel resistance. Nylon 12 is commonly used in North America and Europe for fuel systems and has been shown to be suitable to fuel exposure.
    2. Nylon 66: Continuous use with maximum temperature of 140°C.
    Fuel resistance: No specification was given for the fuel resistance. Nylon 66 is commonly used in North America for fuel systems and has been shown to be suitable to fuel exposure.
    c. Prior to release of production vehicles, development tests were conducted to measure the fuel rail assembly operating temperature. Additionally, in September 2002, a 1997 Cadillac SLS (Seville with 4.6L 275HP (RPO LD8) Engine) was tested at the GM Desert Proving Grounds in Mesa, AZ to measure the Nylon 12 fuel rail temperatures for various driving conditions. This test does not necessarily represent the entire vehicle population, variance of the vehicle builds, and the entire range of vehicle use.

    1. Severe driving cycle: The severe driving test was conducted at ambient temperatures from 35°C to 45°C at the GM Desert Proving Grounds in Mesa, AZ on the City Course. The severe test consists of 3 laps of a square-figure-8. One lap consists of 8 legs of 80%

throttle acceleration to approximately 50 – 60 mph for 0.1 mile followed by ABS stop with 15 second idle. The total test cycle consists of 25 start-and-stops. The peak fuel rail temperature observed with this test was 75°C.
2. Hot soak cycle: After the severe driving cycle, the vehicle was parked against a windbreak until peak temperatures are reached. The peak fuel rail temperature observed with this test was 95°C.

The other subject vehicles were not tested, however, they are expected to have similar results. The operating temperature of the nylon 66 injector pods was not measured during this test.

d. See Attachment 1 in CD under the folder name "Response to Q10" with file names: "10000 heat age final graphs.xls" and grilamid_l30ghs_tds.
e. GM is not aware of the existence of the GM component specification for the subject fuel rail assembly.
f. 1. In model year 1993.5 and 1994, GM produced the other motor vehicles in table Q10-1 with fuel rail assemblies constructed with Nylon 12 material. However, the fuel rail was located within a Magnesium Intake Manifold (clam-shell) and is not subjected to the operating temperature variances or the environment of the 1995 – 1997 Fuel Rail Assembly. GM is not aware of Nylon 12 material being used for the fuel rail tubing or log other than the content of the vehicle table provided below.

Model Year	Engine	Model
1993	4.6L LD8	Cadillac Eldorado
	4.6L L37	Cadillac Allante
	4.6L L37	Cadillac Eldorado
	4.6L L37	Cadillac Seville
1994	4.6L LD8	Cadillac Eldorado
	4.6L LD8	Cadillac Deville
	4.6L LD8	Cadillac Seville
	4.6L L37	Cadillac Eldorado
	4.6L L37	Cadillac Seville

Table Q10-1: Nylon 12 GM Other Vehicle Fuel Rail Applications

2. GM and other OEMs use Nylon 66 material for most fuel rail applications including fuel rail tubing, log, or fuel rail service port cap.

In order to assist General Motors in responding to this NHTSA Information Request, Delphi Automotive Systems has provided responsive information for questions 8 through 12. The information is contained on Attachment 3 CD identified as "Delphi Fuel Rail Product Evaluation PE03-060 (GM 647) CL03-009 Redacted" for questions 8 through 12.

The preceding information was collected from GM Product Engineering and Delphi Automotive. The data collection was completed on January 7, 2004.

11. Produce one of each of the following:
    a. Exemplar samples of each design version of the subject fuel rail assemblies;
    b. Field return samples of the subject fuel rail assemblies that exhibit leakage that is representative of the failures reported in the attached components;
    c. Any ids that have been released, or developed, by GM for use in service repairs to the subject components/assemblies which relate, or may relate, to the alleged defect in the subject vehicles.

a. GM does not have samples of unused original Nylon 12 fuel rail assemblies. All service fuel rail assemblies use M-bond construction. One M-bond fuel rail assembly is submitted with this response.
b. Two Nylon 12 field returned samples are provided with this response.
c. There are no kits available for repair. The current service parts use M-bond construction. A stainless steel service fuel rail is being developed, but it is not in production. No production parts are available as samples.

In order to assist General Motors in responding to this NHTSA Information Request, Delphi Automotive Systems has provided responsive information for questions 8 through 12. The information is contained on Attachment 3 CD identified as "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Redacted" for questions 8 through 12.

12. State the number of each of the following that GM has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model and model year of the vehicle in which it is used and month/year of sale *(including the cut-off date for sales, if applicable)*:
a. Subject components; and
b. Any kits that have been released, or developed, by GM for use in service repairs to the subject components/assembly.

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 and model year, 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.

The requested information is provided on the CD in Attachment 1; refer to the Microsoft Excel file in the folder labeled, "Response to Q12." These sales data have 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.

Monthly part sales information available for the most recent 24 months has been included.

The source of the requested information, current as of December 16, 2003, is GM Service Parts Operations.

No kits were released or developed by GM for use in service repairs.

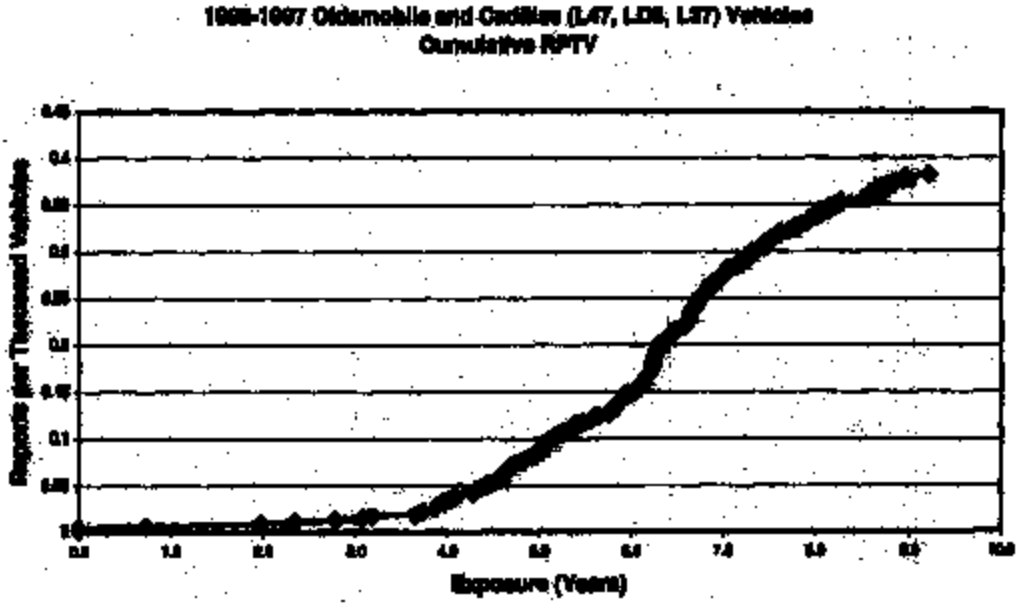
In order to assist General Motors in responding to this NHTSA Information Request, Delphi Automotive Systems has provided responsive information for questions 8 through 12. The information is contained on Attachment 3 CD identified as "Delphi Fuel Rail Product Evaluation PE03-050 (GM 647) CL03-009 Redacted" for questions 8 through 12.

13. 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;

d. The failure rate as a function of vehicle age (months in service and or mileage) and GM's estimate of total failures per thousand vehicles at: (1) five years in service; and (2) ten years in service; and
e. The reports included with this inquiry.

The subject vehicles have been in service for about seven to nine years and have a low rate of reports of engine compartment fires attributed to fuel rail leaks. Many vehicles have little potential to experience a fuel rail leak because of customer use patterns, the type of fuel used, and engine compartment configuration and air flow.

a. Delphi's materials testing showed that the phenomenon of Environmental Stress Cracking (ESC) was responsible for the field failures of the subject component. The ESC is a result of heat, time, alcohol-blended fuel, fuel pressure cycling, and designed-in stressors (steam-bent tubing and retention barb on Nylon tubing). The relative contribution of each factor in the ESC is not completely understood.
b. The failure mechanism of the fuel rail tubing is as follows:
   1. Tube swelling in fuel.
   2. Stress cracking, perpendicular to tube direction.
      i) Accelerated by temperature and periodic localized dry-out.
      ii) Results in loss of material properties, specifically elongation.
   3. As tube wall becomes weaker, the constant expansion/contraction of fuel pressure
      i) Initiates crack at outer wall.
      ii) Crack propagates slowly, until the remaining wall is not able to withstand the fuel pressure.
c. Crack in Nylon 12 tubing of the fuel rail assembly.
d. Based on the reports provided in response to Question 2 and the 76 VOQ related reports, the complaint/ incident rates for the subject conditions are as follows:



This chart is based on conservative assumption of service start date of the reports. The detailed data for this chart is provided on the CD in Attachment 1; refer to the Microsoft Excel file in the folder labeled, "Response to Q13."

For an analysis of warranty and part sales data, see latest draft PPE entry document in Response to 8E.

e. GM reviewed the 69 VOQ reports that NHTSA included with its inquiry and the 29 VOQ reports provided later. Based on the information included with the VOQ reports, 76 reports may be related to the subject condition.

* * *

General Motors requests that the documents stamped "GM Confidential" included in electronic Attachment 2 CD GM Confidential; folders labeled "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" be afforded confidential treatment by the NHTSA. This information is not customarily made public by General Motors and contains trade secrets and commercial information which is privileged or confidential under 5 U.S.C. Section 552(b)(4), 49 CFR Part 512 and 49 U.S.C. Section 30167(a).

Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders contain engineering drawings, performance specifications, price information, description of analysis methods, and test procedures having commercial value that can only be obtained independently at considerable cost. This information can be used by competitors to identify quality and performance problems or differences, thereby enabling them to improve their own products, without the expenditures associated with the evaluation of products, all at the expense of General Motors. Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders contain commercial information the disclosure of which would likely result in substantial competitive harm.

General Motors treats the above material as confidential proprietary information available only to authorized General Motors and supplier personnel and not otherwise available to the public. The document is maintained under a record-keeping system which is intended to control dissemination of this material within General Motors, and to assure that it is not disseminated outside the Corporation, except as described in the attached certification made pursuant to 49 CFR Part 512.4(a).

To the best of our knowledge, no prior determinations of the confidentiality of these documents have been made by the NHTSA, other Federal Agencies, or the Federal Courts. Documents such as the ones contained in Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders, however, have, to the best of our knowledge, normally been granted confidential treatment by the NHTSA in the past. The information in Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders are of a type for which a class determination of confidentiality has been made under 49 CFR Part 512, Appendix B.

The corresponding electronic copies of these documents are being provided on a CD labeled "GM CONFIDENTIAL". If a request for disclosure of any or all of this information is received by the NHTSA, General Motors requests notification of receipt of each such request and, if necessary, an opportunity to further explain the reasons why such material is trade secret and commercial information which should not be disclosed under the applicable statutes and regulations.

GM claims that certain information, in documents that are part of claims files maintained by the GM Legal Staff, is attorney work product and/or privileged. That information includes notes,

memos, reports, photographs, and evaluations by attorneys (and by claims analysts, investigators, and engineers working at the request of attorneys). GM is producing responsive documents from claims files that are neither attorney work product nor privileged and withholding those that are attorney work product and/or privileged.

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, 1994, 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,

Lyndon R. Lie
Director
Product Investigations

Attachments

CERTIFICATE IN SUPPORT OF REQUEST FOR CONFIDENTIALITY

I, Lyndon R. Lie, pursuant to the provisions of 49 CFR Part 512 state as follows:

(1) I am the Director of Product Investigations, and I am authorized by General Motors Corporation (GM) to execute documents on its behalf;

(2) The information stamped "GM Confidential" contained in Electronic Attachment 2 CD GM Confidential; "Response for Q6 GM Confidential" and "Response for Q9 GM Confidential" folders to this document is confidential and proprietary data and is being submitted with the claim that it is entitled to confidential treatment of 5 USC s552(b)(4), 49 U.S.C. Section 30167(a) and implemented in 49 CFR Part 512;

(3) I, or members of my staff, have personally inquired of the responsible GM personnel who have authority in the normal course of business to release the information for which a claim of confidentiality has been made to ascertain whether such information has ever been released outside GM or its suppliers;

(4) Based upon such inquiries to the best of my knowledge, information and belief, the information for which GM has claimed confidential treatment has never been released or become available outside GM or its suppliers, except as hereinafter specified: None.

(5) I make no representations beyond those contained in this certificate and in particular, I make no representations as to whether this information may become available outside GM and its suppliers because of unauthorized or inadvertent disclosure except as stated in Paragraph 4; and,

(6) I certify under penalty of perjury that the foregoing is true and correct. Executed on this the eighth day of January 2004.

Lyndon R. Lie
Director
Product Investigations

GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

January 9, 2004

Jacqueline Glassman,
Office of Chief Counsel
NHTSA Safety Assurance
Room #5219
400 Seventh Street, S.W.
Washington, D.C. 20590

GM-647

NVS-213cla
PE03-050

Dear Ms. Glassman:

Enclosed with this letter are three versions of General Motors' (GM) response to NHTSA's information request (IR), dated November 6, 2003, regarding alleged engine fuel rail assembly leaks in 1995 through 1997 Model Year (MY) Oldsmobile Aurora vehicles equipped with 4.0L V8 engines and Cadillac DeVille, Seville, and Eldorado vehicles equipped with 4.6L V8 engines. First two versions include the confidential documents and in the third has the confidential information removed.

General Motors requests that the documents stamped "GM Confidential" included in electronic Attachment 2 CD GM Confidential; folders labeled "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" be afforded confidential treatment by the NHTSA. This information is not customarily made public by General Motors and contains trade secrets and commercial information which is privileged or confidential under 5 U.S.C. Section 552(b)(4), 49 CFR Part 512 and 49 U.S.C. Section 30167(a).

Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders contain engineering drawings, performance specifications, price information, description of analysis methods, and test procedures having commercial value that can only be obtained independently at considerable cost. This information can be used by competitors to identify quality and performance problems or differences, thereby enabling them to improve their own products, without the expenditures associated with the evaluation of products, all at the expense of General Motors. Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders contain commercial information the disclosure of which would likely result in substantial competitive harm.

General Motors treats the above material as confidential proprietary information available only to authorized General Motors and supplier personnel and not otherwise available to the public. The document is maintained under a record-keeping system which is intended to control dissemination of this material within General Motors, and to assure that it is not disseminated outside the Corporation, except as described in the attached certification made pursuant to 49 CFR Part 512.4(e).

To the best of our knowledge, no prior determinations of the confidentiality of these documents have been made by the NHTSA, other Federal Agencies, or the Federal Courts. Documents such as the ones contained in Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders, however, have, to the best of our knowledge, normally been granted confidential treatment by the NHTSA in the past. The information in Electronic Attachment 2 CD GM Confidential; "Response for Q8 GM Confidential" and "Response for Q9 GM Confidential" folders are of a type for which a class determination of confidentiality has been made under 49 CFR Part 512, Appendix B.

Product Investigations
Mail Code: 480-106-354 • 30400 Mound Road • Warren, MI 48090-9055
Phone: (586) 986-0986 • Fax: (586) 947-8519
GM-647 Confidentiality Cover Letter

The corresponding electronic copies of these documents are being provided on a CD labeled "GM CONFIDENTIAL". If a request for disclosure of any or all of this information is received by the NHTSA, General Motors requests notification of receipt of each such request and, if necessary, an opportunity to further explain the reasons why such material is trade secret and commercial information which should not be disclosed under the applicable statutes and regulations.

Please contact me if you require further information about this request.

Sincerely,

Lyndon R. Lie
Director
Product Investigations

Attachments

DELPHI
Automotive Systems

GL04-001-001
January 6, 2004

Jacqueline Glassman
Chief Counsel
National Highway Traffic
Safety Administration
Room 5219
400 Seventh Street, S.W.
Washington, D.C. 20590

Reference: PE03-050 (GM647)

Dear Ms. Glassman:

Delphi is a supplier of vehicle components to General Motors Corporation, including the Fuel Rail Assembly for the Northstar engines that were used on the 1995 – 1997 C and E car lines. In a recent Product Evaluation Letter (PE03-050), addressed to Mr. Lyndon Lie of GM, the NHTSA Office of Defects Investigation has asked for certain information which Delphi considers to be confidential pursuant to Federal Law. Our request for confidential treatment of these materials follows.

Delphi has supplied General Motors with 1) a complete non-redacted copy of our response to the questions that pertain to Delphi, 2) a complete redacted copy of the same response, 3) an additional complete redacted copy for submission to the rulemaking docket, and 4) the attached redacted copies found in Appendix I.

The materials, for which Delphi is requesting confidential treatment, in both the complete non-redacted copy of our response as well as the materials found in the attached Appendix are clearly marked in red as "Delphi Confidential" at the top of each page. Because of the nature of these materials, Delphi requests confidentiality for each of the entire pages enclosed. These pages have been so marked.

Accordingly, Delphi requests that the documents stamped "Delphi Confidential" included in Appendix be afforded confidential treatment by NHTSA and other agency or department of the government. This information is not customarily made public by Delphi and contains both trade secrets and commercial information, which is privileged or confidential under 5 U.S.C. Section 552 (b) (4), 49 CFR Part 512 and 49 U.S.C. Section 30167(a). A Certificate in Support of the Request for Confidentiality is attached to this letter.

The Appendix contains Engineering Drawings which Delphi considers to be trade secrets and which cannot be used for manufacturing product except after significant reverse engineering. These materials also have commercial value that can only be obtained independently at considerable cost. This information can be used by competitors to identify quality and performance problems or differences, thereby enabling them to improve their own products, without the expenditures associated with the evaluation of products, all at the expense of Delphi Automotive Systems. The

commercial information contained in the Appendix would likely result in substantial competitive harm if disclosed.

Delphi treats the above material as confidential proprietary information available only to authorized Delphi personnel and to the customer for which they were made, and are not otherwise available to the public. These documents are maintained under a record-keeping system which is intended to control dissemination of this material within Delphi, and to assure that it is not disseminated outside the Corporation, except as described in the attached certification made pursuant to 49 CFR Part 512.4.

To the best of our knowledge, no prior determinations of the confidentiality for these documents have been made by the NHTSA, other Federal Agencies, or the Federal Courts. Nonetheless, documents, such as the types contained in the Appendix, have normally been granted confidential treatment by the NHTSA in the past, to the best of our knowledge. The materials in this Appendix are of a type for which a class determination of confidentiality has been made under 49 CFR Part 512, Appendix B.

It is requested that notice concerning the Agency's determination of the confidentiality for these materials and any questions relating to confidentiality be addressed to Donald Parshall, Attorney, Delphi Legal Staff, MC 480-410-254, 5825 Delphi Drive, Troy, MI 48098-2815, Phone 248-813-2567.

The documents subject to this request for confidentiality have been clearly stamped "Delphi Confidential". If a request for disclosure of any of all of this information is received by NHTSA, Delphi requests notification of receipt of each such request and, if necessary, an opportunity to further explain the reasons why such materials are trade secret and commercial information, and which therefore should not be disclosed under the applicable statutes and regulations.

If you require further information about this request, please do not hesitate to call me at 248-813-2362

Sincerely,

Michael J. McKale

Michael J. McKale
Manager
Product Regulations and Investigations

GL04-001-002

GL04-001
Reference: PE03-050 (GM647)

CERTIFICATE IN SUPPORT OF REQUEST FOR CONFIDENTIALITY

I, Michael J. McKale, pursuant to the provisions of 49 CFR Part 512, state as follows:

(1) I am Manager of Product Regulations and Investigations, and I am authorized by Delphi Automotive Systems Corporation (Delphi) to execute this certificate on its behalf;

(2) I certify that the information contained in Appendix I is confidential and proprietary data and is being submitted with the claim that it is entitled to confidential treatment under 5 U.S.C. 552(b)(4) (as incorporated by reference in and modified by the statute under which the information is being submitted);

(3) I hereby request that the information contained in Appendix I be protected for of three years beyond their use in production;

(4) This certification is based on the information provided by the responsible Delphi personnel who have authority in the normal course of business to release the information for which a claim of confidentiality has been made to ascertain whether such information has ever been released outside Delphi;

(5) Based upon that information, to the best of my knowledge, information and belief, the information for which Delphi has claimed confidential treatment has never been released or become available outside Delphi, except as hereinafter specified: the customer, General Motors;

(6) I make no representations beyond those contained in this certificate and, in particular, I make no representations as to whether this information may become available outside Delphi because of unauthorized or inadvertent disclosure (except as stated in paragraph 5); and

(7) I certify under penalty of perjury that the foregoing is true and correct. Executed on this the 6th day January 2004.

Michael J. McKale
Manager
Product Regulations and Investigations

GL03-010-003

GM647
PE03-050

ATTACHMENT "1"

GM647
PE03-050

ATTACHMENT "2"

GM CONFIDENTIAL