

12 Jun 09

Thomas Z. Cooper, 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

N080374A

NVS-212am
EA09-004

Dear Mr. Cooper:

This letter is General Motors' (GM) response to your information request (IR), dated 20 Apr 09, regarding allegations of loss of turn signal function in MY 2004 and 2005 Chevrolet Malibu and Malibu Maxx vehicles manufactured by General Motors Corporation (GM). The alleged defect is the failure of the subject components, specifically all front park, turn, and/or DRL bulbs, rear tail, stop, and/or turn signal bulbs, front park, turn, and/or DRL bulb sockets, and/or rear tail, stop, and or turn signal bulb sockets on the subject vehicles.

Your questions and our corresponding replies are as follows:

1. **State in a table format, within the body of the response letter and in an electronic spreadsheet, by model, model year, the total number of subject vehicles GM has manufactured for sale or lease in the United States. Separately, for each vehicle manufactured to date by GM, state the following:**
 - a. **Make;**
 - b. **Model Series;**
 - c. **Model Year;**
 - d. **Vehicle identification number (VIN);**
 - e. **Date of manufacture (in "yyyy/mm/dd" date format);**
 - f. **Date warranty coverage commenced (in "yyyy/mm/dd" date format); 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."

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

MAKE/ MODEL	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	132,367	212,405	344,772

TABLE 1 VEHICLE PRODUCTION

The production information requested in 1a-1g is provided on the ATT_1_GM disk; folder labeled "Q_01": refer to the Microsoft Access 2000 file labeled "Q_01_PRODUCTION DATA".

Product Investigations

Mail Code: 480-210-G11 • 30001 Van Dyke • Warren, MI 48090
EA09-004_N080374A Response.docx

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. 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 "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 "e," 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.

All the records alleging loss of turn signal, brake lamps, tail lamps, and DRL function for the subject vehicles are summarized in Tables 2-1. GM has organized the records by the GM file number within each attachment. Those records provided with PE08-062 are also included again in this response.

TYPE OF REPORT	GM REPORTS	SUBCATEGORIES			
		CORRESPONDING TO NHTSA REPORTS	NUMBER WITH PROPERTY DAMAGE	NUMBER WITH CRASH	NUMBER WITH INJURIES/ FATALITIES
Owner Reports	631	6	0	0	0
Field Reports	294	1	0	0	0
Not-In-Suit Claims	0	0	0	0	0
Subrogation Claims	0	0	0	0	0
Third Party Arbitration Proceedings	0	0	0	0	0
Product Liability Lawsuits	0	0	0	0	0
Total Reports (Including Duplicates)	925	7	0	0	0
Total Vehicles with Reports (Unique VIN)	877	7	0	0	0

TABLE 2-1: REPORT CLASSIFICATION - ALLEGATIONS OF LOSS OF FUNCTION: ANY EXTERIOR TURN SIGNAL, STOP LAMP, DRL, OR TAIL LAMP BULBS AND SOCKETS

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

SOURCE SYSTEM	LAST DATE GATHERED
Customer Assistance Center	15 May 09
Technical Assistance Center	7 May 09
Field Information Network Database (FIND)	23 Apr 09
Field Product Report Database (FPRD)	23 Apr 09
Company Vehicle Evaluation Program (CVEP)	23 Apr 09
Captured Test Fleet (CTF)	23 Apr 09
Early Quality Feedback (EQF)	23 Apr 09
Legal / Employee Self Insured Services (ESIS)/Product Liability Claims/ Lawsuits	28 Apr 09

TABLE 2-2: 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."

The requested information is provided on the ATT_1_GM disk; folder labeled "Q_03": refer to the Microsoft Access 2000 file labeled "Q_03_REQUEST NUMBER TWO DATA".

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 2-1 are in the file provided in ATT_1_GM disk; folder labeled "Q_03": refer to the Microsoft Access file labeled "Q_03_REQUEST NUMBER TWO DATA". GM has organized the additional attachments by the GM file number within the folder labeled "Q_03_ATT".

To date, GM's investigation of the alleged defect has not included an assessment of the cause(s) of each incident responsive to Request No. 2. Some incident reports may not contain sufficient reliable information to accurately assess cause.

5. State, within the body of the response letter and in an electronic spreadsheet, 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. Bulb location, i.e. DRL/turn signal, tail lamp, or Maxx tail lamp, not left or right;
- c. Vehicle owner or fleet name (and fleet contact person) and telephone number;
- d. VIN;
- e. Repair date;
- f. Vehicle mileage at time of repair;
- g. Repairing dealer's or facility's name, telephone number, city and state or ZIP code;
- h. Labor operation number;
- i. Problem code;
- j. Replacement part number(s) and description(s);
- k. Concern stated by customer; and
- l. 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."

For the subject vehicles, the regular warranty, goodwill warranty and MIC service contract claims with loss of front turn signal function or failure of all exterior turn signal, stop lamp, DRL and tail lamp bulbs or sockets are summarized by model and model year in Table 5-1 (front), Table 5-2 (rear) and Table 5-3 (could not be associated with front or rear). Of the regular warranty claims in Tables 5-1, 5-2 and 5-3, 9.5% of the total front and 6.5% of the total rear claims were socket replacement claims. The front and rear UWC service contract claims are summarized by model and model year in Table 5-4 and Table 5-5, respectively. A summary of the regular warranty claims, MIC service contract claims and UWC service contract claims, including the information requested in 5(a-k), is provided on the ATT_1_GM disk; folder labeled "Q_05": refer to the Microsoft Access 2000 file labeled "Q_05_WARRANTY DATA". A list of the labor codes and trouble codes used to collect the warranty data is provided in response to item No. 6. The warranty claims associated with PE08-062 are also included again in this response.

MAKE/ MODEL	Type	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	Regular	25,658	50,943	76,601
Chevrolet Malibu and Malibu Maxx	MIC	424	522	946

TABLE 5-1: REGULAR WARRANTY AND MIC SERVICE CONTRACT CLAIMS WITH
LOSS OF FRONT TURN SIGNAL/DRL FUNCTION

MAKE/ MODEL	Type	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	Regular	21,618	27,419	48,037
Chevrolet Malibu and Malibu Maxx	MIC	227	170	397

TABLE 5-2: REGULAR WARRANTY AND MIC SERVICE CONTRACT CLAIMS WITH LOSS OF REAR
STOP, TAIL, AND TURN SIGNAL FUNCTION

MAKE/ MODEL	Type	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	Regular	162	833	995
Chevrolet Malibu and Malibu Maxx	MIC	40	44	84

TABLE 5-3: REGULAR WARRANTY AND MIC SERVICE CONTRACT CLAIMS THAT COULD NOT BE ASSOCIATED WITH LOSS OF FRONT OR REAR STOP, TAIL, DRL, AND TURN SIGNAL FUNCTION

MAKE/ MODEL	Type	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	UWC	16	13	29

TABLE 5-4: UWC SERVICE CONTRACT CLAIMS WITH LOSS OF FRONT TURN SIGNAL/DRL FUNCTION

MAKE/ MODEL	Type	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	UWC	4	4	8

TABLE 5-5: UWC SERVICE CONTRACT CLAIMS WITH LOSS OF REAR STOP, TAIL, AND TURN SIGNAL FUNCTION

SOURCE SYSTEM	LAST DATE GATHERED
GART - regular warranty	29 Apr 09
MIC - service contract claims	30 Apr 09
UWC - service contract claims	28 Apr 09

TABLE 5-6: DATES PULLED

GM searched the GM Claim Analysis Retrieval Database (CARD-regular warranty), the Motors Insurance Corporation (MIC- service contract claims) and the Universal Warranty Corporation (UWC- service contract claims) databases to collect the warranty data for this response.

GM's warranty database does not contain the following information: vehicle owner's name, telephone number or customer concern statement. 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 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.

A summary of warranty claims that may relate to the subject condition is provided on the ATT_1_GM disk; folder labeled "Q_05": refer to the Microsoft Access 2000 file labeled "Q_05_WARRANTY DATA".

- 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.

All the labor codes listed in table 6-1 were searched, but only the labor codes listed in table 6-2 had associated claims. From SOP (16 May 03) to Feb 04 the only codes available to GM dealers for bulb or socket replacement were N0528 and N0912. Additional labor codes N0680, N0681, N0760 and N0761 were added for bulb or socket replacement in Feb 04. Labor codes N9537 and N9538 were added on 10 Mar 06 with TSB 06-08-42-004.

The GM Claim Analysis Retrieval Database (CARD-regular warranty) regular warranty database and the Motors Insurance Corp (MIC) service contract claims database were searched using the labor codes that may be related to the alleged defect listed in Table 6-1. Universal Warranty Corporation (UWC) does not use labor codes or trouble codes.

The warranty search identified claims only for the labor codes listed in Table 6-2. These claims were grouped into three sets of claims: one set of claims related to front lamps (consisting of claims with labor codes of N0680, N0681 and N9537), another set of claims related to rear lamps (consisting of claims with labor codes of N0760, N0761 and N9538) and another set of claims that could not be associated with front or rear lamps (consisting of claims with labor code of N6612). Claims with labor codes N0528 (Bulbs, lamp – Exterior – replace) and N0912 (Socket, lamp – exterior – replace) were added to the front or rear lamp grouping based on part number association. Claims with labor code N6612 (Exterior lighting wiring and/or connector repair or replace) were added based on the Trouble Codes listed in Table 6-3 and the verbatims. The warranty claims associated with PE08-062 are also included again in this response.

Some of the VINs have multiple entries for various labor codes. The warranty claims reflect the number of labor operations used by dealers, which is higher than the number of actual visits to dealers for repairs.

LABOR CODE	DESCRIPTION:
N0528	BULBS, LAMP - EXTERIOR - REPLACE
N0680	BULBS, PARK AND TURN SIGNAL LAMP (RIGHT) - REPLACE
N0681	BULBS, PARK AND TURN SIGNAL LAMP (LEFT) - REPLACE
N0760	BULBS, STOP, TAIL AND TURN LAMP (RIGHT) - REPLACE
N0761	BULBS, STOP, TAIL AND TURN LAMP (LEFT) - REPLACE
N0766	STOP, TAIL & TURN BULB REPLACE
N0767	STOP SIGNAL BULB REPLACE
N0912	SOCKET, LAMP - EXTERIOR - REPLACE
N0990	LAMP SOCKET, RT STOP
N0991	LAMP SOCKET, LT STOP
N0996	STOP SIG SOCKET REPLACE
N0997	STOP SIGNAL SOCKET REPLACE
N1590	RT TURN SIGNAL LAMP REPLACE
N1591	LT TURN SIGNAL LAMP REPLACE
N1598	1PC TURN SIGNAL LAMP REPLACE
N9537	SOCKET, LAMP - EXTERIOR (FRONT) - REPLACE
N9538	SOCKET, LAMP - EXTERIOR (REAR) - REPLACE
N0687	TURN SIGNAL BULBS REPLACE
N6612	EXTERIOR LIGHTING WIRING AND/OR CONNECTOR REPAIR OR REPLACE

TABLE 6-1 LABOR CODES USED IN WARRANTY AND MIC SEARCH

LABOR CODE	DESCRIPTION:
N0528	BULBS, LAMP - EXTERIOR - REPLACE
N0680	BULBS, PARK AND TURN SIGNAL LAMP (RIGHT) - REPLACE
N0681	BULBS, PARK AND TURN SIGNAL LAMP (LEFT) - REPLACE
N0760	BULBS, STOP, TAIL AND TURN LAMP (RIGHT) - REPLACE
N0761	BULBS, STOP, TAIL AND TURN LAMP (LEFT) - REPLACE
N0912	SOCKET, LAMP - EXTERIOR - REPLACE
N9537	SOCKET, LAMP - EXTERIOR (FRONT) - REPLACE
N9538	SOCKET, LAMP - EXTERIOR (REAR) - REPLACE
N6612	EXTERIOR LIGHTING WIRING AND/OR CONNECTOR REPAIR OR REPLACE

TABLE 6-2 LABOR CODES WITH ASSOCIATED CLAIMS

TROUBLE CODE	DESCRIPTION:
6S	LAMP (BULB)-DEFECTIVE
6W	SOCKET-BROKEN
6X	SOCKET-CORRODED
6Y	SOCKET-OPEN
6Z	SOCKET-SHORTED

TABLE 6-3 TROUBLE CODES USED IN LABOR CODE N6612 WARRANTY SORTING

The subject vehicles are covered by a bumper-to-bumper new vehicle warranty for three years or 36,000 miles whichever occurs first. Many different 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.

The General Motor's warranty system does not contain information on the number of vehicles that have extended warranty coverage. The number of MIC Service contracts on the subject vehicle that were in-force as of 31 Mar 09 is contained in Table 6-4.

MAKE/ MODEL	2004 MY	2005 MY	Total
Chevrolet Malibu and Malibu Maxx	16,590	25,908	42,498

TABLE 6-4: SUBJECT VEHICLE MIC SERVICE CONTRACTS SOLD

7. State the name, address and appropriate point of contact (name, title and telephone number) of the original equipment supplier of the following:

- a. Subject component front socket;
 - b. Subject component rear socket;
 - c. Subject component front bulb; and
 - d. Subject component rear bulb.
- a. Subject component front socket; Guide Corporation
 - b. Subject component rear socket; Guide Corporation
 - c. Subject component front bulb: Guide Corporation with Federal Mogul as the 2nd tier supplier
 - d. Subject component rear bulb: Guide Corporation with Federal Mogul as the 2nd tier supplier

The original socket supplier was Guide Corporation who is no longer in business.

Federal Mogul
26555 Northwestern Highway
Southfield, MI 48033
Leo Bachynsky 248-631-7213
Application Engineering Manager

8. State the name, address and appropriate point of contact (name, title and telephone number) of any and all service and/or replacement equipment suppliers of the following:

- a. Subject component front socket;**
- b. Subject component rear socket;**
- c. Subject component front bulb; and**
- d. Subject component rear bulb.**

- a. Subject component front socket; Guide Corporation supplied the original service parts from start of production to 19 Jun 06. On 19 Jun 06, Christiana Industries replaced Guide Corporation and began to supply service parts. In Aug 07, Empire Electronics replaced Christiana Industries and began supplying the service parts.
- b. Subject component rear socket; Guide Corporation supplied the original service parts from start of production to 19 Jun 06. On 19 Jun 06, Christiana Industries replaced Guide Corporation and began to supply service parts. In Aug 07, Empire Electronics replaced Christiana Industries and began supplying the service parts.
- c. Subject component front bulb; Federal Mogul supplied the service parts from start of production to 19 Jun 06. On 19 Jun 06, OSRAM Sylvania replaced Federal Mogul and began supplying service parts.
- d. Subject component rear bulb; Federal Mogul supplied the service parts from start of production to 19 Jun 06. On 19 Jun 06, OSRAM Sylvania replaced Federal Mogul and began supplying service parts.

Guide Corporation and Christiana Industries are no longer in business.

Federal Mogul
26555 Northwestern Highway
Southfield, MI 48033
Leo Bachynsky 248-631-7213
Application Engineering Manager

Empire Electronics
214 East Maple Rd
Troy, MI 48083
Robert Gray 248-585-8130
Director of Program Management

OSRAM Sylvania
21800 Haggerty Road
Suite 104
Northville, MI 48167
Frederick Zink (248)596-0385
Automotive OEM Sales Manager

- 9. Furnish copies of all communications sent from and received by GM that relate to or may relate to the alleged defect; including but not limited to such communications between GM and any supplier to GM of one or more of the subject components, and between employees and/or entities within GM.**

Communications related to GM's assessment of loss of turn signal, brake lamp, tail lamp and DRL function in 2004 and 2005 Chevrolet Malibu and Malibu Maxx vehicles were provided in the GM response to item No. 8 of PE08-062, dated 9 Jan 09. Recent communications between employees and/or entities within GM related to GM's assessment of loss of turn signal, brake lamp, tail lamp and DRL function in 2004 and 2005 Chevrolet Malibu and Malibu Maxx vehicles are on the Att_1_GM_ disk in the folder labeled "Q_09_Communications".

- 10. List any and all service and/or replacement parts to replace any and all of the subject components, including the release date and part number of such service and/or replacement part.**

All of the information requested in this item is included in the response to item 12.

- 11. State any and all problems GM is aware of with any and all of the subject component front sockets, the subject component rear sockets, the subject component front bulbs, and/or the subject component rear bulbs, including but not limited to problems with materials and/or performance.**

Contributory Factors:

An analysis of warranty part returns of stop, turn, DRL and tail lamp bulbs and sockets has shown that the most significant contributor to the replacement of these bulbs is bulb quality. The most common quality issue is bulb "wobble". Wobble is the relative movement between the glass bulb and bulb base. A secondary quality issue is bulb sealing. Another minor contributory factor is socket deformation related to heat, but this is only a small proportion of the warranty claims.

Bulb Wobble:

Review of bulbs returned for warranty discovered some could move as much as 3 mm within the bulb assembly (tolerance is +/- 1.0 mm). This relative movement results in impact vibrations for the bulb and also increases the potential for arcing between the bulb lead wires and socket terminals. Impacts and arcing result in reduced bulb life. This issue was most prevalent in vehicles built in February 2004.

Bulb Sealing:

If a bulb leaks and air enters it, the bulb will burn out prematurely. This is referred to as the "puffer" phenomenon. Warranty review of 2004 bulbs indicated there were instances of bulb seal failure. This was traced back to a supplier quality issue. During the manufacturing process some bulbs were not properly sealed. This issue was most prevalent in vehicles built in June and July 2004.

Warranty rates for park/turn/DRL bulbs are similar to that for stop/tail/turn bulbs when the bulbs without the above stated quality issues are present (refer to month of build warranty chart Jul 03 – Oct 03). This is true even with the higher duty cycle of the park/turn/DRL bulbs. During the months of build with the quality issues, the higher duty cycle of the park/turn/DRL bulbs results in higher warranty rates than the stop/tail/turn bulbs.

Socket Retention System:

A review of warranty data since bulletin 06-08-42-004 was issued, indicates that sockets are a very minor contributor and are only 8.3% of all warranty claims. The socket retention system is made up of four retaining posts formed from the socket body material and four terminals. Material creep,

increased by bulb heat, can cause these plastic retaining posts to relax and thereby reduce retention of the bulb. This may allow the bulb to move relative to the socket. If the bulb loosens and moves with vehicle vibration, arcing may occur between the bulb lead wires and socket terminals. The arcing may reduce the life of the bulb.

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 component; and
- b. Any service and/or replacement parts and/or kits that have been released, or developed, by GM for use in service repairs to the subject component.

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.

An electronic summary table of the requested service part information for the subject components is provided on the ATT_1_GM disk; folder labeled "Q_12": refer to the Microsoft Excel files labeled "Q_12_Part Sales". GM does not offer any kits for use in service repairs specifically related to the alleged defect. The part sales associated with PE08-062 are also included again in this response.

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 including the GM vehicles that contain the identical component, part sales figures by month and calendar year and the supplier's name and address, contact name and phone number.

13. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations including, but not limited to, product and design development tests (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.

Any additional actions not included in PE08-062 are listed in Table 13-1 below as a summary of actions that have been conducted, are being conducted, are planned, or are being planned by or for GM regarding the subject condition on the subject vehicles as of 10 Jun 09. Documents and additional supporting information are included in the Attachments as noted in the table.

Action 13-1: GM Investigation
Start Date: 12 Jan 09
End Date: 10 Jun 09
Engineering Group: GM Engineering
Attachment: ATT_1_GM disk; folder labeled "Q_13_GM_Investigation"
Description: GM's internal investigation of the Malibu lighting system and its operation.
Summary: GM's data analysis was completed. Warranty data indicated that the issue was primarily bulb life/replacement and only 8.3% were due to socket replacement.

TABLE 13-1 SUMMARY OF ACTIONS THAT HAVE BEEN CONDUCTED

14. State any and all reasons for why GM did not include the subject vehicles in GM's recall of the 2004-2005 MY Cadillac XLR vehicles (06V-263) dated July 12, 2006.

GM did not include the subject vehicles in the recall of the 2004 - 2005 Cadillac XLR vehicles because the subject vehicles had a lower rate of warranty claims for socket and bulb replacement and different contributing factors. The 12 MIS warranty rates as of 10 May 06 were 104.5 IPTV for the 2004 and 2005 MY XLR and 62.6 IPTV for the 2004 and 2005 MY Malibu. The XLR had issues related to both socket design and bulb quality. As described in the response to item 11, the Malibu issues are primarily related to bulb quality. Differences between the 2004 - 2005 Malibu and the 2004 - 2005 XLR that affect warranty rate include socket design, voltage at the lamp, headlamp design and bulb type.

Socket Design:

Although the Zenite™ socket body is the same for the XLR and Malibu, the XLR has separate front side marker and park lamps. And, its turn/DRL socket only requires three terminals. The Malibu turn/DRL function also serves as the front side marker and park lamp. Its socket requires a fourth terminal to illuminate the bulb's minor filament to accomplish these functions. Since the socket terminals serve as part of the bulb's retention system, the fourth terminal makes the Malibu design more stable. One less terminal makes the XLR bulb inherently less stable in the socket. Less stability can result in bulb movement and then arcing between the bulb and socket terminals which will reduce bulb life. In the event the socket's retention fingers relax from heat generated, less stability can result in the bulb twisting which can lead to arcing. One of the improvements in the XLR socket design used for the recall and for the permanent production design change was to add a fourth terminal to increase stability in the bulb retention system, similar to the 2004 - 2005 Malibu design.

Voltage at the lamp:

The voltage at the lamp for the 2004 - 2005 XLR turn/DRL lamp is higher than the voltage at the lamp for the 2004 - 2005 Malibu park/turn/DRL. In the XLR higher voltage contributed to higher temperatures resulting in socket deformation. Late in the 2005 MY, a length of wire was added to the XLR turn/DRL lamp circuit to reduce the voltage at the XLR lamp as part of the permanent production design change.

The "GMX380 Exterior Lighting Subsystem Voltage and Current Study with Current Wire Design" documented measured voltages at the lamps for an exemplar Malibu vehicle to be 13.3V, 13.13V, 13.17V, 13.06V for the front left, front right, rear left and rear right lamps respectively, consistent with the specification. A similar study of the XLR lamp voltage documented measured voltages at the lamps for an exemplar XLR vehicle to be 13.79V and 13.87V for the front left and front right lamps respectively.

Higher voltage will reduce bulb life. For example, if the operating voltage for a bulb is 13.0 volts the resulting bulb life is approximately 3,280 hours, whereas, with an operating voltage of 13.3 volts, the resulting bulb life would be approximately 2,440 hours, a 26% reduction.

Headlamp Design:

The design of the Malibu headlamp better manages heat generated by the park/turn/DRL bulb. The dimensions of the Malibu headlamp give it more than twice the internal (air) volume than the XLR

headlamp. The smaller internal volume of the XLR headlamp results in higher temperatures at the turn/DRL bulb. In addition, the Malibu amber lens has vents around its entire circumference which allow heat from the park/turn/DRL bulb to dissipate to the front of the lamp and rearward into the housing. The XLR has no vents in its lens and only one vent in the reflector to dissipate heat into the housing. The XLR design results in higher temperatures at the DRL bulb which will reduce bulb life and potentially contribute to socket deformation.

Bulb Type:

The Malibu is equipped with a vented, amber lens and a clear Wagner bulb whereas the XLR is equipped with an amber Wagner bulb. Although both the amber and clear bulbs would be susceptible to the quality issues described in the response to item 11, clear bulbs operate at lower temperature than amber bulbs. Higher operating temperatures result in reduced bulb life and contribute to socket deformation on the XLR.

15. Describe all modifications or changes made by, or on behalf of GM, in the design, material composition, manufacturing, 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. This includes but is not limited to any and all modifications or changes by the subject component manufacturer relating to the alleged defect. 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 identifiable by MY, date of build or VIN in the "PRODUCTION DATA" table of Request No. 1;
- 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.

Refer to the response to Item 9 in PE08-062. This information has not changed since the PE08-062 response.

16. In consideration of any additional information accumulated and evaluated in preparation of GM's response to this letter, furnish an update to GM's assessment of the alleged defect in the subject vehicle, 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, 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
- f. The reports included with this inquiry.

The failure modes have been identified as an intermittent or inoperative front park/turn/DRL or rear stop/tail/turn signal lamp on 2004 and 2005 Chevrolet Malibu and Malibu Maxx vehicles.

Each headlamp assembly utilizes one park/turn/DRL bulb and one Zenite™ socket. The DRL is illuminated when the vehicle is in drive and the low beam or high beam is not activated, and the light sensor detects daytime light. The park/turn/DRL will flash when the turn signal or hazard switch is activated. The park/turn/DRL will also illuminate with the headlamp switch in the park position.

Each tail lamp assembly has a combination stop/tail/turn bulb and nylon socket. The bulb is illuminated during vehicle braking, when the headlamps are on, and when the turn signal or hazard switch is activated. The stop/tail/turn bulb will also illuminate with the headlamp switch in the park position.

Both bulbs have dual lighting elements (minor and major). Refer to the Microsoft PowerPoint file labeled "Q_16_Lamp Graphics" on the ATT_1_GM disk; folder labeled "Q_16" for detailed information.

The park/turn/DRL and stop/tail/turn bulbs are produced on the same assembly line, but they are not the same part number. Bulbs are standard commodity items that are not specific to any vehicle manufacturer. Bulbs are consumable, replaceable items that can burn out within the life of the vehicle. All lamps have some level of bulb burnout within the warranty period. Even low usage functions have bulb burnout warranty, regardless of the rated bulb life due to early failures and/or random failures. GM utilizes the industry's longest rated life bulbs for the park/turn/DRL and stop/tail/turn applications. The customer usage of a DRL is approximately twenty times the usage of a turn signal. Therefore, a bulb used as a park/turn signal/DRL will likely be replaced sooner and more often than one used as a park/turn signal. GM covers bulb replacements during the warranty period.

Contributory Factors:

An analysis of warranty part returns of stop, turn, DRL, and tail lamp bulbs and sockets has shown that the most significant contributor to the replacement of these bulbs is bulb quality. The most common quality issue is bulb "wobble". Wobble is the relative movement between the glass bulb and bulb base. A secondary quality issue is bulb sealing.

Bulb Wobble:

Review of bulbs returned for warranty discovered some could move as much as 3 mm within the bulb assembly (tolerance is +/- 1.0 mm). This relative movement results in impact vibrations for the bulb and also increases the potential for arcing between the bulb lead wires and socket terminals. Impacts and arcing result in reduced bulb life. This issue was most prevalent in vehicles built in February 2004.

Bulb Sealing:

If a bulb leaks and air enters it, the bulb will burn out prematurely. This is referred to as the "puffer" phenomenon. Warranty review of 2004 and 2005 bulbs indicated there were instances of bulb seal failure. This was traced back to a supplier quality issue. During the manufacturing process some bulbs were not properly sealed. This issue was most prevalent in vehicles built in June and July 2004.

Warranty rates for park/turn/DRL bulbs are similar to that for stop/tail/turn bulbs when the bulbs without the above stated quality issues are present (refer to month of build warranty chart Jul 03 – Oct 03). This is true even with the higher duty cycle of the park/turn/DRL bulbs. During the months of build with the quality issues, the higher duty cycle of the park/turn/DRL bulbs results in higher warranty rates than the stop/tail/turn bulbs.

Voltage at the lamp also contributes to bulb warranty. The park/turn/DRL and stop/tail/turn bulbs used for the subject vehicles have an operating voltage of 12.8 volts. System specifications are 12.8 +/-0.5 volts at the lamp. While the headlamps and tail lamps were validated to the maximum lamp design voltage of 13.3 volts, that voltage will reduce bulb life. If the operating voltage for a bulb is

13.0 volts the resulting bulb life is approximately 3,280 hours, whereas, with an operating voltage of 13.3 volts, the resulting bulb life would be approximately 2,440 hours, a 26% reduction. The "GMX380 Exterior Lighting Subsystem Voltage and Current Study with Current Wire Design" found the voltages at the lamps for an exemplar vehicle to be 13.3V, 13.13V, 13.17V, 13.06V for the front left, front right, rear left, and rear right lamps respectively, consistent with the specification.

Warranty analysis shows that the highest months-of-build bulb warranty rates incrementally decrease over time. For example, the months with the highest bulb warranty rates all have a pronounced and consistent decrease in incremental rates. This is because issues of bulb quality tend to occur in the first few years of exposure and, as bulbs with quality issues are replaced, the incremental warranty rate will decrease.

The socket warranty rate is low. The incremental front socket warranty begins increasing after 360 days of exposure, but levels off to approximately 0.9 IPTV/month until the end of the warranty period. The incremental rate of front socket warranty does not increase after 660 days of exposure.

GM does not believe that the subject condition presents an unreasonable risk to motor vehicle safety for the following reasons:

- 1) The replacement rate for the front park/turn/DRL is low for a single bulb at 62.6 IPTV at 12 months.
- 2) Although both rates are low, the replacement rate for the rear stop/tail/turn signal lamp is even lower than that of the front at 29.3 IPTV at 12 months.
- 3) The vast majority of warranty claims are only for bulb replacements. Bulbs represent 91.7% of all warranty claims.
- 4) There is indication to the driver of loss of front turn signal/DRL and rear turn signal/stop lamp function. When the turn signal bulb is non-functional, the driver is notified on activation of the turn signal indicator, as required by FMVSS 108. The turn signal indicator arrow flashes and the audible feedback cycles significantly faster than usual. This feature is described in the owner's manual.
- 5) There are no reports of crashes or injuries as a result of an alleged inoperative turn signal.
- 6) If a front park/DRL lamp becomes inoperative, the other side of the vehicle will still be illuminated as an indicator for on-coming traffic.
- 7) Through the service bulletin, GM has made available to its dealers service instructions that will assure that customers' vehicles are repaired effectively and minimize the likelihood of repeat failures. The bulletin includes part numbers for the improved Christiana Industries socket with a steel retention system and an improved OSRAM Sylvania bulb with a plastic base that improves bulb stability.

The 54 VOQs included with this inquiry may have resulted from the contributory factors noted above. GM has not examined the parts that are the subject of the reports; therefore, GM has not identified the specific contributory factors related to each of the complaints.

* * *

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 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

Attachments