



GENERAL MOTORS LLC
Global Interior and Safety Center

14 Apr 10

Jeffrey L. Quandt, Chief
Vehicle Control Division
Office of Defects Investigation
National Highway Traffic Safety Administration
1200 New Jersey Ave., S. E., Room W48-307
Washington, D.C. 20590

N100023

NVS-213cnl
PE10-005

Dear Mr. Quandt:

This letter is General Motors (GM) response to your Preliminary Evaluation (PE), received on 17 Feb 10, regarding allegations of complete or intermittent failure of the electric power steering (EPS) system in model year (MY) 2005 through 2009 Chevrolet Cobalt vehicles manufactured by GM for sale in the United States, and to request certain information about these vehicles and peer vehicles. GM's interpretation of the alleged defect is loss of power assist during vehicle operation.

In an 8 Mar 10 electronic mail from Chris Lash of the NHTSA Office of Defect Investigations, GM was informed that responses to items Q1 - Q8, Q12, Q13 and Q15 would be required.

Your questions and our corresponding replies are as follows:

1. **State, by model and model year, the number of subject and peer vehicles GM has manufactured for sale or lease in the United States. Separately, for each subject and peer vehicle manufactured to date by GM, state the following:**
 - a. **Vehicle identification number (VIN);**
 - b. **Make;**
 - c. **Model;**
 - d. **Model Year;**
 - e. **Plant of manufacture;**
 - f. **Date of manufacture;**
 - g. **Date warranty coverage commenced; and**
 - h. **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 2003, 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.



General Motors is providing the number of subject and peer vehicles equipped with EPS produced for sale or lease in the United States by make, model and model year in Tables 1-1 and 1-2, respectively, below:

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Chevrolet	Cobalt	140,975	229,576	215,663	176,471	141,588	904,273

TABLE 1-1 SUBJECT VEHICLES

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Saturn	ION	71,023	96,227	94,115	0	0	261,365
Chevrolet	Malibu/Malibu Maxx	212,400	171,472	113,944	121,516	146,516	765,848
Pontiac	G6	62,481	149,884	52,327	68,408	45,048	378,148
Total		345,904	417,583	260,386	189,924	191,564	1,405,361

TABLE 1-2 PEER VEHICLES

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

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 and peer vehicles:
 - a. Consumer complaints, including those from fleet operators;
 - b. Consumer complaints, including those from operators, where a failure or malfunction of the EPS system was reported;
 - c. Field reports, including dealer field reports;
 - d. Field reports, including dealer field reports where EPS failure was claimed;
 - e. 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;
 - f. Property damage claims;
 - g. Third-party arbitration proceedings where GM is or was a party to the arbitration; and
 - h. Lawsuits, both pending and closed, in which GM is or was a defendant or codefendant.

For subparts "a" through "f" 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 "e" through "h," 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 g and h, 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 2-1 below summarizes records that may relate to allegations of loss of power assist during vehicle operation in the subject vehicles. Table 2-2 below summarizes records that may relate to allegations of loss of power assist during vehicle operation in peer vehicles. GM has organized the records by the GM file number within each attachment. Refer to access database "Q_03_REQUEST NUMBER TWO DATA" for categories prescribed by the NHTSA.

GM is also providing additional records that contain allegations of loss of power assist during vehicle operation, but in which the facts do not correspond with the allegation. These additional records are not included in Table 2-1 and 2-2, but are included in "Q_03_REQUEST NUMBER TWO DATA". The column entitled "In Table 2-1 2-2" designates whether the record is in Table 2-1 or 2-2.

GM is also providing additional records that the NHTSA has requested in a phone conversation that contain other steering system allegations such as noise, drivability complaints, and the power steering message appearing without loss of power assist. These additional records are not included in Table 2-1 and 2-2, but are included in "Q_03_REQUEST NUMBER TWO DATA".

Type of Report	GM Reports	Subcategories			
		Corresponding to NHTSA Reports	Number with Property Damage	Number with Crash	Number with Injuries*
Owner Reports	1516	218	23	63	14
Field Reports	195	3	0	0	0
Not-In-Suit Claims	41	5	21	36	21
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)	1752	226	44	99	35
Total Vehicles with Reports (Unique VIN)	1668	211	37	81	27

TABLE 2-1: REPORT CLASSIFICATION - ALLEGATIONS LOSS OF POWER ASSIST DURING VEHICLE OPERATION IN SUBJECT VEHICLES

* THERE WERE NO FATALITIES ASSOCIATED WITH THIS ISSUE

Type of Report	GM Reports	Subcategories			
		Corresponding to NHTSA Reports	Number with Property Damage	Number with Crash	Number with Injuries*
Owner Reports	2432	0	41	70	19
Field Reports	405	0	2	2	1
Not-In-Suit Claims	35	0	12	33	12
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)	2872	0	55	105	32
Total Vehicles with Reports (Unique VIN)	2759	0	54	89	29

TABLE 2-2: REPORT CLASSIFICATION - ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION IN PEER VEHICLES

* THERE WERE NO FATALITIES ASSOCIATED WITH THIS ISSUE

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	24 Feb 10
Technical Assistance Center	4 Mar 10
Field Information Network Database (FIND)	24 Feb 10
Field Product Report Database (FPRD)	25 Feb 10
Company Vehicle Evaluation Program (CVEP)	25 Feb 10
Captured Test Fleet (CTF)	25 Feb 10
Early Quality Feedback (EQF)	25 Feb 10
Legal/Employee Self Insured Services (ESIS)/Product Liability Claims/Lawsuits	27 Feb 10

TABLE 2-3: 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 any warning lights were illuminated at the time the alleged defect occurred;
- j. Whether the vehicle was towed into the dealership;
- k. Whether the driver was able to restart the vehicle, and reset the EPS system;
- l. If the EPS was reset, did the failure occur more than once;
- m. Diagnostic Trouble Code(s) (DTCs) indicated at the time of repair;
- n. Repair(s) dealer made to the vehicle;
- o. Whether a crash is alleged;
- p. Whether property damage is alleged;
- q. Number of alleged injuries;
- r. Number of alleged fatalities; and
- s. A summary of the incident.

Provide this information in Microsoft Access 2003, 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.

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 embedded 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 records by the GM file number within each attachment.

To date, GM's investigation of the alleged defect has not included an assessment of the cause(s) of each incident responsive to item No. 2. Some incident reports may not contain sufficient reliable information to accurately assess cause. FPR documents are included with this response and are also included in the Tables 2-1 and 2-2. FIND documents that are associated with some of the FPR documents are not included.

5. State, by model and model year, total counts for all of the following categories of claims, collectively, that have been paid by GM to date that relate to repair or replacement of the subject system in the subject and peer vehicles: warranty claims; extended warranty claims; claims for good will services; and field, zone, or similar adjustments and reimbursements. This should include all claims

made in accordance with procedures specified in any service bulletins issued by GM related to the subject components.

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. Whether there was a claim for towing within three days before or after the subject claim (yes/no);
- h. Whether there is any other reference to towing in the claim (yes/no);
- i. Labor operation number;
- j. Problem code;
- k. Diagnostic Trouble Code(s) (DTCs) indicated at the time of repair;
- l. Replacement part number(s) and description(s);
- m. Concern stated by customer;
- n. Comment, if any, by dealer/technician relating to claim and/or repair; and
- o. GM's assessment of whether the claim was associated with an EPS failure while driving.

Provide this information in Microsoft Access 2003, 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.

For the subject and peer vehicles, the regular warranty and goodwill warranty claims with allegations of loss of power assist during vehicle operation are summarized by model and model year in Table 5-1 and Table 5-2. MIC extended service contract claims with allegations of loss of power assist during vehicle operation are summarized by model and model year in Table 5-3 and Table 5-4. The UWC extended service contract claims with allegations of loss of power assist during vehicle operation are summarized by model and model year in Table 5-5 and Table 5-6. A summary of all warranty claims, including those with allegations of noise, drivability, and other issues and the information requested in 5(a-o), 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, customer complaint codes and trouble codes used to collect the warranty data is provided in response to item No. 6.

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Chevrolet	Cobalt	660	728	1,003	359	134	2,884

TABLE 5-1 REGULAR WARRANTY CLAIMS WITH ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION FOR SUBJECT VEHICLES

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Saturn	ION	708	401	211	0	0	1,320
Chevrolet	Malibu/Malibu Maxx	925	693	117	685	25	2,445
Pontiac	G6	533	737	77	192	9	1,548
Total		2,166	1,831	405	877	34	5,313

TABLE 5-2 REGULAR WARRANTY CLAIMS WITH ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION FOR PEER VEHICLES

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Chevrolet	Cobalt	228	207	102	8	0	545

TABLE 5-3 MIC EXTENDED SERVICE CONTRACT CLAIMS WITH ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION FOR SUBJECT VEHICLES

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Saturn	ION	66	30	21	0	0	117
Chevrolet	Malibu/Malibu Maxx	115	121	23	5	0	264
Pontiac	G6	69	99	2	4	0	174
Total		250	250	46	9	0	555

TABLE 5-4 MIC EXTENDED SERVICE CONTRACT CLAIMS WITH ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION FOR PEER VEHICLES

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Chevrolet	Cobalt	15	8	1	0	0	24

TABLE 5-5 UWC EXTENDED SERVICE CONTRACT CLAIMS WITH ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION FOR SUBJECT VEHICLES

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Saturn	ION	5	2	0	0	0	7
Chevrolet	Malibu/Malibu Maxx	13	8	1	1	0	23
Pontiac	G6	12	11	1	0	0	24
Total		30	21	2	1	0	54

TABLE 5-6 UWC EXTENDED SERVICE CONTRACT CLAIMS WITH ALLEGATIONS OF LOSS OF POWER ASSIST DURING VEHICLE OPERATION FOR PEER VEHICLES

SOURCE SYSTEM	LAST DATE GATHERED
GART - regular warranty	23 Feb 10
MIC - extended service contract claims	22 Feb 10
UWC - extended service contract claims	23 Feb 10

TABLE 5-4: DATES PULLED

GM searched the GM Global Analysis and Reporting Tool (GART-regular warranty), the Motors Insurance Corporation (MIC-extended service contract claims) and the Universal Warranty Corporation (UWC-extended 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 item 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".

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

The GM Global Analysis and Reporting Tool (GART-regular warranty) regular warranty database and the Motors Insurance Corp (MIC) extended service contract claims database were searched using the labor codes, listed in Table 6-1, that may be related to the alleged defect of electric power steering (EPS) system failure. Claims that contained a verbatim comment that indicated loss of power assist during vehicle operation or contained diagnostic trouble codes C0475, C0545 or C0550, are contained in Tables 5-1 through 5-6 and in Table 12 in the column "loss of power assist during vehicle operation". Counts of claims that contained a verbatim comment that indicated noise or contained one of the customer codes listed in Table 6-2 are in Table

12 in the column "noise". All other claims were then sorted into categories of drivability, claims in which only the power steering message was displayed or unknown issues. All claims are contained in ATT_1_GM disk; folder labeled "Q_12".

Universal Warranty Corporation (UWC) does not use labor codes or trouble codes.

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.

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:
E7630	UPPR COL ASSIST ASSY. POWER STEERING
E7631	MOTOR CNTR ASSY. POWER STEERING
E7660	COLUMN ASM, STEERING
E7680	COLUMN ASSY, STEERING
E8434	EPS MOTOR REPLACE
Z1241	PRODUCT LIABILITY/INVESTIGATION REP PR (GOODWILL)
Z1242	PAR-REPAIRS/REIMBURSEMENT (GOODWILL)
Z1243	INSPECTION-PRODUCT ALLEGATION RESOLUTION

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

CUSTOMER CODE	DESCRIPTION:
N3	WIND NOISE
N2	WHISTLE
NZ	WHINE
NY	TAPPING
NW	SQUISH
NV	SQUEAL
NU	SQUEAK
NS	ROAR
NR	ROAD NOISE
NQ	RATTLE
NP	POPPING
NO	PING
NL	ITCH/SCRATCH/SCRAPE
NJ	HOWLING
NI	HISS
NH	GROWL

CUSTOMER CODE	DESCRIPTION:
NG	GRIND
126	DRIVABILITY - NOISE
NF	CREAK
NE	CLUNK
ND	CLICK/TICKING
NC	CHATTER
NB	BUZZ
NM	KNOCK
NN	MOAN
NT	RUMBLE

TABLE 6-2 CUSTOMER CODES USED IN WARRANTY AND MIC SEARCH

The number of extended service contracts on the subject vehicles that have been sold by MIC as of 22 Jan 10 and UWC as of 22 Feb 10 regardless of status (in-force, expired, cancelled) is contained in Tables 6-3 and 6-4.

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Chevrolet	Cobalt	49,991	68,458	55,280	32,097	16,217	222,043

TABLE 6-3 SUBJECT VEHICLES - MIC EXTENDED SERVICE COVERAGE CONTRACTS SOLD
 (REGARDLESS OF STATUS; IN-FORCE, EXPIRED, CANCELLED)

MAKE	MODEL	2005MY	2006MY	2007MY	2008MY	2009MY	TOTAL
Chevrolet	Cobalt	793	1,228	914	1,150	836	4,921

TABLE 6-4 SUBJECT VEHICLES - UWC EXTENDED SERVICE COVERAGE CONTRACTS SOLD
 (REGARDLESS OF STATUS; IN-FORCE, EXPIRED, CANCELLED)

- 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.**

The Technical Service Bulletins (TSB) that may relate to the subject condition and have been issued to dealers, regional or zone offices, field offices, fleet purchasers or other entities are included in the ATT_1_GM disk; folder labeled "Q_07". The preceding information was collected from GM Service Operations and was completed on 2 Mar 10.

8. Provide a description of how the EPS system functions within the subject vehicles. In addition respond to these specific questions regarding EPS motor operation:

- a. Describe the diagnostic logic for detecting and setting diagnostic trouble code DTC 0475 symptom 00, "Electric Steering Motor Circuit;"
- b. Describe whether and how the system detects a failure within the electric motor that would cause abnormal (too high or too low) current flow;
- c. State whether the system measures or estimate the voltage being applied to the motor, measure the current, and then compare the calculated motor impedance to the nominal expected motor impedance as a method of fault detection; and
- d. State whether and how the system can detect if some of the motor current is being shunted to the motor case.

The electric power steering (EPS) system reduces the amount of effort needed to steer the vehicle. The system uses the body control module (BCM), power steering control module (PSCM), torque sensor, discrete battery voltage supply circuit, EPS motor, serial data bus and the instrument panel cluster (IPC) message center to perform the system functions. The PSCM and torque sensor are not serviced separately from each other or from the steering column. Any EPS component, other than the EPS motor, diagnosed to be malfunctioning requires replacement of the steering column assembly, also known as the EPS assembly. The EPS motor can be serviced separately.

The PSCM uses a torque sensor as its main input for determining the amount of steering assist. The steering column has an input shaft, from the steering wheel to the torque sensor, and an output shaft from the torque sensor to the steering shaft coupler. The input and output shafts are separated by a torsion bar, where the torque sensor is located. The sensor consists of a compensation coil, detecting coil and 3 detecting rings. These detecting rings have toothed edges that face each other. Detecting ring 1 is fixed to the output shaft; detecting rings 2 and 3 are fixed to the top of the input shaft. The detecting coil is positioned around the toothed edges of detecting rings 1 and 2. As torque is applied to the steering column shaft the alignment of the teeth between detecting rings 1 and 2 changes, which causes the detecting coil signal voltage to change. The PSCM recognizes this change in signal voltage as steering column shaft torque. The compensation coil is used to compensate for changes in electrical circuit impedance due to circuit temperature changes from the electrical current and voltage levels as well as ambient temperatures for accurate torque detection.

The EPS motor is a 12-volt brushed DC reversible motor with a 58-amp rating. The motor assists steering through a worm shaft and reduction gear located in the steering column housing.

The PSCM uses a combination of torque sensor inputs, vehicle speed, calculated system temperature and the steering calibration to determine the amount of steering

assist. When the steering wheel is turned, the PSCM uses signal voltage from the torque sensor to detect the amount of torque being applied to the steering column shaft and the amount of current to command to the EPS motor. The PSCM receives serial data from the engine control module (ECM) to determine vehicle speed. At low speeds more assist is provided for easy turning during parking maneuvers. At high speeds, less assist is provided for improved road feel and directional stability. Neither the PSCM nor the EPS motor are designed to handle 58 amps continuously. The PSCM will go into overload protection mode to avoid system thermal damage. In this mode the PSCM will limit the amount of current commanded to the EPS motor which reduces steering assist levels. The PSCM also chooses which steering calibration to use when the ignition is turned ON, based on the production map number stored in the BCM. The PSCM contains all 8 of the steering calibrations which are different in relation to the vehicles RPOs. The PSCM has the ability to detect malfunctions within the EPS system. Any malfunction detected will cause the driver's information center to display "Power Steering". If the history code C0475 has been set, it will clear from the PSCM after 100 ignition cycles.

The responsive information requested in 8a-d is provided on the ATT_3_JTEKCONF disk; folder labeled "Q_08 a - d".

- 12. Provide a table with the following information regarding the actual failure frequencies for the subject and peer vehicles, by model year and design level (if design changes applicable to the alleged defect have been implemented in production):**
- a. Vehicle production counts;
 - b. Total complaints;
 - c. Total warranty claims;
 - d. For each of the following service intervals state the number of each population that have reached that time-in-service and the number of complaints and warranty claims received within each service interval: 12-, 24-, 36-, 48-, and 60 months;
 - e. State GM's assessment of the percentages of EPS failure complaints that involve a loss of EPS while driving for the subject and peer vehicle populations. (alternatively, if GM does not believe that the percentages for the sub-populations are significantly different, state an approximate percentage that would apply to all);
 - f. For complaints that GM does not believe involve loss of EPS assist, provide a breakdown of the percentages associated with other conditions (noise associated with steering, drivability issues such as alignment, EPS malfunction indicator light on etc.);
 - g. State GM's assessment of the percentages of EPS failure warranty claims that involve loss of EPS while driving for the subject and peer vehicle populations. (alternatively, if GM does not believe that the percentages for the sub-

populations are significantly different, state an approximate percentage that would apply to all); and

- h. For warranty claims that GM does not believe involve loss of EPS while driving, provide a breakdown of the percentages associated with other conditions (e.g., steering related noise, drivability issues such as alignment, and EPS malfunction indicator light on).

The responsive table requested in item 12 is provided on the ATT_1_GM disk; folder labeled "Q_12".

13. Provide a table with the following information regarding statistically estimated/modeled EPS system failure frequencies for each vehicle population as defined in this letter:

- a. A short description of the method/model used for the statistical analysis, including the bases for selecting each method, explanations for any differences in modeling methods for different populations, and the report period used for the analysis (e.g., warranty period);
- b. Charts showing the model results for each population;
- c. The results of the analysis (e.g., slope and characteristic life parameters if a 2-parameter Weibull model is used); and
- d. The estimated failure rates at 12-, 24-, 36-, 48-, 60-, and 72-months-in-service.

The responsive table requested in item 13 is provided on the ATT_2_GM_CONF disk; folder labeled "Q_13".

15. Provide the following information regarding the effect of the alleged defect on steering effort and vehicle control in the subject and peer vehicles:

- a. Steering effort as a function of lateral acceleration for normal system operation and after EPS failure;
- b. Copies of all system test standards associated with steering effort/feel with normal operation and after a system failure;
- c. Copies of all studies, reports or related material associated with each of the following for the subject vehicles or any other vehicles: (1) driving steering effort capability (for the full range from 5th to 95th percentile male and female drivers); and (2) human factors analyses/assessments of driver reactions to sudden changes in steering effort; and
- d. Provide a table showing GM's assessment of each of the crash complaints provided with this letter and in GM's response material, including incident speed, road conditions, traffic conditions, description of the steering maneuver attempted, the approximate lateral acceleration, the driver's description of the effect on steering performance/effort, and GM's assessment of the crash severity and all causal factors.

15 a

For the subject vehicles, the steering effort as a function of lateral acceleration for normal system operation and after EPS failure are provided in ATT_2_GM_CONF disk; folder labeled "Q_15a;" file "Q_15a - Cobalt steering effort." For Malibu and Cobalt vehicles, the available steering effort as a function of lateral acceleration for normal system operation is provided in the ATT_2_GM_CONF disk; folder labeled "Q_15_A." For the other peer vehicles, dynamic testing information is not available. GM has no test results of a power off condition for any of the peer vehicles.

15 b

Copies of all system test standards associated with steering effort/feel with normal operation and after a system failure are provided in the ATT_2_GM_CONF disk; folder labeled "Q_15_B."

15 c

GM is not aware of recent studies, reports, or related material in response to item 15c. Documents included in the ATT_1_GM disk; folder labeled "Q_15_C" were located in GM's archives.

15 d

In some cases GM investigated claims/reports of crashes that allege loss of power steering assist. GM's assessment of those claims/reports is listed in the column entitled "GM Assessment" in the Microsoft Access 2000 file labeled "Q_03_REQUEST NUMBER TWO DATA." In other cases, GM did not perform an investigation, but the available facts indicate that the vehicle was travelling at speeds in the range of 30 mph or greater. GM believes that if power assist is lost while a vehicle is moving at speeds in the range of 30 mph or greater there is a small difference in steering efforts perceived in subjective evaluations at these speeds and it is unlikely to lead to loss of vehicle control. Refer to item 3 attachments for attachments that may provide facts or information to support GM's assessment.

* * *

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

GM claims that certain information, in documents that are part of lawsuit and 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 consultants, 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 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, 2002, 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
and Safety Regulations

Attachments