GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

Inter-Organization

Date: February 28, 2005

GM-671 (PE04-080)

On The Cover:

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

Book :6

Tab (1).....GM Response Letter to NHTSA
Tab (2)..... NHTSA Letter
Tab (3)..... Attachment 1 with (1) CD
Tab (4).....Confidential Attachment 2 with Confidential material removed and sent to the Office of Chief Counsel
Tab (5).....Confidential Attachment 3 with Confidential material removed and sent to the Office of Chief Counsel
Tab (6).....Confidential Attachment 12 with Confidential material removed and sent to the Office of Chief Counsel

GM GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

February 28, 2005

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

GM-671

NVS-213phk
PE04-060

Dear Mr. Quandt:

This letter is General Motors' (GM) response to your information request (IR), dated December 17, 2004, regarding allegations of steering knuckle fracture for MY 2003 through 2004 Hummer H2 SUV and H2 SUT vehicles.

Per a telephone conversation with NHTSA on January 4, 2005, the alleged defect for this investigation is lower ball joint attachment steering knuckle fracture for MY 2003 through 2005 Hummer H2 SUV and H2 SUT vehicles.

Your questions and our corresponding replies are as follows:

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

   Provide the information for this request in a Microsoft Access 2000 table format (or a compatible format). Entitle the table "PRODUCTION DATA." See Enclosure 1, Data Collection Disk, 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 1. An electronic summary of the production data is provided on the CD identified as Attachment 1; refer to the Microsoft Access 2000 file in the folder labeled "Response for Q1 - PRODUCTION DATA."

MAKE/ MODEL	2003 MY	2004 MY	2005 MY	TOTAL
Hummer / H2 SUV	47,926	21,530	13,695*	83,151
Hummer / H2 SUT	N/A	N/A	5,880*	5,880

TABLE 1 VEHICLE PRODUCTION SUMMARY
* Vehicle production as of February 2, 2005.
N/A Not Applicable

The production information requested in 1a-1g is provided on the CD labeled Attachment 1; refer to the Microsoft Access 2000 file in the folder labeled "Response to Q1."

This data was collected from the GM Claims Analysis Retrieval Database (CARD) on February 2, 2005.

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

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

Table 2-1 below summarizes records for the subject vehicles that could relate to the subject condition.

Type of Report	Count (including duplicates)	GM Reports	GM Reports Corresponding to NHTSA Reports	Location of Reports (Attachment)	Number with Property Damage	Number with Crash	Number with Injuries/ Fatalities*
Owner Reports	4	4	0	Folder labeled "Response to Q3" in field label 2A	0	1	0
Field Reports & Technical Assistance System Reports	8	7	1	Folder labeled "Response to Q3" in field label 2B	2	6	1
Not-in-Suit Claims	2	1	1	Folder labeled "Response to Q3" in field label 2C	0	2	1
Subrogation Claims	0	0	0	N/A	0	0	0
Third Party Arbitration Proceedings	0	0	0	N/A	0	0	0
Product Liability Lawsuits	1	1	0	Folder labeled "Response to Q3" in field label 2D	0	1	0
Total (Including Duplicates)	15	13	2	N/A	2	10	2
Total (Excluding Duplicates)	11	9	2	N/A	2	8	2

Table 2-1: Report Breakdown
* GM has no fatality reports
N/A Not Applicable

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
Corporate Central File	1/10/2005
Customer Assistance Center	2/2/2005
Technical Assistance Center	2/2/2005
Early Quality Feedback (EQF)	1/11/2005
Field Information Network Database (FIND)	1/11/2005
Field Product Report Database (FPRD)	1/11/2005
Company Vehicle Evaluation Program (CVEP)	1/6/2005
Captured Test Fleet (CTF)	1/6/2005
Legal / Employee Self Insured Services (ESIS)	1/13/2005

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 property damage is alleged;**
   k. **Number of alleged injuries, if any; and**
   l. **Number of alleged fatalities, if any.**
   m. **Provide the information for this request in a Microsoft Access 2000 table format (or a compatible format). Entitle the table REQUEST NUMBER TWO. See Enclosure 1, Data Collection Disk, for a pre-formatted table that provides further details regarding this submission.**

   An electronic summary of the 11 reports included in response to question 2 is provided on the CD identified as Attachment 1 CD; 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.**

   In addition, for all material responsive to this request, provide copies of the full service histories of each vehicle and copies of all dealer repair records (including all technician comments/notes) related to front suspension service.

Copies of the 11 reports identified in response to question 2 are provided on the Attachment 1 CD; refer to the folder labeled "Response to Q3 - REQUEST NUMBER TWO DATA." GM has organized the reports by the GM file number within each attachment.

Copies of claim service histories and certain dealer repair records of each vehicle identified in response to question 2 related to front suspension service are provided on the Attachment 1 CD; refer to the folder labeled "Response to Q4." Certain dealer repair records were not provided from the dealership.

5. Provide table of all incidents responsive to Request No. 2 in this submission, and the incidents identified in the complaints enclosed with this letter, showing GM's assessment of the causes of each. Provide this information by VIN, date of incident, alleged cause, GM's assessed cause, and the basis for GM's assessment (e.g., field investigation, examination/analysis of returned parts, service records, examination of photographs or reports, etc.).

Certain incident assessments are provided in the documents in response to question 9. Additional GM's assessments are provided in response to question 16.

To date, GM's investigation of the subject condition has not included an assessment of the cause(s) of each incident responsive to Request No. 2. Many of the records report the problem and do not contain sufficient reliable information to accurately assess cause, if any. Assessments of other incidents (from lawsuits and claims) may be attorney work product and/or privileged. Therefore, information and documents provided in this response consist only of non-attorney work product and/or non-privileged material for incidents that have been reported to, but not assessed by, GM.

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

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

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

Provide the information for this request in a Microsoft Access 2000 table format (or a compatible format). Entitle the table WARRANTY DATA. See Enclosure 1, Data Collection Disk, for a pre-formatted table that provides further details regarding this submission.

For the subject vehicles, the regular warranty claims and extended warranty claims are summarized by model and model year in Tables 5-1 and 5-2. A summary of these warranty claims is provided on the Attachment 1 CD; refer to the folder labeled "Response to Q5."

MODEL	2003MY	2004MY	2005MY
Hummer / H2 SUV	7	0	0
Hummer / H2 SUT	N/A	N/A	0

TABLE 5-1: REGULAR WARRANTY CLAIMS

MODEL	2003MY	2004MY	2005MY
Hummer / H2 SUV	0	0	0
Hummer / H2 SUT	N/A	N/A	0

TABLE 5-2: EXTENDED WARRANTY CLAIMS

N/A Not Applicable

GM searched the GM North America Claim Adjustment Retrieval Database (CARD-regular warranty), the Motors Insurance Corporation (MIC–extended warranty), and the Universal Warranty Corporation (UWC–extended warranty) databases to collect the warranty data for this response. The warranty data was last gathered on February 2, 2005.

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

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

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

7. **Describe in detail the search criteria used by GM to identify the claims identified in response to Request No. 6, 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) related to the alleged defect 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 operation codes listed in Table 6-1 and trouble codes listed in Table 6-2. The regular warranty data with part cost information and repair description were also reviewed in verification of the steering knuckle replacement.

Labor Code	Description
E2520	KNUCKLE ASSEMBLY, R-STEERING-REPLACE
E2521	KNUCKLE ASSEMBLY, L-STEERING-REPLACE
E2527	KNUCKLE ASSEMBLY, BOTH STEERING-RPL

TABLE 6-1: LABOR CODES USED IN CARD & MIC SEARCH

Trouble Code	Trouble Description
1B	CASTING DEFECT
1D	BROKEN
1K	CRACKED
3Z	RUPTURED
4D	SHEARED
4H	TORN
4R	WELD BROKEN
4Q	WEAK
4X	WORN
6C	COMPONENT-INOPERATIVE

TABLE 6-2: REGULAR WARRANTY TROUBLE CODES

The MIC extended warranty data was also collected by searching for the labor codes listed in Table 6-1. The UWC extended warranty data was collected by searching for the labor codes in Table 6-3.

Labor Code	Description
0550	STEERING KNUCKLE

TABLE 6-3: LABOR CODES USED IN UWC SEARCH

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 customers' preference, up to 7 years from the date of purchase or up to a total of 100,000 vehicle miles. The General Motors warranty system does not contain information on the number of vehicles that have extended warranty coverage.

8. Produce copies of all service, warranty, and other documents that GM has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities, that relate to, or may relate to, the alleged defect in the subject vehicles. 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 such communication that GM is planning to issue within the next 120 days, and state the date on which GM plans to issue the communication.

No bulletins were issued by GM that relate to, or may be related to the alleged defect in the subject vehicles. GM is not aware of plans to issue any communication related to the alleged defect in the subject vehicles in the next 120 days. The data was last gathered on January 4, 2005.

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

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

The information listed in Table 9 below is a summary of actions performed by GM regarding the alleged defect on the subject vehicles. The documents are provided as specified per action. Copies of non-confidential documents related to the action are provided on the Attachment 1 CD; refer to the folder labeled "Response to Q9." Copies of confidential documents related to the actions can be found on the Attachment 2 CD GM Confidential; refer to the folder labeled "Response to Q9 GM Confidential". General Motors requests that this information, which has been stamped "GM Confidential" be afforded confidential treatment by NHTSA. Copies of confidential documents related to the actions can be found on the Attachment 3 CD Supplier Confidential; refer to the folder labeled "Response to Q9 Supplier Confidential". Suppliers, Delphi, Eagle Picher, and Grede, request that this information, which has been stamped "Confidential" be afforded confidential treatment by NHTSA.

Action 9.1.a: Material laboratory analysis STR # 04724 **Start Date:** 5/8/2001 **End Date:** 5/11/2001 **Engineering Group:** GM Engineering **Objective:** Perform material analysis to characterize the fracture surface. **Summary of Action:** The knuckle fracture was the result of a least one overload impact event (possibly more than one). No casting related anomalies were observed on the fracture surface.
Action 9.1.b: Material laboratory analysis STR # 06786 **Start Date:** 11/14/2001 **End Date:** 12/03/2001 **Engineering Group:** GM Engineering **Objective:** Perform material analysis and document sample as received. Remove and return upper ball stud and taper. Verify material hardness, chemistry, and microstructure. Identify fracture mode. **Summary of Action:** 1) The knuckle met blueprint requirements for hardness, chemistry, and microstructure in the areas examined. 2) The taper showed evidence of deformation from the applied load. 3) Fracture mode was a mixture of cleavage and ductile overload

Action 9.1.c: Material laboratory analysis STR # 06798 **Start Date:** 11/14/2001 **End Date:** 12/5/2001 **Engineering Group:** GM Engineering **Objective:** Perform material analysis and document sample as received. Remove and return upper ball stud and taper. Verify material hardness, chemistry, and microstructure. Identify fracture mode. **Summary of Action:** 1) The knuckle met blueprint requirements for hardness, chemistry, and microstructure in the areas examined. 2) The taper showed evidence of deformation from the applied load. 3) Analysis of the fracture surface was performed on STR04724, which found that the knuckle fracture was the result of at least one overload impact event (possibly more than one). No casting related anomalies were observed on the fracture surface.
Action 9.1.d: Material laboratory analysis STR # 09427 **Start Date:** 9/19/2002 **End Date:** 9/23/2002 **Engineering Group:** GM Engineering **Objective:** Perform material analysis and characterize steering knuckle fracture, material properties and black substance on the fracture surface. **Summary of Action:** The submitted steering knuckle sustained an overload fracture of its lower ball stud mounting boss. The part conformed to specification (SAE J434 Grade D4512) as indicated by hardness and microstructure. The black substance on the as-received fracture surface was consistent with grease as determined by field test Incident report.
Action 9.1.e: Material laboratory analysis STR # 09439 **Start Date:** 9/23/2002 **End Date:** 9/26/2002 **Engineering Group:** GM Engineering **Objective:** Perform material analysis and characterize steering knuckle fracture and material. **Summary of Action:** The steering knuckle fracture was a ductile overload initiating at a surface inclusion. The part conformed to blueprint materials specifications as indicated by hardness. The casting meets the typical requirement for microstructure described in SAEJ434 (FEB 2004 revision) GradeD450 for microstructure.
Action 9.1.f: Material laboratory analysis STR # 10030 **Start Date:** 12/10/2002 **End Date:** 1/29/2003 **Engineering Group:** GM Engineering **Objective:** Perform metallurgical analysis and material hardness test on the lower ball stud areas of six steering knuckles. **Summary of Action:** There were no crack indications found on the lower ball stud areas of the knuckles. The material hardness values for the knuckles met the specification. Nodularity by count is greater than 80% with an average 91% of in all areas analyzed. Carbides were not observed in any of the micro samples.
Action 9.1.g: Material laboratory analysis STR # 10298 **Start Date:** 1/27/2003 **End Date:** 1/27/2003 **Engineering Group:** GM Engineering **Objective:** Perform material analysis on three front steering knuckles for the GMT 800 project using (ASTM E1444-94a)" Magnetic Particle Examination (Magnaglo), focusing on the lower ball stud area of the knuckles. **Summary of Action:** Upon completion of Magnaglo testing there was no visual crack indications found in the lower ball stud areas of the knuckles.
Action 9.1.h: Material laboratory analysis STR # 10232 **Start Date:** 2/6/2003 **End Date:** 3/7/2003 **Engineering Group:** GM Engineering **Objective:** Characterize steering knuckle fracture and material. **Summary of Action:** The submitted steering knuckle evidenced an overload fracture through its lower ball stud mounting boss resulting from impact loading. The steering knuckle conformed to material specifications (SAE J434, D4512) as indicated by tensile properties, microstructure and hardness.

Action 9.1.i: Material laboratory analysis STR 10353 **Start Date:** 2/7/2003 **End Date:** 2/18/2003 **Engineering Group:** GM Engineering **Objective:** Provide failure, material, and chemical analysis on a fractured steering knuckle. The submitted steering knuckle fractured on a customer vehicle after completing 14,849 miles of service. **Summary of Action:** 1) Macro analysis revealed mechanical deformation to the inside diameter of the lower ball stud boss. The fracture surfaces revealed overload type fractures. The deformation to the inside diameter of the lower ball stud boss and the overload type failure reveals evidence indicating that the knuckle failed due to an impact type load. 2) Chemical analysis revealed that the chemistry meets the specified range for SAE J434-D4512 grade cast iron. 3) The hardness taken on the machined surface of the lower ball stud boss near the fracture was within the hardness specification listed for SAE J434-D4512. 4) The casting meets the typical requirement for microstructure described in SAEJ434 (FEB 2004 revision) GradeD450 for microstructure.
Action 9.1.j: Material laboratory analysis STR 10552 **Start Date:** 2/27/2003 **End Date:** 3/10/2003 **Engineering Group:** GM Engineering **Objective:** Provide failure, material, and chemical analysis on a fractured steering knuckle. The submitted steering knuckle fractured on a customer vehicle after completing 3,525 miles of service. The steering knuckle reportedly fractured while snow plowing. **Summary of Action:** 1) Macro analysis revealed mechanical deformation on the as cast surface of the steering knuckle. The fracture surfaces revealed overload type fractures. 2) Chemical analysis revealed that the chemistry meets the specified range for SAE J434-D4512 grade cast iron. 3)The hardness taken on the machined surface of the lower ball stud boss near the fracture was within the hardness specification listed for SAE J434-D4512. 4) The casting meets the typical requirement for microstructure described in SAEJ434 (FEB 2004 revision) GradeD450 for microstructure.
Action 9.1.k: Material laboratory analysis STR 10542 **Start Date:** 3/11/2003 **End Date:** 3/27/2003 **Engineering Group:** GM Engineering **Objective:** Provide failure, material, and chemical analysis on a fractured steering knuckle. The submitted steering knuckle fractured on a customer vehicle after completing 20,595 miles of service in a Canteen Truck. **Summary of Action:** 1) Macro analysis revealed mechanical deformation on the as cast surface of the steering knuckle. The fracture surfaces revealed overload type fractures. 2) Chemical analysis revealed that the chemistry meets the specified range for SAE J434-D4512 grade cast iron. 3) The hardness taken on the machined surface of the lower ball stud boss near the fracture was within the hardness specification listed for SAE J434-D4512. 4) The casting meets the typical requirement for microstructure described in SAEJ434 (FEB 2004 revision) GradeD450 for microstructure.
Action 9.1.l: Material laboratory analysis STR # 10659 **Start Date:** 3/18/2003 **End Date:** 3/18/2003 **Engineering Group:** GM Engineering **Objective:** Complete chemical testing of the sample submitted. Testing is to be conducted according to the specific procedures requested (See the Procedure section of this report for further details). **Summary of Action:** The sample submitted meets the chemical material specification for SAE J434- D4512 ferritic nodular iron (see complete chemical analysis in the Results section of this report).
Action 9.1.m: Material laboratory analysis STR # 10716 **Start Date:** 3/18/2003 **End Date:** 4/10/2003 **Engineering Group:** GM Engineering **Objective:** Characterize two steering knuckle test fractures and the part's conformance to specification. **Summary of Action:** Both knuckles evidenced overload fractures resulting from impact loading. The part fractures closely simulated past observed service fractures. Both parts conformed to their materials specifications (SAE J434-D4512) as indicated by hardness. The casting meets the typical requirement for microstructure described in SAE J434 (FEB 2004 revision) GradeD450 for microstructure.

Action 9.1.n: Material laboratory analysis STR # 11825 **Start Date:** 8/6/2003 **End Date:** 8/28/2003 **Engineering Group:** GM Engineering **Objective:** Characterize the steering knuckle and tie rod end ball stud fractures and determine the parts' conformance to specification. **Summary of Action** The parts fractures were the result of a gross overload. The knuckle and ball stud conformed to material and processing specifications.
Action 9.1.o: Material laboratory analysis STR # 16659 **Start Date:** 2/2/2005 **End Date:** 2/24/2005 **Engineering Group:** GM Engineering **Objective:** Examine a fractured H2 front knuckle. Document observations and determine cause of fracture if possible. **Summary of Action:** The fracture of the lower ball stud boss occurred due to overload. The overload was applied through the ball stud to the lower ball stud boss. Significant brinell marks were present in the bore of the ball stud hole in the boss. The shape, location, and size of the brinell marks indicate they were created by the ball stud as it was subjected to a large moment force. The region of the knuckle containing the lower ball stud boss was grossly deformed. Together, the significant brinell marks and the gross deformation of the boss indicated a large force was applied by the knuckle to the ball stud prior to fracturing. No casting defects or manufacturing flaws were observed on the fracture surface at the origin, or elsewhere on the fracture surface.
Action 9.2: Vehicle structure and durability development and validation test reports **Start Date:** 11/27/2001 **End Date:** 11/5/2003 **Engineering Group:** GM Engineering **Objective:** Validate steering knuckle as part of the front suspension system via various vehicle development and validation test procedures. **Summary of Action:** Steering knuckle met all the test requirements.
Action 9.3: Component structure and durability development and validation test reports **Start Date:** 11/27/2001 **End Date:** 11/5/2003 **Engineering Group:** GM Engineering **Objective:** Validate steering knuckle as part of the front suspension system via various component development and validation test procedure on GMT800. **Summary of Action:** Steering knuckle met all the test requirements.
Action 9.4: Engineering analysis reports **Start Date:** 7/1/2000 **End Date:** 2/13/2003 **Engineering Group:** GM Engineering, Supplier Eagle Picher (knuckle machining) **Objective:** Simulate steering knuckle and front suspension system failure modes via engineering analysis and run Potential Failure Mode Effects Analysis **Summary of Action:** Identified the limits of manufacturing process and process plan to have the manufacturing process in control.
Action 9.5: Management review and engineering work orders **Start Date:** 3/17/2003 **End Date:** 3/17/2003 **Engineering Group:** GM Engineering **Objective:** Review status of field incidents **Summary of Action:** Release current steering knuckle as continuous improvement.
Action 9.6: Steering knuckle ball joint draw-in study using strain gage **Start Date:** 4/14/2003 **End Date:** 8/22/2003 **Engineering Group:** GM Engineering **Objective:** To obtain torque, displacement and strain data on the lower control arm ball joint to steering knuckle attachment and to determine the torque specification for the joint. **Summary of Action:** For Engineering Design purposes only.

Action 8.7: Manufacturing quality control torque measurements Start Date: April 2004 End Date: February 2005 Engineering Group: GM Engineering Objective: Measure dynamic and static torques in the assembly plant as a part of the quality control process. Summary of Action: Both dynamic and static torques met the specification.
Action 8.8: Current Product Investigation Start Date: 1/3/2005 End Date: 2/28/2005 Engineering Group: GM Engineering Objective: Investigate the alleged defect for the subject vehicles Summary of Action: Refer to response to question 16.

TABLE 9

The data was last gathered on February 28, 2005.

10. Describe all modifications or changes made by, or on behalf of, GM in the design, material composition, manufacture, quality control, supply, or installation of the subject component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. 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 information requested in items "a" through "h" above for any further modification or change to the subject component(s) of which GM is aware which may be produced, distributed, made available, or incorporated into vehicle production within the next 120 days, provided that in this context, item (a) above refers to planned changes and should be read as if it were written in the future tense.

The folder labeled "Responsive to Q10" on the Attachment 1 CD contains a chart describing the changes and modifications on the lower steering knuckle in the subject vehicles, and components that relate or could relate to the alleged defect.

General Motors is not aware of any modifications or changes that may be incorporated into vehicle production within the next 120 days. The data was last gathered on January 13, 2005.

11. Provide copies of all test and computer modeling data relating to subject component stress and strain at static (curb) condition and during high-load driving maneuvers. Please describe the maneuvers that GM believes produce the highest loads in the subject component, particularly at the lower ball joint attachment.

GM is providing a description of its computer simulation and results of that simulation in Attachment 2 CD GM Confidential; refer to the folder labeled "Response to Q11 GM Confidential".

Based on that analysis, GM believes that the highest loads at the lower ball joint attachment are generated in the following sequence of events.
1) 25 degree inboard steering angle
2) Front wheels not rolling at impact
3) Severe contact of the outboard edge of the wheel/tire with an obstacle

Physical test results are provided in response to question 9.

12. Provide copies of all engineering drawings, blueprints, engineering specifications and other documents related to the manufacturing and material specifications for the subject components.

The engineering drawings, blueprints, engineering specifications and other documents related to the manufacturing and material specifications for the subject components can be found on the Attachment 2 CD GM Confidential; refer to the folder labeled "Response to Q12 GM Confidential". General Motors requests that this information, which has been stamped "GM Confidential" be afforded confidential treatment by NHTSA.

1. Hard copies of the engineering drawings are provided in Attachment 1 Hard Copy GM Confidential as follows:

   A. Knuckle Machining 15097781-003 for 2003MY.
   B. Knuckle Machining 15097781-004 for 2004MY.
   C. Knuckle Casting 15097644-001 for 2003MY.
   D. Knuckle Casting 15097644-002 for 2004MY

   The following engineering drawings are provided in Attachment 2 CD GM Confidential; refer to the folder labeled "Response to Q12 GM Confidential" under sub-folder "Engineering Drawings."

   A. 15046286 Nut, M16 x 20 nut / washer assembly
   B. 15047221 Lower ball joint assembly

2. The following engineering specification is provided in Attachment 1 CD; refer to the folder labeled "Response to Q12".

   A. SAE J434 – Automotive Ductile Iron Castings

   The following engineering specifications and test procedures are provided in Attachment 2 CD GM Confidential; refer to the folder labeled "Response to Q12 GM Confidential" under sub-folder "Engineering Specifications and Test Procedures".

   A. MTL0207 Panic Braking
   B. 0210 Knuckle Bending Fatigue
   C. 0219 Ball stud draw-in Test
   D. 0394 Panic Braking

E. 0433 Brake Belgian Rolls Durability
F. GMN3888TP Truck Severe Trough
G. GMN4155TP_V3 4WD Truck Durability
H. GM4350M Painted Part Performance Requirements
I. 8302 Front Suspension Abuse Test
J. GMN8303TP Curb bumping at 45 degree
K. 8204 Truck Suspension Impact Test
L. GMN8306TP Curb Bumping – Parallel Test
M. GMN8522TP Suspension Impact Brake Test
N. GMN9726TP Pothole #3

3. The following manufacturing engineering document is provided in Attachment 1 CD; refer to the folder labeled "Response to Q12".

   A. 4-17-01-02 Steering knuckle Product Assembly Document (PAD)

13. For all vehicles that GM manufacturers which use the same (or substantially similar) chassis configuration or platform as the subject vehicle's (T800), state by make, model and model year;

a. Gross vehicle weight rating;
b. Front gross axle weight rating;
c. Rear gross axle weight rating;
d. Available wheel sizes and wheel material types (steel, alloy, etc.); and
e. Available tire sizes and brand names.

The folder labeled "Responsive to Q13" on the Attachment 1 CD contains a matrix in describing the ratings and information on gross vehicle weight, front gross axle weight, rear gross axle weight, available wheel sized and material types, and available tire sizes and brand names for the subject vehicles and vehicles that GM manufactured with the same chassis configuration. The acronym of MMEC is Minimum Mandatory Equipment Chart.

14. Produce one of each of the following:
a. Exemplar samples of each design version of the subject component; and
b. Two field return samples of the subject component exhibiting the subject failure mode.

a. GM is providing one sample of each past and current production steering knuckle. Prior design versions were removed from service. Since one side of the steering knuckle is identically symmetric, GM is providing only one side of the sample. Current production steering knuckle was not painted with a coating since it came from Tier 1 supplier before it was sent for coating.

b. GM is providing one sample of a field-returned steering knuckle that exhibits the subject condition. GM is requesting a return of this sample after NHTSA's review. GM plans to conduct a destructive material test to measure the micro-structure of the casting.

The data was last gathered on January 28, 2005.

15. State the number of subject components that GM has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model 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).

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.

An electronic summary table of the requested service part information for the subject component is provided on the Attachment 1 CD; refer to the folder labeled "Response to Q15." GM does not offer any kits that have been released or developed for use in service repairs specifically related to the subject condition. The data was last gathered on January 5, 2005.

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. From this data, it is not possible 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. The General Motors Service Parts system does not contain a title of a contact person for each component and is therefore unable to provide this information.

16. Furnish 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 subject vehicles are among the most rugged ever produced for private use on – and off – the road. But, like any other vehicle, they are not indestructible; nor are they exempt from the laws of physics. Abuse and/or extreme loading, such as, might be encountered in collisions with obstacles at a given rate of speed and amount of energy can break any automotive component. However, NHTSA's definition of "alleged defect" for purposes of this Preliminary Evaluation appears to rest on a presumption that suspension components should never fracture, or at a minimum that the subject vehicles' suspension components fracture too frequently or at loads that they should be capable of sustaining. Little, if any, evidence exists to support either of these propositions. In fact, the clear weight of the evidence is that they are false. Accordingly, while GM's response to this question will address the "risk to motor vehicle safety" as requested, the threshold premise (and ultimate conclusion) of this response is that there is no defect as alleged.

The subject vehicles were designed, developed, validated and manufactured to exacting standards of performance.

As detailed in response to questions 9 and 12, the subject component underwent a rigorous and extensive development and validation process, including extreme durability and abuse conditions. GM's durability requirements, which include a requirement that vehicles be validated using the minimum torque specification, are predicated on field data representing the 99.8th percentile customer usage profile. While it is impossible to simulate every condition that might be sufficient to cause a steering knuckle to fracture, the abuse tests itemized in response to question 12 reflect years of history and experience that give GM a high degree of confidence that its products will perform as intended under a wide range of reasonably foreseeable conditions. These demanding requirements that GM imposes on itself go beyond durability to encompass abuse conditions that apply extreme loads to suspension components. For example, the Truck Suspension Impact Test (8204) has been used since 1977 to evaluate the structural durability and retention characteristics of suspension components. This test procedure requires that the vehicle must complete a total of 50 railroad tie (6"x 6") impacts without loosening, bending, or breaking suspension components. All front-end wheel alignment and heights should remain within tolerances.

In addition, GM is providing test video clips showing a 4WD truck general durability test (GMN4155TP) event further demonstrating the level of severity of one of its validation tests.

The frequency of steering knuckle fractures is extremely low and the reported incidents do not provide a reliable basis for concluding a defect exists

The subject vehicles passed all of the rigorous requirements outlined above. This factor is significant for three reasons. First, it explains why the observed frequency of incidents is extremely low. Second, it provides strong corroboration of GM's belief that most, if not all, of the reported incidents involve circumstances that go beyond the extremes to which the vehicles were subjected during validation. Third, it reinforces the fundamental reality that absent evidence of fatigue or some other cause not evidenced here, steering knuckles do not fracture unless they are overloaded in an impact.

As to frequency, dividing the subject vehicle population of 89,031 by the 11 reported incidents yields a rate of just 0.12 Incidents Per Thousand Vehicles (IPTV). But even this relatively low number is misleading. Comparing the above validation history with the limited available field information, there is substantial reason to doubt the reliability of these reports as establishing the existence of a defect or defect trend.

For example, in the case of VOQ reference number 8022961, the explanation of the incident published in a newspaper story two years after the incident alleges the sudden detachment of the wheel without any impact. This statement is later contradicted by an admission that the wheel came to rest "a few feet away from a concrete light standard that had been clipped by the left front of the H2." Regardless of the precise sequence of events, that account concludes that the event as "probably a fluke," as opposed to alleging any defect. In fact, GM Field Area Service and Sales managers reported this incident in January 2003, concluding that the available evidence points to a collision with a pole as the most likely cause of the fracture. Likewise, in the case of VOQ reference number 10106322, the police report quotes the driver as claiming, "I made the turn, and the wheel fell off". The investigating officer continued: "Based on my investigation, I determined that [the vehicle] turned left... and while doing so, struck the curb and traffic signal post...."

The available technical evidence is instructive, but inconclusive as to the cause of the reported fractures

Beyond the limitations discussed above, GM's assessment of the alleged defect has been hampered further by the lack of physical evidence. Since its investigation began in January

2005, GM has received only one part returned and photos of another part for close examination of the potential causes of the fractures. Based upon these evaluations and the additional material analysis results supplied in response to question 9, GM can be certain of only this: that the fractures it has examined resulted from severe impact loading and that there were no metallurgical flaws in the steering knuckles.

Suspension components, such as steering knuckles, control arms, and ball joints are designed using materials that have some degree of ductility. That is, they exhibit plastic deformation prior to eventual fracture when grossly overloaded. The tapered holes in all of the fractured knuckles examined exhibit significant deformation indicating that they were subjected to extremely high loads prior to fracture since the ball stud cannot impart any load to the knuckle once fracture has occurred.

Consistent with this understanding, and in an effort to understand the cause in the absence of physical evidence, GM built on its examination of the returned part and has performed computer modeling and related testing correlated to the model. In the process, GM defined an extreme abuse load case that could overload the steering knuckle and result in fracture.

During its evaluation of this extreme load case, GM has explored a theory that, as a function of the inherent variability of production processes and manufacturing tolerances, steering knuckles and/or ball joints tightened to the low end of GM's torque specification may not exhibit optimal "draw-in" (tightness of fit) of the ball stud into the knuckle socket. The theory holds that the fraction of knuckles produced at this low end of the tolerance range may be susceptible to a series of loads that tend to relax the compression between the tapered hole of the knuckle and the ball stud. This, in turn, can create a condition in which a sufficiently severe impact load can cause a fracture.

Although GM acknowledges a possibility that knuckles exhibiting this condition may be less capable than fully drawn-in ball studs of resisting overload impacts, several factors mitigate against the conclusion that this theory identifies a defect or defect trend. First, beyond the substantial body of validation documentation, GM has confirmed by inquiries including an assembly plant visit, that assembly records and quality control data document a robust process, including dynamic and static torque checks. In addition, this review produced no evidence of out-of-specification dynamic torque assembly builds. A process for rework of any part not meeting that requirement and a systematic audit procedure utilizing a static torque check further minimize the likelihood of tolerance-related issues.

In addition, to test the theory involving ball stud draw-in, GM ran an instrumented vehicle exhibiting zero ball stud draw-in over a fixed (6"x6") railroad tie impact at 50 mph with no damage to the knuckle, thus illustrating the capability of the knuckle to withstand extreme forces even with an artificially induced condition which has not been observed in any of the subject vehicles.

Finally, even if lower draw-in involves some diminution in the capacity of a steering knuckle to withstand a severe impact when compared to a fully drawn in ball stud, GM has determined that the highest impact load event in which this condition will manifest itself requires a specific sequence of events that are unlikely to be replicated with any significant frequency in the field, and even then, only under circumstances when the driver has failed to control the vehicle properly:

1) 25 degree inboard steering angle
2) Front wheels not rolling at impact
3) Severe contact of the outboard edge of the wheel/tire with an obstacle

The combination of these factors is indicative of a low speed maneuver or over-steer condition associated with a loss of control (e.g., sliding on ice with wheels on the verge of lock-up). In the first case, the risk of injury is inherently likely to be low. And in both cases, the risk of injury to the alleged defect is likewise unlikely.

In summary, the VOQs and field reports fail to establish a defect trend. All of the available evidence, from GM's validation documentation to computer modeling and associated testing to field investigation and metallurgical analysis, indicates that ball joint fractures are the consequence of extreme overload resulting from impact. Accordingly, GM believes the record clearly shows that the subject components are neither defective nor do they present an unreasonable risk of accident or injury.

* * *

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 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 January 1, 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 FCA
Director
Product Investigations

Attachments

GM-671

DEC 17 2004

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

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

Jay Sim

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

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

NVS-213phk
PE04-080

Original w/ CD
Received 1-3-05

Dear Ms. Kent:

This letter is to inform you that the Office of Defects Investigation (ODI) of the National Highway Traffic Safety Administration (NHTSA) has opened a Preliminary Evaluation (PE04-040) to investigate allegations of steering knuckle fractures in model year (MY) 2003 and 2004 Hummer H2 vehicles manufactured by General Motors Corporation, and to request certain information.

This office has received four complaints of steering knuckle fractures at the location of the lower ball joint attachment in MY 2003 and 2004 Hummer H2 vehicles. The consumers have all stated that the vehicles were not driven off-road or exposed to other abusive driving conditions. All four complainants allege that the failure caused them to lose control of the vehicle. One consumer crashed into a parked vehicle. Another consumer alleged that the failure caused the vehicle to veer into oncoming traffic and run into a ditch on the opposite side of the road. Three of the four complaints allege that the knuckle failure resulted in wheel separation. A copy of each of the reports is enclosed for your information.

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

- **Subject vehicles:** all MY 2003 and 2004 Hummer H2 vehicles manufactured for sale or lease in the United States.
- **Subject component:** all steering knuckles used as original equipment or service parts for MY 2003 through current production Hummer H2 vehicles.
- **GM:** General Motors Corporation, all of their past and present officers and employees, whether assigned to their principal offices or any of their field or other locations,

including 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 January 1, 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.

- **Alleged defect:** steering knuckle fracture.

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

"document(s)"also means any identical copies of the original and all non-identical copies thereof. Any document, record, graph, chart, film or photograph originally produced in color must be provided in color. Furnish all documents whether verified by the manufacturer or not. If a document is not in the English language, provide both the original document and an English translation of the document.

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

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

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

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

   Provide the information for this request in a Microsoft Access 2000 table format (or a compatible format). Entitle the table "PRODUCTION DATA." See Enclosure 1, Data Collection Disk, for a pre-formatted table that provides further details regarding this submission.

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

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

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

   Provide the information for this request in a Microsoft Access 2000 table format (or a compatible format). Entitle the table REQUEST NUMBER TWO. See Enclosure 1, Data Collection Disk, for a pre-formatted table that provides further details regarding this submission.

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

   In addition, for all material responsive to this request, provide copies of the full service histories of each vehicle and copies of all dealer repair records (including all technician comments/notes) related to front suspension service.

5. Provide table of all incidents responsive to Request No. 2 in this submission, and the incidents identified in the complaints enclosed with this letter, showing GM's assessment of the causes of each. Provide this information by VIN, date of incident, alleged cause, GM's assessed cause, and the basis for GM's assessment (e.g., field investigation, examination/analysis of returned parts, service records, examination of photographs or reports, etc.).

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

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

   Provide the information for this request in a Microsoft Access 2000 table format (or a compatible format). Entitle the table WARRANTY DATA. See Enclosure 1, Data Collection Disk, for a pre-formatted table that provides further details regarding this submission.

7. Describe in detail the search criteria used by GM to identify the claims identified in response to Request No. 6, 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) related to the alleged defect 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.

8. Produce copies of all service, warranty, and other documents that GM has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities, that relate to, or may relate to, the alleged defect in the subject vehicles. 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 such communication that GM is planning to issue within the next 120 days, and state the date on which GM plans to issue the communication.

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

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

10. Describe all modifications or changes made by, or on behalf of, GM in the design, material composition, manufacture, quality control, supply, or installation of the subject component, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. 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 information requested in items "a" through "h" above for any further modification or change to the subject component(s) of which GM is aware which may be produced, distributed, made available, or incorporated into vehicle production within the next 120 days, provided that in this context, item (a) above refers to planned changes and should be read as if it were written in the future tense.

11. Provide copies of all test and computer modeling data relating to subject component stress and strain at static (curb) condition and during high-load driving maneuvers. Please describe the maneuvers that GM believes produce the highest loads in the subject component, particularly at the lower ball joint attachment.

12. Provide copies of all engineering drawings, blueprints, engineering specifications and other documents related to the manufacturing and material specifications for the subject components.

13. For all vehicles that GM manufacturers which use the same (or substantially similar) chassis configuration or platform as the subject vehicle's (T800), state by make, model and model year;

    a. Gross vehicle weight rating;
    b. Front gross axle weight rating;
    c. Rear gross axle weight rating;
    d. Available wheel sizes and wheel material types (steel, alloy, ect); and
    e. Available tire sizes and brand names.

14. Produce one of each of the following:
    a. Exemplar samples of each design version of the subject component; and
    b. Two field return samples of the subject component exhibiting the subject failure mode.

15. State the number of subject components that GM has sold that may be used in the subject vehicles by component name, part number (both service and engineering/production), model 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).

    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.

16. Furnish 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.

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

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

GM's response to this letter, in duplicate, together with a copy of any confidentiality request, must be submitted to this office by February 7, 2005. Please refer to PE04-080 in GM's response to this letter. If GM finds that it is unable to provide all of the information requested within the time allotted, GM must request an extension from Mr. Jeffrey L. Quandt at (202) 366-5207 no later than five business days before the response due date. If GM is unable to provide all of the information requested by the original deadline, it must submit a partial response by the original deadline with whatever information GM then has available, even if an extension has been granted.

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

If you have any technical questions concerning this matter, please call Peter Kivett of my staff at (202) 366-6178.

Sincerely,

12/16/2004

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

Enclosure 1, One CD ROM titled Data Collection Disc containing three files
Enclosure 2, Vehicle Owners Questionnaires No(s) 8022961, 10045134, 10082603 and 10099676

GM671
EA04-080

ATTACHMENT "1"

GM671
EA04-080

ATTACHMENT "2"

GM CONFIDENTIAL

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

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ATTACHMENT "3"

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ATTACHMENT "12"

GM CONFIDENTIAL

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