

DAIMLERCHRYSLER

March 12, 2004

DaimlerChrysler Corporation

Stephan J. Speth

Director

Vehicle Compliance & Safety Affairs

Ms. Kathleen DeMeter, Director
Enforcement
Office of Defects Investigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Ms. DeMeter:

Reference: NVS - 213plk; EA03-023

This follows up on the previous submission of information by DaimlerChrysler Corporation ("DCC") on September 5, 2003 and our numerous conversations with various members of NHTSA's Office of Defect Investigation thereafter. Enclosed you will find DCC's partial response to NHTSA's Engineering Analysis dated January 22nd, 2004 regarding the upper ball joint assembly in 1998-2003 model year Dodge Durango vehicles and in 1987-2004 Dodge Dakota pickup trucks ("subject vehicles").¹

In response to NHTSA's PE and EA, DCC performed a thorough investigation into alleged upper ball joint separations in the subject vehicles. After analysis and review of the data retrieved from the investigation, DCC has concluded that there is not a safety-related defect present in the upper ball joints of the subject vehicles. The data retrieved from the investigation revealed several factors (supported in this and prior submissions) that led DCC to this conclusion:

- First, the ball joint assemblies on the subject vehicles are "compression" type joints. Unlike "tension" ball joints, a compression ball joint assembly has the weight of the vehicle constantly pressing the ball joint assembly together. This design characteristic makes separation very improbable during the normal operation of the vehicle. In fact, separation has only been observed at lower speeds during extreme suspension travel (e.g., making a sharp turn and proceeding up an inclined driveway).
- Next, there were few complaints that alleged actual upper ball joint separation and those complaints did not reveal a trend or pattern. The complaint rate for the

¹ Due to the broad nature of this inquiry, DCC has requested additional time to perform testing and analyze the data. The testing and analysis is described in the attached submission, and, as discussed with your staff, completion of these tests is anticipated by late April 2004. In reaching our analysis and conclusions, and by providing the information contained herein, DCC is not waiving its claim to attorney work product and attorney-client privileged communications.

subject vehicles is only 1.29 conditions per 100,000 vehicles. NHTSA recently decided to close a ball joint investigation (RQ03-002) into a competing manufacturer's vehicles with a complaint rate of over 13 conditions per 100,000 vehicles. Even distinguishing the New Castle Machining ("NCM") upper ball joint equipped vehicle population from the whole, the complaint rate was only 2.0 conditions per 100,000 vehicles. This 0.71 increase per 100,000 vehicles is statistically insignificant.

- Third, there is substantial and sufficient warning to vehicle owners that the upper ball joints may need replacement well before an upper ball joint separation occurs. The investigation revealed that nearly all of the operators responded to these warning signs. It was only the few operators that (1) ignored the lengthy and obvious warnings, (2) did not want to pay for ball joints service and/or (3) elected not to follow the suggested maintenance and inspection service procedures contained in the owner's manual that experienced a risk of separation of the upper ball joint assembly.
- Fourth, it is apparent from a large sample of survey data that even on vehicles identified with compromised sealing in either the boot or the crimped surface that any degradation of the ball to socket interface occurs over an extended period of time. This appears to be true of both NCM and TRW designed upper ball joint assemblies. On 2000 model year vehicles equipped with NCM upper ball joints ranging in mileage from 29,000 to 120,000 (average 68,900 miles), only one of 14 vehicles surveyed had a measured end play beyond the suggested 0.060" replacement specification at 0.073". Since warranty return parts measured to have end play as high as 0.300" have been identified without experiencing separation from the socket, it can be deduced that degradation in end play due to a compromised seal, evacuation of grease, bearing wear and ultimately grinding corrosion takes a significant amount of time and mileage. As supported with the complaint data, this period of time and/or mileage is more than sufficient for customers to recognize the issue through audible noise, tire wear or normal inspection and vehicle maintenance.
- Fifth, there were dramatic spikes in ball joint complaints among vehicle owners immediately following national media stories related to the investigation that do not accurately reflect actual ball joint issues in the subject vehicles. As evidence, many of the complaints following the media coverage were driven by a liberal application of the term "ball joint" as a causal description for many vehicle related complaints, including issues not even relating to the front suspension.
- Lastly, there were no injuries caused by a ball joint separation in the subject population of vehicles that has, in some instances, been on the road for over seven years. In fact, the overwhelming majority (98.3%) of customer complaints received regarding these ball joints did not communicate a safety concern. The issues raised by customers primarily related to the cost of ball joint service.

In summary, for the reasons stated above and based on the data contained in this and prior submissions, it is DCC's assessment that there is not a safety-related defect in the ball joints of the subject vehicles.

Sincerely,

A handwritten signature in black ink, appearing to read 'S. J. Speth', with a stylized flourish at the end.

Stephan J. Speth
Director
Vehicle Compliance and Safety Affairs

Attachments and Enclosure

- 1. State, by model, model year, and drive type (two-wheel drive or four-wheel drive) the number of subject vehicles DaimlerChrysler has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by DaimlerChrysler, state the following:**
 - a. Vehicle Identification number (VIN);**
 - b. Make;**
 - c. Model;**
 - d. Model year;**
 - e. Drive type;**
 - 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 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.

A1. Enclosure 1 (CD-Rom) contains the requested vehicle volume information provided in the Microsoft Access 2000 format. There were 1,841,488 Dodge Durango and Dodge Dakota vehicles manufactured for sale or lease in the United States for the 1997-2004 model years model years through January 22, 2004.

- 2. State the number of each of the following, received by DaimlerChrysler, or of which DaimlerChrysler is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:**
 - a. Consumer complaints, including those from fleet operators;**
 - b. Field reports, including dealer field reports;**
 - c. Reports involving a crash, injury, or fatality, based on claims against DaimlerChrysler involving a death or injury, notices received by DaimlerChrysler 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;**
 - e. Third-party arbitration proceedings where DaimlerChrysler is or was a party to the arbitration; and**
 - f. Lawsuits, both pending and closed, in which DaimlerChrysler is or was a defendant or codefendant.**

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

In a separate enclosure, provide a tabulation of the total complaint counts by source (complaints, field reports), model, model year, drive type, and complaint category for all other complaints and field reports related to the subject components. Use the following complaint categories for this tabulation: (1) wear; (2) noise; (3) loose steering; (4) uneven tire wear; (5) cost of repair; (6) other; and (7) unknown.

A2. In accordance with a conference call with your staff on February 11th, 2004, DaimlerChrysler Corporation ("DCC") is providing all requested input as described in a - f above that allege a separation of the upper ball joint assembly. This information does not include duplication of the reports already identified in PE 03-032. A comprehensive table combining all reports is provided in question 5. Reports regarding other attenuated ball joint issues such as tire wear, suspension noise, loose steering, ball joint wear, cost of replacement, or other issues, are provided herein with revised tabulation.

Reports presented in the attached table are those received by DCC as of January 22nd, 2004 and include those not provided with PE03-032 in September, 2003. The reason these reports were not provided with PE03-032 is due to the fact they were either received after DCC's August 6th, 2003 cutoff date for Durango reports or if they were related to the Dodge Dakota, which was not the subject of PE03-032.

- a. From the subject population of 1,941,489 vehicles, there are a total of 53 consumer complaints received by DCC which may relate to ball joint separation. Of these complaints, 30 have been investigated by an independent third-party investigator and are noted by the descriptor "SI-CAIR" (Special Investigation - Customer Assistance Inquiry Report). The remaining 23 are designated "CAIR" (Customer Assistance Inquiry Report).

Following is a summary of the 53 responsive complaints:

- 19 of 21 of the complaints appear to be due to separation of the upper ball joint from the socket. In each of these cases, the upper ball appeared to be severely corroded and worn, consistent with other complaints stating

- premature wear but no separation. These 21 reports represent a complaint rate of 1.08 conditions per 100,000 vehicles.
- 7 complaints may be related to separation of the upper ball joint assembly, but due to not having the parts or vehicle available for review, no further inspection or conclusions can be drawn regarding these complaints.
- 3 complaints allege separation of a wheel from the vehicle, but do not include any information regarding a possible cause. No additional information is available and no conclusions can be drawn relative to these reports.
- 14 complaints alleged a wheel separation, but were later identified during an independent inspection to have been caused by a preceding vehicle impact.
- 7 SI-CAIRs suggest wheel separation but lack conclusive supporting information to confirm any relation to the upper ball joint.
- 3 CAIRs match 3 of the provided VOQs and confirm that the complaint is not related to the alleged defect.

These complaints are summarized in the table on the following page.

Subject Vehicle Population: 1,941,469

| Category Description | CAIR | SI - CAIR | Field Reports | Claims / Lawsuits | VOQs | Total (Unique VINs) |
|---|------|-----------|---------------|-------------------|-----------------|---------------------|
| Ball Joint separation | 13 | 6 | 0 | 4 | 4 | 21 |
| Alleged Ball Joint Separation - not confirmed | 7 | 0 | 1 | 0 | 11 | 18 |
| Alleged Wheel separation - not confirmed | 0 | 3 | 0 | 2 | 3 | 3 |
| Wheel separation - due to preceding vehicle accident | 0 | 14 | 0 | 10 | 0 | 14 |
| Ball Joint Assembly separated from Knuckle due to retaining nut shy | 0 | 0 | 1 | 0 | 0 | 1 |
| Insufficient information available | 0 | 7 | 0 | 7 | 22 ^A | 29 |
| Not related | 3 | 0 | 0 | 0 | 3 | 3 |
| Sub-Total | 23 | 30 | 2 | 23 | 43 | 89 |

Total

53

A) VIN and other relevant detail not provided

- b. There is only 1 field report relevant to this investigation.
- c. The 30 "SI-CAIR" reports include incidents where a vehicle crash was alleged. There are no fatalities or confirmed personal injuries.
- d. None of these reports claim property damage.
- e. There are no third party arbitration proceedings.
- f. There are 23 incidents classified as lawsuits and claims. For purposes of this question we have been overly inclusive in labeling certain incidents as "claims." These may not meet the strict definition of a "claim" under Part 579.4. Each lawsuit and claim has been investigated by DCC, and only 4 of these lawsuits and claims appear to be due to separation of the upper ball joint from the socket. 10 of these lawsuits and claims have been determined by DCC to be clearly related to a preceding vehicle accident. 1 of these claims had an aftermarket upper ball joint installed which was sheared as a result of impact. 7 of these lawsuits and claims provided insufficient information for DCC to make a

determination. Please note that DCC is only including background information (e.g. claim letter, police reports, etc.) for incidences confirmed to be related to the alleged defect. For each lawsuit or claim, a summary will be provided and if available, photographs. In most of these cases the vehicle had been repaired prior to inspection, parts had been removed before inspection was allowed by DaimlerChrysler Corporation, or the owner would not allow the inspector to further review vehicle. Of the 23 lawsuits and claims provided with this submission, 22 were received by DCC after August 2003. It is DCC's opinion that the incidents giving rise to the majority of these lawsuits and claims were not caused by the alleged defect, and were likely driven by the media coverage surrounding this issue. There are no lawsuits or claims relevant to this investigation with confirmed injuries due to the alleged defect. A summary of these lawsuits and claims is provided in Enclosure 2.

Although not perhaps called for by this question, in the spirit of complete cooperation DCC has received service of one additional class action lawsuit since submission of the PE response. This lawsuit alleges only economic damages and was filed after recent publicity regarding the Durango and Dakota ball joints.

- Kipnis, Jerome, et al – Plaintiffs. Vs DaimlerChrysler AG, et al – Defendants.

None of the named plaintiffs have alleged any personal injury or property damage as a result of operating a Dodge Durango or Dakota vehicle.

Reports of consumer complaints concerning issues other than separation were not previously provided with PE03-032 (as requested by NHTSA) and are herein provided as received by DCC as of January 22, 2004. These reports were not previously provided with PE03-032 due to NHTSA's request to provide complaints only related to separation of the upper ball joint. The tabulation of these reports regarding other attenuated ball joint issues such as tire wear, suspension noise, loose steering, ball joint wear, cost of replacement, or other issues such as media driven inquiries are provided below.

Subject Vehicle Population: 1,941,469

| | | | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|----|-----|----|----|----|----|----|----|--------------|
| CAIRB through 8/5/2003 | | | | | | | | | | | | | | |
| Customer Complaint Categories | 97 | 98 | 98 | 99 | 99 | 00 | 00 | 01 | 01 | 02 | 02 | 03 | 03 | Total |
| | AN | AN | DN | AN | DN | AN | DN | AN | DN | AN | DN | AN | DN | |
| Upper Worn | | | | | | | | | | | | | | |
| Upper Worn: Cost | 179 | 151 | 191 | 187 | 248 | 57 | 88 | 16 | 8 | 4 | 1 | 0 | 0 | 1110 |
| Upper Worn: Tire wear | 29 | 21 | 20 | 16 | 36 | 4 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 137 |
| Upper Worn: Noise or Handling | 17 | 15 | 22 | 18 | 26 | 18 | 15 | 9 | 3 | 1 | 0 | 0 | 0 | 145 |
| Upper Worn: Parts not available or could not pass state inspection | 18 | 9 | 13 | 16 | 25 | 7 | 10 | 1 | 1 | 0 | 2 | 0 | 0 | 103 |
| CAIRB through 8/5/2003 | | | | | | | | | | | | | | |
| Customer Complaint Categories | 97 | 98 | 98 | 99 | 99 | 00 | 00 | 01 | 01 | 02 | 02 | 03 | 03 | Total |
| | AN | AN | DN | AN | DN | AN | DN | AN | DN | AN | DN | AN | DN | |
| Upper Worn | 22 | 24 | 34 | 28 | 75 | 29 | 34 | 29 | 20 | 25 | 2 | 2 | 4 | 330 |
| Upper Worn: Cost | 18 | 22 | 127 | 55 | 254 | 70 | 115 | 43 | 63 | 25 | 26 | 7 | 1 | 657 |
| Upper Worn: Tire wear | 4 | 3 | 10 | 8 | 32 | 4 | 14 | 6 | 7 | 5 | 5 | 0 | 0 | 98 |
| Upper Worn: Noise or Handling | 4 | 10 | 32 | 10 | 62 | 29 | 48 | 17 | 28 | 17 | 15 | 4 | 8 | 306 |
| Upper Worn: Parts not available or could not pass state inspection | 2 | 2 | 8 | 2 | 18 | 9 | 13 | 9 | 8 | 8 | 2 | 2 | 0 | 81 |
| No technical input/media driven inquiry | 23 | 30 | 104 | 38 | 185 | 68 | 120 | 45 | 75 | 39 | 48 | 17 | 30 | 520 |

A majority of the complaints received by DCC prior to 8/5/2003 (74.2%) were not related to safety but rather relate to the cost of replacement parts for vehicles outside the warranty period. Since that time, and in an effort to improve customer satisfaction, DCC has taken steps to reduce the cost of replacing the upper ball joint assemblies. Replacement of upper ball joint assemblies before August 2003 also required upper control arm replacement and front end alignment, which in many cases resulted in increased service cost. In August 2003, DCC released for service an upper ball joint assembly that could be bolted onto the existing upper control arm, eliminating control arm replacement and front end alignment. The recent availability of this part is expected to address most complaints regarding service cost of the subject ball joints.

A review of the upper ball joint wear related complaints received before August 2003 also indicate that most customers were calling to complain about the cost of their repair. Those customers whose vehicles required ball joint replacement were able to recognize at least one of the symptoms consistent with ball joint wear. For example, they observed increasing and noticeable looseness in the vehicle steering, the front suspension emitting unusual and loud clunking or popping noises, unusual and premature tire wear, and an inability to align the vehicle's front suspension.

As would be expected, the total number of complaints received since August 2003 has been greatly influenced by media stories relating to this investigation. DCC review of these complaints revealed a dramatic spike in the number of complaints received

following national media coverage of the ball joint investigation. Additionally, a detailed review of complaint input to DCC after August 2003 and following significant national media coverage indicates that customer awareness has been increased, driving liberal application of the term ball joint as a causal description for many vehicle related complaints, including many issues not even relating to the front suspension. It is also noted that of 26 VOQs from the EA provided to NHTSA, 15 of them allege incidents that occurred more than 4 months prior to their submission of the VOQ. Based on this DCC believes this quantity of complaints does not accurately represent a specific customer safety problem.

An inclusive review of all complaints reveals that operators of the subject vehicles receive sufficient warning when ball joint service is required. The great majority of the data indicates that separation due to compromised ball joint sealing leading to water intrusion, evacuation of the grease, bearing wear and ultimately grinding corrosion occurs beyond 30,000 miles. It is those vehicles whose operators ignore this warning have the greatest risk of eventual ball joint separation. Further, if the Owner's Manual maintenance and inspection procedures regarding the ball joint had been followed, it is virtually assured that this situation would be avoided.

Of the approximately 8000 reports received and reviewed by DCC, there exists no supporting evidence of a safety defect and no allegations of any injuries. Analysis of the reports provided indicates an overwhelming majority of complaints received relating to ball joints due to cost of repair or media related inquiries. From PE03-032, 4 of 16 reports of alleged separation appeared to be related to corrosive degradation of the upper ball joint assembly, while the data provided in the table above indicate that an additional 21 of 89 reports provided appear to be also related. While the rate of alleged separations has slightly increased since August 2003 from 0.44c/100,000 vehicles to 1.29c/100,000 vehicles, the rate of confirmed upper separations due to premature wear remains very low. Even segregating the 2000 model year and newer vehicle population, which contains the majority of the alleged separations, the rate only increases to 2.0c/100,000 vehicles. Further, comprehensive survey data provided in question 22 will show analysis further reinforcing that degradation of the upper ball joint to the point of potential separation occurs over a significant period of time.

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. DaimlerChrysler'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 DATA." See Enclosure 1, Data Collection Disk, for a pre-formatted table that provides further details regarding this submission.

A3. Enclosure 3 contains the Access 2000 file information requested for each category of complaint with the specified owner, vehicle, and complaint detail provided.

- 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 DaimlerChrysler used for organizing the documents.**

In addition, for all material responsive to this request, all material provided in response to this request in DaimlerChrysler's September 5, 2003 response to PE03-032, and all complaints enclosed with this letter, 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.

A4. Enclosure 4 contains copies of all documents related to each item within the scope of response 2.

In addition, the full service histories of each vehicle and copies of all dealer repair records relating to front service suspension service are provided for the 16 complaints provided in DCC's response to PE03-032, and all reports (of upper ball joint separation) enclosed with this letter.

The service histories provided for each vehicle can be found in enclosure 4. Of the confirmed separations, the service histories provided do not indicate a pattern of frequent visitation to dealerships by these owners. Therefore, it is not possible to determine whether there was a reasonable attempt to follow DCC's recommended inspection and maintenance schedule. Had the maintenance schedule been followed as recommended, we are confident that this condition would have been identified and corrected well before the possibility of upper ball joint separation.

- 5. Provide a comprehensive table of all incidents responsive to Request No. 2 in this submission, the incidents identified in the PE03-032 response, and the incidents identified in the VOQ's enclosed with this letter showing**

DaimlerChrysler's assessment of the causes of each. Provide this information by VIN, date of incident, alleged cause, DaimlerChrysler's assessed cause, and the basis for DaimlerChrysler's assessment (e.g., field investigation, examination/analysis of returned parts, service records, examination of photographs or reports, etc.). Use the following categories for DaimlerChrysler's assessment of the causal factors: (a) upper ball joint separation; (b) upper ball joint failure related to retaining nut installation; (c) upper ball joint failure related to impact damage (describe impact); (d) other cause/type of upper ball joint failure; (e) upper ball joint did not fail catastrophically; (g) confirmed non-upper ball joint failure (e.g., failure of lower ball joint or other component of front suspension); and (h) insufficient information to determine if upper ball joint failure occurred.

A5. In accordance with a conference call with your staff on February 11th, 2004, DCC is providing all requested input as described in questions 2 a – f above that allege a separation of the upper ball joint assembly. This information includes the reports identified in PE 03-032.

- a. From the subject population of 1,941,469 vehicles, there are a total of 89 consumer complaints received by DCC which may relate to ball joint separation. Of these complaints, 35 have been investigated by an independent third-party investigator and are noted by the descriptor "SI-CAIR" (Special Investigation – Customer Assistance Inquiry Report). The remaining 34 are designated "CAIR" (Customer Assistance Inquiry Report).

Following is a summary of the 89 responsive complaints:

- 23 of 25 of the complaints appear to be due to separation of the upper ball joint from the socket. In each of these cases, the upper ball appeared to be severely corroded and worn, consistent with other complaints stating premature wear but no separation. These 25 reports represent a complaint rate of 1.29 conditions per 100,000 vehicles.
- 13 complaints may be related to separation of the upper ball joint assembly, but due to not having the parts or vehicle available for review, no further inspection or conclusions can be drawn regarding these complaints.
- 7 complaints allege separation of a wheel from the vehicle, but do not include any information regarding a possible cause. No additional information is available and no conclusions can be drawn relative to these reports.
- 15 complaints alleged a wheel separation, but were later identified during an independent inspection to have been caused by a preceding vehicle impact.
- 1 complaint alleges wheel separation due to the upper ball joint retaining nut missing due to service repair or assembly.

- 7 SI-CAIRs suggest wheel separation but lack conclusive supporting information to confirm any relation to the upper ball joint.
- 3 CAIRs match 3 of the provided VOQs and confirm that the complaint is not related to the alleged defect.

Subject Vehicle Population: 1,941,489

| Category Description | CAIR | SI - CAIR | Field Reports | Claims / Lawsuits | VOQs | Total (Unique VINs) |
|---|------|-----------|---------------|-------------------|-----------------|---------------------|
| Ball Joint separation | 16 | 7 | 0 | 4 | 5 | 26 |
| Alleged Ball Joint Separation - not confirmed | 11 | 2 | 1 | 0 | 11 | 24 |
| Alleged Wheel separation - not confirmed | 4 | 3 | 0 | 3 ^A | 4 | 8 |
| Wheel separation - due to preceding vehicle accident | 0 | 15 | 0 | 10 | 1 | 15 |
| Ball Joint Assembly separated from Knuckle due to retaining nut shy | 0 | 1 | 1 | 0 | 0 | 2 |
| Insufficient information available | 0 | 7 | 0 | 7 | 23 ^B | 30 |
| Not related | 3 | 0 | 0 | 0 | 3 | 3 |
| Sub-Total | 34 | 35 | 2 | 24 ^A | 47 | 107 |
| Total | 69 | | | | | |

A) Includes 1 claim not believed to be relevant to this investigation

B) VIN and other relevant detail not provided

- There is only 1 field report relevant to this investigation. The second field report was due to a missing upper ball joint retaining nut.
- The 35 "SI-CAIR" reports include incidents where a vehicle crash was alleged. There are no fatalities or confirmed personal injuries.
- None of these reports claim property damage.
- There are no third party arbitration proceedings.
- There are 24 incidents classified as lawsuits and claims. For purposes of this question we have been overly inclusive in labeling certain incidents as "claims." These may not meet the strict definition of a "claim" under Part 579.4. Each

lawsuit and claim has been investigated by DCC, and only 4 of these lawsuits and claims appear to be due to separation of the upper ball joint from the socket. 10 of these lawsuits and claims have been determined by DCC to be clearly related to a preceding vehicle accident. 1 of these claims had an aftermarket upper ball joint installed which was sheared as a result of impact. 7 of these lawsuits and claims provided insufficient information for DCC to make a determination. Please note that DCC is only including background information (i.e., claim letter, police reports, etc.) for incidences confirmed to be related to the alleged defect. For each lawsuit or claim, a summary will be provided and if available, photographs. In most of these cases the vehicle had been repaired prior to inspection, parts had been removed before inspection was allowed by DaimlerChrysler Corporation, or the owner would not allow the inspector to further review vehicle. Of the 24 lawsuits and claims provided with this submission, 22 were received by DCC after August 2003. It is DCC's opinion that the incidents giving rise to the majority of these lawsuits and claims were not caused by the alleged defect, and were likely driven by the media coverage surrounding this issue. There are no lawsuits or claims relevant to this investigation with confirmed injuries due to the alleged defect.

6. State, by model, model year, and drive type, a total count for all of the following categories of claims, collectively, that have been paid by DaimlerChrysler 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. DaimlerChrysler'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. Secondary component damage (y/n) - Whether there were coincident repairs to secondary components that can be damaged when an upper ball joint separation occurs. For example, repairs to the following components

at the same front wheel position as the subject component on or about the same date as the subject component repair (± 2 days): brake rotor, brake hose, axle (four-wheel drive), body damage, steering knuckle, etc. (state the specific criteria used by DaimlerChrysler);

- l. Concern stated by customer; and
- m. 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.

A6. In addition to the information provided in Enclosure 6, in the file entitled "WARRANTY DATA," the chart below is a total collective count of claims separated by model year as requested.

| MODEL YEAR | UPPER CONTROL ARM and/or UPPER BALL JOINT CLAIMS |
|------------|--|
| 1997 | 2,778 |
| 1998 | 5,647 |
| 1999 | 12,128 |
| 2000 | 11,534 |
| 2001 | 8,113 |
| 2002 | 7,398 |
| 2003 | 1,304 |
| 2004 | 5 |

An analysis performed by DCC of the vehicles towed under warranty within 7 days of one of the identified labor operation codes indicated that no trend could be identified that would highlight upper ball joint separations that may relate to this investigation.

An analysis of the 1997-2004 Dakota and Durango vehicle warranty data provided in enclosure 6 indicated that there were 390 reports of vehicles towed under warranty within 7 days of having the aforementioned labor operation codes performed. Further analysis indicated:

- Only 42 of the 390 vehicles that were towed had an associated ball joint failure code of broken or cracked.
- Of the 42 vehicles identified, 24 of those vehicles had more than 20,000 miles, and as previously stated, the great majority of the data indicates that separation due to compromised ball joint sealing leading to water

Intrusion, evacuation of the grease, bearing wear and ultimately grinding corrosion occurs beyond 30,000 miles.

- Of those 24 reports, 21 provided either no technician comments in the repair order or comments which indicate there were no unusual circumstances and no separation.
- 1 of the reports indicated an issue with the previous service repair of an upper control arm that is unrelated to the ball joint.
- 3 of the reports indicate that the customer alleged a wheel or suspension related issue, however none of the reports indicate an upper ball joint issue that relates to this investigation. 1 of those 3 reports indicated that several lug nuts had been missing prior to the alleged incident.
- None of the reports reviewed were forwarded to SI-CAIRs for further investigation (which would be the case if an accident or property damage was alleged), and there were no corresponding VOQs relating to ball joint/suspension issues for the vehicles identified in this analysis.

7. Describe in detail the search criteria used by DaimlerChrysler 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 and all labor operations DaimlerChrysler used to identify vehicles that had been towed and/or vehicles with secondary component damage. State, by make and model year, the terms of the new vehicle warranty coverage offered by DaimlerChrysler 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 DaimlerChrysler 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.

A7. The search criteria used by DCC to identify claims to Request No. 8, can be found in the charts below:

| | | |
|----------------------------|-------------------|----------------------------------|
| Upper Control Arm, Replace | 02-10-55-XX (all) | K4,X8,06,07,11,37,51,60,68,UC,SE |
| Upper Ball Joint, Replace | 02-10-60-XX (all) | K4,X8,06,07,11,37,51,60,68,UC,SE |

Problem codes for the above referenced labor operations are provided below:

| | | | | | |
|----|--------------------------|----|--------------------------|----|----------------|
| K4 | Loose | X8 | Stripped – Threads | 06 | Bent |
| 07 | Binds, sticks, or seized | 11 | Broken or Cracked | 37 | Excessive Wear |
| 51 | Improperly installed | 60 | Insufficient Lubrication | 68 | Noisy |
| UC | Uncodeable | SE | Shortage Part | | |

The warranty provided by DCC for the 1998-2003 model year Durango and 1997-2004 model year Dakota vehicles are covered under the "Basic Warranty" period, which is 3 years or 36,000 miles. Additionally, DCC dealers often perform ball joint repairs at no charge on out-of-warranty vehicles as a goodwill gesture. Customers can also purchase additional extended service contracts at their option.

8. Produce copies of all service, warranty, and other documents that DaimlerChrysler 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 DaimlerChrysler is planning to issue within the next 120 days, and state the date on which DaimlerChrysler plans to issue the communication.

A8. Enclosure 8 (CD-Rom) contains 1 TSB (Technical Service Bulletin) and 4 GPOP (Global Parts Ordering Process) documents which may be responsive to this request

TSB 02-04-98
 GPOP documents

Release of 4X4 lower ball joint kit for service
 Release of upper ball joint kit for service

As discussed earlier in this response, release of the aforementioned service kits do not relate directly to this investigation; they are merely dealer communications which involved the subject components. There are no planned communications in the next 120 days.

- 9. State the torque specifications for the retaining nuts for the upper ball joints and describe the quality control processes for monitoring this and other aspects of subject component assembly.**

A9. The retaining nut torque specifications along with an overview of the quality control processes for monitoring retaining nut torque specifications have been summarized as requested and submitted in Enclosure 9 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

- 10. Provide copies of all engineering standards, design verification/validation documents, and production part approval process documents related to the subject components. Provide copies of all completed verification, validation, and PPAP reports.**

A10. The engineering standards, design verification/validation documents that were not provided with PE03-032 have been summarized as requested and submitted in Enclosure 10 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

- 11. State the design life for subject components. Explain why DaimlerChrysler decided to use maintenance free ball joints for the upper and later for the lower control arm assemblies used in the subject vehicles.**

A11. Maintenance free ball joints were, and continue to be, an accepted industry practice. They are widely used by automakers worldwide in a majority of vehicles and will continue in future designs. The design and development criteria established in the mid 1990s for the subject components are stated below. However, actual life may vary based on a number of factors such as customer usage and corrosive environmental exposure.

Model Year Vehicle Projected Design Life

1997-1999 Dakota 10 years/100,000 miles

1998-1999 Durango 10 years/100,000 miles

2000-2004 Dakota 10 years/150,000 miles

2000-2003 Durango 10 years/150,000 miles

The ball joints must be inspected on a regular basis as described in the owner's manual (at least every 7500 miles or 6 months) throughout the life of the vehicle. Damage may occur to the boot seal from road debris or improper service procedures. A cut or tear in the seal could allow contaminants to enter the joint, which may result in premature wear. Regular inspections greatly improve the chance of discovering premature wear resulting from damage to the boot seal.

DaimlerChrysler decided to use maintenance free ball joints as a continuous improvement measure to increase customer satisfaction and to improve ball joint performance. Maintenance free ball joints have the following advantages:

- No greasing required throughout design life.
- Eliminates possibility of contamination entering through the grease fitting and purge vents in the boot seal.
- Eliminates possibility of incorrect grease being introduced into the joint, which may not be compatible with polymer components.
- Reduced friction and rotating torque for improved steering and handling performance.
- Environmentally friendly. No purged grease to drop on driveways, garage floors, and roads.

12. Furnish copies of all communications between DaimlerChrysler and each supplier of subject components for the subject vehicles that pertain to the design, manufacture, performance, durability, quality, testing, or modification of the ball joints for the subject vehicles or to their application for the front suspension assembly. If any communications on this subject were oral or were conducted electronically, provide a written transcript or summary of each such communication, and include a statement that identifies the participants and the date of the communication.

A12. Copies of all communications have been summarized as requested and submitted in Enclosure 12 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

13. 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, DaimlerChrysler. 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.

A13. Other than information found in responses to other questions contained within this inquiry, DCC has conducted no assessments, analyses, tests, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, separation of the upper ball joint in the subject vehicles, nor are any such actions being conducted or planned to be conducted.

However, DCC has conducted a number of actions regarding the durability, cost of service and replacement parts, and other actions in regards to the subject upper ball joints. Although these actions are not directly responsive to this inquiry, DCC is submitting this information voluntarily to aid in NHTSA's complete understanding of the issue. These actions have been summarized and are provided in Enclosure 13 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

14. Identify and describe all service and production countermeasures that have been considered by DaimlerChrysler to address problems with wear related failures of subject components. State which alternatives, if any, have been eliminated and state the reasons. For each option that remains under consideration, identify the remaining testing and analyses needed to make a decision and give the target dates for completing each action.

A14. Copies of all documents have been summarized as requested and submitted in Enclosure 14 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

15. Other than the modifications described in DaimlerChrysler's September 5, 2003 response to PE03-032, describe every modification or change made by, or on behalf of, DaimlerChrysler in the design, material composition, manufacture, quality control, supply, or installation of the subject component(s), from the start of production to date, that relates to, or could 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 numbers (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 DaimlerChrysler 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.

A15. Copies of all documents have been summarized as requested and submitted in Enclosure 15 -Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

16. For each model and drive type, provide computer model images of the front suspension components at full jounce and full rebound. Include in each drawing the loads (x-, y-, and z-direction forces and the resultant forces magnitudes and directions) of the upper and lower ball joints. Also, include the angles of articulation of each control arm and ball joint (measured from the ball joint stem to control arm axis) from static curb weight condition to the full jounce and full rebound positions.

A16. Copies of all documents have been summarized as requested and submitted in Enclosure 16 -Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information. Force direction and magnitudes will be provided at the completion of the test program, which is detailed in question 17.

17. For each model and drive type of subject vehicle, describe, and provide copies of all documents relating to, all vehicle testing (including computer simulations) to assess the forces acting on the subject ball joints. Provide DaimlerChrysler's assessment of the forces acting on the subject ball joints and the associated control arm bushings in the x-, y-, and z-directions during: (a) static conditions; (b) steady state driving; (c) cornering (both sides); (d) braking (normal and hard); and (e) transient driving conditions (e.g., force vs. time plots of forces associated with driving over a vertical perturbation in the

road at a designated speed – for instance, force vs. time plots for each load direction showing transitions from steady state to full jounce to full rebound to steady state while driving at 30 mph).

A17. DCC is in the process of conducting a comprehensive test program to measure the requested information. Documents summarizing this plan and the anticipated data approach are being submitted in Enclosure 17 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

18. Provide DaimlerChrysler's assessment of which of the above (in Request No. 17), or other, operating conditions contribute most to: (a) wear of the subject components; and (b) separation of worn joints.

A18. DCC's assessment of this information will not be available completion of the test plan outlined in question 17.

19. Describe, and provide copies of all documents relating to, all testing conducted by, or for, DaimlerChrysler to assess the separation or pull-out forces for new and used ball joint assemblies used in the subject vehicles. Provide copies of all test plans and procedures used and video demonstrating how each test was performed. Include in your response to this request a detailed comparison of the axial and side-load forces required to separate ball joints supplied by TRW and NCM in both new and field return parts. For the latter, state the VIN, mileage, symptoms reported by the owner, end-play (if measured), ball diameter, and any other measurements or observations that characterize the degree of wear for each part. Provide pull-out/separation force vs. ball joint wear curves for the TRW and NCM parts and DaimlerChrysler's assessment of the relative performance of the parts from the two suppliers and the relationship of each to the forces that the parts may see in service in each of the subject models and drive types.

A19. DCC is in the process of conducting a comprehensive test program to measure the requested information. Documents summarizing this plan and the anticipated data approach are being submitted in Enclosure 19 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

20. Using the information furnished in response to Request Nos. 17 and 19, provide DaimlerChrysler's assessment of the wear conditions and load conditions (and the associated driving maneuvers) that are necessary to cause a ball joint separation to occur. State what evidence, if any, is available to correlate this assessment to actual incidents of ball joint separation that

have been investigated by DaimlerChrysler.

A20. DCC's assessment of this information will not be available completion of the test plan outlined in questions 17 & 19.

21. State the design dimensions and tolerances for the ball and the socket/capsule stem opening for the subject components manufactured by TRW and NCM. Provide copies of all engineering drawings for the subject components.

A21. Requested information has been summarized and submitted in Enclosure 21 - Confidential (CD-Rom) to Ms. Jacqueline Glasman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information. Copies of engineering drawings for the subject components were provided with a request for confidential treatment in the September, 2003 submission of PE03-032.

22. Describe, and provide copies of all documents relating to, the DaimlerChrysler field survey that was referenced during the December 9, 2003 meeting with NHTSA.

A22. From a sample of over 200 Durango and Dakota vehicles identified in Southeastern Michigan representing all model years, 78 were selected for a comprehensive review of the condition of the upper ball joints. The 78 vehicles selected represented a cross section of model years, mileages, and customer usages. Copies of all documents related to the survey approach and the observed and measured findings have been summarized as requested and submitted in Enclosure 22 -Confidential (CD-Rom) to Ms. Jacqueline Glasman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information.

It is apparent from this data that even on vehicles identified with compromised sealing in either the boot or the crimped surface that degradation of the ball to socket interface occurs over an extended period of time. This appears to be true of both NCM and TRW designed upper ball joint assemblies. On 2000 model year vehicles equipped with NCM upper ball joints ranging in mileage from 29,000 to 120,000 (average 66,900 miles), only one had a measured end play beyond the suggested 0.060" replacement specification at 0.073". Since warranty return parts measured to have end play as high as 0.300" have been identified without experiencing separation from the socket, it can be deduced that degradation in end play due to a compromised seal, evacuation of grease, bearing wear and ultimately grinding corrosion takes a significant amount of time. As supported with the complaint data, this period of time is more than sufficient for customers to recognize the issue through audible noise, tire wear or normal inspection and vehicle maintenance.

23. Describe in detail, and provide copies of all documents relating to, all other testing and analyses that have been conducted by, or for, DaimlerChrysler on

field return samples of subject components. Provide an electronic listing of all such parts collected by DaimlerChrysler. Include the following information in the list: (a) VIN; (b) repair date; (c) symptoms reported by the consumer; (d) end-play (if measured); (e) dealer technician notes/observations; (f) DaimlerChrysler's characterization of the severity of the wear in the part (use the categories low, moderate, or severe and state the conditions used by DaimlerChrysler to define each category); (g) ball diameter; (h) ball hardness; (i) socket hardness; and (j) a column for each of the analyses that have been completed or are planned by DaimlerChrysler, with the results for completed tests shown for each part. Provide photographs of each part, including high-resolution pictures of the balls that have been removed from returned parts with metric scales shown in the images.

A23. Requested information has been summarized and submitted in Enclosure 23 - Confidential (CD-Rom) to Ms. Jacqueline Glassman, Office of the Chief Counsel, under separate cover with a request for confidential treatment of information. Information collected from field returned samples is provided in these enclosures where available. Some information requested above in (a) through (j) is not commonly collected or measured, and is not provided.

24. Describe, and provide copies of all documents relating to, all metallurgical testing and analyses of new and field return ball joint assemblies supplied by TRW and by NCM that have been done by DaimlerChrysler or of which DaimlerChrysler is otherwise aware. Include all mechanical and chemical analyses of ball, socket, and wear debris, such as microscopy, metallography, macroscopic and microscopic hardness testing, microstructure analysis, and chemical analyses of wear surfaces or wear debris. Describe by manufacturing process, hardness, and thickness all case hardening and/or surface coatings in the balls and sockets/capsules of new parts supplied by TRW and NCM and provide copies of relevant specifications and documents.

A24. DCC has no additional documents responsive to this question beyond what is already being provided elsewhere in this inquiry, or was previously provided with PE03-032.

25. State whether DaimlerChrysler has conducted any testing or analyses of subject components to measure the rate of corrosive/grinding wear related dimension change of the balls and/or sockets. Describe the test methods and results for any such analyses and provide copies of all related documents.

A25. DCC has not conducted any testing or analyses of upper ball joint assemblies to measure the rate of corrosive/grinding wear related dimension change of the balls and/or sockets.

26. Provide DaimlerChrysler's assessments of the approximate mileage ranges and symptoms associated with the following stages of upper ball joint wear progression: (a) initiation of water intrusion; (b) evacuation of joint lubrication; (c) deterioration/disintegration of the plastic bearing; (d) onset of corrosive/grinding wear the ball and socket; (e) 25 percent reduction of joint pull-out forces; (f) 50 percent reduction in joint pull-out forces; and (g) severe loss of joint retention capability (e.g., ball can be separated from socket with less than 200 pounds force of axial or side load). For parts "e" through "g," state the approximate ball diameters associated with the respective joint load capacities. For part "d" through "g," state DaimlerChrysler's assessment of the wear rates through each stage, including whether the wear rates are approximately constant or if they may accelerate at some point in the process. State the bases for each such assessment.

A26. Effects on mechanical fatigue and therefore symptoms and performance will be provided following completion of questions 17-19.

27. State the number of each of the following that DaimlerChrysler has sold that may be used in the subject vehicles by component name, part number (both service and engineering/ production), model, model year, and drive type of the vehicle in which it is used and month/year of sale (including the out-off date for sales, if applicable):

- a. Subject component;
- b. Front suspension lower ball joint;
- c. Front suspension upper control arm;
- d. Front suspension lower control arm; and
- e. Any kits that have been released, or developed, by DaimlerChrysler for use in service repairs to the subject component/assembly.

For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number).

Also, identify by make, model and model year, any other vehicles of which DaimlerChrysler is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

A27. The service part demand for the components identified is provided in the Enclosure 27 (CD-Rom).

- a. Front suspension upper ball joint
- b. Front suspension lower ball joint
- c. Front suspension upper control arm
- d. Front suspension lower control arm
- e. Any kits that have been released, or developed by DCC for use in service repairs to the subject component/assembly

Until the previously discussed service kits were released in August 2003, the upper control arm and ball joint was serviced as an assembly.

The front suspension lower ball joint for the 4X4 vehicle was released as a service kit in May 1998 per TSB 02-04-98.

It is important to note that DCC's part demand information does not specify the specific reason that control arm assemblies are typically sold.

The requested supplier information is provided in Enclosure 27.

28. Provide DaimlerChrysler's assessment of the effect of the change to the one-piece bearing design that was implemented in MY 2003 vehicles on the wear related failures of the subject components. Identify any test data or field data analyses that provide quantitative evidence of the effectiveness of the design change.

A28. DaimlerChrysler believes that the one-piece bearing design is an improvement over the previous two-piece design for the following reasons:

- Based on discussion with NCM, the one piece bearing design lends itself to less dimensional variability, and is therefore more consistent during the manufacture of the critical crimp seal interface.
- The one-piece design was required to pass more stringent validation testing, which DCC believes is more indicative of real world use. This included an environmental integrity test, which did not exist when the two-piece design was introduced.
- With the implementation of the one-piece design in Oct. 2002, an air leak audit check was added to verify the seal at the roll crimp. One part is checked per hour. Since implementation of the one piece bearing design, there have been no documented issues with the crimp seal.
- Five one-piece bearing upper ball joints have been recently inspected. These upper ball joint assemblies were warranty returns with a mileage range from 2,701 to 34,572. All five of the parts had no axial and play detectable by hand, good seals, good grease, and no corrosion inside the joint. In addition, none of the five parts leaked air through the roll crimp when tested with the air leak tester.

29. Using Weibull analysis of warranty data for all wear related claims, provide DaimlerChrysler's estimates of the following for the subject components by model, drive type, and model year:

- a. State the slope (β) and scale (η) parameters;**
- b. State the estimated B1, B5, and B10 service intervals (in mileage);**

- c. State the percentages of subject components that DaimlerChrysler estimates will have experienced a wear-related failure of a subject component at the following mileage intervals: 50,000 miles; 100,000 miles; and 150,000 miles;
- d. Provide DaimlerChrysler's assessment of how well the estimates compare with current volumes and trends in part sales; and
- e. Based on the currently understood ratios of separation failures to total wear related failures of subject components, provide DaimlerChrysler's estimate of the total number of separation incidents that may occur in the next three years.

A29. DCC does not typically perform Weibull analysis for wear related properties, only for mechanical fatigue. The vast majority of warranty returned parts, if not all, have not experienced separation because they are replaced when customers identify performance issues with the vehicle caused by such wear. Therefore, it is DCC's opinion that such analysis is not valid.

30. Furnish DaimlerChrysler's current assessment of the alleged defect in the subject vehicles, including:

- a. The causal or contributory factor(s) of corrosive/grinding wear related failures of subject components;
- b. The failure mechanism(s) of corrosive/grinding wear related failures of subject components;
- c. The wear condition of upper ball joints that have been involved in known incidents of upper ball joint separation that have been investigated to date – this should be limited to parts that have been inspected, tested, or otherwise analyzed by, or for, DaimlerChrysler;
- d. The driving maneuvers associated with known incidents of upper ball joint separation that have been investigated to date – include DaimlerChrysler's assessment of the estimated forces from each such maneuvers on the subject components;
- e. The reason(s) for differences in rates of separation between subject components supplied by TRW and NCM;
- f. The reason(s) for the disproportionately high rate of separation incidents currently alleged in the MY 2000 subject vehicles;
- g. The reason(s) for differences in the rates of subject component separation, if any, when compared by model and drive type;
- h. The risk to motor vehicle safety that it poses;
- i. 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
- j. The reports included with this inquiry.

A30. After analysis and review of the data from this investigation, DCC has concluded that there is not a safety-related defect present in the upper ball joints of the subject vehicles.

(a) Regarding the causal and contributory factors to corrosion and grinding, analysis of returned parts indicates that the wear is related to a compromising of the seal, leading to intrusion of water, evacuation of the grease, bearing wear and, after a significant amount of time, corrosion leading to grinding wear of the joint.

(b) From the few confirmed ball joint separations, DCC has observed that a separation may occur if the conditions described in subpart (a) are permitted to exist without proper vehicle maintenance and service. The long term effects of corrosion causes degradation of the joint integrity due to the reduction of metal at the interface between the ball and socket. This reduction of metal at the interface increases the risk of separation during extreme suspension travel.

(c) All documented separations reviewed to date reveal a severely corroded ball stud and housing. This supports our assertions that there is significant notice prior to a separation and if the operator would have followed the recommended maintenance procedures contained in the owner's manual, this condition would have been detected prior to separation.

(d) The rare incidents where separation of the upper ball joint from the control arm has occurred have only been observed at lower speeds during extreme suspension travel (e.g. making a sharp turn and proceeding up an inclined driveway). DCC is in the process of conducting a comprehensive test program to measure the associated forces with these maneuvers. Documents summarizing this plan and the anticipated data approach are summarized in the response to question 17.

(e) There is not a statistically significant difference in the rate of separation between the subject components supplied by TRW and NCM (0.71c/100,000).

(f) Although the rate of alleged upper ball joint separations is slightly higher in model year 2000 than the other model years, there is insufficient data to indicate that a complaint rate of 4.20c/100,000 is disproportionately high. In fact, NHTSA recently decided to close a ball joint investigation (RQ03-002) into a competing manufacturer's vehicles with a complaint rate of over 13 conditions per 100,000 vehicles.

(g) Component separation data shows no trend based on drive type or vehicle model.

(h-j) DCC has concluded that there is not a safety-related defect present in the upper ball joints of the subject vehicles and therefore no risk to motor vehicle safety for the following reasons:

First, the ball joint assemblies on the subject vehicles are "compression" type joints. Unlike "tension" ball joints, a compression ball joint assembly has the weight of the vehicle constantly pressing the ball joint assembly together. This design characteristic makes separation very improbable during the normal operation of the vehicle. In fact, separation has only been observed at lower speeds during extreme suspension travel (e.g., making a sharp turn and proceeding up an inclined driveway).

Next, there were few complaints that alleged actual upper ball joint separation and those complaints did not reveal a trend or pattern. Even distinguishing the NCM upper ball joint equipped vehicle population from the whole, the complaint rate was only 2.0 conditions per 100,000 vehicles.

Third, there is substantial and sufficient warning to vehicle owners that the upper ball joints may need replacement well before an upper ball joint separation occurs. The investigation revealed that nearly all of the operators responded to these warning signs. It was only the few operators that (1) ignored the lengthy and obvious warnings such as audible noise and tire wear, (2) did not want to pay for ball joints service and/or (3) elected not to follow the suggested maintenance and inspection service procedures contained in the owner's manual that experienced a risk of separation of the upper ball joint assembly.

Fourth, it is apparent from a large sample of survey data that even on vehicles identified with compromised sealing in either the boot or the crimped surface that any degradation of the ball to socket interface occurs over an extended period of time. This appears to be true of both NCM and TRW designed upper ball joint assemblies. On 2000 model year vehicles equipped with NCM upper ball joints ranging in mileage from 29,000 to 120,000 (average 86,900 miles), only one of fourteen surveyed vehicles had a measured end play beyond the suggested 0.060" replacement specification at 0.073". Since warranty return parts measured to have end play as high as 0.300" have been identified without experiencing separation from the socket, it can be deduced that degradation in end play due to a compromised seal, evacuation of grease, bearing wear and ultimately grinding corrosion takes a significant amount of time and mileage. As supported with the complaint data, this period of time and/or mileage is more than sufficient for customers to recognize the issue.

Fifth, there were dramatic spikes in ball joint complaints among vehicle owners immediately following national media stories related to the investigation that do not accurately reflect actual ball joint issues in the subject vehicles. As evidence, many of the complaints following the media coverage were driven by a liberal application of the term "ball joint" as a causal description for many vehicle related complaints, including issues not even relating to the front suspension.

Lastly, there were no injuries caused by a ball joint separation in the subject population of vehicles that has, in some instances, been on the road for over seven years. In fact,

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the overwhelming majority (98.3%) of customer complaints received regarding these ball joints did not communicate a safety concern. The issues raised by customers primarily related to the cost of ball joint service.

In summary, for the reasons stated above and based on the data contained in this and prior submissions, it is DCC's assessment that there is not a safety-related defect in the ball joints of the subject vehicles or risk to motor vehicle safety.