

# *Ford Motor Company*

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Automotive Safety Office  
Environmental & Safety Engineering

December 11, 2003

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

Dear Ms. DeMeter:

Subject: EA03-014:NVS-212mj

The Ford Motor Company (Ford) response to the agency's October 22, 2003 letter requesting certain information regarding the side air bag system in 2001 through early 2003 model year Lincoln Town Car vehicles is attached.

Ford designed the side air bag restraint systems in 2001-2003 Town Car vehicles to provide head, neck and thorax protection in a wide variety of impact events while minimizing the potential for injury from a deploying air bag, even with occupants out-of-position. This combination head and thorax side air bag restraint system is state-of-the-art and balances excellent out-of-position occupant performance with the critical time to fire requirements necessary to provide a high level of occupant protection. Extensive testing has demonstrated that the air bag system in the subject vehicles meets all of Ford's out-of-position performance objectives to guard against the risks of serious injury to occupants who may be very close to the side air bag when it deploys, and the low number of reports alleging any injuries and the minor nature of those that are alleged (all of the alleged injuries can be categorized as very minor- bruising, ringing in the ears, or soreness) confirms this excellent out-of-position performance in the real world.

Further, Ford's extensive abuse tests (approximately 200 for the 2003 model year) demonstrate that the side air bags in the subject vehicles are designed not to deploy unless significant impact has occurred. The design intent is verified based upon a review of the information and data submitted in this and previous responses on this subject, which demonstrates that allegations of unwanted deployments in these vehicles are typically related to severe underbody impacts. These impacts are indistinguishable from the earliest onset of a serious side crash within the extremely short period of time the sensor, in a system that provides head and thorax protection, has to make a decision. Of the combined responsive reports (for both the June 13, 2003 response to PE03-011 and this inquiry) that indicate a potential cause for the alleged deployment in 2001-2003 model year Town Cars, approximately 73% appear to be the result of the vehicle striking an object in the road (specific examples include tires and pieces of cement) or available information provides

indication of undercarriage or other damage, some of which was severe (specific examples include bent body mounts, bent wheels, dents in the transmission oil pan, and pieces of gravel trapped in the underbody components). Because side air bag systems are a developing technology, Ford has continued to revise its design, performance requirements, and testing to further refine sensor capabilities to avoid some of these deployments while enhancing occupant protection. Ford will continue to make improvements as side air bag technology evolves.

It is noteworthy that customer contacts as recorded in the CQIS database show a 93% reduction in the allegations for 2001, 2002, 2003 model year vehicles from the 1999 and 2000 model year for customer perceived non-deployments of a side air bag. Of the allegations of side air bag non-deployment, 73% also allege an injury, many of which are described as serious (e.g., a fractured pelvis), as a result of a side impact accident in which the side air bag did not deploy. There is only one allegation of injury for non-deployment during the 2001 through early 2003 model years, and the injury described in that incident is bruising. Clearly, the trade-offs made in the performance of the intricate logic systems involved in controlling the supplemental restraint components must yield to increased occupant protection in the event of an impact, as they have.

Based on the excellent head and thorax protection afforded occupants of these vehicles in side impacts, the minimal risk of minor injury resulting from a bag deployment in the subject vehicles, the extremely low number of reports alleging any injury and the minor nature of those that are alleged, and because unwanted deployments are typically the result of severe undercarriage impacts, we do not believe the reported occurrences demonstrate a defect or the existence of an unreasonable risk to safety in the side air bag systems of 2001-2003 Town Car vehicles.

If you have any questions, please call my office.

Sincerely,



James P. Vondra

Attachment

FORD MOTOR COMPANY (FORD) RESPONSE TO EA03-014

Ford's response to this Engineering Analysis information request was prepared pursuant to a diligent search for the information requested. While we have employed our best efforts to provide responsive information, the breadth of the agency's request and the requirement that information be provided on an expedited basis make this a difficult task. We nevertheless have made every effort to provide thorough and accurate information, and we would be pleased to meet with agency personnel to discuss any aspect of this Engineering Analysis.

The scope of Ford's investigation conducted to locate responsive information focused on Ford employees most likely to be knowledgeable about the subject matter of this inquiry and on review of Ford files in which responsive information ordinarily would be expected to be found and to which Ford ordinarily would refer, as more fully described in this response. Ford notes that although electronic information was included within the scope of its search, Ford has not attempted to retrieve from computer storage electronic files that were overwritten or deleted. As the agency is aware, such files generally are unavailable to the computer user even if they still exist and are retrievable through expert means. To the extent that the agency's definition of Ford includes suppliers, contractors and affiliated enterprises for which Ford does not exercise day-to-day operational control, we note that information belonging to such entities ordinarily is not in Ford's possession, custody or control. Ford has construed this request as pertaining to vehicles manufactured for sale in the United States, its protectorates and territories.

Answers to your specific questions are set forth below. Because this inquiry is an update from PE03-011, Ford is providing reports and information in this response that were received subsequent to the ending date for retrieval of such reports and information provided in our June 13, 2003 response to PE03-011. As requested, after each numeric designation, we have set forth verbatim the request for information, followed by our response. Unless otherwise stated, Ford has undertaken to provide responsive documents dated up to and including October 22, 2003, the date of your inquiry. Ford has searched business units and/or affiliates within the following offices for responsive documents: Environmental and Safety Engineering, Ford Customer Service Division (FCSD), Quality, Research, Global Core Engineering, Office of the General Counsel, Vehicle Operations, and Ford Car Product Development.

Request 1

State, by model and model year, the number of subject vehicles Ford has manufactured for sale or lease in the United States. Separately, for each subject vehicle manufactured to date by Ford, 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 response in a table in Microsoft Access 2000, or a compatible format, entitled "PRODUCTION DATA."

### Answer

The information requested herein was provided in Appendix A of Ford's June 13, 2003 response to PE03-011. Because the subject vehicles for the 2003 model year in this inquiry are limited to those vehicles produced prior to December, 2002, the 2003 model year volume for this request is reduced to 39,030 units from 49,916 units reported in PE03-011.

### Request 2

State the number of each of the following received by Ford, or of which Ford is otherwise aware, which relate to, or may relate to, the alleged defect in the subject vehicles:

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

For subparts "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 (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 "f," provide a summary description of the alleged problem and causal and contributing factors and Ford'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.

### Answer

For the purpose of identifying reports of incidents potentially involving the alleged defect and any related documents, Ford has gathered "owner reports" and "field reports" maintained by FCSD, Intensified Customer Concern Definition (ICCD) data maintained by Ford's Quality Office, fleet reports maintained in a Fleet Test Database, and claim and lawsuit information maintained by Ford's Office of the General Counsel (OGC).

Descriptions of the FCSD owner and field report systems, the ICCD and the Fleet Test Database systems, and the criteria used to search each of these, are provided electronically in Appendix A (filename: 2003-12-12 Appendix A - Searches) on the enclosed CD.

The following categorizations were used in the review of reports located in each of these searches:

- Category A:** Allegations of any inadvertent, non-crash or low speed crash deployment of a side air bag, or any other unwanted or inappropriate side air bag deployment (the alleged defect).
- Category B:** Allegations that are ambiguous as to whether they pertain to the alleged defect. \*

\*We are providing electronic copies of these reports as "non-specific allegations" for your review because of the broad scope of the request. Based on our engineering judgment, the information in these reports is insufficient to support a determination that they pertain to the alleged defect.

We note that in a preliminary review of owner and field reports, some reports were initially determined to be ambiguous (Category B), because it could not be determined from the text of the report if the allegation related to a side air bag or to a frontal air bag. A subsequent review of warranty repair records, where available for the corresponding vehicle, was conducted to determine which parts had been affected and the categorization was revised as appropriate. We have not re-categorized as ambiguous or non-responsive those reports that on their face allege unwanted deployments, even if other documents indicate they are not.

**Owner Reports:** The search and review of the Ford Master Owner Relations Systems (MORS) database records, as described in Appendix A, identified 25 non-duplicative reports that appear to relate to the alleged defect. Copies of these owner reports are provided in the MORS III portion of the electronic database contained in Appendix B (filename: 2003-12-12 Appendix B - Town Car Request Number Three Data) on the enclosed CD. These reports are identified by an "A" in the "Category" field. Where we were able to identify that responsive (i.e., not ambiguous) duplicate owner reports for an alleged incident were received, each of these duplicate reports was marked accordingly, and the group counted as one report. In other cases, certain vehicles may have experienced more than one incident and may have more than one report associated with their VINs; any such reports have been counted separately.

**Legal Contacts:** Ford is providing in Appendix A a description of Ford's Litigation Prevention activity and contacts that may be categorized by that activity as "Legal Contacts." To the extent that responsive (i.e., not ambiguous) owner reports reflect that they are Legal Contacts, Ford has gathered the related files from the Litigation Prevention section. Based on this search, files corresponding to 11 of the category "A" owner reports were located; non-privileged documents concerning these reports are provided in Appendix C.

A privilege log identifying the redacted responsive documents as well as those that are not being provided in their entirety on the grounds that they are protected by attorney work product or attorney-client privilege is also provided in Appendix C.

**ICCD Information:** A search of the ICCD database as described in Appendix A located no reports that relate to the alleged defect.

**Fleet Reports:** In addition to fleet reports that may be contained in the owner reports or field reports identified in this response, Ford conducted a search of its Fleet Test Database as

described in Appendix B for reports that may relate to the alleged defect in the subject vehicles. This search did not identify any such fleet reports.

**Field Reports:** The search and review of the Ford Common Quality Indicator System (CQIS) database records, as described in Appendix A, identified 27 non-duplicative reports that appear to relate to the alleged defect. Copies of these field reports are provided in the CQIS portion of the electronic database contained in Appendix B on the enclosed CD. These reports are identified by an "A" in the "Category" field. Where we were able to identify that responsive (i.e., not ambiguous) duplicate owner reports for an alleged incident were received, each of these duplicate reports was marked accordingly, and the group counted as one report. In other cases, certain vehicles may have experienced more than one incident and may have more than one report associated with their VIN; any such reports have been counted separately. In addition, seven field reports that appear to be duplicative of reports identified in other report sources are provided in Appendix B; the count of these reports is not reflected in the count above.

Ford is also including field reports that are ambiguous as to whether they meet the alleged defect criteria. We are providing electronic copies of these reports in Appendix B as "non-specific allegations" for your review because of the broad scope of the request. Based on our engineering judgment, the information in these reports is insufficient to support a determination that they pertain to the alleged defect. These reports are identified by a "B" in the Category field.

**Unified Database:** The Unified Database (UDB) was created to facilitate parts availability by tracking part sales and is not intended as a problem reporting system. However, because a small percentage of the records may contain verbatim comments that could potentially relate to the agency's inquiry, we are including these in response to Request 2.

A search of the UDB, as described in Appendix A, identified no non-duplicative incidents that appear to relate to the alleged defect. Nine UDB reports that appear to be duplicative of reports identified in other report sources are provided in Appendix B on the enclosed CD; the count of these reports is not reflected in the count above.

**VOQ Data:** This information request had an attachment that included two Vehicle Owner's Questionnaires (VOQs). Ford made inquiries of its MORS database for customer contacts, its CQIS database for field reports, and its Analytical Warranty System (AWS) database for warranty claims regarding the vehicles identified on these VOQs. One VOQ identified by the agency, reference number 10011875, contains insufficient information to reliably identify the alleged event in Ford's database (i.e., there is no VIN, mileage, date of alleged event, name, location, etc.). In addition, this particular report contains a "Vehicle Component Code" of "141000 Air Bags: Frontal" which is not related to the alleged defect. The other VOQ provided (VIN 1LNHM82WX1Y607948) was previously identified in the June 13, 2003 response to PE03-011. The MORS report for this alleged incident was not identified by a "Y" in the "VOQ Dup" field, because the VOQ was not provided in the attachment to PE03-011.

**Reports of Crash/Injury/Fatality:** For purposes of identifying alleged accidents or injuries potentially related to the alleged defect, Ford has reviewed responsive (i.e., not ambiguous) owner and field reports, UDB reports, lawsuits and claims, and warranty claims. Based on a reasonable and diligent search, Ford located one owner (MORS) report that may contain allegations of a minor accident related to the alleged defect. In that incident [VIN 1LNHM82W83Y640661], the driver alleges to have "hit a meridian [sic]" as a result of the air bag deploying. It is noteworthy that in the report the owner's insurance company is said to

feel that the operator may have run over something of enough significance to deploy the air bag, and settled the claim, apparently without subrogation.

Based on a reasonable and diligent search, Ford located nine reports that allege minor injuries such as bruising, ringing of the ears, and general soreness. There were no reports that allege anything more than minor injuries, and none that allege a fatality.

**Claims, Lawsuits, and Arbitrations:** For purposes of identifying incidents potentially related to the alleged defect, Ford has gathered claim and lawsuit information maintained by Ford's OGC. Ford's OGC is responsible for handling product liability lawsuits, claims, and consumer breach of warranty lawsuits and arbitrations against the Company.

Based on a reasonable and diligent search, Ford located no non-duplicative lawsuits, claims, consumer breach of warranty lawsuits, nor arbitrations that appear to relate to the alleged defect in the subject vehicles. Ford did locate two claims that appear to be duplicative of owner or field reports included in Appendix B.

In addition to a log of these two claims, Ford is providing copies of all non-privileged documents associated with these claims in hardcopy form in Appendix D. With respect to the claims, Ford has not undertaken to contact outside law firms to obtain additional documentation.

### Request 3

Separately, for each item or report (consumer complaint, field report, claim, notice, or matter) within the scope of your response to Request No. 2, state the following information:

- a. Ford'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 this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER THREE DATA."

### Answer

The requested information, to the extent that it is available, is provided in Appendices B, C, and D as discussed in response to Request 2.

Request 4

Produce copies of all documents related to each item within the scope of Request No. 2. The term "all documents" includes, but is not limited to, all photographic evidence accompanying each of the reports provided, including but not limited to images of road surface conditions (e.g., potholes, curbs, dips, etc.) and vehicle damage. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Ford used for organizing the documents. Also, clearly identify Ford's file number, vehicle owner or fleet name, and VIN for each item responsive to this request.

Answer

The requested information, to the extent that it is available, is provided in Appendices B, C, D, E, and H as discussed in response to Request 2.

Request 5

State, by model and model year, a total count for all of the following categories of claims, collectively, that have been paid by Ford 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. Ford's claim number;
- b. Vehicle owner or fleet name (and fleet contact person) and telephone number;
- c. VIN;
- d. Repair date;
- e. Vehicle mileage at time of repair;
- f. Repairing dealer's or facility's name, telephone number, city and state or ZIP code;
- g. Labor operation number;
- h. Problem code;
- i. Replacement part number(s) and description(s);
- j. Concern stated by customer; and
- k. Comment, if any, by dealer/technician relating to claim and/or repair.

Provide this information in Microsoft Access 2000, or a compatible format, entitled "WARRANTY DATA."

Answer

In responding to this information request, Ford electronically searched its AWS for all claims meeting the criteria described in Appendix A. The resulting claims were then reviewed individually for allegations that may relate to the alleged defect. This search and review of the Ford AWS database records identified 12 non-duplicative warranty reports that appear to relate to the alleged defect in the subject vehicles. Ford's policy (as set forth in the attached ISM, Appendix F, and as discussed within certain communications documents provided in the June 13, 2003 response to PE03-011 and appendices B, E, and I of this response) is to repair vehicles under warranty where the vehicle is within the warranty period despite the absence of evidence of any underbody or impact damage. For those vehicles falling outside the warranty



period, Ford is aware that its dealerships may, on a case by case basis, choose to make a business decision to financially assist the owners with repairs when no indication of impact or damage is found. Dealerships provide this assistance at their discretion.

Electronic copies of these claims are provided in the AWS portion of the electronic database contained in Appendix B and are identified by an "A" in the "Category" field. When we were able to identify that duplicate claims for an alleged incident were received, each of these duplicate claims was marked accordingly and the group counted as one report. In other cases, certain vehicles may have experienced more than one incident and may have more than one claim associated with their VINs. These claims have been counted separately. In addition, ten warranty claims that appear to be duplicative of reports identified in other report sources are provided in Appendix B; the count of these reports is not reflected in the count above.

#### Request 6

Describe in detail the search criteria used by Ford to identify the claims identified in response to Request No. 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by model and model year, the terms of the new vehicle warranty coverage offered by Ford 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 Ford 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.

#### Answer

The search criteria used by Ford to identify responsive claims is described in the AWS section of Appendix A.

Warranty coverage and options were previously described in Ford's June 13, 2003 response to PE03-011.

#### Request 7

Produce copies of all service, warranty, and other documents that relate to, or may relate to, the alleged defect in the subject vehicles, that Ford has issued to any dealers, regional or zone offices, field offices, fleet purchasers, or other entities. This includes, but is not limited to, bulletins, advisories, informational documents, training documents, or other documents or communications, with the exception of standard shop manuals. Also, include the latest draft copy of any such communication that Ford is planning to issue within the next 120 days.

#### Answer

For purposes of identifying communications to dealers, zone offices, or field offices pertaining, at least in part, to the alleged defect in the subject vehicles, Ford has reviewed the following FCSD databases and files: The On-Line Automotive Service Information System (OASIS) containing Technical Service Bulletins (TSBs) and Special Service Messages (SSMs); Internal Service Messages (ISMs) contained in the CQIS; and Field Review Committee (FRC) files. We assume this request does not seek information related to electronic communications between

Ford and its dealers regarding the order, delivery, or payment for replacement parts, so we have not included these kinds of information in our response.

A description of the search criteria used is provided in Appendix A. One ISM was identified that may relate to the alleged defect and is included in Appendix F. This ISM was identified during the document review for PE03-011, however, due its subject it was felt that the ISM was not responsive to that inquiry. Upon additional review, in an abundance of caution, the ISM is being provided as potentially responsive to this request.

#### Request 8

Furnish copies of all communications between Ford and each supplier of the subject components for subject vehicles pertaining to the design, manufacture, performance, durability, quality, testing, or modification of the subject components that relate to, or may relate to, the alleged defect. If any communications on this subject were oral, provide a written transcript or summary of each such communication, and include a statement that identifies all participants and the date of the communication.

#### Answer

This requested information is being submitted with a request for confidentiality to the agency's Office of the Chief Counsel pursuant to 49 CFR, Part 512 under separate cover as Appendix I.

#### Request 9

Furnish the deceleration vs. time, velocity vs. time, and other requirements that relate to any and all "must fire" deployment thresholds for the side air bags in MY 1999 through 2003 Town Cars. In addition, provide a full and comprehensive technical description of each deployment threshold requirement and the differences in the requirements among all of the Town Car vehicles.

#### Answer

Ford understands this request to mean that the agency is seeking data collected during Ford's crash testing of the subject vehicles. Deceleration vs. time data is contained in graphical form in the crash test reports provided in response to Request 11. Velocity vs. time data (the mathematical integral of the deceleration data) is used on a very limited basis and typically only on a specific data channel, when an engineer desires to gain a better understanding of the event. Within Ford, velocity vs. time data is typically transient data and is not stored as part of the permanent event record. To the extent that such data exists, it would be included in the crash test reports provided in response to Request 11.

It should be noted that Ford sets "must deploy" targets based upon occupant protection objectives that are similar throughout the industry. A speed is determined to meet the objective, and this target-related speed is used in crash testing to capture acceleration signals that are used in sensor modeling and system calibration development. The acceleration/deceleration data from the crash test is used to develop sensor and system strategy to meet an occupant protection objective. The deceleration vs. time data provided in response to this question is not considered by Ford to be "threshold profiles," but rather the vehicle/sensor system responses to crash events. "Must deploy" thresholds, for side pole impacts, for the 1999-2003 model year Lincoln Town Car side air bags are:

<u>Model Year</u>	<u>Speed</u>
1999 - 2002	15 mph
2003 - Present	13 mph

#### Request 10

Furnish a summary of all "rough road and abuse tests" (non-crash non-deployment tests) conducted by, or for, Ford, from vehicle development to date, for the side air bags in MY 1999 through 2003 Town Cars. For each such test, include the title and description of the test, test number, test date, name of entity that conducted the test, vehicle model, model year, manufacture date and VIN, vehicle speed, location of vehicle impact (if any), description of road surface conditions including dimensions (e.g., potholes, curb, etc.) or size/weight of object/debris (e.g., gravel road, hammer hit, etc.), test requirements, test results, video tape of the test, and brief summary of findings and/or conclusions from the test.

#### Answer

In addition to the information provided in Ford's June 13, 2003 response to PE03-011, to the extent that it exists and is in Ford's possession, the information requested herein has been provided in response to Requests 6 and 13 of this inquiry. Suppliers may have additional information in their possession. Unlike regulatory and compliance verification type crash testing, suppliers typically perform abuse type testing during the product development phase and as design verification. Accordingly, Ford typically receives only algorithm outputs indicating if a deployment decision was reached or not reached during the test. Test results are utilized to further refine the calibration prior to release for production. Due to the nature of this testing Ford does not have in its possession the detailed information related to the very large number of these individual tests.

#### Request 11

Furnish a summary of all "must fire" side pole crash tests conducted by, or for, Ford, from vehicle development to date, for MY 1999 through 2003 Town Cars. For each such test, include the title and description of the test, test number, test date, name of entity that conducted the test, vehicle model, model year, manufacture date and VIN, pole type and diameter, impact speed and location, crash dummy type, test requirements, test results (e.g., dummy injury numbers), video tape of the test, and brief summary of findings and/or conclusions from the test.

#### Answer

The requested information, to the extent that it is available, is provided in Appendix G. Ford is interpreting this request broadly, and because the Ford Crown Victoria and the Mercury Grand Marquis vehicles share similar side air bag system sensing components with the Lincoln Town Car, Ford is also including any crash tests related to those vehicles. That data may have also been used in developing the Town Car side air bag system calibration. Side air bag restraints were first introduced in the Crown Victoria and Grand Marquis during the 2003 model year.

#### Request 12

Furnish a full and comprehensive technical description of the crash and air bag data recording capabilities of the side air bag system in the subject vehicles.

Answer

A full and comprehensive technical description of the entire supplemental restraint system was provided in Ford's June 13, 2003 response to PE03-011. We note that the side air bag system does not provide for any event data recording other than system fault codes and deployment commands. The system will only record a code that indicates sufficient lateral deceleration was measured by the side crash sensor(s) for the restraint control module to issue a deploy command. No record of the event with respect to actual deceleration magnitudes is provided.

Request 13

Describe all assessments, analyses, tests, 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, Ford. 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, whether final, tentative, or postulated.

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. If an action is not complete, provide a detailed schedule for the work to be done, tentative findings and/or conclusions, and provide an update within 10 days of completion of the action.

Answer

The requested information, to the extent that it is available, is provided in Appendices E and I.

Request 14

Describe all modifications or changes made by, or on behalf of, Ford in the design, material composition, manufacture, quality control, supply, or installation of the subject components, from the start of production to date, which relate to, or may relate to, the alleged defect in the subject vehicles. For each such modification or change, provide the following information:

- a. The date or approximate date on which the modification or change was incorporated into vehicle production;
- b. A detailed description of the modification or change;
- c. The reason(s) for the modification or change;
- d. The part number(s) (service and engineering) of the original component;
- e. The part number(s) (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.

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 Ford is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

Answer

The requested modification and change information was previously provided in Ford's June 13, 2003 response to PE03-011. There have been no changes or modifications made since that time. Ford has no information regarding components on non-Ford vehicles.

At a system level, all Ford vehicles equipped with side air bags share the same design as the subject vehicle, because they all have a central restraints control module (RCM) and two accelerometer-based side crash sensors. Ford is construing this question to mean vehicles sharing an RCM and the two side crash sensors supplied by the same supplier, even though they contain calibrations different from the subject vehicles. In these respects, the 2000-2003 model year Windstar, and the 2003 model year Crown Victoria and Mercury Grand Marquis share the same design of the side air bag sensing system as the subject vehicles. However, although vehicles may share these three components, it must be noted that that their performance may be different for many reasons, including but not limited to:

- Sensor mounting locations
- Mounting bracketry
- Vehicle structure and energy transfer functions
- Platform specific "time to deploy" requirements
- Platform specific crash modes
- Platform specific crash discrimination software calibration
- Platform specific hardware interfaces (occupant classification system (OCS) strategy, etc.)
- Platform specific deployment logic strategy

Request 15

For each design change to the crash sensor calibration, software, and/or mounting identified in Appendix N of Ford's Preliminary Evaluation Information Request (PEIR) response of June 13, 2003, provide all relevant documents. Also, explain in detail the reason and/or provide the background for the sensor mounting change in December 2002. Ford's response must include, but not be limited to, all deployment and non-deployment criteria for both the original and the revised crash sensor.

Answer

To the extent that it exists, information related to the changes listed in Appendix N of Ford's June 13, 2003 response to PE03-011 is contained in Appendices C through M of that response. Any additional documentation discovered during this inquiry is provided in response to Requests 8 and 13.

Relocation of the side crash sensor (SCS) from the floor to the B-pillar was made as the result of a continued evolution of side crash sensing technology. The relocation was incorporated to provide improved immunity to under body impact events, as well as improved performance in Insurance Institute for Highway Safety (IIHS) side impact type tests. By moving the SCS to the B-pillar, the system is capable of providing a faster response time to a taller vehicle side impact. There were no functional changes to the crash sensor itself other than sensor axis rotation within the housing due to reorientation from the floor to the B-pillar. The deployment/non-deployment criteria did not change. However, the acceleration signals measured by the sensor for various events significantly changed, requiring extensive crash test development of the calibration for the sensing system.

Request 16

Furnish the exact date of the December 2002 design change in the subject components (i.e., relocation of side crash sensor from floor pan to B-pillar) made by Ford to the subject vehicles during MY 2003 Town Car production.

Answer

Our records indicate that the introduction date was December 2, 2002.

Request 17

Other than the modifications described in Ford's response to Request No. 10 of the PEIR and Ford's response to Request No. 14 of this letter, state whether any other Ford vehicles share the design of the side air bag crash sensing system used in the subject vehicles. If so, provide a list of the vehicles by make, model, and model year.

Answer

Ford is not aware of any additional information that was not provided in response to Request 14

Request 18

State whether Ford ever considered substituting an alternative design(s) or component(s) for the subject components in the subject vehicles that relate, or may relate, in any way to this investigation. If so, identify and describe each such alternative design or component, and state:

- a. The date it was first proposed;
- b. The disposition of that proposal (i.e., approved, disapproved, or still being evaluated), and
- c. The reasons for that action.

Answer

In January 2002, Ford considered introducing an underbody shield to protect the area directly under the side crash sensors from direct impact. Extensive testing and evaluation of materials, designs and mounting strategy led to the conclusion that the shield was only marginally effective at reducing the effects of underbody impacts for a limited number of cycles, affected the structure sufficiently to change the acceleration signals measured by the sensors during impact events so as to require a complete recalibration of the crash sensing system, and introduced

several new durability and performance issues for the vehicle. Because of these limitations and Ford's belief that the added risk outweighed the minor benefit, Ford elected not to incorporate an underbody shield. Copies of the extensive communications within Ford and between Ford and its suppliers were included in Ford's June 13, 2003 response to PE03-011.

### Request 19

Furnish Ford's assessment of the alleged defect in the subject vehicles, including:

- g. The causal or contributory factor(s);
- h. The failure mechanism(s);
- i. The failure mode(s); and
- j. The risk to motor vehicle safety that it poses.

### Answer

Of the combined responsive reports (for both the June 13, 2003 response to PE03-011 and this inquiry) that indicate a potential cause for the alleged deployment in 2001-2003 model year Lincoln Town Cars, approximately 73% appear to be the result of the vehicle striking an object in the road (specific examples include tires and pieces of cement) or available information provides indication of undercarriage or other damage, some of which was severe (specific examples include bent body mounts, bent wheels, dents in the transmission oil pan, and pieces of gravel trapped in the underbody components). Evidence for one event (VIN 1LNHM81W73Y605871) can be viewed in Appendix H, which contains photographs taken by a Ford Field Service Engineer of the gravel found trapped between the frame, sub-frame, suspension, and exhaust components of a Lincoln Town Car. During another incident (VIN 1LNHM81WX1Y727847) the vehicle hit a tire carcass with sufficient force to deploy the belt pretensioners, in addition to the side air bags. In an additional example (VIN 1LNHM82WX1Y712392), the owner provides in claim documents that the vehicle was traveling on a gravel road behind a road grader that was establishing a "windrow" of gravel. The operator crossed over the pile of gravel being established by the road grader just prior to the side air bag deployment. Such events are beyond the scope of the extensive non-deployment abuse testing conducted during development of the side air bag system and beyond those that are typically encountered under normal road and driving conditions, and cannot, in any way, be considered an indication of a defect or failure.

In the remaining reports, no explanation for the alleged deployment is provided. Omission in a report of indication of damage or impact does not mean there was no impact, as evidenced by some incidents with reports across data sources (i.e., an owner report may not mention an impact, but a warranty claim may provide information that an impact occurred). Ford has not undertaken to investigate such reports and, therefore, is uncertain if evidence of a preceding abuse event exists in all of these incidents. Some of these reports contain information that raises concern regarding the validity of the allegation. For instance, the CQIS report related to VIN 1LNHM82W82Y668835 alleges that the side air bag deployed with the key in the "off" position when closing the door. Because the restraint system is not supplied electrical power with the ignition in the "off" position, this event is highly unlikely. The CQIS report for VIN 1LNHM82W73Y700137 indicates that the RCM for this rental vehicle had been replaced prior to the vehicle being delivered to the dealership for the side air bag repair. While no damage to the vehicle was identified at this point, there was no explanation provided as to why the RCM had been replaced, nor is there any record of repairs being performed on this vehicle in any of the databases searched.

Consistent with NHTSA's prior analyses of air bag performance and applicable Safety Act precedents, there is no basis to conclude that a safety defect exists in the Town Car side air bag system.

We understand that one of the agency's primary concerns in this investigation is the number of perceived unwanted side air bag deployments as compared with other models equipped with side air bag systems. While we understand that this apparent relative difference in numbers may have been the basis for opening the investigation of this issue, we respectfully submit that prior agency analyses of air bag system performance and applicable Safety Act precedents dictate that this apparent difference in numbers is not a sufficient basis upon which to determine that a safety defect exists. Further, when the numbers of these deployments that may have been caused by an impact or severe abuse is considered, the number of events that may be of concern is significantly reduced.

For example, in the agency's investigation into a defect petition alleging that passenger side frontal air bags were causing deaths in 1995-1999 Hyundai Accent vehicles (EA00-001), the agency found that while the rate of deaths attributed to front passenger air bag deployments was two to three times higher than vehicles with relatively high passenger air bag fatality rates, "the differences alone do not demonstrate the existence of a safety defect in the Accent vehicles." NHTSA conducted a thorough analysis of the entire air bag system design and performance characteristics to evaluate whether a defect existed. Some of those characteristics included:

- Air bag inflator tank testing
- Various passenger air bag design and performance factors
- Child dummy/front seat-to-passenger measurements
- Out-of-position tests
- The facts related to each reported incident
- Various factors in the use of the vehicle that contribute to air bag fatalities
- How the design of the vehicle may contribute to higher air bag deployment rates

When the agency applies the same thorough system-based analysis to the Town Car side air bag system, the data will not support a defect finding, particularly in view of the fact that any injuries alleged are minor in nature, unlike the deaths alleged in the referenced Hyundai investigation.

Following the agency's precedent of conducting thorough comparisons of competitive air bag designs, the agency should find that Ford's design decision to balance a relatively benign air bag with the incremental occupant protection a head and thorax bag provides, but which requires the deployment decision to be made within a few milliseconds, was appropriate and does not warrant a defect finding.

#### **Impact / Abuse Events Discrimination**

The side air bag system was first introduced on the Lincoln Town Car in the 1999 model year. This system balances incremental head and thorax side impact protection with a side air bag that was specifically designed to be relatively benign in order to reduce the risk of deployment-induced injuries, including those to out-of-position occupants. The system provides substantially more protection in certain side impacts than vehicles without side air bags, and, significantly for this analysis, more protection than vehicles equipped with thorax-only side air bags. In a 1999 study conducted by the Insurance Institute for Highway Safety, side impact



crash tests were conducted on 1998 and 1999 model year Lincoln Town Cars, without and with side air bags, respectively. The results of the IIHS test indicated that the combination head and thorax side air bag installed on the 1999 Lincoln Town Car reduced the dummy HIC value by 93% from that of the 1998 Lincoln Town Car without side air bags.

Because of the relative closeness of the occupant's body to the side of a vehicle, the side air bag sensor system must determine whether to deploy the air bag within just a few milliseconds of the start of the impact event in order to provide this enhanced level of head and thorax protection in some severe side impacts. This is a significantly shorter period of time than is required for side air bag systems that offer thorax-only protection. Because of this extremely short period of time the system has to discriminate a side impact from other types of events, certain abuse events may cause the system to predict that a side impact has occurred causing the air bags to deploy. As illustrated by the list of deployment and non-deployment test conditions provided in response to information Request B in Ford's June 13, 2003 response to PE03-011, Ford engaged in thorough, state-of-the-art testing in order to balance the resistance to such abuse events in which side air bag protection is not required with the responsiveness necessary to provide enhanced occupant protection in side impacts for which side air bag protection is warranted. This testing involved numerous abuse events, including body twists, cobblestones, curb impacts and gravel roads at various speeds to validate non-deployments under such conditions. Allegations of unwanted deployments in the subject vehicles are not a matter of the calibration of the crash sensor being so sensitive as to cause deployments to occur whenever the undercarriage of the vehicle contacts an object in the road. Indeed, as demonstrated by Ford in its abuse testing, the crash sensor meets the no-fire requirements of Ford's design in abuse test conditions.

For the 2001 model year, the Lincoln Town Car side impact sensing system was sourced to a different supplier. Because of differences in the system architecture, evolving performance expectations, and the algorithms used by the two suppliers in the design of their sensing systems, the 1999-2000 model year system may respond differently to a given impact or abuse event than the 2001 model year and later systems. The algorithm in the 2001 model year system was designed to provide improved levels of occupant protection in moderate speed (approximately 15 mph) pole side impacts. This further enhancement in occupant protection was balanced against the potential for increased sensitivity to certain types of undercarriage impacts. Because of the low risk of injury posed by Ford's air bag designs and the need to deploy the bag quickly to provide enhanced levels of head protection across a wide variety of impacts including the moderate speed pole crash, the design choice was to deploy the air bag for these types of crash events and provide enhanced protection for the occupant, particularly in view of the relatively benign bag design and excellent out-of-position occupant protection performance, minimizing the risk of injury. This proper performance, which contributes to improved occupant protection across a wide variety of side collisions, is not a "failure" or a "defect." Rather, systems that perform in this manner function exactly as designed. Further, it is noted that customer contacts as recorded in the CQIS database show a 93% reduction in the allegations for the 2001, 2002, and 2003 model year vehicles from the 1999 and 2000 model years for customer perceived non-deployment of a side air bag. Of the allegations of side air bag non-deployment, 73% also allege an injury; many of which are described as serious (e.g., a fractured pelvis), as a result of a side impact accident in which the side air bag did not deploy. There is only one allegation of injury for non-deployment during the 2001 through early 2003 model years, and the injury described in that incident is bruising. Clearly, the trade-offs made in the performance of the intricate logic systems involved in controlling the supplemental restraint components must yield to increased occupant protection in the event of an impact, as they have.

For the 2002 model year, an occupant classification system was introduced into the front passenger seat of the Lincoln Town Car. The occupant classification system employs seat load sensors that provide signals that vary according to the force and location of a load resting in the passenger seat. These signals are used by the RCM to predict whether the seat is occupied, and if so, to predict the size of the occupant. The RCM may then suppress deployment of the passenger side frontal and side air bags depending on the impact severity prediction and deployment status. Passenger side frontal and side air bags are fully functional when the sensor identifies that a large child or adult occupies the passenger seat. As a result of the introduction of the OCS, the time-adjusted rate of alleged inadvertent side air bag deployments fell by approximately 45% in the 2002 model year Lincoln Town Car. This decrease may be attributable to the fact that the deployment of the passenger side air bag will be suppressed, when the OCS identifies that the passenger seat is not occupied, or is occupied by a small child.

In 2003 model year Lincoln Town Car vehicles produced on or after December 2, 2002, the side crash sensors were moved from the floor of the vehicle to near the base of the B-pillar further improving the side air bag system's ability to discriminate between those events that warrant supplemental restraints and those that do not. This has had the effect of reducing the time-adjusted rate of occurrences of alleged incidents for the 2003 model year Lincoln Town Car. Because side air bag systems remain a developing technology, Ford continues to evaluate and balance system discriminating performance and occupant protection across a wide range of potential side impact modes to further enhance system performance. However, future enhancements do not indicate that the current, or prior technology contains a "defect."

#### **Alleged Injuries and Accidents**

As noted above, Ford designed the side air bag restraint system in the 1999-2003 model year Lincoln Town Car to provide head, neck and thorax protection in a variety of impact events. The combination head and thorax side air bag restraint system provided in the subject vehicles is a state-of-the-art system designed to offer increased occupant head protection in significant side impact events while reducing the risk of injury to out-of-position occupants. To achieve this design intent, Ford continues to balance the excellent out-of-position occupant performance of the air bag with the critical time to fire requirements necessary to provide this high level of occupant protection. Testing demonstrates that the air bag system met all of Ford's out-of-position performance objectives to guard against the risks of serious injury to occupants who may be very close to the system when it deploys. The low number of reports alleging any injuries and the minor nature of those that are alleged (nearly all indicate only bruising or soreness) confirms this excellent out-of-position performance in the real world.

The side air bag system contained in the 2001-2003 model year Lincoln Town Car not only meets the design intent of Ford but also the directive of the then NHTSA Administrator, Dr. Ricardo Martinez. In his December 1998 correspondence to Ford and other automobile manufacturers, Dr. Martinez directed the industry to "thoroughly test these devices with both child and adult anthropomorphic dummies and other surrogates in a wide variety of positions to guard against the risk of serious injury to an occupant who may be very close to these systems when they deploy."

As to public policy, the excellent real world performance of the Town Car side air bag system shows that Ford took seriously the challenge issued by Dr. Martinez, when he encouraged the early introduction of side air bag systems that were designed to "guard against the risk of serious injury" in the event of deployment. Ford accepted that challenge and met it. As to the law, the first litigated case under the Safety Act, *Wheeler*, reminded NHTSA and the industry that

"Congress was concerned with the day-to-day performance of motor vehicles in the myriad conditions of use experienced by the public, not the test data compiled by professional drivers on the manufacturer's proving grounds or performance specifications under laboratory conditions." U.S. v. General Motors Corp., 518 F.2d 420, 434 (D.C. Circuit, 1975). Based on this direction, the agency should follow the approach used in the Hyundai Accent investigation and should not isolate the performance of the air bag in allegedly unwanted deployments, and dissociate that issue from the inextricably related performance in real world crash conditions, in which the Lincoln Town Car side air bag performs exceedingly well.

### Peer Vehicle Review

NHTSA's investigation centers on the increased rate of alleged side air bag unwanted deployments occurring in 2001-2003 model year Lincoln Town Car vehicles as compared to other vehicles. The agency conducted a peer review of models with side air bag systems to compare the number of reports alleging inadvertent deployments. This peer review, however, does not consider the design choices made by each manufacturer in designing their vehicles. Because side air bag systems are an evolving technology, there is a wide range of designs that have dramatically different safety benefits and potential risks. If the peer review focuses on only one aspect of performance, it would not properly assess whether a defect exists in the system, i.e., the control module, the bag, and the vehicle. In particular, it is inappropriate to compare the unwanted deployment rate on the Town Car with any side air bag system that does not also include head protection, because thorax-only side air bags can delay the deployment decision significantly longer than combination side air bags providing head protection, and thus avoid many of the allegedly unwanted deployments associated with the Town Car side air bag.

Ford's design in the Lincoln Town Car balanced both head and thorax protection in a wide range of crash modes while limiting the risk of deployment injuries with a relatively benign air bag design. Unlike side air bags that protect only the thorax, Ford made the decision to provide both head and thorax protection with its side air bags. In order to provide potentially life-saving benefits to the head region in certain crash modes, the sensor must make the deployment decision extremely quickly, within just a few milliseconds from the start of the impact. Air bags providing thorax-only protection need less time to deploy fully, meaning that the deployment decision can be made later than for a combination side air bag providing both head and thorax protection. When comparing competitive designs, these types of design balances and available protection must be taken into consideration when assessing whether a defect exists. In summary, a "peer review" that attempts to compare the performance of "thorax-only" side air bags with combination head-and-thorax side air bags would not be valid, because these systems are not "peers" and the time-to-fire requirements between the two types of air bags are very different.

Vehicles, like the Lincoln Town Car, with side air bags provide substantially more side impact protection than those without. A NHTSA Special Crash Investigation report found that side air bag systems like the one found in the Town Car helped reduce the risk of serious head and thorax injuries, and did not cause serious injuries in the crashes they studied. In an April 6, 1999 report, the Insurance Institute for Highway Safety found that the Lincoln Town Car side air bag system reduced the head injury criterion (HIC) numbers from a HIC of 5,390 without a side air bag to a HIC of 376 with the side air bag protection. This data shows that the Town Car system provides life-saving benefits in certain crashes that could otherwise be fatalities. For the reasons noted above, a broad performance analysis is required under the Safety Act when NHTSA is considering determining a defect on performance criteria alone.

A comparison of the Town Car with the side air bag system as designed to vehicles without side air bags demonstrates the need for the agency to consider the entire system performance in assessing whether a defect exists.

When compared to the variety of side air bag systems in other models, the Town Car does not have a defective system. The complexity of a side air bag system and the necessary and difficult design decisions an automobile manufacturer must make renders a comparison of different systems impractical. Unlike frontal air bags where there is a minimum performance standard to which all manufacturers must certify their vehicles, there is no minimum performance requirement for side air bag systems. Accordingly, each manufacturer makes its own performance and design decisions irrespective of any minimum standard. For instance, thorax-only air bags provide no protection to occupants in pole-impacts and, therefore, are not tested in these conditions. As a result, a manufacturer choosing a thorax-only side air bag has fewer impact events to consider when designing the air bag system, including calibrating and positioning crash and safing sensors and establishing firing times and inflation rates.

Not only is the head/thorax bag a more complex design but it also is decidedly more effective in saving lives than a thorax-only bag and must be considered differently. In an August 2003 statement, the Insurance Institute for Highway Safety reported that "[s]ide air bags that include head protection are reducing deaths by about 45 percent among drivers of passenger cars struck on the near (driver) side [while] [s]ide air bags that protect the chest and abdomen, but not the head, . . . [are] less effective (about 10 percent)."

This is particularly true when the Town Car is struck by taller vehicles, which tend to concentrate crash energy at a higher location than does a striking passenger car. In a report dated July 30, 1998, the IHS concluded that in a side impact with a pole or a taller vehicle, a side air bag system with both head and thorax protection provides substantial benefit over vehicles equipped with thorax-only side air bags. And while thorax bags do not provide head protection in side impacts involving poles or taller vehicles, the Special Crash Investigation group has found at least one instance where a thorax bag in another manufacturer's vehicle caused AIS 3 level injuries. We believe the real measure of the system is whether it is providing a safety benefit to the occupants. Clearly, the trade-offs made by Ford in choosing to design a system that provides greater overall protection to occupants involved in side impacts cannot be compared to design trade-offs made by manufacturers not accepting those same challenges.

Just as a comparison of a head/thorax bag to a thorax-only bag is not valid, neither is comparison of apparently similar systems that use different algorithms, particularly those that have been developed at different times. As air bag technology and the balance of the various system performances continues to evolve, so too, does the system algorithm. As previously discussed, the side impact sensing system in the Town Car was re-sourced to a different supplier beginning with the 2001 model year. Because of the differences in each supplier's side impact sensing system architecture and algorithm, the 2001 model year and later system may respond differently to a given impact or abuse event than previous model year systems. The differences in the response to abuse events may account for the lower rate of alleged unwanted side air bag deployments in the 2002 and later model year systems. However, as discussed above, the performance of the entire system must be considered when assessing if a defect exists. The potential for increased sensitivity to certain types of undercarriage impacts must be balanced against enhanced occupant protection in moderate speed (approximately 17 mph) pole side impacts. This proper performance, which contributes to improved occupant protection across a wide variety of side collisions in a system specifically designed to minimize the possibility of occupant injury from a deploying side air bag, even if the occupant is out-of-

position, is not a "failure" or a "defect." Rather, systems that perform in this manner function exactly as desired.

In addition, based upon a cursory review of the agency's VOQ database, there are several vehicles across different manufacturers with similar numbers of alleged unintended/inadvertent side air bag deployments as the Lincoln Town Car. Further review of the agency information on the internet indicates that there are no agency investigations of a defect or recalls related to the side air bag systems of these other vehicles.

### Summary

The side air bag system in 2001-2003 model year Lincoln Town Cars provides incremental head and thorax protection to front seat occupants during a side impact. This incremental protection provided a 93% reduction in the dummy HIC value during an IIHS side impact test. This was achieved only because the side air bag system was developed to balance the resistance to abuse events normally encountered while driving (gravel roads, potholes and bumps) with the responsiveness required to provide incremental head and thorax protection in a variety of side impacts, particularly pole impacts, while minimizing the possibility of injury from a deploying air bag.

The agency has acknowledged on its public website, "Occasionally, air bags can deploy due to the vehicle's undercarriage violently striking a low object protruding above the roadway surface." In the majority of reports that indicate a potential cause for the alleged deployment, the alleged deployment appears to be the result of events of this nature. These events include damage to powertrain components and other signs of undercarriage impacts. Ford's policy (as set forth in the attached ISM, Appendix F, and as discussed within certain communications documents provided in the June 13, 2003 response to PE03-011 and Appendices B, E, and I of this response) is to repair vehicles under warranty where the vehicle is within the warranty period despite the absence of evidence of any underbody or impact damage. For those vehicles falling outside the warranty period, Ford is aware that its dealerships may, on a case by case basis, choose to make a business decision to financially assist the owners with repairs when no indication of impact or damage is found. Dealerships provide this assistance at their discretion. When indication of an underbody impact or other non-side impact events are discovered, the owner's insurance company covers the repairs, with full right of subrogation.

The perceived elevated rate of alleged unwanted deployments in the 2001-2003 model year Town Car is due to severe underbody impacts that (collectively) are indistinguishable from the earliest onset of a serious side crash within the short period of time the system has to make its decision. Because side air bag systems are a developing technology, Ford has continued to revise its design and testing to further refine sensor capabilities to avoid some of these deployments while enhancing occupant protection. Ford will continue to make improvements as side air bag technology evolves. However, when assessing the design of this side air bag system compared with contemporary vehicles, we believe the agency must thoroughly analyze all of the pertinent design issues as it has in other such investigations. Based on thorough analysis and consistent with NHTSA's treatment of similar investigations, this Engineering Analysis should be closed with a finding of no defect.

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