Ford Motor Company

James F. Vondale, Director
Automotive Safety Office
Environmental & Safety Engineering

July 20, 2004

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

Dear Ms. DeMeter:

Subject: EA03-012:NVS-213bby

Attached is the Ford Motor Company (Ford) response to the agency's May 6, 2004 letter concerning reports of alleged brake line failure as a result of corrosion and/or abrasion from contact with the vehicle undercarriage in 1996-1999 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles and peer 1995-1998 Ford Mustang and Explorer vehicles.

As the agency is aware, Ford conducted customer satisfaction program 98B19 as a result of field reports of rear brake line abrasion on severe duty cycle Ford Crown Victoria vehicles equipped with the police equipment package. Prior to the program, an analysis of the reports indicated that the observed brake line abrasion was due to contact between the rear brake lines and a stiffening rib on the floor pan resulting from relative motion between the body and the chassis. The field reports predominantly concerned police vehicles and typically related to the severe driving pattern encountered in police service. In addition, the customer satisfaction program included Ford Crown Victoria vehicles sold for taxi or fleet applications, vehicles equipped with compressed natural gas (CNG) fuel systems, and Lincoln Town Car vehicles equipped with livery or limousine packages, because of their typically higher vehicle outfit weight and severe duty cycles.

A safety recall was not conducted because extensive analysis and testing, which was reviewed with the agency prior to the initiation of the field service action, found that the brakes continued to function without an increase in stopping distance for many severe stops even after a leak occurred, that an operator would notice a change in brake pedal feel as soon as the leak occurred, and that the brake warning light would illuminate and allow several more brake applications before an increase in stopping distance occurred. At the time the ONP was initiated, there were no reports of accident or injury.

The vehicles that are the subject of this EA include 1995-1997 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles that were not part of ONP 98B19, as well as vehicles included in the ONP for which a report was received after the ONP expired. This information request also asks for information and data concerning 1998-1999 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles, and includes an additional failure mechanism - corrosion – that was not identified as an issue for those vehicles included in ONP 98B19. The average time in service for the vehicles at the time of the ONP was approximately two years, as compared to the approximately eight years of service for the subject vehicles. The design lifetime of the subject vehicle components is 100,000 miles or approximately ten years of service under normal usage conditions.

Brake line corrosion is typically caused on vehicles of any make by repeated exposure to road salt used during the winter. Packaging of the brake lines can also be a factor in the durability of the lines. The rear brake lines for the subject vehicles produced in the 1995-1997 model years initiate from the ABS hydraulic control unit, run the length of the frame mid-span, and terminate prior to the rear axle. The lines are secured to the inside vertical surface of the frame rail to reduce the likelihood of road debris contacting the lines. The rear brake lines must navigate a transition in the frame called the "torque-box," that is located behind the front tires. The rear brake lines routed behind the "torque-box" may be subjected to increased exposure to moisture, road dirt and salt, and stones kicked up from the front tires. In its investigation, Ford reviewed the brake line packaging for peer competitors' vehicles. During this review Ford identified heavily corroded brake lines across several manufacturer's vehicles produced during the same time period, notably the Chevrolet Cavalier, Pontiac Grand Am, and Dodge Intrepid vehicles.

Ford sold over 950,000 1995-1997 model year Crown Victoria, Grand Marquis, and Town Car vehicles. Approximately 167,000 of these vehicles are equipped with police, commercial fleet, or livery or limousine packages and were included in ONP 98B19. When Ford announced the ONP in May 1998, most of those vehicles had only been in service for approximately two years. During the internal investigation that led to the ONP, Ford located 136 CQIS reports alleging abrasion related leaks in the rear brake line. None of these reports alleged an accident or injury. The report rate for these vehicles was approximately 0.61 R/1000. Ford has identified 20 CQIS reports alleging brake line abrasion for the 1995-1997 vehicles not included in the ONP fleet. The comparable abrasion related report rate for the non-ONP subject vehicles is substantially lower at 0.025 R/1000, without consideration of the six additional years in service. Further, if all of the CQIS field reports, i.e., those reporting abrasion and those reporting corrosion, that are not included in the rate calculation for the ONP vehicles, are included in the rate calculation for the 1995-1997 non-ONP vehicles, the rate is only 0.042 R/1000 vehicles, still less than one-nineteenth the original ONP rate – despite the vehicles being in service two and one-half times longer and including corrosion related reports, which are not included in the rate calculation for the ONP vehicles. If the abrasion rate calculations account for time in service, the R/1000/year of vehicle service for the ONP population is 0.44 versus a rate of 0.0033 for the 1995-1997 non-ONP vehicles.

Ford also calculated the rate on the 1995-1997 non-ONP vehicles using data from all sources (AWS/CQIS/MORSII/MORSIII/UDB) and those calculations compare similarly: including all responsive data indicating abrasion, the R/1000 rate is 0.221; for responsive data indicating corrosion, the R/1000 rate is 0.202; and the combined abrasion plus corrosion rate is 0.423. Similar results are obtained when years in service are considered:

the R/1000/year of vehicle service rate for abrasion is 0.029, for corrosion is 0.026, and combined is 0.055. These rates are substantially lower than for the vehicles included in the ONP.

With respect to 1995-1997 model year Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles not included in ONP 98B19, Ford has identified four responsive reports/claims/lawsuits that allege an accident due to brake line abrasion or corrosion. None of these reports allege an injury. They are: 1) VOQ/MORSII report concerning VIN 2FALP74W0VX[redacted] that alleges the driver ran off the road and through a fence due to brake line failure as a result of abrasion. No injuries were reported. 2) MORS III report concerning VIN 2MELM74W5VX[redacted] that alleges an accident due to brake line failure as a result of abrasion. No injuries were reported. 3) Subrogation claim, concerning VIN 1LNLM82W5VY[redacted] alleges the vehicle, driven by the customer's daughter, rear-ended a van as a result of brake line corrosion. The accident was minor and no injuries were reported; additionally, the van was not damaged as a result of the accident. 4) As mentioned in its previous response, Ford also investigated the VOQ report concerning VIN 1LNLM83W2SY[redacted], in which the customer reported a minor accident with no injuries. The customer had admittedly ignored the brake system indicator lamp for a long period of time prior to the alleged accident.

The extremely low report rate (0.4234R/1000) and almost negligible accident rate (0.0061R/1000) on the subject 1995-1997 model year non-ONP vehicles that have been in service over eight and one-half years is a compelling indicator that there is not a pattern of a brake line defect of any kind in the subject vehicles, including brake line leakage as a result of abrasion and/or corrosion, that would pose an unreasonable risk to motor vehicle safety.

If you have any questions concerning this response, please feel free to contact me.

Sincerely,

J. P. Vondale

James P. Vondale

Attachment

ATTACHMENT
July 20, 2004

FORD MOTOR COMPANY (FORD) RESPONSE TO EA03-012

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.

In a June 2, 2004 telephone conversation Jeffery Quandt and Bruce York, of the agency, informed Ford that the Windstar vehicles would no longer be part of the peer vehicles for this information request.

In a June 7, 2004 telephone conversation Jeffery Quandt and Bruce York, of the agency, informed Ford personnel that the scope of the investigation would be limited to 1995-1999 Crown Victoria, Grand Marquis, and Town car vehicles and 1995-1998 Mustang and Explorer peer vehicles. Ford was also informed that the alleged defect for this information request will be the same as RQ03-004.

In a June 16, 2004 telephone conversation Jeffery Quandt and Bruce York, of the agency, defined the word search criteria to be used by Ford in searching for potentially relevant reports in Ford's databases. The criteria are intended to gather reports that would most likely contain allegations of rear brake line failure due to the alleged defect.

In a June 30, 2004 telephone conversation with Bruce York, of the agency, Ford was informed that the starting date for searches of the owner, field, and warranty reports for the 1995-1997 Owner Notification Program (ONP) fleet will be the completion date of the ONP.

Answers to your specific questions are set forth below. 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 May 6, 2004, 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, Marketing and Sales Operations, Purchasing, Quality, Research, Global Core Engineering, Office of the General Counsel, Vehicle Operations, North American Car Product Development and Lincoln Mercury Product Development.

Request 1

State, by model, model year, and brake system (ABS or non-ABS) the number of subject and peer 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. Brake system;
e. Model year;
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.

Answer

Ford records indicate that the approximate total numbers of Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles sold in the United States (the 50 states and the District of Columbia) and its protectorates and territories (American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and Virgin Islands) are:

Model	1995 MY	1996 MY	1997 MY	1998 MY	1999 MY
Ford Crown Victoria	98,951	108,399	123,624	85,497	119,619
Mercury Grand Marquis	94,506	95,383	128,324	88,210	122,910
Lincoln Town Car	107,710	90,773	105,017	83,172	89,619

The requested data for each subject vehicle is provided electronically in Appendix A1 (file: 2004-07-20_Appendix_A1_Subject_Volume) on the enclosed CD.

Ford records indicate that the number of peer vehicles sold in the United States (the 50 states and the District of Columbia) and its protectorates and territories (American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and Virgin Islands) are:

Model	1995 MY	1996 MY
Ford Mustang	165,462	126,721
Ford Explorer	259,749	421,646

The requested data for each peer vehicle is provided electronically in Appendix A2 (file: 2004-07-20_Appendix_A2_Peer_Volume) on the enclosed CD.

A summary table listing the number of ABS and non-ABS subject and peer vehicles sold in the United States is provided electronically in Appendix A3 (file: 2004-07-20_Appendix_A3_Brake_System_Summary) on the enclosed CD.

Request 2

State, by model and model year, 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 and peer vehicles:

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

For subparts "a" through "e," state the total number of each item (e.g., consumer complaints, field reports, etc.) separately. Multiple incidents involving the same vehicle are to be counted separately. Multiple reports of the same incident are also to be counted separately (i.e., a consumer complaint and a field report involving the same incident in which a crash occurred are to be counted as a crash report, a field report and a consumer complaint).

In addition, for items "c" through "e," provide a summary description of the alleged problem and causal and contributing factors and Ford's assessment of the problem, with a summary of the significant underlying facts and evidence. For items "d" and "e", 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 purposes of identifying reports of incidents potentially involving the alleged defect and any related documents, Ford has gathered "owner reports" and "field reports" maintained by Ford Customer Service Division (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 B (file: 2004-07-20_Appendix_B) on the enclosed CD.

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

Category	Allegation
A1	Alleged Rear Brake Line Leak - Abrasion
A2	Alleged Rear Brake Line Leak - Corrosion
B1	Alleged Leak - Unspecified Brake Line due to any cause*
B2	Alleged Leak - Rear Brake Line w/unspecified cause*
B3	Alleged Brake Concern-not confirmed by technician*
B4	Alleged Brake Line Abrasion, no allegation of a leak*

*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.

Ford is providing the requested reports in five separate databases as described in the table below:

Vehicle Line	Appendix	File
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	C1	2004-07-20_Appendix_C1
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car Included in ONP 98B19	C2	2004-07-20_Appendix_C2
1998-1999 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	C3	2004-07-20_Appendix_C3
1995-1996 Ford Mustang	C4	2004-07-20_Appendix_C4
1995-1996 Ford Explorer	C5	2004-07-20_Appendix_C5

Owner Reports: The search and review of the Ford Master Owner Relations Systems (MORS) database records, as described in Appendix B, identified the following number of owner reports in accordance with the categories described above:

Vehicle Line	Reports	
	A1	A2
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	24	59
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car Included in ONP 98B19	3	1
1998-1999 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	0	0
1995-1996 Ford Mustang	3	0
1995-1996 Ford Explorer	0	1

Copies of the owner reports referenced above are provided in the MORS II and MORS III portions of the electronic database contained in Appendices C1-C5 on the enclosed CD as described in the table above. The categorization of each report is identified in the "Category" field. When 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 is marked accordingly, and the group is counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one report associated with their VIN. These reports have been counted separately.

ICCD Information: A search of the ICCD database as described in Appendix B located no reports that may 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, and no related reports were identified.

Field Reports: The search and review of the Ford Common Quality Indicator System (CQIS), as described in Appendix B, identified the following number of field reports, excluding duplicates, in accordance with the categories described above:

Vehicle Line	Reports	
	A1	A2
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	20	13
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car Included in ONP 98B19	30	1
1998-1999 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	0	0
1995-1996 Ford Mustang	2	0
1995-1996 Ford Explorer	1	0

Copies of the field reports referenced above are provided in the CQIS portion of the electronic database contained in Appendices C1-C5 on the enclosed CD as described in the table above. The categorization of each report is identified in the "Category" field. When we were able to identify that responsive (i.e., not ambiguous) duplicate field reports for an alleged incident were received, each of these duplicate reports is marked accordingly, and the group is counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one report associated with their VIN. These reports have been counted separately. In addition, two 1995 – 1997 Ford Crown Victoria, Mercury Grand Marquis and Lincoln Town Car category A2 CQIS reports are duplicative of two owner reports, and one report related to a 1995 – 1997 Ford Crown Victoria, Mercury Grand Marquis and Lincoln Town Car included in the ONP category A1 CQIS report and one category A2 CQIS report are duplicative of owner reports and are provided in Appendix C2; these reports are not included in the report count above.

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 UDB, as described in Appendix B, was conducted. Copies of potentially relevant reports and ambiguous reports are provided in the UDB portion of the electronic database contained in Appendices C1-C5 on the enclosed CD as described in the table above.

Vehicle Line	Reports	
	A1	A2
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	2	28
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car Included in ONP 98B19	0	0
1998-1999 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	0	0
1995-1996 Ford Mustang	1	0
1995-1998 Ford Explorer	0	0

The categorization of each report is identified in the "Category" field. When we were able to identify that responsive (i.e., not ambiguous) duplicate UDB reports for an alleged incident were received, each of these duplicate reports is marked accordingly, and the group is counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one report associated with their VINs. These reports have been counted separately. In addition, one 1995 – 1997 Ford Crown Victoria, Mercury Grand Marquis and Lincoln Town Car category A2 UDB record is duplicative of an owner report and is provided in Appendix C but is not included in the report count above.

VOQ Data: This information request had an attachment that included 55 Vehicle Owner's Questionnaires (VOQs). Ford made inquiries of its MORS database for customer contacts, and its CQIS database for field reports regarding the vehicles identified in the VOQs. Ford notes that in some instances, where the VOQ does not contain the VIN, or the owner's last name and zip code, it is not possible to query the databases for owner and field reports specifically corresponding to the VOQs. Any reports located on a vehicle identified in the VOQs related to the alleged defect are included in the MORS and CQIS portions of the electronic database provided in Appendix C and have been identified by a "Y" in the "VOQ Dup" field.

Crash/Injury Incident Claims: 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, lawsuits and claims, and warranty claims. Based on a reasonable and diligent search, Ford located on the 1995-1997 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car fleet two owner (MORS) reports [VIN: 2FALP74W0VX[redacted] 2MELM74W5VX[redacted] alleging minor accidents with no injuries, one lawsuit [VIN:1LNM82W5V[redacted] alleging an accident with no injuries, and one VOQ [VIN: 1LNLM83W2SY[redacted] which alleged a minor accident with no injuries.

Ford has also located in the 1995-1997 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car fleet included in ONP 98B19 one field (CQIS) field report dated December, 2000 [VIN: 2FALP71W3V[redacted], which alleges the vehicle was in a fatal accident. The report does not indicate that the accident occurred as a result of a brake line failure and no contact with Ford other than the CQIS report was located. The vehicle was in the ONP fleet but did not get the ONP service. Ford also located one lawsuit [VIN: 2FALP71VY4TX[redacted]] filed after the ONP notification. The alleged accident occurred one year prior to the lawsuit file date. The owner and field reports are included in the MORS and CQIS portions of the electronic database contained in Appendices C1-C5 on the enclosed CD as described in the table above. Ford is also providing the ambiguous accident allegations for the subject and peer vehicles. Lawsuit and claim information is provided as described below.

Vehicle Line	Crash/Injury Incident Claims, Category	
	A1/A2	Ambiguous
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	4	10
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car included in ONP 98B19	2	7
1998-1999 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	0	17
1995-1998 Ford Mustang	0	28
1995-1998 Ford Explorer	0	31

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 for the subject vehicles, Ford has located one responsive claim on a 1997 Lincoln Town Car and one responsive lawsuit on a 1998 Ford Crown Victoria which was part of the ONP fleet. Ford has also located other lawsuits, claims or consumer breach of warranty lawsuits each of which are ambiguous as to whether they meet the alleged defect criteria. We have included these lawsuits and claims as "non-specific allegations" for your review because of the broad scope of the request. Based on our engineering judgment, the information in these lawsuits and claims is insufficient to support a determination that they pertain to the alleged defect. We are providing the requested detailed information, where available, on the responsive and ambiguous lawsuits and claims in our Log of Lawsuits and Claims, as Appendix D (file: 2004-07-20_Appendix_D) on the enclosed CD. To the extent available, electronic copies of complaints, first notices, or MORS reports relating to matters shown on the Log are provided on the enclosed CD in Appendicies E1-E3 (file: 2004-07-20_Appendix_E1, file: 2004-07-20_Appendix_E2, file: 2004-07-20_Appendix_E3). With regard to these lawsuits and claims, Ford has not undertaken to contact outside law firms to obtain additional documentation. Additionally, Ford notes that it was unable to locate one claim file relating to the subject vehicles, and one claim file and one lawsuit file related to the peer vehicles. As a result, Ford is unable to determine if the cases are related to the alleged defect.

Request 3

Separately for each item (complaint, report, claim, notice, or matter) within the scope of your response to Request 2, state the following information:

a. Ford's file number or other identifier used;
b. The category of the item, as identified in Request 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. Type of failure (abrasion, corrosion, other, unknown);
j. Front or rear brakes (if diagonal, what half)
k. Whether a crash is alleged;
l. Whether property damage is alleged;
m. Number of alleged injuries, if any;
n. Number of alleged fatalities, if any;
o. Complaint summary; and,
p. Consumer comments, if any;

Answer

Ford is providing owner and field reports in the electronic database contained in Appendices C1-C5 on the enclosed CD in response to Request 2. To the extent information requested in Request 3 is available, it is provided in those databases

Request 4

Provide this information in Microsoft Access 2000, or a compatible format, entitled "REQUEST NUMBER TWO DATA." See Enclosure 1, Data Collection Disc, for a pre-formatted table designed for this submission.

Answer

The requested information, to the extent available, is provided in Appendices C1-C5 as discussed in response to Request 2.

Request 5

Produce copies of all documents related to each item within the scope of Request 2. Organize the documents separately by category (i.e., consumer complaints, field reports, etc.) and describe the method Ford used for organizing the documents.

Answer

Ford is providing electronic copies of responsive, as well as ambiguous, owner and field reports in the database contained in Appendices C1-C5 on the enclosed CD in response to Request 2.

The categorization as to whether each report appears to concern a brake fluid leak occurring as a result of abrasion or corrosion or is ambiguous as to whether it relates to these conditions is identified in the "Category" field. These reports are provided under separate tabs for owner (MORSII and MORSIII) reports and field (CQIS) and UDB reports in the database.

Request 6

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 and peer 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." See Enclosure 1, Data Collection Disc, for a pre-formatted table designed for this submission.

Answer

In responding to this information request, Ford electronically searched its Analytical Warranty System (AWS) for all claims meeting the criteria described in Appendix B. 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 the following number of non-duplicative warranty claims in accordance with the categories described above:

Vehicle Line	Reports	
	A1	A2
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	129	61
1995-1997 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car included in ONP 98B19	233	19
1998-1999 Ford Crown Victoria, Mercury Grand Marquis & Lincoln Town Car	14	0
1995-1996 Ford Mustang	9	0
1995-1996 Ford Explorer	5	4

Electronic copies of these claims and ambiguous claims are provided in the AWS portion of the electronic database contained in Appendices C1-C5. The categorization of each report is identified in the "Category" field. When we were able to identify that duplicate claims for an alleged incident were received, each of these duplicate claims is marked accordingly and the group is counted as one report. In other cases, certain vehicles may have experienced more than one incident and have more than one claim associated with their VIN. These claims have been counted separately. Also, six of the 1995 – 1997 Ford Crown Victoria, Mercury Grand Marquis and Lincoln Town Car category A1 and two of the category A2 warranty claims are duplicative of six category A1 and two category A2 field reports and three category A1 warranty claims are duplicative of three category A1 owner reports. In addition, seven of the category A1 warranty claims concerning 1995 – 1997 Ford Crown Victoria, Mercury Grand Marquis and Lincoln Town Car vehicles included in ONP 98B19 are duplicative of seven category A1 field reports. These claims are provided in Appendix C1 and Appendix C2, respectively, but are not included in the report count above. Ford assumes that providing the warranty claims in the electronic database format meets the requirements of this request, because the agency can review or order the claims as desired.

The requested customer concern codes and the warranty condition codes are provided in Appendix B.

Requests for "goodwill, field, or zone adjustments" received by Ford to date that relate to the alleged defect in the subject vehicles that were not honored, if any, would be indicated in the MORS reports identified above in response to Request 2. Requests for goodwill that were honored, if any, are contained in the warranty data provided.

Request 7

Describe in detail the search criteria used by Ford to identify the claims identified in response to Request 5, including the labor operations, problem codes, part numbers and any other pertinent parameters used. Provide a list of all labor operations, labor operation descriptions, problem codes, and problem code descriptions applicable to the alleged defect in the subject vehicles. State, by make and model year, the terms of the new vehicle warranty coverage offered by 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) related to the alleged defect 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 criteria used for searching Ford's Analytical Warranty System (AWS) is described in Appendix B. All claims coded under the selected part numbers were included in this search regardless of labor operations or problem codes. The resulting claims were then reviewed individually for allegations that may relate to the alleged defect.

The standard new vehicle warranty coverage for 1995-1999 Ford Crown Victoria and Mercury Grand Marquis vehicles is three years or 36,000 miles, whichever occurs first. For 1995-1999 Lincoln Town Car Vehicles, the standard new vehicle warranty coverage is four years or 50,000 miles, whichever occurs first. A list of Extended Service Plans (ESP) available on the subject components is provided electronically on the enclosed CD in Appendix F (file: 2004-07-20_Appendix_F) with time/mileage coverage. This appendix also includes the count of total vehicles participating in those ESP's.

Request 8

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 communication that manufacturer's short name is planning to issue within the next 120 days.

Answer

For purposes of identifying communications to dealers, zone office, 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 answer.

A description of Ford's OASIS messages, Internal Service Messages, and the Field Review Committee files and the search criteria used are provided in Appendix B.

OASIS Messages: Ford has not identified any SSMs/TSBs that relate to the alleged defect in the subject vehicles.

Internal Service Messages: Ford has identified no new ISMs from the submission date of RQ03-012 that may relate to the alleged defect in the subject vehicles.

Field Review Committee: Ford has not located any field service action communications from the submission date of RQ03-012 that may relate to the alleged defect in the subject vehicles.

Request 9

Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject components that have been conducted, are being conducted, are planned, or are being planned by, or for, Ford. These actions should include any environmental testing that was performed on the vehicle. 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.

Answer

Ford has developed specific, recognized processes for identifying, investigating, and assessing potential safety concerns in Ford products. Ford interprets the agency's request as seeking the documents resulting from such processes or actions, such as documents from Ford's Critical Concern Review Group (CCRG) and Field Review Committee (FRC), if any, and final field service action evaluation papers (14 D's and 8 D's) concerning allegation of brake line failure as a result of corrosion or abrasion from contact with the vehicle's undercarriage. Ford has conducted a reasonable diligent search for such documents that it is producing to the agency's Office of Chief Counsel, along with a request for confidential treatment on the grounds that such items contain commercially sensitive business information and/or trade secrets. Such documents are provided in Appendix H (file: 2004-07-20_Appendix_H). No other such actions are being conducted or planned to be conducted at this time.

Further, Ford is submitting voluntarily additional documents that may assist in the agency's analysis of this matter. Copies of such documents that are not customarily disclosed outside of Ford will be submitted under separate cover with a request for confidentiality to the agency's Office of Chief Counsel in Appendix Appendices I1-I2 (file: 2004-07-20_Appendix_I1, file: 2004-07-20_Appendix_I2).

Documents for which Ford is not requesting confidentiality are included in Appendix J (file: 2004-07-20_Appendix_J).

Ford is not producing documents responsive to this request that are protected from disclosure by attorney-client privilege, work-product doctrine or other applicable immunity. Documents

protected from disclosure on these bases are described in a privilege log contained in Appendix M.

Request 10

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

a. Subject component; and
b. Any kits that have been released, or developed, by Ford 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 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

Ford is providing the requested part sales information in Appendix L (file: 2004-07-20_Appendix_L). The data is broken down by part names and service/engineering numbers. Ford notes that the part sales database does not contain sales information broken down by month for historic data. Ford released a service kit for the Owner Notification Program 98B19 repairs; kit sales information is also provided in Appendix L. Typically dealers use bulk tube to repair brake line leaks. Accordingly, Ford is also providing information concerning bulk tube sales. As the agency is aware, Ford service parts are sold in the U.S. to authorized Ford and Lincoln-Mercury dealers. Ford has no means by which to determine how many of the parts were actually installed on vehicles, the vehicle model on which a particular was installed, or the reason that the installation was made.

Request 11

Furnish copies of all documents relating to communications between Ford and each and every supplier of rear brake tubes used in MY 1995 through current production Crown Victoria, Grand Marquis, and Town Car vehicles that are related to the resistance of the brake tubes to corrosive failure. This should include all communications related to design, manufacture (application processes and quality control monitoring methods) anti-corrosion protection systems used on the brake tubes. 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.

Answer

In the June 7, 2004 phone conversation reference above, NHTSA informed Ford this request would apply to the subject vehicles only. Responsive documents, if any, that Ford has been able to locate are included in Ford's response to Request 9.

Request 15

Provide the following information regarding the rear brake tubes used in the subject and peer vehicles:

a. The base material composition and manufacturing method (i.e., single-walled or double-walled);
b. Tube coating systems;
c. Tube nominal outer diameter;
d. Tube outer diameter tolerances;
e. Tube nominal wall thickness;
f. Tube wall thickness tolerances;
g. Tube design pressure;
h. Tube maximum service pressures (ABS and non-ABS);
i. Tube burst pressure;
j. The minimum wall thickness necessary to contain maximum service pressures (include consideration with and without stress concentration factors representative of corroded tube walls and state all calculations used and the values of all calculation parameters);
k. Summaries and copies of corrosion performance test specifications -- conditions (e.g., salt spray tests, cyclical corrosion tests) and end-of-test requirements;
l. Summaries and copies of all corrosion performance test results; and
m. Identify all suppliers by models and model years.

Answer

In its response to Request 15, Ford has provided a table that contains information addressing sections a-i and k-m in an electronic format in Appendix O (file: 2004-07-20_Appendix_O). For section l, Ford has provided corrosion test summary table, test reports, and photographs in an electronic format in Appendix P (file: 2004-07-20_Appendix_P). Ford has not provided information for item j regarding the minimum wall thickness necessary to contain the maximum service pressure for the brake system. These calculations are not customarily performed during the course of brake system design because the brake tube design specifications meet the requirements stated in SAE J1677, which are standard for the industry. Parameters affecting the calculations for the minimum wall thickness (stress concentration factors due to manufacturing operations and adjustment due to fatigue) are difficult if not impossible to determine for new vehicles, let alone for vehicles which have experienced eight to ten years of vehicle service. Ford notes that brake tube suppliers customarily perform brake tube burst pressure tests on new brake tubes as a quality control procedure. Burst strength tests on brake tubes from that time period indicate the typical burst pressure from tube stock was approximately 17,000-20,000 psi. Considering the maximum service pressure is 2,000 psi on the subject vehicles, there is a minimum 8.5 times tolerance factor when new.

Request 16

Provide the following information concerning the rear brake lines and fuel lines in the subject and peer vehicles:

a. Describe the basic brake system design (e.g., system split front/rear or diagonal, ABS, front/rear disc, etc.)
b. Furnish basic diagrams of the brake and fuel tube routing/retention in the subject and peer vehicles;

brake and fuel lines. As a consequence, body-to-frame isolator static loaded heights and stiffness were revised across all the 1998-1999 model year subject vehicles.

Request 13

Provide the following information regarding the Windstar vehicles that were recalled by Ford to correct a brake line corrosion defect condition (Ford 02S36/NHTSA 02V-101):

a. Copy of Ford's 14D report;
b. Sample of a one foot length of the replacement rear brake line coated with nylon that was used as a replacement part in the recall campaign;
c. The failure rates by MY when the recall decision was made; and
d. Ford's estimate/forecast of the failure rate at 10 years in service for the recalled vehicles.

Answer

During the referenced June 7, 2004 phone conversation, the agency informed Ford the 1995-1998 Ford Mustang and Explorer would be the peer vehicles. Ford will provide information for Request 13 in its response to agency's RQ04-003 inquiry for 1995-1998 Windstar Brake Line Performance.

Request 14

Furnish copies of the following Ford engineering specifications for the subject components:

a. Specifications related to durability, routing, clearances, and/or corrosion resistance that were in effect during production of the subject vehicles;
b. Copies of all documents related to design verification/validation testing of the subject components to the specifications identified in part "a" of this request;
c. Current specifications related to durability, routing, clearances, and/or corrosion resistance for the subject components on current production Town Car, Crown Victoria, and Grand Marquis vehicles; and
d. Copies of all documents related to design verification/validation testing of the subject components to the specifications identified in part "c" of this request.

Answer

In the referenced June 7, 2004 phone conversation, the agency deleted sections c and d of Request 14. Ford is providing the remaining requested documents regarding specifications in Appendix M and validation documents Appendix N with a request for confidentiality under separate cover to NHTSA's Office of Chief Counsel pursuant to 49 CFR, part 572.

Request 12

In response to RQ03-004 Ford furnished a document titled, "1995-1997 Crown Victoria Police & Fleet/ Town Car Livery Option Brake Line Wear -98B19" (Bates Nos. 0077-0079). Provide the following additional information regarding this document:

a. A detailed description of the audits identified in item 3.E (Bates No. 0077), including a list of vehicles examined by VIN, application (police, taxi, other), and mileage; a description of how the vehicles were measured/inspected; and all measurements and other data recorded for each vehicle; and

b. Provide quantitative comparisons of the design clearances, tolerance stack-up, compression, and relative movements of body mounts on the heavy-duty use vehicles covered under the subject ONP and the remaining subject vehicles.

Answer

To date, Ford has not located any additional information concerning the referenced audits beyond that contained in the documents previously provided to the agency.

An analysis of the body-to-frame isolators, which determine the spacing between the brake tubes and the undercarriage for 1995-1997 model year Ford Crown Victoria vehicles identified in the ONP 98B19 and the remaining subject vehicles, indicates the part number and design specifications for static loaded height and stiffness (24.4-28.4mm & 1480 N/cm) remained the same for the #1a, #1b, #2, #3, #4, #5, and #6 locations for the 1995-1997 model years. For the 1996 model year, the #2 body-to-frame isolator specifications for static loaded height and stiffness were revised (28-30mm & 2350 N/cm) for those Ford Crown Victoria vehicles in the ONP. Mercury Grand Marquis body-to-frame isolator part numbers and design specifications remained the same as those for the remaining vehicles. As a result, the design clearance between the brake tubes and the undercarriage was consistent between both groups of vehicles.

An analysis of the body-to-frame isolators for Lincoln Town Car vehicles in the ONP 98B19 and the remaining subject vehicles indicates the part number and design specifications for static loaded height and stiffness (24.4-28.4mm & 1251 N/cm) remained the same for the #1a, #1b, #2, #3, #4, #5, and #6 locations for the 1995-1997 model years. The design clearance between the brake tubes and the undercarriage for both groups of vehicles was the same.

In 1996, dynamic body-to-frame relative motion was measured on a 1996 Mercury Grand Marquis. The vehicle was outfitted with 800 pounds of simulated passenger weight and was evaluated through the first phase of R-310 durability testing. Measured body-to-frame fore/aft, lateral, and vertical dynamic displacement was 6.0mm of travel. For packaging considerations, a 15% test tolerance is added to the travel to account for test variability. A review of the 14D for ONP 98B19 indicates the original brake tube to floor pan design clearance was 7.0mm, before the addition of the floor pan reinforcement rib, and is consistent with 6.0mm of travel including the test tolerance.

Ford notes that for the 1998 model year, Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car were redesigned. The redesigned frame and body sheet metal necessitated changes to a number of chassis mounted components including the body-to-frame isolators and

c. Identify all peer vehicles in which the brake lines are routed in a "bundle" with the fuel lines (i.e., sharing common retention clips);
d. Identify all other Ford vehicles produced from 1994 to date with fuel lines and rear brake lines routed together in a "bundle;"
e. Identify the material composition of the fuel lines;
f. Describe any and all design and assembly requirements related to preventing of contact between the rear brake lines and the fuel lines in the subject vehicles; and
g. State Ford's opinion of the effect that any such contact may have on the corrosion of the subject components.

Answer

In its response to Request 16, Ford has provided a table that contains information addressing items a, c, e in an electronic format in Appendix Q (file: 2004-07-20_Appendix_Q). In a June 7, 2004 telephone conversation, Jeffery Quandt and Bruce York of the agency informed Ford that the scope Request 16, section d, is limited to the peer vehicles only. As a result, the information requested for item d is provided in the table Appendix Q under the request for item c. Per the agency's request, subject and peer vehicle diagrams regarding brake and fuel tube routing and retention, section b, have been provided in hardcopy form in Appendix R.

For the 1995-1997 Crown Victoria, Grand Marquis, and Town Car vehicles, the rear brake lines and fuel lines are packaged in a bundle utilizing plastic spacer clips spaced at regular intervals. The plastic spacer clips maintain the proper spacing between the brake and fuel lines in order to reduce the likelihood of contact and provide a means of attachment to the frame. In those instances where clearance between the adjacent brake and fuel lines is at a minimum due to routing considerations, rubber spacers have been added to the lines to maintain distance between the tubes and to prevent contact between the fuel and brake system lines.

It is Ford's opinion that once the brake and fuel line bundle is installed on the vehicle's frame, it is unlikely the brake and fuel lines would contact each other during normal vehicle operation. In addition, the brake line design specification regarding the spacing between plastic spacer clips takes into account and eliminates tube vibration and possible contact. Ford has compared the material properties of the brake lines and the fuel lines for the possibility of galvanic corrosion and found the both materials to be minimally reactive. The plastic spacers clips act as an insulator between the fuel and brake system lines.

Request 17

Provide copies of any other testing, survey, research data, and/or technical literature related to corrosive failure of hydraulic brake tubing in motor vehicles that are in Ford's possession.

Answer

In the June 7, 2004 phone conversation, referenced previously, NHTSA informed Ford this request pertains to information available in the 1995-1999 time frame and to include information related to design guides, brake routing and corrosion resistance requirements during that time period. These materials are provided in a hard copy format in Appendix S. In it's response to Request 17, Ford has provided the results of a competitive vehicle brake line corrosion survey

conducted on vehicles produced in the same time frame as the subject vehicle population. These materials are provided in an electronic format on the enclosed CD (file: Appendix_I1).

Request 18

Provide Ford's assessment of the alleged defect in the subject vehicles. Include the following information in your response:

a. The design life of the subject components in years and mileages;
b. Furnish a detailed comparison of all data concerning differences in brake line clearances from the vehicle body and other components in the subject vehicles and the vehicles covered by the subject Owner Notification Program;
c. Furnish an assessment of the pattern of brake line corrosion in the subject vehicles (general or localized);
d. Furnish an assessment of the type(s) of corrosion occurring in the brake lines of the subject vehicles; and
e. Furnish an assessment of the severity of corrosion occurring in the brake lines of the subject vehicles – Include in this answer a comparison of the available failure data concerning the subject and peer vehicles.

Answer

After a thorough analysis of eight to ten years of field data related to the subject vehicles and review of competitive models, Ford does not believe there is a defect in the subject brake line on the subject vehicles, or any evidence of an unreasonable risk to safety. The corrosion protection and packaging of the brake line are similar to many other contemporaneous vehicles. As demonstrated in our limited survey of competitor's vehicles and as illustrated in the photos presented in our April 7, 2004 Quarterly Meeting, the brake lines on many vehicles can experience corrosion if the vehicles are operated in a severe environment. Further, the report rate and number of alleged related accidents is very small for a vehicle population of this size and age.

ONP 98B19 properly addresses a high incident rate in certain fleet vehicles

As the agency is aware, Ford conducted customer satisfaction program 98B19 as a result of field reports of rear brake line abrasion on severe duty cycle Ford Crown Victoria vehicles equipped with the police equipment package. Prior to the program, an analysis of the reports indicated that the observed brake line abrasion was due to contact between the rear brake lines and a stiffening rib on the floor pan resulting from relative motion between the body and the chassis. The field reports predominantly concerned police vehicles and typically related to the severe driving pattern encountered in police service. In addition, the customer satisfaction program included Ford Crown Victoria vehicles sold for taxi or fleet applications, vehicles equipped with compressed natural gas (CNG) fuel systems, and Lincoln Town Car vehicles equipped with livery or limousine packages, because of their typically higher vehicle outfit weight and severe duty cycles.

A safety recall is not warranted even in the ONP population with a much higher incident rate than the subject vehicles

A safety recall was not conducted because extensive analysis and testing, which was reviewed with the agency prior to the initiation of the field service action, found that the brakes continued to function without an increase in stopping distance for many severe stops even after a leak

occurred, that an operator would notice a change in brake pedal feel as soon as the leak occurred, and that the brake warning light would illuminate and allow several more brake applications before an increase in stopping distance occurred. At the time the ONP was initiated, there were no reports of accident or injury.

The subject vehicles have a similar level of corrosion to competitive models with eight to ten years in service

The vehicles that are the subject of this EA include 1995-1997 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles that were not part of ONP 98B19, as well as vehicles included in the ONP for which a report was received after the ONP expired. This information request also asks for information and data concerning 1998-1999 Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles, and includes an additional failure mechanism - corrosion – that was not identified as an issue for those vehicles included in ONP 98B19. The average time in service for the vehicles at the time of the ONP was approximately two years, as compared to the approximately eight years of service for the subject vehicles. The design lifetime of the subject vehicle components is 100,000 miles or approximately 10 years of service under normal usage conditions.

Ford has reviewed photographs of the subject vehicle brake lines supplied by the agency in a July 13, 2004 email. It is difficult to determine if the photographs are showing the left or right rear brake line. Each of the six photographs shows what appears to be uniform corrosion, as red rust, covering the length and diameter of the parts. Four photographs show a section of the brake tube, most likely the section of the tube which transitions over the transmission cross member. The corrosion for this section of brake line is darker than that observed in other sections of the brake line. We are unable to determine if there is a reduction in the outside tube diameter as a result of the corrosion. Water infiltration between the rear brake line and the shrink-wrap, or the mastic patch on those vehicles so equipped, could provide a closed environment for corrosion to take place; however, the corrosion rates do not show a substantial increase in reports for vehicles built with mastic. Several of the photos show a jagged external crack in the line, which is indicative of slowly progressing corrosion. Further, determination of the cause, extent, and type of corrosion this particular tube experienced is difficult from post removal photographs. Because the rear brake line is constructed from double wall thickness tubing, corrosion of the line would have to progress through the two layers of tube before the line would be compromised. It is Ford's experience that all makes of vehicles with this type of brake line that are exposed to corrosive elements will encounter corrosion. In its review of competitive vehicles, Ford observed similar types of corrosion on competitor's vehicles produced in the same time frame as the subject vehicles.

Brake line corrosion is typically caused on vehicles of any make by repeated exposure to road salt used during the winter. Packaging of the brake lines can also be a factor in the durability of the lines. The rear brake lines for the subject vehicles produced in the 1995-1997 model years initiate from the ABS hydraulic control unit, run the length of the frame mid-span, and terminate prior to the rear axle. The lines are secured to the inside vertical surface of the frame rail to reduce the likelihood of road debris contacting the lines. The rear brake lines must navigate a transition in the frame called the "torque-box", that is located behind the front tires. The rear brake lines routed behind the "torque-box" may be subjected to increased exposure to moisture, road dirt and salt, and stones kicked up from the front tires. In its investigation, Ford reviewed the brake line packaging for competitors' peer vehicles. During this review, Ford identified heavily corroded brake lines across several manufacturers' vehicles

produced during the same time period, notably the Chevrolet Cavalier, Pontiac Grand Am, and Dodge Intrepid vehicles.

Ford believes the body-to-frame isolators do not play a notable role in the apparent performance difference between the two fleets. The 14D for ONP 98B19 states the brake-to-floor pan design clearance prior to the addition of the stiffening rib was 7.0mm. Also, instructions provided to service technicians performing ONP 98B19 reference a minimum brake-to-floor pan clearance of 8-12mm. Ford has reviewed the body-to-frame isolators, which control the relative position of the floor pan to the chassis, for 1995-1997 model year vehicles. Only the #2 body-to-frame isolators on Ford Crown Victoria vehicles equipped with police packages or a CNG fuel systems were revised by incorporating an increase in static loaded height from 24.4-26.4mm to 28-30mm and an increase in stiffness from 1251 N/cm to 2350 N/cm for the 1996–1997 model years. The body-to-frame isolators were not changed for the majority of the isolator locations for both vehicle populations.

<u>As reviewed with the agency in 1998, a potential leak as a result of this condition does not pose an unreasonable risk to safety</u>

A driver of a subject vehicle with a rear brake line leak due to abrasion or corrosion has several overt indicators of fluid loss prior to an increase in stopping distance, including a change in brake pedal feel and effort, and a gradual increase in brake pedal travel. Additionally, owners will likely observe brake fluid stains on the pavement underneath a leak. Customer observations of a change in brake pedal feel are reported in the MORS III report for VIN 2MELM74WXVX[redacted] in which the customer states, "upon leaving the restaurant the brake were not functioning properly. It was evening and only gas stations were open. Stopped and checked brake fluid it was low, so cust purchased a can" and "looked under vehicle and discovered the leak in the brake line on the driver side."

In the case of rear brake line leakage due to abrasion or corrosion, the compromise to the line is typically a pinhole leak. Tests conducted for this condition on vehicles included in the ONP found that there is no increase in stopping distance for 85 to 125 maximum deceleration stops; after completing one half of the stops approximately the brake system indicator lamp was illuminated giving ample warning to the driver of a low fluid level condition and the need for inspection. The subject vehicles are equipped with a front-to-rear split master cylinder system. If the driver ignores the several overt signs of leakage and the fluid is completely depleted, the front brakes, which provide most of the vehicle's stopping power, remain fully functional.

<u>Even with many more years in service, the subject vehicles have a low report rate</u>

Ford sold over 950,000 1995-1997 model year Crown Victoria, Grand Marquis, and Town Car vehicles. Approximately 167,000 of these vehicles are equipped with police, commercial fleet, livery or limousine packages and were included in ONP 98B19. When Ford announced the ONP in May 1998, most of those vehicles had only been in service for approximately two years. During the internal investigation that led to the ONP, Ford located 136 CQIS reports alleging abrasion related leaks in the rear brake line. None of these reports alleged an accident or injury. The report rate for these vehicles was approximately 0.81 R/1000. Ford has identified 20 CQIS reports alleging brake line abrasion for the 1995-1997 vehicles not included in the ONP fleet. The comparable abrasion related report rate for the non-ONP subject vehicles is substantially lower at 0.025 R/1000, without consideration of the six additional years in service. Further, if all of the CQIS field reports, i.e., those reporting abrasion and those reporting corrosion, that are not included in the rate calculation for the ONP vehicles, are included in

the 1995-1997 non-ONP vehicles, the rate is only 0.042 R/1000 vehicles, still less than one-nineteenth the original ONP rate – despite being in service two and one-half times longer and including corrosion related reports which are not included in the rate calculation for the ONP vehicles. If the abrasion rate calculations account for time in service, the R/1000/year of vehicle service for the ONP population is 0.44 versus a rate of 0.0033 for the 1995-1997 non-ONP vehicles.

Ford also calculated the report R/1000 on the 1995-1997 non-ONP vehicles using data from all sources (AWS/CQIS/MORSII/MORSIII/UDB) and those calculations compare similarly: including all responsive data indicating abrasion, the R/1000 rate is 0.221; for responsive data indicating corrosion, the R/1000 rate is 0.202; and the combined abrasion plus corrosion rate is 0.423. Similar results are obtained when years in service are considered: the R/1000/year of vehicle service rate for abrasion is 0.029, for corrosion is 0.026, and combined is 0.056. The rates are substantially lower than for the vehicles included in the ONP.

<u>The small number of alleged accidents and injuries in this population of vehicles over eight to ten years in service do not demonstrate a safety defect</u>

With respect to 1995-1997 model year Ford Crown Victoria, Mercury Grand Marquis, and Lincoln Town Car vehicles not included in ONP 96B19, Ford has identified four responsive reports/claims/lawsuits that allege an accident due to brake line abrasion or corrosion. None of these reports allege an injury. They are: 1) VOQ/MORSII report concerning VIN 2FALP74W0VX[redacted] that alleges the driver ran off the road and through a fence due to brake line failure as a result of abrasion. No injuries were reported. 2) MORS III report concerning VIN 2MELM74W5VX[redacted] that alleges an accident due to brake line failure as a result of abrasion. No injuries were reported. 3) A subrogation claim, concerning VIN 1LNLM82W6VY[redacted] alleges the vehicle, driven by the customer's daughter, rear-ended a van as a result of brake line corrosion. The accident was minor and no injuries were reported; additionally, the van was not damaged as a result of the accident. 4) As mentioned in its previous response, Ford also investigated the VOQ report concerning VIN 1LNLM83W2SY[redacted] in which the customer reported a minor accident with no injuries. The customer had admittedly ignored the brake system indicator lamp for a long period of time prior to the alleged accident.

In addition, we have identified ten reports of accidents allegedly related to brake system concerns that are ambiguous as to whether they relate to either brake line abrasion or corrosion. Ford does not believe these reports provide sufficient information to conclude that they are related to the agency's investigation. Three MORS reports alleging accidents (VINs 1LNLM81W3VY[redacted], 1LNLM82W38Y[redacted], 1LNLM82W6V[redacted] occurred on vehicles with 15,000 miles or less and could not possibly be related to corrosion or abrasion due to the low mileage and short time in service. The vehicle identified in MORS report for VIN 2FALP74W4TX[redacted] was taken to the dealer for warranty service a week after ther reported accident. There was no mention of brake line failure in this report. The vehicle is from California, a non-rust belt state, and accordingly, it is unlikely that the brake line was corroded. The other four remaining MORS reports (VIN 1LNLM82W5SY[redacted] LNLM82W7T[redacted] 1LNLM81W6V[redacted], 1LNLM81W0TY[redacted] allege accidents but make no assertion of brake line failure being the cause of the accident. The information available to Ford concerning these four reports does not support any conclusion that these reports concern the alleged defect.

As part of this response, Ford is providing accident/injury claims for the subject vehicles, as well as for the peer vehicles. As the agency is aware, Ford receives many accident/injury claims alleging brake failure. If the subject vehicles exhibited a brake system defect it would be evident versus the number of brake system related accident allegations involving the peer vehicles. The 23 accident/injury claims for the subject vehicles (both retail and the ONP fleet) results in a rate of 0.0241 claims/1000 vehicles based on 952,857 vehicles built. There are 28 total accident/injury claims for 1995-1996 Mustang vehicles, which equate a rate of 0.0869/1000 vehicles based on 292,203 vehicles built. There are 31 total accident/injury claims for the Explorer, which equates to a rate of 0.0454/1000 vehicles based on 681,395 vehicles built. The rate for the subject 1995-1997 vehicles is less than one-third of that for the Mustang and approximately one-half that of the Explorer. These data support Ford's assumption that there is no pattern of defect attributable to the brake lines in the subject vehicles.

The brake line design is typical of contemporaneous models

The brake lines on the subject vehicles are constructed of double wall thickness low carbon steel, which is coated with an aluminum-zinc alloy and then covered with an organic aluminized paint; the industry name for brake tubes manufactured using this process is Al-Gal. The tubing utilized on the subject and peer vehicles was also used on most other vehicle makes produced by other North American manufacturers for the 1995-1997 model years and was considered to be a standard for the industry. For the 1995-1996 model year Ford Explorer, the Al-Gal brake lines are mounted in a bundle, which is attached on the inside surface of the frame rail, inside the C-section of the frame. This configuration may protect the bundle from moisture, road dirt and salt, and debris. For the 1995-1996 model year Ford Mustang vehicles, the Al-Gal brake lines are packaged separate from the fuel lines. Ford Crown Victoria, Mercury Grand Marquis and Lincoln vehicles were redesigned for the 1998 model year and incorporated double wall thickness low carbon steel brake tubes coated with an aluminum-zinc alloy and then processed with a nylon coating for improved corrosion protection. The name for tubes manufactured using the new process is Ny-Gal. In addition, the fuel and brake lines were redesigned and packaged separately. For 1998 and 1999 model year Crown Victoria, Grand Marquis and Town Car vehicles the brake lines were packaged differently, in conjunction with other vehicle changes and utilize a different brake line coating for corrosion protection (Ny-Gal versus AL-Gal). The Ny-Gal coated brake lines are routed on the outside vertical surface of the frame.

Eight to ten years of field data does not demonstrate a safety defect trend

The extremely low report rate (0.4234R/1000) and almost negligible accident rate (0.0051R/1000) on the subject 1995-1997 model year non-ONP vehicles that have been in service over eight and one-half years is a compelling indicator that there is not a pattern of a brake line defect of any kind in the subject vehicles including brake line leakage as a result of abrasion and/or corrosion, that would pose an unreasonable risk to motor vehicle safety.

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