GENERAL MOTORS LLC
Global Interior and Safety Center

July 2, 2010

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

N100097 Complete

NVS-213cla
PE10-010

Dear Mr. Quandt:

This letter completes General Motors (GM) response to your Preliminary Evaluation (PE), dated March 30, 2010, regarding allegations of steel brake line corrosion failures in certain model year (MY) 1999 through 2003 GMT800 C/K series vehicles manufactured by General Motors for sale or lease in the United States.

In an e-mail dated May 27, 2010, Stephen McHenry of your staff agreed that the due date for this inquiry is July 2, 2010. GM's responses to questions 1 – 7 were sent to the NHTSA June 18, 2010. This letter responds to Questions 8-12.

Your requests and our corresponding responses are as follows:

8. Describe all assessments, analyses, tests, test results, studies, surveys, simulations, investigations, inquiries and/or evaluations (collectively, "actions") that relate to, or may relate to, the alleged defect in the subject vehicles that have been conducted, are being conducted, are planned, or are being planned by, or for, GM. For each such action, provide the following information:

a. Action title or identifier;
b. The actual or planned start date;
c. The actual or expected end date;
d. Brief summary of the subject and objective of the action;
e. Engineering group(s)/supplier(s) responsible for designing and for conducting the action; and
f. A brief summary of the findings and/or conclusions resulting from the action.

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

The information listed in Table 8 below is a summary of actions that have been conducted, are being conducted, are planned, or are being planned by or for GM regarding the subject condition on the subject vehicles as of June 18, 2010. Documents

and additional supporting information are included in the Attachments as noted in the table.

General Motors requested assistance and documents from suppliers in responding to this question and this response includes those documents and the information received from suppliers.

Action 8-A: Design, Development, and Validation of the subject vehicle brake system including brake pipes. **Start Date:** August 1996 **End Date:** January 2003 **Engineering Group:** GM Engineering (GM), TI Group Automotive Systems Corp. (TI) **Attachments:** ATT_1_GM_ disk; folder labeled "Q_8-A Validation" ATT_2_GM_Conf disk; folder labeled "Q_8-A GM Validation" ATT_3_TI_Conf disk; folder labeled "Q_8-A TI Validation" **Description:** GM and TI design, validation and test documents. **Summary:** The subject component meets Vehicle Technical Specifications (VTS), Subsystem Technical Specifications (SSTS), Brake Pipe Material Specifications, Corrosion Protective Coating Material Specifications, Brake System MVSS standards and Vehicle Corrosion Durability Validation Requirements.
Action 8-B: GM Investigation 2007 **Start Date:** December 2007 **End Date:** February 2008 **Engineering Group:** GM Engineering (GM), TI Group Automotive Systems Corp. (TI) **Attachment:** ATT_1_GM_disk; folder labeled "Q_8-B GM Investigation" ATT_2_GM_Conf disk; folder labeled "Q_8-B GM Inv" **Description:** GM internal investigation regarding 1999 to 2003 GMT800 Series Pickups brake pipe corrosion in the area of the ABS module in subject vehicles. **Summary:** Product Investigations has determined that the investigation of brake pipe corrosion near the ABS modulator can be closed. There is no evidence of a trend by region or date of build, and regular/extended warranty claims for the GMT800 Pickups are low and consistent with claims from other platforms. The few incidents observed may be attributable to normal process variation that occurs for over 2.2 million vehicles studied as part of the investigation.
Action 8-C: PRTS C-T880-80549 Pipe Asm.-RR Brake RR-Functional **Start Date:** May 2000 **End Date:** October 2000 **Engineering Group:** GM Engineering **Attachments:** ATT_2_GM_Conf disk; folder labeled "Q_8-C PRTS" **Description:** PTRS C-T880-80549, regarding a beta hardware level brake line exhibiting corrosion. **Summary:** End of test observation noting the presence of corrosion. The observation of corrosion was attributed to a quality concern by the brake pipe manufacturer; however GM has corrosion testing from the manufacturer showing the corrosion protection meets or exceeds the required specifications. This brake pipe completed corrosion exposure testing on other vehicles. This PRTS is closed with no action required.
Action 8-D: GM Investigation 2010 **Start Date:** April 2010 **End Date:** Continuing **Engineering Group:** GM Engineering, TI Group Automotive Systems Corp. (TI) **Attachments:** ATT_1_GM_disk; folder labeled "Q_8-D GM Investigation"

Description: GM's investigation of the alleged defect in the subject vehicle brake lines.
Summary: Analysis of warranty data, GM reports and VOQs indicates a low rate of occurrence; no trends by date of build, model, or location of subject component in the vehicle and in the event of a leak, there may be a BRAKE telltale. GM meets the requirements of FMVSS 105 or FMVSS 135 as designed, and in regards to the Brake System – Performance Requirements – Partial Failure in the event of a leak. GM has analyzed 12 parts from the field and is obtaining additional parts to analyze for metal loss and estimate remaining life.

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

a. The date or approximate date on which the modification or change was incorporated into vehicle production;
b. A detailed description of the modification or change;
c. The reason(s) for the modification or change;
d. The part numbers (service and engineering) of the original component;
e. The part number (service and engineering) of the modified component;
f. Whether the original unmodified component was withdrawn from production and/or sale, and if so, when;
g. When the modified component was made available as a service component; and
h. Whether the modified component can be interchanged with earlier production components.

Also, provide the above information for any modification or change that GM is aware of which may be incorporated into vehicle production within the next 120 days.

GM is providing a summary of the product engineering information requested in 9(a-h) on the Att_1_GM disk in the folder labeled "Q_9_Modifications"; refer to the file labeled, "Q_9_Modifications".

The modification was a new design on the rear axle crossover pipe for drum brakes at the start of production of the 2005 MY GMT800 1500 series pickups. There were no modifications or changes made by, or on behalf of, GM in the design, material composition, manufacture, quality control, supply, or installation of the subject component which relate to, or may relate to, the alleged defect in the subject vehicles. The Engineering Program Number Summary (EPN) and Engineering Work Orders (EWO) related to the modification are on the Att_2_GM_Conf disk in the folder labeled "Q_9", refer to the files labeled, "Q_9_ EPN38552" , "Q_9_ APASR", "Q_9_ AHCJGE", "Q_9_AHCJGF", "Q_9_ AVYFF" and "Q_9_AWNPN".

10. Produce one of each of the following:

a. Exemplar short section (approximately 1 ft) of each design version of the subject component (brake line pipe);
b. Short sections of field return samples of the subject component exhibiting the subject failure mode;

The subject components are no longer manufactured for new vehicle production and there are none in GM service stock.

Enclosure 10a contains one exemplar sample of the subject component removed from a 2002 MY Chevrolet Avalanche, VIN 3GNEK13T12G[redacted] with approximately 167,000 miles and 102 months in service in Michigan. There no issues or leaks in the brake pipes when they were removed.

A second part included in Enclosure 10a contains one exemplar sample of a subject component removed from a 2003 MY GMC Sierra 1500 4WD REG CAB PICKUP, VIN 1GTEK14T13Z[redacted] with approximately 77,948 miles and 87 months in service. This vehicle is the subject of VOQ 10332391. This part does not exhibit the subject failure mode but is a different part removed from the above vehicle. The brake pipe that the customer alleges to have leaked in the VOQ was unavailable.

GM was not able to obtain short sections of field return samples of the subject component exhibiting the subject failure mode.

11. State the number of subject components that GM has sold that may be used in the subject vehicles by state, 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). If part sales data cannot be provided by state, provide it by part distribution center with a description of the region covered by each center.

For each component part number, provide the supplier's name, address, and appropriate point of contact (name, title, and telephone number). Also identify by make, model and model year, any other vehicles of which GM is aware that contain the identical component, whether installed in production or in service, and state the applicable dates of production or service usage.

An electronic summary table of the requested service part information for the subject components is provided on the ATT_1_GM disk; folder labeled "Q_11"; refer to the Microsoft Excel file labeled "Q_11_Part Sales".

These sales numbers represent sales to dealers in the US and Canada. This data has limited analytical value in analyzing the field performance of a motor vehicle component because the records do not contain sufficient information to establish the reason for the part sale. It is not possible from this data to determine the number of these parts that

have been installed in the subject vehicles or the number remaining in dealer or replacement part supplier inventory.

This table contains service part numbers, part description, part usage information including the GM vehicles that contain the identical component, part sales figures by month and calendar year, and the supplier's name and address, contact name and phone number.

12. Furnish GM's assessment of the alleged defect in the subject vehicle, including:

a. The causal or contributory factor(s), including a detailed assessment of the factors affecting the occurrence of corrosion on the brake lines;
b. The failure mechanism(s);
c. The failure mode(s);
d. The risk to motor vehicle safety that it poses;
e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring or subject component was malfunctioning; and
f. The reports included with this inquiry.

The subject vehicles are equipped with a front-rear brake split system. On the GMT800 series of vehicles, the primary circuit supplies hydraulic brake fluid to the front brake calipers and the secondary circuit supplies hydraulic fluid to the rear brake calipers.

When the brake pedal is depressed, force and travel is transferred through the push rod and brake booster to the master cylinder primary piston which moves forward covering its bypass hole. The force from the brake pedal is transferred through the primary piston moving the secondary piston forward at the same time. When both pistons have moved forward and their primary seals are past both bypass holes, hydraulic fluid displacement begins to take place in both chambers. The fluid displacement from the primary chamber results from the primary piston pressurizing the brake fluid between its own forward facing primary seal and the rearward facing seal on the secondary piston. The hydraulic pressure in the primary chamber acting on the back of the secondary piston and the rearward facing seal on the secondary piston moves the secondary piston down the bore and supplies the input force acting on the secondary piston. The fluid displacement from the secondary chamber results from the secondary piston pressurizing the brake fluid against the end of the bore. The hydraulic fluid displaced from each chamber is then transmitted through individual pressure circuits (i.e. brake pipes & hoses) to each of the two wheel brakes that they supply.

As the operator continues to provide pedal force and travel to the brake pedal, the primary and secondary pistons will continue to travel down the bore of the master cylinder pushing hydraulic brake fluid under pressure out to the front and rear brake calipers. This pressure applied to the caliper piston(s) is transmitted to the inboard shoe and lining,

forcing the lining against the inboard rotor surface. The pressure applied to the bottom of the caliper piston bore(s) forces the caliper to slide or move inboard toward the center of the vehicle. Since the caliper is a one piece pin slider style of caliper, this movement inboard causes the outboard section of the caliper to apply pressure against the back of the outboard shoe and lining assembly, forcing that lining against the outboard rotor surface. As the hydraulic line pressure increases, both inboard and outboard shoe and lining assembles are pressed against the rotor surfaces with nearly equal force, generating brake torque and bringing the vehicle to a stop. As lining wear occurs, the caliper piston(s) will move outward from the caliper bore and brake fluid from the master cylinder reservoir will fill the space between the caliper piston(s) and the bottom of the piston bore(s) causing the fluid level in the master cylinder reservoir to drop. Brake lining wear is automatically compensated for by the outward movement of the piston(s) and the inward movement of the caliper body on its sliding mechanism.

The master cylinder reservoir is designed to have sufficient fluid volume to meet the requirements of MVSS105 and MVSS135. The reservoir contains two dedicated sub-chambers, one for the primary hydraulic circuit and one for the secondary hydraulic circuit. In the event of a leak in one of the hydraulic circuits, there will be sufficient brake fluid remaining in the other dedicated sub-chamber to allow that hydraulic circuit to continue to function and generate brake pressure and stop the vehicle. Above both sub-chambers is a shared chamber that holds fluid when filled to the design-intent level. Brake fluid from this shared chamber is available to supply both sub-chambers. The fluid level sensor is in the shared chamber and when sufficient fluid is depleted, each circuit will operate using fluid independently from their respective sub-chamber. Prior to this occurring the fluid sensor will activate and the BRAKE telltale will illuminate.

The brake system will include either a fluid level sensor or a differential pressure switch depending on the model and model year. For vehicles equipped with a fluid level sensor, it is located in the master cylinder reservoir and is activated by a floating magnet within the reservoir which is designed to activate when the fluid level in the reservoir drops to a level as required by both MVSS105 and MVSS135. The volume of fluid in the reservoir between the design-intent level and the activation point of the fluid level sensor is greater than the volume of fluid required for all four brake calipers to move from the new lining condition to a worn lining position (i.e. linings worn to audible pad wear indicators). The sensor will activate when the fluid level drops below the worn lining position. The initial volume of fluid placed in each vehicle and the minimum level to activate the sensor will vary across models and brake system type.

For vehicles equipped with a brake proportioning combination valve, the system also includes a differential pressure switch. The combination valve limits the rate of increase of hydraulic pressure in the rear brake circuit during normal braking. This valve is designed to improve the front-to-rear brake balance in the event of an antilock functional failure when tested according to MVSS135. The differential pressure switch that is included with this valve is designed to activate when it detects a pressure differential between the front and rear brake circuits.

When either the fluid level sensor or the differential pressure switch is activated, the red BRAKE telltale in the instrument cluster is illuminated.

ATT_1_GM disk, folder labeled Q_12 contains a list of the master cylinder usage for 1999-2003 for the subject vehicles and whether the master cylinder was equipped with a fluid level sensor or the brake system was equipped with a differential pressure switch.

The brake line tubing in the subject vehicles is made of a double-wall construction. Vehicle manufacturers typically use double wall brazed tubing for brake lines. A double wall brazed tube (such as GM123M tubing), is copper plated steel that is double wrapped and then heated in a furnace to braze the two layers of steel. This allows for the joining brazes to be on opposite sides of the tube, 180 degrees from each other, around the steel tubing versus a single point joint for the welded tubing. Because a double wall braze tube has two layers of steel, if there were a flaw in one layer of the steel it would not affect the other layer. A double wall brazed tube also has the benefit of more consistent properties because there is not an isolated heat affect zone for a brazed double wall tube as there is with a single wall welded tube. The tubing includes a protective zinc coating for corrosion.

In the case of a leak in the primary circuit, the master cylinder primary piston moves forward during the brake apply, but may not be able to build up sufficient hydraulic pressure. In such a case, only a negligible force is transferred to the secondary piston through the primary piston spring until the primary piston extension screw comes in contact with the secondary piston. Then, mechanical actuating force is transmitted directly to the secondary piston through the primary piston and force is built up to operate the secondary chamber pressure circuit.

If there is a leak in the secondary chamber circuit, both master cylinder pistons move forward when the brakes are applied just as they would under normal conditions. In that case, only the secondary piston spring resists piston travel. Once the secondary piston bottoms out in the cylinder bore, the hydraulic pressure increases in the primary chamber pressure circuit, applying the brakes in the circuit.

The additional travel required for the primary piston extension screw to contact the secondary piston or for the secondary piston to contact the bottom of the master cylinder bore, results in increased brake pedal travel before significant brake hydraulic pressure can be generated in the intact brake hydraulic circuit.

If the brake line tubing corrodes to the extent that the structural integrity of the base steel tubing is compromised, a slow loss of brake fluid may occur at first and may be noticed by the vehicle operator as fluid spotting under the vehicle while parked. As the brake is applied, depending on the rate of brake pedal apply, the size of the leak and the force applied to the brake pedal, the operator may notice some change in resistance at the brake pedal, however, the brake pedal travel will continue to increase even though the

operator is maintaining a constant pedal force on the brake pedal. If the operator continues to apply force and travel to the brake pedal, eventually, the master cylinder piston in the leaking circuit will bottom out. As the operator continues to apply force and travel to the brake pedal, the hydraulic pressure in the intact brake circuit will continue to increase and there will be braking on the intact circuit. As described above the brake telltale may be activated. Also as noted above, prior to this scenario occurring the customer may notice fluid deposits on his driveway or garage floor.

If a brake pipe sustained sufficient loss of the base steel tube material due to corrosion, and application of the brake pedal developed enough hydraulic pressure to breach the pipe and cause a rapid loss of fluid, the brake pedal travel would immediately increase. If the operator continues to apply force and travel to the brake pedal, once the master cylinder piston in the failed circuit bottoms out, hydraulic pressure will continue to increase and there will be braking in the intact circuit. The BRAKE telltale may be activated.

If there is a leak in one of the brake hydraulic circuits or a rapid loss during braking and the vehicle is equipped with a brake proportioning combination valve which contains a differential pressure switch, the driver would be notified first by the increased brake pedal travel until a differential pressure sufficient to activate the switch is detected between the front and rear brake circuits at which point the red BRAKE telltale will be illuminated. The driver would also notice a reduced level of vehicle deceleration and stopping distances will be increased.

If there is a leak in one of the brake hydraulic circuits or a rapid loss of fluid and the vehicle is equipped with a fluid level sensor in the master cylinder reservoir, the driver would be notified first by the increased brake pedal travel and reduced level of vehicle deceleration and increased stopping distances. The red BRAKE telltale will be illuminated once the brake fluid level in the master cylinder has dropped sufficiently to activate the fluid level sensor. The number of brake applications to activate the fluid level sensor is dependent on several variables, including the initial level of the brake fluid in the reservoir above the fluid level sensor, the number of times the brake pedal is applied or pumped during the stop, and the travel of the brake pedal (i.e. master cylinder piston travel) each time the brake is applied or pumped.

Under some circumstances the red BRAKE telltale will illuminate and the driver will get a warning of a leak warning before the brake pedal is applied. For example, if the master cylinder reservoir is equipped with a fluid level sensor and there is a leak in one of the brake hydraulic circuits sufficient to allow the master cylinder reservoir to drain due to gravity while the vehicle is being driven and the fluid level sensor is activated, the red BRAKE telltale will illuminate. Also, if the vehicle is parked and there is a leak in one of the brake hydraulic circuits sufficient to allow the master cylinder reservoir to drain due to gravity and the fluid level sensor is activated, immediately after starting the vehicle, the red BRAKE telltale will illuminate.

For model year 2003, in addition to illuminating the red BRAKE telltale when either the fluid level sensor or differential pressure switch is activated, there will be a 10 second chime and a "SERVICE BRAKE SYSTEM" message will appear in the Driver Information Center in the instrument cluster.

See the table below for a general representation of the above information.

		Fluid level sensor/Differential pressure switch Notification by BRAKE telltale when fluid loss in the reservoir is sufficient to activate the sensor/ differential pressure between intact and breached system is sufficient.
Leak Type	Small	Reduced pedal resistance initially* Increased/Increasing pedal travel Braking on intact circuit
	Large	Little or no pedal resistance initially* Increased pedal travel Braking on intact circuit
	Rapid Loss	Immediate increase to pedal travel* Braking on intact circuit

* Pedal will become firm and hydraulic pressure in the intact circuit will increase after the master cylinder piston of the breached circuit bottoms out.

When one of the vehicles brake circuits are inoperative due to a leak, the brake pedal travel may increase, the vehicle deceleration may be reduced, and stopping distances may be increased.

The subject vehicles were designed to meet the hydraulic circuit partial failure requirements of either MVSS105 or MVSS135 based on both the model year and GVWR of the subject vehicle.

In general, corrosion on brake lines can be caused by a number of factors, including exposure to de-icing salts, exposure to calcium chloride from gravel road dust control treatment and salt water (as from the ocean), and exacerbated by such factors as elevated temperatures and humidity, coating abrasion from stones and other road debris, brake line routing, coating damage at attachment clips, installation and handling damage, and the quality of the corrosion protection coating.

A survey was conducted involving the review of 12 1999-2003 MY full size trucks from the metro Detroit area. The brake lines were inspected for corrosion, and samples of lines from three trucks were removed for more detailed assessment. Corrosion was observed on brake lines from those vehicles that have predominantly been operated in Michigan.

The corrosion observed along the pipe surfaces was not visually more severe at attachment clips or areas of increased exposure to stone impingement. Two of the vehicles inspected were originally sold and operated in Florida and Texas, before being transferred to Michigan. These two vehicles did not exhibit brake line corrosion.

The more detailed, laboratory analysis of the samples of the brake lines removed from three of the trucks inspected revealed pitting corrosion of the tube wall, and no evidence of perforations. These three trucks have been operated in Michigan since their original purchase. In two cases, the pitting was found only in the outer wrap of the double wall construction. In one case, the pitting had progressed to the inner wrap. These three vehicles averaged 10.3 years in age with the projection for useful life estimated to be an average of 12.8 years.

A Materials Lab analysis of the thickness of the corrosion protection zinc coating was also conducted, using samples of the brake lines cut from corrosion free areas. The coating thickness was found to exceed that of the minimum required by the GM123M AGE specification. Considering the manufacturing process, it is expected that the coating thickness did not vary significantly along the length of the pipe and the original coating thickness would have also met the specification at other areas of the pipe when it was manufactured.

Analysis of the data and information related to the subject condition has shown that for the subject population there is a low rate of occurrence. Across the U.S., vehicles in the population range from seven to 11 years old and the combined cumulative rate including Warranty claims, Owner Reports and Extended Service Contract claims is .458 IPTV for the 2000 Model Year. The Month of Build chart shows no trends with the maximum IPTV being .8 IPTV in the month of August 1999.

Further, the brake system is designed to address when there is a leak, as required by FMVSS 105 and FMVSS 135. Upon occurrence of a leak, a brake telltale will come on as the result of sufficient fluid loss in the reservoir, or sufficient pressure differential between the intact and breached circuit. The system is operating as designed and meets all FMVSS 105 or FMVSS 135 requirements, including the front rear split brake system and warnings. The brake pipe design itself is similar to the design of other manufacturers at that time.

GM Specifications call for a target life of 10 years of exposure for the GMT800 series vehicles. Component and vehicle testing completed validation that the brake system meets all GM and Federal requirements.

Owner's Manuals for these models also specifies an inspection of the entire brake system, including brake pipes and hoses, on a periodic basis. This inspection should be completed by the customer at each tire rotation. Tire rotation is called for every 7,500 mile of vehicle usage. It also specifies for the owner to clean the underbody of the vehicle on a yearly basis to remove corrosive materials on the underbody parts.

Analysis shows that the majority of states in the Northeast area of the US, and in other locations in the US, require periodic safety inspections. Each of these inspections requires a review of the brake system to receive certification. This inspection may provide a warning of a leak or an observation of a corroded line with or without a leak. Customer complaints may occur for vehicles subjected to an inspection and drive replacement of brake lines that are not leaking.

In summary, General Motors believes that there is no unreasonable risk to safety.

- Low rate of GM Reports of leaks (320 reports over 6 million vehicles).
- No trends by date of build, model, or location of part in the vehicle.
- GM meets the requirements of FMVSS 105 or FMVSS 135 as designed, and in regards to the Brake System – Performance Requirements – Partial Failure in the event of a leak.
  - In the event of a leak, there will be a BRAKE telltale light when the fluid level sensor or differential pressure switch is activated.
- Brake pipe design is similar to other manufacturers in this timeframe.
- Periodic inspections of entire brake system are specified in the Owner's Manual.
- State inspections, based heavily in corrosion states, provide an additional opportunity to identify brake pipe corrosion prior to a leak.

* * *

General Motors requested assistance and documents from suppliers in responding to item 8 and this response includes all those documents received from suppliers as of this date, except for some documents for which the supplier is still conducting a confidentiality determination. Those will be provided as soon as GM receives them.

GM claims that certain information, in documents that are part of lawsuit and claims files maintained by the GM Legal Staff, is attorney work product and/or privileged. That information includes notes, memos, reports, photographs, and evaluations by attorneys (and by consultants, claims analysts, investigators, and engineers working at the request of attorneys). GM is producing responsive documents from claims files that are neither attorney work product nor privileged, and withholding those that are attorney work product and/or privileged.

This response is based on searches of General Motors (GM) locations where documents determined to be responsive to your request would ordinarily be found. As a result, the scope of this search did not include, nor could it reasonably include, "all of its past and present officers and employees, whether assigned to its principal offices or any of its field or other locations, including all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their

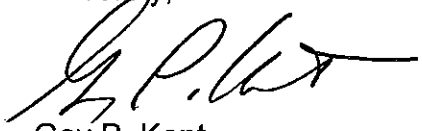
employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of GM (including all business units and persons previously referred to), who are or, in or after January 1, 1994, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

a. Design, engineering, analysis, modification or production (e.g. quality control);
b. Testing, assessment or evaluation;
c. Consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits; or
d. Communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers.

This response was compiled and prepared by this office upon review of the documents produced by various GM locations, and does not include documents generated or received at those GM locations subsequent to their searches.

Please contact me if you require further information about this response or the nature or scope of our searches.

Sincerely,



Gay P. Kent,
Director, Product Investigations
and Safety Regulations

Attachments