GENERAL MOTORS NORTH AMERICA
Structure & Safety Integration

February 4, 2005

05V-043
(3 Pages)

Mr. Ronald Medford
Senior Associate Administrator, Vehicle Safety
National Highway Traffic Safety Administration
400 Seventh Street, S.W., Room 5321
Washington, D.C. 20590

Dear Mr. Medford:

The following information is submitted pursuant to the requirements of 49 CFR 573.6 as it applies to a determination by General Motors of a safety defect involving certain 2004-05 model year Chevrolet Silverado, Suburban, Avalanche, Kodiak, Express; GMC Sierra, Yukon XL, Topkick, Savana; and Hummer H2 vehicles.

573.6(c)(1): Chevrolet, GMC and Hummer Divisions of General Motors Corporation.

573.6(c)(2)(3)(4): This information is shown on the attached sheet.

573.6(c)(5): General Motors has decided that a defect which relates to motor vehicle safety exists in certain 2004-2005 Chevrolet Avalanche, Express, Kodiak, Silverado, Suburban; GMC Savana, Sierra, TopKick, Yukon XL; and HUMMER H2 vehicles. On some of these vehicles, the hydraulic brake booster's pressure accumulator may crack and/or separate from the Hydro-Boost® assembly during normal vehicle operating conditions. If a separation occurred and the hood of the vehicle were open, fragments from the accumulator could cause injury to people in the immediate area. In addition, the presence of this crack or fractured surface could allow the hydraulic fluid to leak from the accumulator circuit of the booster assembly. The loss of fluid would cause increased steering and braking effort.

573.6(c)(6): On June 29, 2004, the Robert Bosch Corporation (Bosch) Warranty Center received a Hydro-Boost® assembly without an accumulator. The assembly showed evidence of damage due to handling, and this information was reported to GM. On July 30, 2004, the Bosch warranty center received a second unit without an accumulator from the GM warranty return process. This part did not show evidence of physical damage, as had the first unit. Disassembly and inspection of the second unit showed that the accumulator circuit two-function valve (TFV) had a visual anomaly at the relief ball seat. During performance testing, the valve did not open within the specification of 1300-1800 pounds per square inch (psi) and did not open at the test equipment capability of 2400 psi. The first unit was then disassembled and the TFV was found to have the same visual anomaly at the ball seat as the second unit. The performance test showed that the valve from the first unit also did not open within the 1300-1800 psi specification limits or at the 2400 psi test equipment limit. Since the TFVs in the two field return units did not perform to specification, Bosch initiated the root cause and corrective action process with the supplier of the two-function valve on August 5, 2004.

On September 23, 2004, Bosch Warranty Center received a third HydroBoost® assembly without an accumulator. Analysis of this assembly showed the same performance as the first two returned assemblies. Since teardown of the assembly indicated that the TFV had a visual anomaly at the relief ball seat, the returned units suggested the possibility of a special-cause condition in the field. GM and Bosch began investigating the technical root cause of the condition, but could not replicate accumulator separation in the laboratory. On October 28, 2004, Product Investigations was informed of the condition.

During a meeting on November 12, 2005, Bosch Engineering reported to GM Product Development that the housing fracture and accumulator separation was replicated in the laboratory with prototype valves modified to have blocked relief ports. On November 19, 2004, results from laboratory testing indicated that certain high-temperature conditions could sufficiently increase the pressure in the HydroBoost® assembly with a blocked relief port to cause the housing to fracture.

From November 19, 2004 through January 11, 2005, additional vehicle and laboratory tests were conducted to establish under-hood operating temperatures in the vicinity of the accumulator, confirm the results from the lab tests, determine the vehicles that may be subject to the condition based on the possibility of a TFV anomaly and specific temperatures in the area of the HydroBoost® assembly, and determine if the reported customer condition could be replicated on a vehicle using the field return TFVs. Additional vehicle analysis was run on pickups to determine the under-hood temperature profiles during typical dynamic driving conditions. This information was collected for a similar reason as the engine idle-only test; namely to determine the temperature conditions that can be expected under typical driving.

The reported condition is caused by over-pressurization of the transition system. The over-pressurization is caused by a TFV not opening within the specified limits during expansion of the hydraulic fluid in the accumulator circuit. The expansion of the hydraulic fluid is caused by exposure of the booster assembly to increasing under-hood temperatures during typical operation of most vehicles.
The issue was presented to the FPE Director on January 13, 2005. The issue was presented to the GMNA Senior Management Committee (SMC) and on January 31, 2005 the Field Action Decision Committee decided to conduct a safety recall.

573.6(c)(8): Using a specifically developed custom tool, the Hydro-Boost assembly will be tested for functional operation of the two-function valve (TFV). If the Hydro-Boost assembly fails the test, dealers are to replace the assembly.

Pursuant to 577.11(e), General Motors does not plan to notify owners about reimbursement because all involved vehicles are within the new vehicle warranty coverage.

573.6(c)(9): GM will submit a draft copy of the dealer bulletin and owner letter and scheduled mailing dates when available. The parts and tools for this remedy will be available in the middle of February 2005.

Sincerely,

Gay P. Kent
Director
Product Investigations

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Attachments

573.6(c)(2),(3),(4)

VEHICLES POTENTIALLY AFFECTED BY MAKE, MODEL, AND MODEL YEAR
PLUS INCLUSIVE DATES OF MANUFACTURE

MAKE	MODEL SERIES	MODEL YEAR	NUMBER INVOLVED	INCLUSIVE MANUFACTURING DATES (FROM)	(TO)	DESCRIPTIVE INFO. TO PROPERLY IDENT. VEH.	EST. NO. W/CONDITION
Chevrolet	C/K	2004	41,617	02/2004	08/2004	Silverado	*Unknown
Chevrolet	C/K	2005	39,335	04/2004	09/2004	Silverado	"
Chevrolet	C/K	2004	1,249	02/2004	08/2004	Suburban	"
Chevrolet	C/K	2005	833	04/2004	09/2004	Suburban	"
Chevrolet	C/K	2004	250	02/2004	08/2004	Avalanche	"
Chevrolet	C/K	2005	82	04/2004	09/2004	Avalanche	"
Chevrolet	Medium Duty	2004	44	02/2004	06/2004	Kodiak	"
Chevrolet	Medium Duty	2005	65	07/2004	09/2004	Kodiak	"
Chevrolet	G-Van	2004	11,113	02/2004	07/2004	Express	"
Chevrolet	G-Van	2005	16,527	03/2004	09/2004	Express	"
GMC	C/K	2004	12,863	02/2004	08/2004	Sierra	"
GMC	C/K	2005	12,612	04/2004	09/2004	Sierra	"
GMC	C/K	2004	298	02/2004	08/2004	Yukon XL	"
GMC	C/K	2005	236	04/2004	09/2004	Yukon XL	"
GMC	Medium Duty	2004	15	02/2004	05/2004	TopKick	"
GMC	Medium Duty	2005	3	04/2004	08/2004	TopKick	"
GMC	G-Van	2004	2,600	02/2004	07/2004	Savana	"
GMC	G-Van	2005	4,878	03/2004	09/2004	Savana	"
Hummer	H2	2004	1,602	02/2004	04/2004	H2	"
Hummer	H2	2005	9,243	02/2004	09/2004	H2	"
		GM Total:	155,465				

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