



U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

ODI RESUME

INVESTIGATION: SQ01-014
 DATE OPENED: Nov. 27, 2001 DATE CLOSED: Oct. 3, 2002
 SUBJECT: Post Rear End Collision Fires
 PROMPTED BY: Ford TSB No. 01-21-14
 Consumer Complaints
 PRINCIPAL ENGINEER: F. Borris

MANUFACTURER: Ford Motor Company
 MODEL(S): Ford Crown Victoria (including Police Interceptor), Mercury Grand Marquis,
 Lincoln Town Car
 MODEL YEAR(S): 1992-2001
 VEHICLE POPULATION: 3,128,603

PROBLEM DESCRIPTION: The fuel tank can rupture following a high-energy rear collision
 resulting in severe fires. A vehicle occupant surviving the impact trauma could be killed as a
 result of fire intrusion into the passenger compartment.

FAILURE REPORT SUMMARY

	ODI	MANUFACTURER	TOTAL
FIRES:	23	3	26
# INJURIES:	10	1	11
# FATALS:	14	2	16
OTHER:	2	0	2

Description of Other: Two reports were identified involving a post rear crash fire in the subject
 vehicles where the officer was struck and killed while standing out of the target vehicle.

ACTION: The Service Query is closed.

ENGINEER: [Signature]

DIV CHF: [Signature]

OFC DIR: [Signature]

DATE: 10/3/02

DATE: 10/3/02

DATE: 10-3-02

SUMMARY: The Office of Defects Investigation opened an investigation (SQ01-014) after
 reviewing a Ford technical service bulletin and consumer complaints involving fuel tank
 punctures and fires following high-energy rear collisions in MY1992-2001 Ford Panther
 platform vehicles (Crown Victoria, Grand Marquis, and Town Car.) During the course of its
 investigation, ODI:

- Reviewed documents from Ford, General Motors, plaintiff attorneys, and NHTSA records;
- Conducted on-site and phone interviews with police personnel; and
- Inspected post-crash subject vehicles.

For more detailed information, see the investigation closing report.

02913

10/8/02

Investigation No.: SQ01-014
 Subject: Fuel Tank Integrity in Rear Collisions
 Manufacturer: Ford Motor Company
 Model Years: 1992-2001
 Models: Crown Victoria, Town Car, Grand Marquis
 Date Opened: November 27, 2001 Date Closed: October 3, 2002

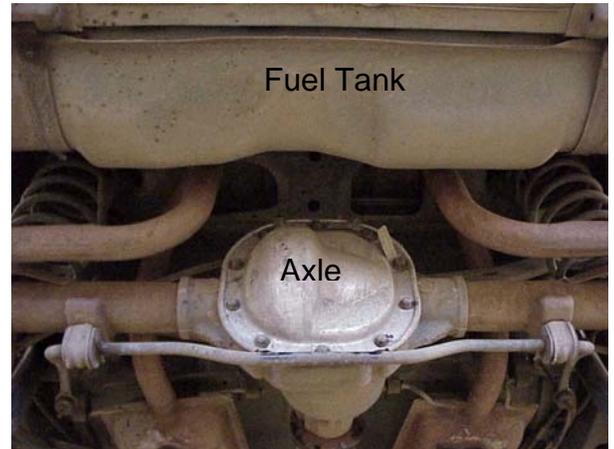
Background: The Office of Defects Investigation (ODI) opened a Service Query (SQ01-014) after reviewing a Technical Service Bulletin (TSB) (Ford Article 01-21-14) issued by Ford Motor Company (Ford). The TSB provides information and suggests modifications aimed at reducing the potential for post-rear crash fuel tank punctures in Ford's Panther Platform vehicles produced during Model Years (MY) 1992-2001.

Prior to the publication of the TSB, ODI received three letters from law enforcement organizations expressing concern or requesting an investigation into the potential for fuel leaks in Crown Victoria Police Interceptor (CVPI) vehicles following rear impact crashes. ODI requested additional information from one correspondent (National Troopers Coalition) and received summaries of 17 incidents alleging post rear crash fires (PRCF) in CVPI vehicles from calendar year (CY) 1983 to 2001. The summaries included allegations of 11 deaths of which 4 occurred during CY 2001. All the target vehicles involved were CVPIs and 14 were within the scope of the TSB. It stands to reason that the majority of PRCF's would occur within the law enforcement population of Panther vehicles due to their use on highways where high-energy collisions are most likely to occur. Law enforcement officers routinely pull motorists to the shoulder area exposing their vehicles to a greater risk of rear impact. A search of ODI's consumer complaint database revealed one incident involving a MY 2000 CVPI that burst into flames following a high-energy rear impact. Fortunately, the officer escaped with relatively minor injuries. Based on the above information, ODI determined that an investigation was warranted.

Chronology:

Date	Event	Remarks
Dec. 17, 1983	Officer Drew Brown fatal crash; Cobb County, GA	Earliest record of Panther platform PRCF fatality
Jan. 21, 1995	Ford Crash Test No. 9706, 50 mph crash of a 1989 Taurus into 1996 CV	Leakage in excess of FMVSS amount; caused by frame rail puncture (FMVSS 301 specifies a 30mph test speed)
Jul. 26, 1999	Florida Highway Patrol Study	Analysis of PRCFs involving Panther platform vehicles
Feb. 16, 2001	Ford makes presentation to Arizona Police Organizations	Statistically defends crash performance of Panther platform
Jun. 29, 2001	Ford meets with ODI and presents AZ presentation; offers to provide available reports	Reports on 5 incidents provided by Ford on August 10, 2001
Oct. 22, 2001	Ford publishes TSB	Ford also sends message to law enforcement about TSB via LAWNET
Nov. 27, 2001	ODI opens SQ01-014	ODI subsequently sends information request to Ford and to GM on B-Body vehicles

Fuel Tank Description: The Panther fuel tank is steel construction and has a usable capacity of 19 gallons. The system is equipped with a fill limiting feature to provide an air space of 12-14 percent at full capacity. The tank is positioned aft and slightly above the vertical centerline of the rear axle. In essence, the fuel tank is sandwiched between the rear axle and the forward trunk wall. This is not a new concept; Ford has used this same fuel tank location in the Panther platform since the late 1970's.



The picture to the right was taken at a local police department and shows the relationship of the fuel tank to the rear axle. The distance from the tank leading edge to the differential cover ring gear bulge is approximately four inches. Also visible are the sway bar brackets and dual exhaust pipes. This vehicle is a MY 2000 CVPI.

Population:

	Grand Marquis	Town Car	All Crown Victoria	Crown Victoria Police Interceptor
1992	146,391	109,120	137,000	26,569
1993	82,973	113,544	100,173	28,219
1994	95,089	113,028	100,983	31,700
1995	94,203	107,691	98,328	34,139
1996	95,034	90,764	108,273	52,567
1997	127,977	104,977	123,819	55,089
1998	87,784	83,048	85,406	43,432
1999	122,595	89,620	118,884	59,005
2000	135,349	89,228	103,814	63,155
2001	104,942	68,897	89,669	54,264
TOTALS	1,092,337	969,917	1,066,349	448,139

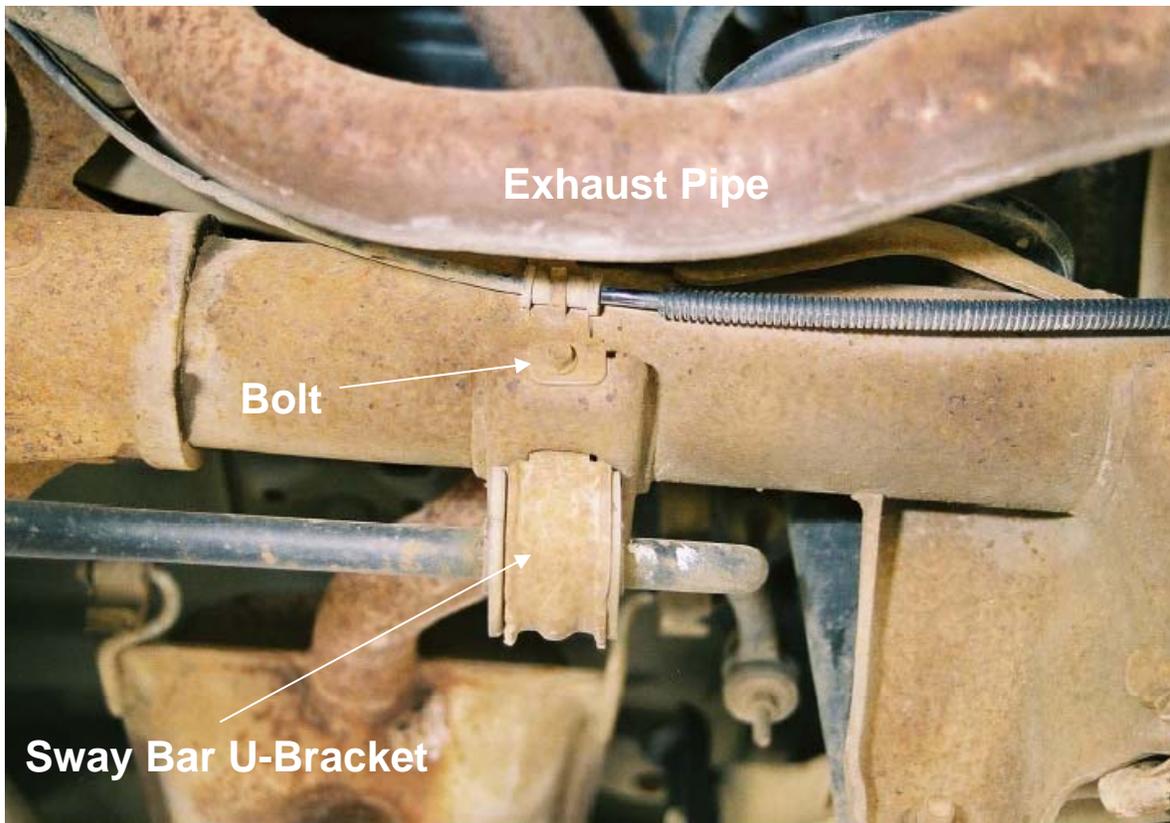
Ford TSB 01-21-14:

Although the scope of Ford's TSB includes all 1992-2001 Crown Victoria, Town Car and Grand Marquis vehicles, the focus is on law enforcement agencies who operate CVPI fleets. While it is true that the police and civilian versions of the Crown Victoria share the same fuel system and rear suspension geometry, the CVPI vehicles have a much greater exposure to high-energy rear impacts due to the nature of their use as blocker vehicles at crash scenes or during routine traffic stops along high-speed public roads. This is not to say that civilian vehicles cannot benefit in some measure from having the same modifications performed, but the vast majority of documented PRCFs in the subject vehicle population have occurred in the segment of the Panther population dedicated to police duty.

Prior to publishing its TSB, Ford had conducted a number of post crash inspections of CVPI vehicles and determined that at least one fuel tank puncture was caused by components mounted on the rear axle.

- 1) On 1992-1997 models, the hex-headed bolt that secures the parking brake cable to the axle protrudes beyond the cable bracket by 18 mm. Ford determined that this bolt could puncture the fuel tank in high-energy rear crashes. (In 1998 the Panther rear suspension was redesigned and does not use this parking brake attaching bracket or bolt.)
- 2) On 1992-2001 models, the sway bar U-brackets include a tab (4mm high by 6 mm wide) that can cut the tank. In high-energy rear crashes, the axle tends to rotate upward, exposing the fuel tank to these tabs.

To address these two potential sources of fuel tank puncture, Ford's TSB recommended replacing the hex-headed parking brake cable bolt with a different fastener having a rounded head and grinding the U-bracket tabs flush, leaving no sharp edges.



TSB Dissemination Efforts:

Ford indicated in its April 29, 2002 response to ODI that it met with at least three law enforcement agencies to discuss the TSB (Massachusetts State, Connecticut State, and City of Phoenix Police Departments). Additionally, Ford representatives introduced the TSB at two conferences at which it believes hundreds of law enforcement personnel were in attendance. Ford has also transmitted information on the TSB through law enforcement communications networks via the Michigan State Police onto the "LAW NET" system. Ford also states that its fleet hotline has received over a hundred contacts regarding the TSB and has responded directly to each law enforcement agency that made an inquiry.

**Federal Motor Vehicle Safety Standard (FMVSS)
No. 301, Fuel System Integrity:**

FMVSS 301 is intended to reduce deaths and injuries occurring from fires that result in fuel spillage during and after a motor vehicle crash. With regard to rear-impact crashes, FMVSS 301 requires that a stationary vehicle withstand an impact with a flat, 1,814 kg barrier moving at 48 km/h (30 mph) and not leak fuel in excess of 28g from impact until motion of the vehicle has ceased. Additionally, the vehicle shall not leak fuel in excess of 142g in the 5-minute period following cessation of motion.

Ford has established Safety Design Guidelines under which the company designs its vehicles not only to meet or exceed all applicable laws and regulations, but also to advance the state-of-the-art where practicable (see Ford Letter dated 2-1-84). Ford conducts fuel system integrity testing of its pre-production models at greater energy levels and under more severe conditions than that required by FMVSS 301. For example, Ford conducts rear impact testing with a moving barrier of similar mass and geometry as specified in FMVSS 301; however, Ford increases the impact speed to 56.4km/h (35 mph) representing a 16.6% speed increase or, more importantly, a 36.1% increase in energy at impact. Ford also conducts vehicle-to-vehicle rear impact testing at 80.6 km/h (50 mph) where the bullet vehicle (typically a Taurus) strikes the target vehicle at what Ford believes is the most severe point of impact (i.e., 50% offset towards the fuel filler side of the vehicle).

Ford indicated in its response to ODI that the subject vehicles not only meet but exceed the requirements of FMVSS 301.

Design Changes:

Ford has made the following design changes affecting Panther Platform fuel system integrity:

- In August 1993 for the MY 1993 initial production release, Ford added a reinforcement ring around the tank opening for the fuel level sender. This was done to strengthen the tank structure and reduce the potential of the fuel sender being forced out by hydrostatic forces created during a crash.
- In August 1995 (for MY 1996), Ford added two plastic polyethylene shields that mount on the frame between the tank and frame. This was done to reduce the potential of the frame puncturing the tank (Ford had conducted a

crash test in January 1995 during which the frame distorted, producing sharp edges that punctured the tank).

- In November 1997 (for MY 1998 ¼ vehicles), Ford deleted the polyethylene shields, citing that the FMVSS certification was conducted without shields installed. The rear frame was reinforced in the kick-up area to reduce the likelihood of buckling in that area. To address the potential for fuel tank punctures associated with the rear bumper, Ford modified the center bumper reinforcement, added two welds to the outboard edge of the mounting bracket and center beam section, and increased the rear panel thickness of the fuel tank from 0.030" to 0.037". It should also be noted that the rear suspension was substantially redesigned for 1998 to incorporate a Watts link. As part of this redesign, the parking brake cable was rerouted such that the bolt identified in the TSB was deleted.
- In May 2001, Ford released into production new sway bar brackets without the tab identified in the TSB for the Crown Victoria and Grand Marquis. The Town Car is built at a different plant and did not have the revised U-Brackets implemented until October 2001.

Comparison to GM B-Body:

From MY 1985 to MY 1996, GM produced over 1.7M of its B-Body vehicles (Caprice, Impala). Like the Panther vehicles, the GM B-Body vehicles are rear wheel drive, four door sedans of similar weight. GM sold a similar percentage of the total B-Body production (15% vs. 14% for Panther) to law enforcement organizations. Thus, the B-Body is the most comparable vehicle to the Panther for peer analysis.

GM Vehicle Populations:

Model Year	All B-Body	B-Body w/SEO
1985	242,121	Unknown
1986	231,771	Unknown
1987	202,095	19,058
1988	157,313	25,278
1989	166,905	34,058
1990	85,323	35,535
1991	217,462	36,015
1992	92,708	26,366
1993	82,677	24,994
1994	90,324	30,140
1995	80,735	25,327
1996	69,623	9,450
TOTAL	1,719,057	266,221

Note: "SEO" refers to Special Equipment Option code and designates police use.

MY 1996 Vehicle Specifications

	Crown Victoria (Panther)	Caprice Classic (B-Body)
Wheel Base (in.)	114.4	115.9
Length (in.)	212.0	214.1
Height (in.)	56.8	55.7
Width (in.)	77.8	77.5
Curb Weight (in.)	3,800	4,036

Like the Ford Panther vehicles, the GM B-Body stores its fuel in a tank mounted aft of the rear axle. But unlike the Panther's vertically mounted steel tank, the B-Body tank is made of plastic (HDPE) and is horizontally mounted below the trunk floor. As illustrated in the photographs below, the GM fuel layout strategy presents less of the tanks leading edge toward the rear suspension components at the expense of being further within the vehicle's crush zone.



Panther Fire Reports:

ODI has identified 26 reports of Panther fires following a high-energy rear impact crash with either another vehicle or a stationary object. These reports span approximately September 1992 to August 2002 and do not include reports involving vehicles outside of the scope of Ford's TSB. Information regarding these incidents was obtained from Ford, the 1999 Florida Highway Patrol Study, plaintiffs' attorneys, news media, and ODI records. Of the 26 reports, 22 involve law enforcement vehicles (CVPI) and 4 occurred during civilian use. A fatality resulting from thermal injuries is alleged in 16 of the 26 reports along with 4 reports of serious burns.¹ Estimates of bullet vehicle impact speeds range from 55 to 85 mph. The mass of the bullet vehicle also varies greatly from a relatively light 1997 MY Honda Prelude at roughly 3000 lbs. to a 1999 MY International tractor-trailer partially loaded at 48,000 lbs. Some of the reports alleged that the front passenger door was jammed shut by the force of impact, further decreasing the likelihood of escape.

¹ A total of 18 fatalities are associated with the 26 known reports of Panther fires. One particular crash resulted in the death of three civilian passengers seated in the rear row of seats. Additionally, two police officers were struck and killed by the bullet vehicle while they were standing outside of their respective Panther vehicles which were also struck and ignited.

Fuel Tank Failure Mode:

Information concerning the fuel tank failure mode is not readily available for 11 of the known reports. However, the parking brake cable bolt is alleged to be a contributing factor in 7 reports. Other alleged sources of fuel tank failure include:

- One side of the frame rail bending producing sharp edges (3);
- A shock absorber support rotating from its original position (2);
- Severe crush caused by massive penetration of the bullet vehicle (1);
- A fuel pump assembly dislodging from its flange (1);
- A aftermarket floor jack puncturing the rear half of the tank (1); and
- Rupture caused by a trunk-mounted radio (1).

It should be noted that in some of the examined tanks show evidence of multiple failures.

B-Body Fire Reports:

As indicated above, ODI also requested information from GM using the same criteria as that requested from Ford. From a review of GM's response and the Florida Highway Patrol study mentioned above, ODI identified 11 reports including 6 (55%) law enforcement vehicles and 5 vehicles in civilian use. These reports span 11 calendar years from 1989 to 1999 and resulted in 6 fatalities and 5 injuries. No specific fuel tank failure mode information was provided with these reports.

Fatality Analysis Reporting System (FARS):

FARS is a census of all fatal crashes occurring on public highways in the United States. ODI conducted a recent search of the FARS database for the MY 1992 - 2001 Panther models, including both civilian and law enforcement, where the initial impact point was equal to 5, 6, or 7 o'clock. This search was repeated for the GM B-Body models from MY 1985 -1996. For the period covering calendar years 1992 to a portion of 2001, the subject Panther vehicles are reported as having 21 fires out of a total of 267 fatal rear crashes yielding a fire/fatal rear crash ratio of 21/267 or 8.0%. Similarly, for the same period of time, the B-Body vehicles are reported as having 12 fires out of a total of 190 fatal rear crashes for a ratio of 12/190 or 6.3%.

"Florida Highway Patrol (FHP) Rear End Collision Study of 1999":

This study was conducted by Florida's Bureau of Law Enforcement Support Services and was completed on July 26, 1999. A total of 32 crashes involving 13 law enforcement vehicles were analyzed of which 23 were from the FARS database. The models and model years selected were the 1992-1997 Ford Crown Victoria, the 1991-1996 Chevrolet Caprice, the 1985-1997 Ford Taurus and the 1989-1997 Chevrolet Lumina. These populations were selected because all of these vehicles were sold with a police package as an option. The two front wheel drive models (Taurus and Lumina) both have the fuel tank located forward of the rear axle, while the opposite is true for the two rear wheel drive models.

In order to compare the risk of a PRCF, the study used sales figures and reports from FARS of fatal crashes involving fire. An estimate of MY 1997 sales figures was made for the two Ford models based on previous sales trends since the actual figures were unavailable at the time. The study determined that the CVPI and B-Body were comparable based on the then-current FARS data with fatal rear-end crash rates with fire per 100,000 vehicles of 0.427 and 0.431 respectively. The Taurus (0.089) and Lumina (0.115) rates were significantly lower, but some of this difference may be attributed to differences in the service environment between rear wheel and front wheel drive vehicles. Specifically, law enforcement officers tend to use the rear wheel drive vehicles in greater numbers for duty on high-speed roadways, exposing this population to a greater potential for high-energy rear impacts.

California Highway Patrol (CHP):

ODI contacted the CHP in April 2002 while conducting an informal survey to ascertain the law enforcement community's awareness of Ford's TSB. The CHP contact provided the following approximations regarding the CVPI field performance. The CHP operates a fleet of 4,200 vehicles including 2700 CVPI vehicles. Vehicles in the CHP fleet are retired after 40-42 months of use. The CVPI fleet averages 55-60 million miles of highway use per year or 20.3K miles per vehicle per year. It is common for the CHP to average one rear impact collision per week resulting in a CVPI vehicle being totaled. The average impact speed for these crashes is between 45-55 mph, but some are significantly greater. According to the CHP representative's memory, there were only two incidents in the past few years of fuel tank failure following a rear crash. One of the two resulted in a fire and fatality.

Ford Testing:

In connection with a product liability lawsuit, Ford contracted with an independent test facility in February 2002 to conduct high-energy crash testing of three Ford Crown Victoria vehicles and one Chevrolet Caprice. In each test, the target vehicle was parked in neutral on level ground at 95% fuel system capacity (with Stoddard solvent). For each of the vehicle-to-vehicle crashes, the bullet vehicles were positioned such that the front bumper centerline of the bullet vehicle impacted the rear bumper of the target vehicle 23 inches to the left of the target centerline.

Test No.	Target Vehicle	Bullet Vehicle	Speed (mph)	Fuel Leakage?	Remarks
7148	1996 Crown Vic (OEM)	Moving Deformable Barrier (MDB)	50.2	None / 30 min	No fuel loss for 30 minutes
7142	1996 Crown Vic (OEM)	1995 Nissan Altima	70.4	15.7oz / 20 min	Fuel loss around filler pipe, no TSB component punctures
7156	1996 Crown Vic (with plastic shield and TSB performed)	1995 Nissan Altima	71.6	117oz / 30 min	Fuel loss from small hole at lower left seam and at filler pipe
7153	1996 Caprice	1995 Nissan Altima	72.4	328 oz / 24 min	Fuel loss at filler pipe and from right rear lower surface

Crash Test 7156 (Crown Victoria) showing severe penetration.



Crash Test 7156 (Crown Victoria with TSB modifications) showing crushed fuel tank with a black polymer shield installed.



The photograph below was taken during Crash Test 7153 (Caprice) and shows severe penetration and resulting leakage.



Crash Test 7153 (Caprice) showing severe deformation of fuel tank.



Manufacturer's Position:

On February 8, 2002 Ford submitted the following comments in response to ODI's Information Request Letter:

...the rear impacts that have resulted in fuel leakage have been so severe that it is likely that similar vehicles from any manufacturer would also experience fuel leakage in similar impacts.... The impacts that were resulting in fuel leakage were occurring at extremely high closing speeds, almost always above 60 miles per hour with some as high as 84 miles per hour, and frequently involved heavy and rigid vehicles, such as pick up trucks, or even larger and heavier commercial vehicles, such as dump trucks or tractor trailer vehicles.

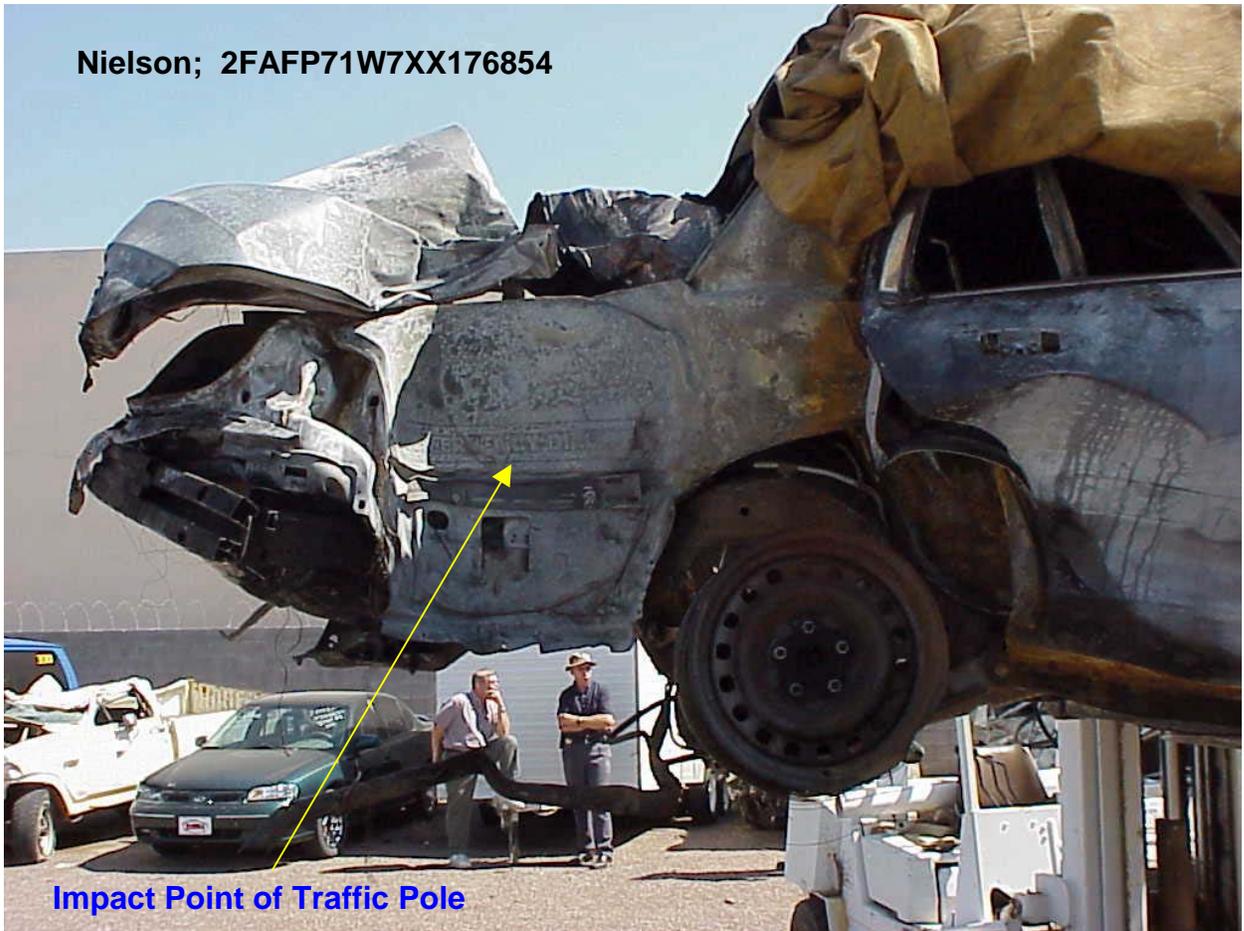
No vehicle or fuel system design can completely eliminate the risk of fuel leakage in extremely severe collisions.

Vehicle Inspections:

During the course of this investigation, ODI received a report of a fatal crash with fire involving a Chandler, Arizona police officer. According to a press release from the Chandler Police Department, the officer was driving a subject CVPI that erupted in flames after striking a traffic signal pole. ODI sent an investigator to Arizona on June 26, 2002 to inspect the CVPI and three other Arizona-based CVPI vehicles involved in earlier PRCFs. ODI met with staff from the Arizona Department of Public Safety (DPS) and reviewed crash documents including eyewitness statements, reconstruction reports, and photographs.

Chandler Crash: Officer Robert Nielson was killed in the line of duty while responding to investigate a traffic collision on June 12, 2002. His MY 1999 CVPI was traveling westbound at an estimated 76mph and carrying a half tank of fuel when it was struck on its left rear by an eastbound MY 1999 Mitsubishi sedan. The initial impact tore the left frame rail apart and ripped the left side axle and housing out of the center differential housing. The impact sent the CVPI into a counter-clockwise rotation until it struck a traffic signal pole on its left rear quarter panel behind the rear axle. There was approximately 47 inches of crush damage to the right side of the vehicle, centered just rearward of the axle and in line with the fuel tank. An inspection of the tank revealed three sources of fuel leakage: a small hole caused by the differential housing, a large hole caused by the right fuel tank strap mount, and another small hole from an unidentified object in the trunk. The Ford TSB modifications had been performed on this vehicle.

Nielson; 2FAFP71W7XX176854



The picture at left of the Nielson fuel tank shows the severe crush concentrated on the right side. This would result in an immediate loss of volume and corresponding increase in internal pressure.

The picture at right shows the underside of the Nielson tank reinstalled in the vehicle. The area inside the red circle shows the largest hole caused by the right fuel tank strap mount. The small area of daylight visible through this hole is from the fuel filler pipe opening.



ODI also inspected two other PRCFs that occurred during the course of this investigation. In July 2002 near Atlanta, Georgia, a MY 1998 CVPI operated by Cobb County Police was struck in the rear by a MY 1997 Mack tractor-trailer operated by the US Postal Service traveling at approximately 55 mph. The officer was able to escape the vehicle via the right side front window. An inspection of this vehicle was conducted on July 16, 2002. A visual inspection of the vehicle indicates that the fuel tank was punctured in at least two locations. The larger of the two punctures was caused by the left, lower shock absorber mount. A smaller hole appears to have resulted from the edge of the differential cover.

Another MY 1998 CVPI was struck from the rear on August 5, 2002 near Buffalo, NY by a 2002 Chevrolet pickup truck hauling a gooseneck cattle trailer at an estimated speed of 55 mph. The officer was rendered unconscious by the force of the impact but was removed from the burning vehicle by nearby witnesses before suffering serious injury. A contractor working on behalf of ODI inspected the vehicle and determined that at least one puncture of the fuel tank was caused by the left sway bar U-bracket. Although the Ford TSB recommendations had been performed on this vehicle, the U-bracket made contact with the tank along an edge other than the area ground away in accordance with the TSB.

Ford Activities:

After the Nielson crash, Ford began working with the Arizona Attorney General to develop its CVPI Police Officer Safety Action Plan (POSAP). The POSAP is a joint effort by Ford and the law enforcement community to address the entire spectrum of work practices and equipment that protect law enforcement personnel from PRCFs. Three major components comprise the Plan: the formation of a Blue Ribbon Panel, the formation of a Technical Task Force, and efforts aimed at improving communication between Ford and local law enforcement agencies.

The Blue Ribbon Panel is tasked to identify best practices to help avoid crashes and improve officer safety by focusing on issues such as vehicle visibility, use of vehicles as barriers, and police procedures during traffic stops. The panel is comprised of nine members: four appointed by the Arizona AG; four appointed by Ford; and the remaining position will be reserved for the chair of the Technical Task Force.

The Technical Task Force was tasked to study crashworthiness issues for the CVPI that may include: bladders (see Figure below), shields, trunk usage, fire suppression, and test development. It is comprised of Ford engineers and fuel system experts in addition to selected outside technical experts, including representatives from the military and the racing and aviation industries.

Ford indicated that it has conducted tests of fire suppression materials and is partnering with experts in this field. Although earlier reports from Ford indicated that fuel bladders would be evaluated by the Technical Task Force, Ford stated that it has been unable to initiate testing as of this time.

On September 27, 2002, Ford announced a series of actions aimed at enhancing police officer safety and improving communication.

- The availability of a new upgrade kit for the CVPI designed to reduce the potential for fuel tank punctures in rear crashes by shielding critical components. Upgrade kits will be provided by Ford for all Police Interceptors currently in police service at no cost. Parts will be available in late October 2002 via Ford dealerships.
- The development of an optional trunk package designed to reduce the potential for fuel tank puncture by items stored in the trunk. This package will be available by the end of this calendar year.
- The availability of a trunk template that can be placed on the trunk floor indicating the optimal positioning of equipment.
- The availability of a new Internet web site (www.cvpi.com) dedicated to improving communication between Ford and the law enforcement community. Ford requested that law enforcement agencies visit the new web site immediately to obtain more information and later, during the week of October 21, 2002, to register affected vehicle fleets to facilitate the shipment of upgrade kits to local dealerships.

Center for Auto Safety (CAS) Petition:

On July 22, 2002, the CAS petitioned NHTSA to upgrade SQ01-014 to an Engineering Analysis and to expand the scope of its investigation to include all fuel-fed post crash fires in the subject vehicles regardless of the source or direction of impact. ODI conducted searches of the FARS database for information on all MY 1992-2001 Panther vehicles and all other sedans (AOS) for fatal crashes involving fire. These searches included all impact locations and were executed once including police vehicles and once excluding police vehicles.

Expressing the risk of fire as a ratio of fires in fatal vehicles per total fatal vehicles yields a ratio (including police vehicles) of 0.033 for both the Ford Panther and AOS. Excluding police vehicles yields a ratio of 0.029 for the Ford Panther versus 0.033 for AOS. These results indicate that the subject vehicles are not over-represented with respect to the risk of fire in high-energy crashes.

ODI Findings:

- The crash energy levels associated with post rear impact fuel tank failures in the CVPI vehicles are significantly greater than the levels in FMVSS 301 tests.
- Fuel tank failures during high-speed rear impacts can result from numerous causes in addition to the hex-headed bolt and U-brackets identified in the Ford TSB. Crash reports identify many causes for loss of fuel system integrity during a high-energy rear crash, such as puncture from a deformed frame rail, lower shock absorber supports, or stowed items in the trunk, hydrostatic rupture, and other causes.
- Based on analysis of FARS data, the risk of fire per fatal rear crash in the subject vehicles is comparable to that of the GM B-body vehicle (Caprice).
- The vast majority of reported post rear crash fires in the subject vehicles (over 80%) occurred in CVPI vehicles, even though they constitute less than 15% of the total Panther vehicle production.

- The Florida Highway Patrol Study did not identify a difference between the post rear impact fire risk in CVPI vehicles and that of the Caprice police vehicles.
- Ford-sponsored testing indicates that the subject vehicles are not unique in their inability to maintain fuel tank integrity in at least one example of a severe rear impact crash.
- There have been numerous high-energy rear crashes involving CVPI vehicles within the scope of Ford's TSB that exhibited little or no fuel loss and no fire.

The available information regarding fuel tank failure mode, the risk of fire per fatal crash, field performance, and crash testing indicate that the performance of the subject vehicle in high-energy rear crashes is not unlike that of the most comparable peer vehicle, the GM B-body.

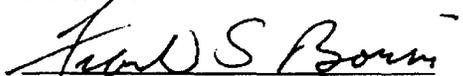
Reason for Closing:

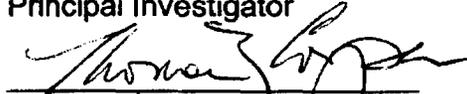
Under the present circumstance, it is unlikely that further investigation would produce sufficient evidence to demonstrate the existence of a safety-related defect in the subject vehicles. Therefore, this investigation is closed based on the evidence available at this time. The agency reserves the right to take further action if warranted by new or changed circumstances.

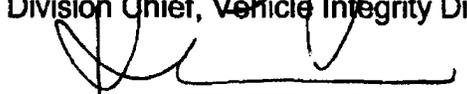
Future Activities:

NHTSA will continue to monitor efforts by Ford and other parties to enhance the safety of law enforcement officers in motor vehicle crashes. To direct even more attention and resources to this issue, the agency is entering into a collaborative partnership with the International Association of Chiefs of Police (IACP). NHTSA anticipates that this cooperative effort will study such issues as emergency vehicle lighting configuration and their effect on crashes; placement of police vehicles during traffic stops; after-market equipment placement on officer safety; the use of sport utility vehicles as police vehicles; and safety issues associated with the use of other types of "non-traditional" vehicles for law enforcement purposes. NHTSA believes that this effort, coupled with the work of the Ford/Arizona Blue Ribbon Panel and Technical Task Force describe above, will help build a compendium of best practices to promote police vehicle safety.

I concur:


Principal Investigator


Division Chief, Vehicle Integrity Division


Office Director, Office of Defects Investigation

02928