



**Virginia Commonwealth University  
Transportation Safety Training Center  
Virginia Multi-disciplinary Crash Investigation Team**

Report Number 197 – May 2006

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**ABSTRACT**

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The crash described in this report occurred when the driver of one vehicle began traveling the wrong way on a limited access rural interstate highway. He encountered traffic and struck a vehicle traveling in the correct direction in the left travel lane. The roadway alignment was a gentle right curve on a slight upgrade. The two sport utility vehicles struck head on and both burst into flames, incinerating the drivers and the vehicle components and contents. Witness statements taken both at the scene and in the days immediately following all seemed in agreement regarding which vehicle had been traveling the wrong way, but they were not consistent with the physical evidence and crash dynamics.

This crash report illustrates the need for gathering physical evidence and using sound reconstruction techniques for investigation, as well as the questionable reliability and accuracy in witness accounts of catastrophic events. It further demonstrates the limitations of visual perception in low lighting conditions. Driving under the influence of alcohol and the need for conspicuous signage to alert wrong way drivers are also discussed.

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**SYNOPSIS**

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**Day, Time, Season:** Friday, 11:20 p.m., Winter

**Road/Weather:** Dry, clear

**Vehicles Involved:** 1998 Ford Expedition SUV, Red in color,  
2005 Chevrolet Trailblazer SUV, White in color

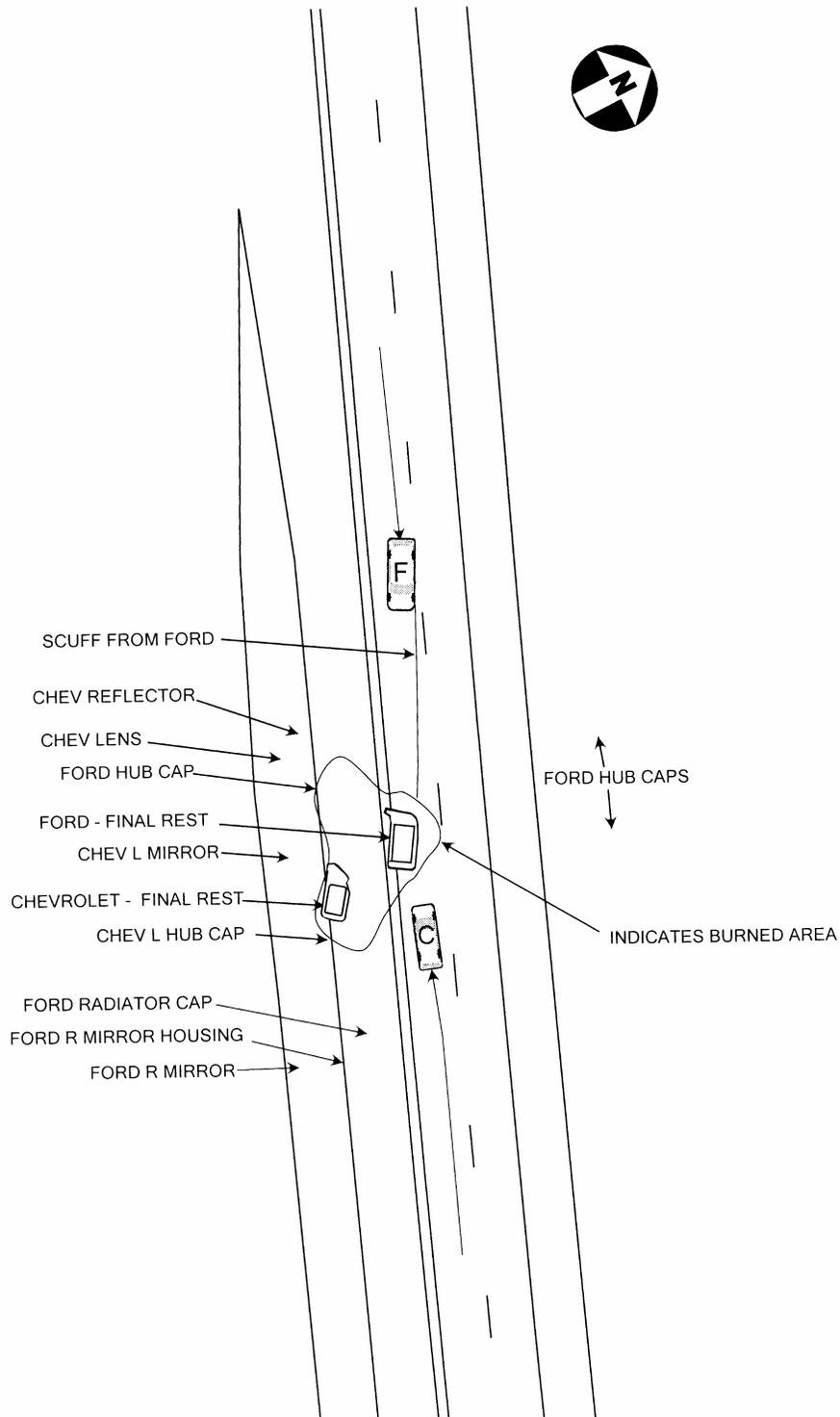
**Summary:** The Expedition, traveling the wrong direction in the left travel lane, struck the Trailblazer head on. Both vehicles burned completely without either driver escaping.

**Severity:** Two fatalities, extensive property damage. Traffic blocked.

**Probable Cause:** Wrong-way driver.

**Significant Points:** Wrong way drivers, driving under the influence of alcohol, highway signs to alert wrong way drivers, the limitations of visual perception in reduced lighting conditions, eyewitness accounts and physical evidence in crash reconstruction.

VIRGINIA  
MULTI-DISCIPLINARY  
CRASH INVESTIGATION TEAM  
REPORT NUMBER 197  
Rural Interstate Highway  
1998 Ford Expedition  
2005 Chevrolet Trailblazer



## CRASH DESCRIPTION

On a clear Friday night in January at approximately 11:20 p.m., a white 2005 Chevrolet Trailblazer, a medium size sport utility vehicle (SUV), was traveling west in the left travel lane of a four lane, divided, limited access rural interstate facility. The road alignment is a very slight upgrade for vehicles traveling west and a long, gentle, sweeping curve to the right. The travel lanes were paved with asphalt, both 12 feet wide with an 11-foot paved shoulder bordering the north and a three-foot shoulder to the south. The pavement in this area was resurfaced approximately six months prior. The lane markings were fresh and in good repair. There was a yellow solid line at the lane edge adjacent to the median, dashed white lines delineating separation between lanes and a solid white line between the right shoulder and edge of the right lane. However, the reflectors embedded in this section of the pavement had not been replaced in the westbound lanes, although they had been replaced in the eastbound lanes. The pavement edges are bordered by a grass berm that slopes gently into drainage ditches on both sides. The median then rises approximately 3 to 4 feet above the road surface and is lined with trees, shrubs and other vegetation. The speed limit is posted at 65 mph. The highway is not lighted; however, there is a rest stop on the other side of the median that does have lighting that shines through defoliated trees, casting some light across the median. There was no appreciable moonlight on the night of the crash. The surface was dry and the weather clear. Traffic was light to moderate for that time of night.

The Trailblazer, operated by a lone 37-year-old male who was headed home after arriving at a nearby airport, was approximately one half mile east of the westbound rest stop. Only a few miles from his home, he passed a westbound car in the right lane and continued west. As the Trailblazer approached a tractor-trailer also traveling in the left lane, the driver of the rig moved into the right lane.

A red 1998 Ford Expedition, a full size SUV, was traveling east, in the wrong direction in the left westbound travel lane of the interstate highway. The 52-year-old male driver of the Expedition was traveling alone and was supposed to be en route to visit his mother and daughter. They resided in a state to the northwest, approximately seven hours away. The Expedition passed several vehicles, including the tractor-trailer that had just moved into the right lane. Witnesses indicated that both the Expedition and the Trailblazer had their respective tail and headlights turned on. As the SUVs approached each other in the left lane, the Expedition driver

apparently steered to his right in an attempt to avoid the imminent collision. His tires began to side-slip in the road, leaving four scuff marks that were visible the night of the crash. A 70 foot yaw mark was observed a week later and identified by the reconstruction team trooper as the mark made by the Expedition's left front tire. The Expedition then struck the westbound Trailblazer head on, with the driver's side of the front impacting slightly ahead of the passenger side. The angle of the collision damage to both vehicles indicates that the Trailblazer also swerved toward the median just prior to impact.

Upon impact, the two vehicles moved forward into each other, causing extensive crushing of the engine compartments and intrusion into the front occupant compartments for both SUVs. Although the damage occurred across the entire front of both vehicles, the heaviest penetration to the westbound Trailblazer was on the passenger side (see Photo 1 and 3). On the driver's side, the front of the vehicle was crushed in 2.9 feet; on the passenger side, the severe forces collapsed 5.2 feet of the engine compartment. For the Expedition, the driver's side received the greatest intrusion (see Photo 2 and 4). The front of this SUV was crushed in 3.2 feet on the driver's side, while the passenger side had 2.9 feet of collapse. After maximum engagement, the vehicles began to separate and rotate. Fire erupted as a result of the collision. Damage to the vehicles and the road made it impossible to determine specifically where and when the fire started, or its cause. The lighter Trailblazer was pushed backward, rapidly rotating nearly 360 degrees counter-clockwise. It came to rest in the median with its rear wheels in the ditch and the back bumper against the raised median. This vehicle burned extensively, destroying the white painted surfaces and leaving the metal exposed. The grass median caught fire and burned the area around the Trailblazer, as well. The Expedition continued forward slightly after impact, rotating clockwise approximately 165 degrees, and came to rest in the left travel lane. The red painted surfaces, tires and non-metallic components of the Expedition burned, including the spare tire mounted beneath the luggage compartment, which left an impression in the asphalt pavement.

Witnesses to the crash immediately stopped, parking their vehicles on both shoulders near the scene. They summoned police, fire and EMS using cell phones. The tractor-trailer driver had stopped after seeing the crash in his rear view mirror. He and other witnesses observed that the Trailblazer driver was obviously deceased, so he attempted to use a fire extinguisher on the burning Expedition, but the fire was too large to control. Unable to do anything more, the witnesses stood off to one side, several discussing what they had seen.



**Photo 1: Front view of Trailblazer**



**Photo 2: Front view of Expedition**



**Photo 3: Right side view of Trailblazer**



**Photo 4: Left side view of Expedition**

A Virginia State Police Trooper on a traffic stop some three miles distant was the first responder, arriving on the scene only minutes after he received the call. He also approached the burning vehicles with a fire extinguisher but quickly determined that his equipment was not sufficient to put out the blaze. Fire and rescue units arrived a few minutes later and began to battle the blaze. Three tankers and two engines responded, and the fire fighters used foam to extinguish the flames, although gasoline flowing on the ground and under the vehicles made it difficult to control. They also shut down both westbound travel lanes until the flames had been put out and the danger of potential explosions eliminated, which took about twenty minutes. Three ambulances also responded to the scene. Even though it was apparent that no one survived the crash, rescue workers remained until the scene was cleared, in case injuries occurred to workers during the clean-up phase. Approximately thirty minutes after the call was first received, other State Police personnel arrived to assist the investigating trooper. Virginia Department of Transportation (VDOT) workers arrived with trucks and cones and blocked the left lane, allowing traffic to pass on the right. They also scraped melted metal from the road and placed barrels on the shoulder until the road surface could be repaired and painted. Members of the local press arrived at the scene as well.

The trooper on scene called for a Virginia State Police (VSP) divisional crash reconstruction team, as mandated by his department's protocols and as advised by the midnight shift supervisor. He additionally requested dispatchers to alert the Public Information Officer (PIO) to this crash, as well as the supervisor on call for his area. While waiting for these people to respond, he began collecting the names of witnesses, gathering information about what they saw and their respective vantage points. All of the witnesses interviewed the night of the crash indicated the "white" SUV was traveling the wrong way. The area supervisor arrived, as did a trooper assigned to conduct the reconstruction of this crash. After discussing the available information about the crash with the investigating trooper, including the apparent agreement across witness statements about which vehicle had been traveling the wrong way, the area supervisor made a decision not to have the reconstruction team involved. The reconstruction team trooper already present, although not in total agreement, then cancelled the other team member and remained on the scene in case further assistance was needed. The PIO handled the media inquiries on the scene and released the preliminary findings, which were based only on the witness statements.

The charred remains of the drivers were found in the area behind the steering wheels of their respective vehicles. No other human remains were found in the vehicles. The trooper attempted to call a local medical examiner but ultimately contacted the district office, where an on-call medical examiner gave permission to remove the bodies. The trooper also contacted several local funeral homes, but none were able to accept the bodies. He then contacted a removal service in a nearby city. Fire department personnel prepared the scene for removal of the victims, shielding the area from the view of passing motorists. When the removal service employees arrived, the drivers were extricated from the vehicles and transported to the nearest Office of the Chief Medical Examiner. The vehicles were then removed by waiting tow trucks, fire and rescue workers departed, and VDOT workers re-opened the left lane to traffic. The scene was cleared at 4:40 a.m., just over 5 hours after the crash.

### **REMARKS**

Even though he had not conducted a full reconstruction of the crash, the trooper on the reconstruction team who had been present at the scene observed the damage to the vehicles, their positions at final rest and the marks that were visible on the roadway that night. Based on his knowledge of reconstruction, he was uncomfortable with the conclusions drawn from the witness statements. Later, he discussed the matter with the investigating trooper, who also had some concerns. He then contacted a member of the Virginia Multi-disciplinary Crash Investigation Team (VMCIT) to discuss some of those concerns and to perhaps look at the physical evidence more closely.

After the initial contact with the reconstruction trooper, members of the VMCIT went to the crash site to assess the area and look for physical evidence. The burn areas and damage to the road and shoulders were easily identified. An examination of the median terrain, which had not been conducted in the dark the night of the crash, revealed pieces of debris from the two vehicles. Parts that had broken off and were thrown from the two vehicles could be identified and their locations were noted. Team members then visited the sites where the vehicles were stored, assessing the damage to each and matching the unburned parts found at the crash site to specific locations on each of the SUVs. It quickly became apparent that the vehicle placement described by witnesses was erroneous. After identifying a number of issues that would be valuable from a reconstruction perspective, the VMCIT decided to fully investigate this tragic

incident. The following day, with support from VDOT and the reconstruction trooper, members returned to the crash site. One lane of the interstate highway was closed to traffic for approximately three hours while detailed measurements and a thorough search of the area was conducted. The vehicles were examined again, measured and photographed.



**Photo 5: View looking west with burned area in foreground. Note total station on left shoulder and cubes depicting remaining scuff mark and outlining the burned area.**

The scene was measured using an electronic total station to document road features, the placement of evidence and the final resting positions of the vehicles. A VMCIT member noted the absence of in-pavement reflectors in the area of this crash. New pavement started near the cross-over approximately .6 mile east of the crash and the reflectors had not been replaced from that point westward to and beyond the scene.

Two Expedition hubcaps were located in the ditch across the roadway, approximately 50 feet north of the impact area. The remaining parts from the vehicles were found in the median. Another Ford hubcap was located approximately 20 feet south of the SUV's final resting position. The Expedition's outside right mirror glass was found intact near the top of the

embankment, approximately 60 feet southeast of the impact area. Embossed on the surface of this mirror were the words “Caution Objects Are Closer Than They Appear”, a message that is printed only on the right mirror. The housing for this mirror was found in the ditch at the bottom of the embankment, 56 feet southeast of the impact site. A piece of a coolant reservoir with the pressure cap still attached, which was traced back to the Ford Expedition, lay near the mirror housing.

Pieces of the Chevrolet Trailblazer were found on the other side of the impact area. The front corner lamp assembly and a reflector, both labeled “LH” (Left Hand) and matched to the Trailblazer, were located 30 feet southwest. A hub cap from the Trailblazer was located 25 feet south of the collision site.

Since items broken from the vehicles at impact usually continue in the direction the vehicle was originally traveling, this physical evidence tends to validate the VMCIT opinion that the Trailblazer was traveling west and the Expedition east when the impact occurred. Parts that could be matched to the left side of the Trailblazer were found in the median, west and south of the impact site. These would have broken off and continued in a westward direction if that vehicle had been traveling west. Several parts matched to the Expedition were found in the median south and east of the collision area. They would have been projected east if the Expedition had been traveling east. As the two vehicles struck, two hubcaps from the left side of the Expedition popped off and were propelled across the two lanes and into the ditch on the far side of the interstate. The third hubcap, which came from the right side, ended up in the median. A post-crash examination revealed that no hubcaps remained on the Expedition. The Trailblazer had left front and right rear hubcaps still attached when examined later.

The scarred and burned areas of the road were noted and measurement of the remaining scuff mark was documented. According to the reconstruction trooper who had been on the scene, four scuff marks had been visible the night of the crash. These marks, which showed clear crossover of the tires and striations from their sliding during the abrupt steering maneuver, were not measured or photographed at that time. A week later, only one mark, 70 feet long, was visible (see Crash Diagram, page 3). Based on the reconstruction trooper’s identification, this mark was determined to be from the loaded steering tire, in this case, the left front tire of the wrong way vehicle. Two sets of chord and middle ordinate measurements were taken to determine speed from the remaining scuff mark. An initial speed of approximately 83 mph was calculated for the wrong way vehicle. The second set, taken closer to the point of impact,

indicated a speed of approximately 73 mph. The decreasing speed calculation from the second measurements is consistent with what would be expected from a yaw mark. These speed calculations were compared to estimates using crush and a simultaneous inline solution formula. The additional methodologies yielded results that were consistent with the speeds calculated from the yaw marks.

After reviewing the data they had gathered during the follow-up investigation, the VSP reconstruction troopers prepared a preliminary Crash Team Report illustrating what the analysis of the physical evidence revealed. This report was reviewed by management and released to the press, along with the identity of a driver who had not been positively identified previously.

Several witnesses reported seeing a white SUV driving in the wrong direction that night. One described seeing headlights straddling the white line as it approached and then a “white GM product” passed him and several other vehicles, including a tractor-trailer. When interviewed on the night of the crash, the tractor-trailer driver indicated that he saw a white vehicle going the wrong way. During a follow-up interview several days later, he recanted, saying that he could not tell what kind of vehicle passed him going the wrong way, but that everybody who stopped said it was a white vehicle. He reported that he saw “an explosion” in his mirror and pulled over.

Only two of the witnesses, interviewed by the investigating trooper several days after the crash, reported seeing the vehicles actually collide. The first individual had been four or five car lengths behind an SUV when it was struck head on. He stated that he saw brake lights from the vehicle ahead of him a couple of seconds just prior to impact and that he was afraid the vehicle would hit him as it spun in the road. He described the vehicle he had been following as a red SUV and stated that it collided with a white SUV.

The second of these witnesses did not give her name to the investigating trooper the night of the crash. Five days later, she talked to members of the press, who released her story. She then contacted a local police department and finally, the Department of State Police. She reported that she had been talking on her cell phone as she traveled west in the right hand lane. She noticed something unusual off to the left where the shoulder opens to a crossover between the east and westbound lanes. At a crossover in the median .6 of a mile east of the crash site, orange and white striped barrels had been placed on the left shoulder of the road. These were a temporary safety measure until a guard rail that had been damaged in an earlier crash could be replaced. At night, the reflective material on the barrels is quite bright and drew the attention of this witness. She thought they might be a police car. A white SUV passed her in the left lane,

blocking her view. She had just ended her call and placed her phone on the dash of her vehicle when the SUV collided with another vehicle and both immediately caught fire. This witness described stopping and approaching the vehicles to see if anyone was alive. She observed that the driver of the white SUV was obviously deceased and turned her attention to the driver of the other SUV. At first, she noticed no movement, but as the fire began to spread and she heard a popping noise, she stated that the other driver began to moan. She noted that a truck driver had attempted to put out the fire with an extinguisher, but it continued to grow. She pleaded with other bystanders to help get the driver out, but they yelled for her to move away instead. As she backed away, both SUVs were engulfed in flames. When interviewed by the investigating trooper, this witness stated that her original intent was to remain silent regarding the crash. However, when the initial reports in the media cited the white SUV as the wrong way vehicle, she changed her mind and called a local newspaper to give her account.

The reliance on eyewitness reports appears to have had a negative impact on the initial discovery of the facts in this crash. Reviewing their statements and analyzing them within the context of human perception and cognition, as well as with regard to social dynamics and emotional stress, can help to explain the contradictory descriptions and different reactions.

First, several witnesses reported that the wrong way vehicle that passed them was a white SUV. These individuals said that they first saw headlights approaching, and then the vehicle passed on their left. In the darkness, however, with headlights shining into their eyes, they would have experienced “disability glare”. A bright light within a darker visual field will interfere with the eye’s ability to detect other objects, similar to the effect a person experiences when the flash on a camera goes off and they are temporarily blinded to anything but the flash. These witnesses would not have been able to identify the vehicle until the headlights were no longer prominent in their field of vision. Once the headlights’ illumination path moved more to the side, which would have occurred shortly before it passed to their left, they may have been able to perceive the rest of the vehicle, although even then, their night vision may have been compromised by the residual effects of the light. All the witnesses reported that the SUV appeared to be traveling at or above the posted 65 mph speed limit. At 65 mph, it would be traveling over 95 feet per second. Their own vehicles were moving in the opposite direction at a similar rate, making the closing speed between the two vehicles at least 190 feet per second. Even if these drivers were able to perceive the SUV body when it was several car lengths in front and to their left, they would have had only a fraction of a second to catch a glimpse of it moving

past. While they could be certain they saw something pass them, the claim that they could make clear visual identifications of the vehicle's make and color is doubtful.

The problem of disability glare would not have been a factor for drivers of the vehicles behind the westbound SUV. Following the Trailblazer, or observing it as it passed in the left lane, their headlights would have projected illumination onto or near the vehicle, and no lights would have been directed into their eyes. Additionally, the vehicles were traveling at or near the speed of the SUV, so these drivers had more time to make identifications. One of these witnesses indicated he was following a red SUV; the other reported seeing white SUV pass her. Under low levels of illumination, colors are difficult to identify and the red taillights may have been the piece of information that the first witness relied upon to form his conclusion as to the color of the vehicle. His view prior to the crash was only of the rear of the vehicle. The second witness had a much closer view and observed the SUV broadside as it passed. Her overall perspective was not as likely to be influenced by the red taillights at the back of the vehicle.

In addition to the issue of perceiving the vehicles during low levels of light prior to the crash, post-crash information and influences are likely to have affected the way the witnesses processed their earlier observations and formed their conclusions, which then became the memories they stored about the crash. When individuals make judgments and decisions, they often use mental shortcuts called heuristics. A heuristic is similar to a rule of thumb, a generalized approach that usually leads to an accurate conclusion. However, sometimes the shortcut leads to an erroneous conclusion. Two common heuristics may have had an impact on the witnesses' conclusions about what they saw that night.

The first is called the availability heuristic: individuals base conclusions on information that is available or easily brought to mind, even if it is insufficient or incomplete. All of these witnesses stopped and stayed at the scene after the collision, observing the location of the burning vehicles. The final rest of the vehicles is important to consider within this context. The wrong way SUV sat in the left lane, facing west, which is the lane and direction the "right way" SUV had been traveling just prior to the crash. The other SUV was also facing west, but it was off the shoulder and backed up against an embankment. Looking at the positions of the burning vehicles, and having no knowledge of crash dynamics, it would be easy to conclude that the vehicle traveling the wrong way had hit and then rotated off the "right way" SUV, ending up off to the side, and that the SUV westbound in the left lane had simply been pushed backward.

Some of the witnesses discussed their opinions about the crash while waiting for help to arrive. When one person said that he had seen a white SUV traveling in the wrong direction, the others went along with that version. If they had some uncertainty about their own observations, they would be less likely to question another's statements. This is an example of the social consensus heuristic. When individuals are unwilling or unable to go through the mental steps required to make rational and logical judgments, they may rely instead on the statements of others. The group gets together and agrees upon what happened. Social comparison combined with the dynamics of group persuasion can lead to social "proof". In such cases, factual information becomes subordinate to what members of the group decide to believe happened. The social consensus heuristic became apparent when the investigating trooper interviewed the tractor-trailer driver. At the scene that night, he stated that the white SUV had been traveling the wrong way. During a follow-up interview, when he was away from the group influence, he stated that he couldn't be certain and that everyone else said it was the white vehicle. As a contrast, the woman who later reported seeing the white SUV going in the correct direction was not a part of the group that discussed the crash at the scene. She stood off to the side and did not provide information from her perspective until days later.

Individuals rely on heuristics for a variety of reasons. Often, they are simply easier than doing the sometimes tedious mental work of cognitive processing: identifying facts and assessing their relevance, analyzing the information within the appropriate context, evaluating alternative explanations and reaching logical conclusions. In emotionally-charged situations, the need to manage fear and anxiety can compete with other mental efforts, narrowing attention and increasing the likelihood an individual will choose a quick method of decision-making. While using these shortcuts can be understandable, their potential for fallibility cannot be overlooked. Research on eyewitness statements has consistently revealed that reliability and accuracy are often poor, underscoring the need to be cautious when forming conclusions and basing decisions upon them. For this reason, physical evidence must always be at the core of discovery with regard to motor vehicle crashes.

The location of vehicle parts, when considered along with the configuration of damage to the vehicles and their positions at final rest, reveal that the red Expedition was traveling the wrong way the night of the crash. The driver of the Expedition was a superintendent for a construction company and had been living in the area for six to eight weeks. He was described as a reliable employee, but not a person who socialized much with others. The project that

brought him to the area was almost completed. The previous weekend, family members, who resided in another state, had requested that he come home. He did not travel that weekend, but apparently he decided to make the trip the following Friday. He was living in an extended stay hotel in a city approximately 12 miles east of the crash. His activities that evening and his exact departure time for the anticipated 7 hour drive have not been determined. Although he did not mention the trip to a fellow construction superintendent during any conversations the day of the crash, he did call his mother to tell her that he was going to visit. This driver was licensed in his state of residence. Virginia records showed only that he had been convicted of speeding in another part of the state the previous year.

The toxicology report for this driver provides some explanation for his driving the wrong way on an interstate facility. His blood alcohol level was .25%, more than three times the legal limit for presumption of intoxication in Virginia. Alcohol impairs judgment as well as coordination and, at higher levels, individuals often become confused and disoriented. At these higher levels of intoxication, the symptoms can be extreme, including vomiting, loss of consciousness and death, although hard core drinking drivers may develop a tolerance to higher concentration levels over time. Such individuals may learn to perform certain routine functions, such as driving along a familiar route, while under the influence of alcohol. However, if they encounter an unfamiliar or unexpected situation, they are at the same high risk as any other driver: they are extremely impaired. In this case, it is likely that alcohol intoxication was a key factor in the Expedition driver's fatal decision to drive east in the westbound lanes.

There is no physical evidence to identify where this driver began driving the wrong way. However, since traffic was moderate that night and since police did not receive any reports of wrong way drivers prior to the crash, it is unlikely that he had traveled more than a few miles. The crash site was less than two miles from an exit and less than one mile from a rest area. The driver could have exited the interstate at either location and re-entered by traveling the wrong way on the ramp. One individual reported seeing a wrong way vehicle, a truck that was either white or silver, traveling at a very high rate of speed west of the rest area. She stated that she flashed her high beams and honked her horn as the vehicle went past. Another person who did not learn of the crash until later that evening reported seeing a wrong way vehicle in the left lane as he was approaching the rest area. He stated that it "blew by" and that he was unable to identify the type of vehicle or its color. Both witnesses lived in the vicinity and were familiar with the roadway, including local landmarks like the rest stop. While not conclusive, these

reports decrease the likelihood that the wrong way driver had stopped at the rest area and become turned around. The second possibility is that he took the exit onto a secondary road, perhaps to stop at one of the convenience stores on either side of the interstate, and then got onto the wrong ramp to return to the highway. While exit ramps normally display “wrong way” signs on both sides of the road to alert drivers, one of the signs on this ramp had been knocked down. However, the Expedition driver could not be identified from reviews of video tape footage recorded at either convenience store that night. A third possibility is that, in his inebriated state, he believed that he was on a two lane road instead of a four lane interstate. He may have decided to return home and made a U-turn, thinking he was traveling in the correct direction. Without any physical evidence to place the driver in a specific location or making a U-turn, it is impossible to identify where and how he made the fatal turn.

Once he began traveling east, there were few cues to warn the Expedition driver that he was headed in the wrong direction. If he had re-entered via the exit ramp for the primary road, only one sign would have warned him that he was headed in the wrong direction. The other had been knocked down and not replaced. At his level of intoxication, he is not likely to have noticed that there were no signs facing him as he traveled the interstate. Nor was this driver likely to have noticed the yellow edge line, which would have been white if he had been traveling in the correct direction on a two lane road. On multiple lane facilities, yellow lines are used to separate traffic traveling in opposite directions, while white lines separate traffic traveling in the same direction. Additionally, because the reflectors normally embedded in the pavement had not been re-installed after the road was resurfaced, this additional cue was absent. These reflectors, which appear white to drivers traveling in the correct direction, are red on the reverse side and can be an additional warning to wrong way drivers. Unfortunately, this driver continued in the wrong direction until the collision.

The Expedition driver died at the scene as a result of blunt force injuries to his chest and torso and from the effects of fire. The carbon monoxide level in his blood was less than 7% saturation and autopsy results revealed no soot in his upper airways. This indicates that he was not breathing when his vehicle caught fire.

The Expedition displayed license plates that belonged to another vehicle owned by the driver. The Vehicle Identification Number (VIN) revealed that the SUV was owned by another individual who lived in a different area of the state. The Expedition was not insured and its safety inspection status could not be determined due to fire damage. The Trailblazer involved in

this crash had valid license plates registered to a company out of state. The safety inspection status of this vehicle could not be determined due to extensive fire damage.

According to the Department of Motor Vehicles, the operator of the Trailblazer held a valid driver's license and was required to wear corrective lenses while driving. He had six speeding convictions on his driving record, three of which he received in the four months prior to this crash. One was for traveling 20 or more miles per hour above the speed limit. He had failed to appear in court earlier in the month for a speeding violation the previous month and his record showed a negative 14 safety points. The 37-year-old male was traveling alone that night. He had arrived at an airport approximately 30 miles east of the crash location on a return flight from a business trip. He left the airport and was en route to his home. He was familiar with the area and the highway. The crash site is less than ten miles away from his home and he had less than two miles to travel to reach his normal exit off the interstate. The Trailblazer driver called home and alerted his wife to his arrival at the airport approximately 35 minutes prior to the crash. He placed a second call about 15 minutes before the crash, leaving a message for his father that he had returned. Autopsy results revealed that this driver suffered fatal blunt force injuries from the impact, as well as fatal burns. Like the Expedition driver, this individual had a blood saturation of carbon monoxide that was below 7% and no soot or burns in his upper airways, indicating that he was not breathing at the time of the fire. The toxicology report revealed no evidence of alcohol or other substances that may have impaired his judgment or motor skills.

Damage to the Trailblazer indicates that the driver did not take any evasive action until just before the collision. The sight distance along this gently curving stretch of road is at least a half mile if the view is unobstructed. However, the tractor-trailer driver who witnessed the crash reported being in the left lane and pulling into the right lane just before seeing the headlights for the oncoming wrong way vehicle. Considering the timing of this lane change, in combination with the slight curve of the roadway, the tractor-trailer may well have blocked the westbound SUV driver's view of the approaching vehicle. In addition, drivers on interstate roads do not expect vehicles to be approaching from the opposite direction. Such unexpected circumstances are confusing and difficult to assess, resulting in slower perception-response times. In light of either condition, it is not surprising that the Trailblazer driver did not take action until it was too late to avoid this tragic collision.

## RECOMMENDATIONS

1. The Virginia Department of Transportation should review the resurfacing project that was completed on this section of interstate and determine if the reflectors and rumble strips that were present before resurfacing should be added to this stretch of highway. (The reflectors had been replaced as this report went to press.)
2. The Virginia Department of Transportation should research additional methods to alert drivers when they are traveling in the wrong direction or to prevent them from entering highways from exit ramps.
3. Those associated with transportation safety, research and training should continue to emphasize the importance of avoiding alcohol or other substances that affect cognitive skills while driving. Issues associated with hard core drinking drivers should be addressed, including ways to identify hard core drinking drivers, understanding the biological tolerance and compensatory behaviors that often accompany chronic use, and the legal consequences of repeat offenses.
4. Those associated with transportation safety, research and training should educate drivers to be alert to the dangers presented by wrong way drivers and to be mentally prepared to avoid them or other unexpected obstacles in the roadway. Since wrong way drivers on four lane (or greater) divided highways may believe they are traveling in the correct direction, and in the correct lane, right way drivers should keep to the right as often as possible.
5. Law enforcement officers responsible for investigating motor vehicle crashes should gather as much information as possible before forming conclusions about the incident. Since physical evidence and eyewitness memory can both deteriorate with time, measurements and physical observations must be collected and eyewitnesses should be interviewed as soon after a crash as possible. The evidence can then be analyzed to reconstruct the events of the crash and eyewitness information, if used with caution, can augment an understanding of the incident.

6. Law enforcement officers should be aware of the potential inaccuracies in eyewitness statements. Such errors may not be intentional and witnesses may actually believe that they witnessed every aspect they report. However, limitations on human perception and the use of cognitive heuristics to form conclusions may cause human memory and the recall of traumatic events to be inaccurate and unreliable. Additional training in human factors related to crash investigation can provide a better understanding of these issues. If eyewitnesses cannot be interviewed immediately at the scene, they should be requested to write down what they saw and avoid discussing details with other witnesses until after they have been interviewed.
7. Law enforcement officers and dispatchers should have current and correct information regarding contact methods and availability of support service providers.
8. Police departments and sheriff's offices should consider ways to improve communication with the media in their respective localities. A contact person within a department or agency can improve the quality and consistency of information that is released. Using an approach similar to that employed by Public Information Officers in Virginia State Police Divisions, regularly scheduled meetings with members of the media can be used to educate them about protocols for investigations and the reasons for those protocols. This can facilitate an understanding of what types of information are likely to be released, and when, during an ongoing investigation.