



**HUMAN PERFORMANCE GROUP CHAIRMAN'S  
FACTUAL REPORT**

**Gray Summit, Missouri**

**HWY-10-MH-018**  
(32 Pages)



**NATIONAL TRANSPORTATION SAFETY BOARD  
OFFICE OF HIGHWAY SAFETY  
WASHINGTON, D.C. 20594**

**HUMAN PERFORMANCE GROUP CHAIRMAN'S FACTUAL  
REPORT**

**A. ACCIDENT**

**Type:** Truck Tractor, Pickup, School Bus Multivehicle Accident  
**Date and Time:** August 5, 2010, 10:11 a.m. CDT  
**Location:** Interstate 44 Eastbound at milepost 250.6  
Gray Summit, Franklin County, Missouri  
**Vehicle #1:** 2007 Volvo Truck-tractor  
**Motor Carrier:** Climate Express, Inc.  
**Vehicle #2:** 2007 GMC Sierra  
**Vehicle #3:** 2003 Bluebird 71-passenger capacity school bus  
**Motor Carrier:** Copeland Bus Services, LLC  
**Vehicle #4:** 2001 Bluebird 72-passenger capacity school bus  
**Motor Carrier:** Copeland Bus Services, LLC  
**Fatalities:** 02  
**Injuries:** 38

**NTSB #:** **HWY-10-MH-018**

**B. HUMAN PERFORMANCE GROUP**

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## **C. ACCIDENT SUMMARY**

For a summary of the accident, refer to the *Accident Summary* report, which is available in the docket for this investigation.

## **D. DETAILS OF THE INVESTIGATION**

This report provides a factual record of the behavioral, medical, operational, and environmental factors associated with the drivers of the following vehicles:

- 2007 Volvo Truck-tractor;
- 2007 GMC Sierra;
- 2003 Bluebird school bus; and
- 2001 Bluebird school bus.

Behavioral, medical, operational, and environmental factors for each driver are discussed in sections E through H of this report. Section I discusses common human performance factors. Relevant supporting documentation can be found as attachments to this report; a list of those attachments can be found in section J at the end of this document.

## **E. DRIVER OF THE 2007 VOLVO TRUCK-TRACTOR**

### **1. Behavioral Factors**

#### **1.1. 72-hour History**

Based on an interview with the driver of the 2007 Volvo,<sup>1</sup> follow-up questions through a company attorney,<sup>2</sup> the driver's logbooks,<sup>3</sup> and his cellular telephone records,<sup>4</sup> the following table of the driver's activities in the 72 hours prior to the accident was generated. All times in the table are expressed in Central Daylight Time (CDT).<sup>5</sup>

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<sup>1</sup> Human Performance Factual Report Attachment 1: Narratives of Investigative Interviews.

<sup>2</sup> Human Performance Factual Report Attachment 2: E-mail Communication with Climate Express, Inc. Attorney.

<sup>3</sup> The driver's logbook entries can be found as an attachment to the Motor Carrier Group Chairman's Factual report. When reviewed by investigators, the logs indicated the driver had begun driving after the time of the accident, which is impossible. Although the driver stated he keeps his logs in Central Time (the time at the carrier's main terminal), investigators determined that assuming the logs were recorded in Eastern Time (the time at the driver's residence) would be consistent with the driver's statements and the known time of the accident. Therefore, all logbook times were adjusted back one hour for this table.

<sup>4</sup> Human Performance Attachment 3: 2007 Volvo Driver Cellular Telephone Records.

<sup>5</sup> Times are expressed in CDT to allow easy comparison with the time of the accident.

**Table 1. 2007 Volvo Driver Activities in the 72 hours prior to the crash**

<b>Monday, August 2, 2010</b>			
<u>Time (CDT)</u> <sup>6</sup>	<u>Event</u>	<u>Location</u>	<u>Source</u>
7:10 a.m.	Driver makes outgoing cell call	Martinsburg, WV	Cell records
8:00 a.m. -	Driver states he awakes	Martinsburg, WV	Interview
9:00 a.m.			
5:00 p.m.	Driver departs his home	Martinsburg, WV	Interview
5:00 p.m.	Logs on-duty, not driving: pre-trip inspection	Martinsburg, WV	Logbook
5:15 p.m.	Logs driving	Martinsburg, WV	Logbook
6:00 p.m.	Logs on-duty, not driving: loading at shipper	Berryville, VA	Logbook
6:30 p.m.	Driver departs shipper	Berryville, VA	Interview
6:30 p.m.	Logs driving	Berryville, VA	Logbook
7:00 p.m.	Driver stops for fuel	Clearbrook, VA	Interview
7:00 p.m.	Logs on-duty, not driving: fuel	Clearbrook, VA	Logbook
7:15 p.m.	Logs driving	Clearbrook, VA	Logbook
7:33 p.m.	Driver receives incoming cell call		Cell records
8:40 p.m.	Call ends		Cell records
<b>Tuesday, August 3, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
1:45 a.m.	Driver enters sleeper berth	Catlettsburg, KY	Interview
1:45 a.m.	Logs on-duty, not driving: post-trip inspection	Catlettsburg, KY	Logbook
2:00 a.m.	Logs off-duty	Catlettsburg, KY	Logbook
2:30 a.m.	Logs sleeper berth	Catlettsburg, KY	Logbook
<b>Tuesday, August 3, 2010 (continued)</b>			
11:00 a.m.	Driver awakes	Catlettsburg, KY	Interview
11:30 a.m.	Logs off-duty	Catlettsburg, KY	Logbook
11:55 a.m.	Driver makes outgoing cell call		Cell records
12:00 noon	Logs on-duty, not driving: pre-trip inspection	Catlettsburg, KY	Logbook
12:15 p.m.	Logs driving	Catlettsburg, KY	Logbook
8:00 p.m.	Refuels	Warrenton, MO	Interview
8:00 p.m.	Logs on-duty, not driving: fuel	Warrenton, MO	Logbook
8:15 p.m.	Logs driving	Warrenton, MO	Logbook
9:26 p.m.	Driver makes outgoing cell call		Cell records
9:30 p.m. -	Arrives in Jefferson City	Jefferson City, MO	Interview
9:45 p.m.			
9:30 p.m.	Logs on-duty, not driving: arrived consignee, post-trip inspection	Jefferson City, MO	Logbook
9:45 p.m.	Logs off-duty	Jefferson City, MO	Logbook
10:30 p.m.	Logs sleeper berth	Jefferson City, MO	Logbook
<b>Wednesday, August 4, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
	Driver logs off-duty all day	Jefferson City, MO	Logbook
6: 52 a.m.	Driver makes outgoing cell call		Cell records
7:00 a.m.	Driver awakes	Jefferson City, MO	Follow-up
9:15 a.m.	Driver departs for Climate Express	Jefferson City, MO	Follow-up
10:45 a.m.	Driver arrives at Climate Express	Union, MO	Follow-up
6:38 p.m.	Driver receives cell call		Cell records

<sup>6</sup> According to staff at the cellular provider, times in the cell records are based on the time zone of the routing tower. The times for those calls occurring in the Eastern Time Zone were adjusted to Central Time.

Wednesday, August 4, 2010 (continued)			
8:24 p.m.	Cell call ends		Cell records
9:00 p.m.	Driver goes to bed	Union, MO	Follow-up
Thursday, August 5, 2010			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
7:30 a.m. - 8:00 a.m.	Driver awakes	Union, MO	Follow-up
7:45 a.m.	Logs on-duty, not driving: pre-trip inspection, depart consignee	Jefferson City, MO	Logbook
8:00 a.m.	Logs driving	Jefferson City, MO	Logbook
8:45 a.m. - 8:50 a.m.	Driver leaves carrier en-route to St. Louis, MO	Union, MO	Interview
9:15 a.m.	Logs on-duty, not driving: dropped trailer 1098, fuel	Union, MO	Logbook
9:30 a.m.	Logs driving	Union, MO	Logbook
9:56 a.m.	Driver makes outgoing cell call		Cell records
<b>10:11 a.m.</b>	<b>ACCIDENT OCCURS</b>	<b>Gray Summit, MO</b>	

## 2. Medical Factors

As part of the investigation, medical records for the driver of the 2007 Volvo were requested from the doctor the driver identified as his primary care physician. A review of those records by the Safety Board's Medical Officer did not reveal any medical conditions on the part of the Volvo driver that would have caused or contributed to this accident.<sup>7</sup>

### 2.1. Commercial Driver Fitness Determination Exam

Commercial drivers in the United States are required by the Federal Motor Carrier Safety Regulations (FMCSRs) to be medically certified as physically qualified for commercial vehicle operation.<sup>8</sup> The driver's most recent examination prior to the crash was conducted in July of 2009 by a doctor in Washington, Missouri<sup>9</sup>. The exam was required by Climate Express, Inc. upon the driver accepting employment with the company. All Climate Express drivers are examined by the same physician.

Commercial driver fitness examinations result in one of four outcomes with respect to medical certification:

- The driver is found to meet the standards in 49 CFR §391.41 and is given a 2-year certificate;
- The driver is found to meet the standards, but requires periodic evaluation for one or more conditions and is qualified for 3 months, 6 months, or 1 year;

<sup>7</sup> For further details, please see "Medical Records Information" in the docket.

<sup>8</sup> 49 Code of Federal Regulations §391.41.

<sup>9</sup> Human Performance Factual Report Attachment 4: 2007 Volvo Driver Commercial Driver Fitness Determination.

- The driver is temporarily disqualified due to a condition or medication; or;
- The driver is found to not meet the standards.

The driver of the 2007 Volvo was medically qualified though July of 2011.

## **2.2. General Health**

At the time of the crash, the driver of the 2007 Volvo was 43 years old. During his Commercial Driver Fitness Determination Exam in July of 2009, his height was recorded as five feet 10 inches and his weight was recorded as 220 pounds. The physician performing the exam indicated he observed no abnormalities in any of the driver's general body systems.<sup>10</sup> During that exam, the driver denied any significant health history.

In an interview with NTSB investigators, the driver of the 2007 Volvo described his general health as good, denying any health problems prior to the accident.

## **2.3. Vision**

In the driver's most recent Commercial Driver Fitness Determination, the driver's uncorrected Snellen distant visual acuity<sup>11</sup> was recorded as 20/20 with the left and right eyes, and as 20/15 with both eyes. The driver's horizontal field of vision was noted as 130° with both the right and left eye and 180° with both eyes.<sup>12</sup> There was no indication the driver wore corrective lenses during the exam. The performing physician indicated the driver could distinguish red, green, and amber colors.

In an interview with NTSB investigators, the driver of the 2007 Volvo described his vision as good.

## **2.4. Hearing**

In the driver's most recent Commercial Driver Fitness Determination, he was noted to be able to hear a forced, whispered voice at 29 feet with both his left and right ears.

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<sup>10</sup> General appearance, eyes, ears, mouth and throat, heart, lungs and chest, abdomen and viscera, vascular system, genito-urinary, extremities, spine and other musculoskeletal, and neurological.

<sup>11</sup> Snellen fractions are a measure of visual acuity (sharpness of sight). In the Snellen fraction, the first number represents the test distance (20 feet) and the second represents the distance at which the average eye could see the letters on a certain line of the chart. A fraction of 20/20 is considered normal vision.

<sup>12</sup> Normal human horizontal field of vision is approximately 60 degrees nasally and 100 degrees temporally, or 160 degrees.

In an interview with NTSB investigators, the driver of the 2007 Volvo described his hearing as good.

## **2.5. Medications (Prescription, Over-the-Counter, Other)**

The driver of the 2007 Volvo denied taking any prescription medications, herbal supplements, or over-the-counter medications, both in general and in the three days prior to the crash.

## **2.6. Alcohol Consumption**

In an interview with NTSB investigators, the 2007 Volvo driver denied consuming alcohol.

## **2.7. Post-accident Toxicology**

### **2.7.1. Law Enforcement**

On August 6, 2010, officers from the Missouri State Highway Patrol stated the driver of the 2007 Volvo had submitted to alcohol breath testing after the accident, and that no alcohol was detected. The Missouri State Highway Patrol Accident Reconstruction Report<sup>13</sup> provided to the Safety Board states that there was no evidence to indicate the driver of the 2007 Volvo was under the influence of intoxicants or controlled substances at the time of the crash.

### **2.7.2. Employer/DOT Required**

The driver of the 2007 Volvo underwent post-accident alcohol and drug testing on August 5, 2010, at the direction of his employer. The testing was performed at St. John's Mercy Corporate Health in Washington, Missouri. A breath sample was taken at 2:15 p.m. local time and a urine sample was taken at 2:17 p.m. local time. Testing of the breath sample indicated no alcohol and testing of the urine sample was negative for marijuana, cocaine, amphetamines, opiates, and PCP at the cutoff levels specified in 49 CFR §40.87.<sup>14</sup>

## **2.8. Sleep / Fatigue**

When asked about the quality and quantity of his sleep, the driver of the 2007 Volvo described both as good. He stated he has no trouble falling asleep and denied snoring or a diagnosis of sleep apnea. He stated his typical amount of sleep is between 8 and a half and 9 hours a night.

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<sup>13</sup> Available in the Official Use Only portion of the docket as an attachment to the Highway Group Chairman's Report.

<sup>14</sup> Human Performance Factual Report Attachment 5: 2007 Volvo Driver Post-accident Testing

### 3. Operational Factors

#### 3.1. Licensing

At the time of the crash, the driver of the 2007 Volvo held a valid West Virginia Class “A” Commercial Driver’s license<sup>15</sup> issued in December 2008 and expiring in November 2013. He held the hazardous materials (“H”) endorsement and was subject to no restrictions.<sup>16</sup>

#### 3.2. Training / Experience

##### 3.2.1. General Experience

When asked about his commercial driving experience, the driver of the 2007 Volvo stated he had gotten his temporary CDL in April 2005, and had a total of over 5 years of experience. He estimated he had approximately 722,000 miles driven in a commercial motor vehicle. He has worked for Climate Express, Inc. since July 2009.<sup>14</sup> His employment prior to working for Climate Express, Inc. is listed in table 2.

**Table 2. 2007 Volvo Driver Experience**

<b>From</b>	<b>To</b>	<b>Company</b>	<b>Notes</b>
2/09	7/09	None	Care of family member
6/07	2/09	Shaffer Trucking	
2/07	6/07	Swift Transportation	
8/06	2/07	Schneider National	No HAZMAT endorsement
9/05	7/06	JB Hunt Transportation	
4/05	9/05	CR England	

#### 3.3. Accident / License History

A check of the driver’s record indicated no convictions, revocations, or suspensions in the last five years.

### 4. Task Factors

#### 4.1. Accident Trip

At the time of the accident, the driver of the 2007 Volvo was en route from Climate Express, Inc. to St. Louis, Missouri to pick up a load. The driver stated in an interview that when he merged onto Interstate 44 from U.S. Route 50

<sup>15</sup> Allows the operation of any combination of vehicles with a gross vehicle weight rating of 26,001 pounds or more, provided the gross vehicle weight rating of the vehicles being towed is in excess of 10,000 pounds.

<sup>16</sup> Human Performance Factual Report Attachment 6: 2007 Volvo Driver Record.



he observed two school buses on the interstate in the left hand lane, approximately a mile behind the point where he merged onto the interstate. The driver stated he stopped as traffic in his lane did so. Once stopped, the 2007 Volvo driver looked into his rear view mirror, saw the pickup truck, and “knew” he was going to be hit. He was, and approximately two or three seconds later, there was another impact.

## **4.2. Workload / Distraction**

### **4.2.1. Distractions External to the Vehicle**

When interviewed by NTSB investigators, the 2007 Volvo driver did not mention any distractions in the external environment even when specifically asked.

### **4.2.2. Internal Workload / Distraction**

#### **(a) Cell Phone Use**

The driver of the 2007 Volvo owned a cellular telephone which was with him in the truck at the time of the accident. He stated he owns and uses a hands-free headset. He denied using the phone at the time of the accident, although he did state he called his wife as he left the yard. He stated that call ended before he got onto Interstate 44.

A check with the 2007 Volvo driver’s cellular company indicated he made a cellular phone call at 9:56 a.m. That call lasted 16 minutes and 23 seconds.

#### **(i) Cell Phone Laws**

In West Virginia, where the 2007 Volvo driver lives and is licensed, drivers 18 years old and younger who hold a learner’s or intermediate license are restricted from using a cell phone or texting.

In Missouri, where the accident occurred, the only restriction on cell phone use is a texting prohibition for drivers under 21 years of age.

#### **(b) Other In-vehicle Distractions**

According to the driver of the 2007 Volvo, the truck was equipped with a Citizens Band (CB) radio as well as an AM/FM radio; he denied using either at the time of the crash.

## F. DRIVER OF THE 2007 GMC SIERRA

### 1. Behavioral Factors

#### 1.1. 72-hour History

Based on an interview with the parents and friends<sup>17</sup> of the driver of the 2007 GMC Sierra and his cellular phone records,<sup>18</sup> the following table of the driver's activities in the 72 hours prior to the accident was generated. All times in the table are expressed in Central Daylight Time (CDT).

**Table 3. Driver Activities in the 72 hours prior to the crash**

<b>Monday, August 2, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
12:25 a.m.	Driver sends outgoing SMS message <sup>19</sup>		Cell Records
UNK	Driver awakes	Sullivan, MO	Interview
6:13 a.m.	Driver sends outgoing SMS message		Cell Records
7:13 a.m.	Makes outgoing cell call		Cell Records
UNK	Driver engages in pre-election activities	Sullivan, MO	Interview
10:07 p.m.	Driver receives last cell call of day		Cell Records
11:58 p.m.	Driver sends outgoing SMS message		Cell Records
<b>Tuesday, August 3, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
12:00 a.m.	Driver sends outgoing SMS message		Cell Records
UNK	Driver goes to bed	Sullivan, MO	Interview
5:00 a.m.	Driver awakes	Sullivan, MO	Interview
5:30 a.m.	Driver departs home for Sullivan community center	Sullivan, MO	Interview
6:04 a.m.	Driver makes first cell call of day		Cell Records
6:32 a.m.	Driver sends outgoing SMS message		Cell Records
UNK	Driver arrives at community center	Sullivan, MO	Interview
7:00 p.m.	Polls close, driver goes to Sullivan County Club	Sullivan, MO	Interview
UNK	Driver arrives at Country Club	Sullivan, MO	Interview
7:48 p.m.	Driver receives last cell call of day		Cell Records
10:30 p.m.	Driver leaves to go home	Sullivan, MO	Interview
UNK	Driver arrives home	Sullivan, MO	Interview
11:18 p.m.	Driver sends outgoing SMS message		Cell Records
<b>Wednesday, August 4, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
6:00 a.m.	Driver awakes	Sullivan, MO	Interview
6:30 a.m.	Driver departs for work	Sullivan, MO	Interview
6:38 a.m.	Driver sends outgoing SMS message		Cell Records
6:40 a.m.	Driver makes first cell call of day		Cell Records
7:00 a.m.	Driver begins work	Villa Ridge, MO	Interview
5:00 p.m.	Driver ends work	Villa Ridge, MO	Interview
5:13 p.m.	Driver receives last cell call of day		Cell Records

<sup>17</sup> Human Performance Factual Report Attachment 1: Narratives of Investigative Interviews.

<sup>18</sup> Human Performance Factual Report Attachment 8: 2007 GMC Driver Cellular Telephone Records.

<sup>19</sup> According to the driver's cellular service provider, the time recorded for SMS (text) messages is the local time at which the phone sends or receives the message.

<b>Wednesday, August 4, 2010 (continued)</b>			
5:45 p.m.	Driver begins boating on river	Stanton, MO	Interview
8:00 p.m.	Boat returns to shore	Stanton, MO	Interview
8:30 p.m.	Boat returned to owner's residence	Sullivan, MO	Interview
9:00 p.m.	Driver arrives at Blue Springs Resort	Bourbon, MO	Interview
11:56 p.m.	Driver sends outgoing SMS message		Cell Records
<b>Thursday, August 5, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
12:30 a.m.	Driver drops friend at home	Sullivan, MO	Interview
12:40 a.m.	Driver arrives home (estimated)	Sullivan, MO	Interview
1:00 a.m.	Driver sends outgoing SMS message		Cell Records
5:52 a.m.	Driver receives first cell call of day		Cell Records
6:00 a.m.	Driver awakes	Sullivan, MO	Interview
6:30 a.m.	Driver departs for work	Sullivan, MO	Interview
7:00 a.m.	Driver begins work	Villa Ridge, MO	Interview
7:10 a.m.	Driver sends outgoing SMS message		Cell Records
UNK	Driver takes truck for inspection	Villa Ridge, MO	Interview
9:15 a.m.	Driver receives last cell call before accident		Cell Records
9:20 a.m.	Appointment time for truck inspection	Union, MO	Interview
9:58 a.m.	Driver receives SMS message		Cell Records
9:58 a.m.	Driver sends outgoing SMS message		Cell Records
10:03 a.m.	Driver receives SMS message		Cell Records
10:03 a.m.	Driver sends outgoing SMS message		Cell Records
10:04 a.m.	Driver receives SMS message		Cell Records
10:05 a.m.	Driver sends outgoing SMS message		Cell Records
10:06 a.m.	Driver sends outgoing SMS message		Cell Records
10:07 a.m.	Driver receives SMS message		Cell Records
10:08 a.m.	Driver sends outgoing SMS message		Cell Records
10:08 a.m.	Driver sends outgoing SMS message		Cell Records
10:09 a.m.	Driver receives SMS message		Cell Records
<b>10:11 a.m.</b>	<b>ACCIDENT OCCURS</b>	<b>Gray Summit, MO</b>	

## **2. Medical Factors**

As part of the investigation, medical records for the driver of the 2007 GMC were requested from local physicians. A review of those records by the Safety Board's Medical Officer did not reveal any medical conditions on the part of the GMC driver that would have caused or contributed to this accident.<sup>20</sup>

### **2.1. General Health**

When asked about the 2007 GMC driver's health, his family described him as very fit and indicated he had undergone a sports physical the week prior to the accident.

### **2.2. Vision**

When asked, the family of the 2007 GMC driver stated he did not have any problems with his vision and did not wear glasses or contact lenses.

<sup>20</sup> For further details, please see "Medical Records Information" in the docket.

### **2.3. Hearing**

The family of the 2007 GMC driver stated he did not have any problems with his hearing.

### **2.4. Medications (Prescription, Over-the-Counter, Other)**

The family of the 2007 GMC driver stated that he did not take prescription drugs on a regular basis and only took over-the-counter on an as-needed basis. They did not believe that he had taken any in the three days prior to the accident. The family also stated that the driver was not currently taking any herbal supplements and did not use illegal drugs. The family stated that the driver occasionally used chewing tobacco.

### **2.5. Alcohol Consumption**

When asked if the 2007 GMC driver drank alcohol, his family stated that he likely did, but only occasionally and not to excess. They stated they did not believe he had consumed any in the three days prior to the accident.

### **2.6. Post-accident Toxicology**

#### **2.6.1. Law Enforcement**

As the driver of the 2007 GMC was fatally injured in the accident, post-accident toxicology for law enforcement purposes was conducted as part of the post-mortem examination. The results of that examination<sup>21</sup> were negative for alcohol<sup>22</sup> and 18 drugs.<sup>23</sup>

#### **2.6.2. Civil Aerospace Medical Institute**

Following the accident, toxicological samples<sup>24</sup> from the 2007 GMC driver were transferred to the Civil Aerospace Medical Institute (CAMI) for analysis. The samples were tested for alcohol and 9 legal and illegal drugs.<sup>25</sup> None were detected in the samples.<sup>26</sup>

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<sup>21</sup> Human Performance Group Chairman's Factual Report Attachment 9: St. Louis University Toxicology Laboratory Report.

<sup>22</sup> Ethanol, acetone, isopropanol, and methanol.

<sup>23</sup> Amphetamines, antidepressants, barbiturates, benzodiazepines, cannabinoids, cocaine and cocaine metabolites, lidocaine, methadone, non-opiate narcotic analgesics, opiates, phencyclidine, phenothiazines, propoxyphene, acetaminophen, salicylates, oxycodone, fentanyl, and oxymorphone.

<sup>24</sup> Blood (Heart).

<sup>25</sup> Amphetamines, opiates, marijuana, cocaine, phencyclidine, benzodiazepines, barbiturates, antidepressants, and antihistamines.

<sup>26</sup> Human Performance Group Chairman's Factual Report Attachment 10: Final Forensic Toxicology Fatal Accident Report.

## **2.7. Sleep / Fatigue**

The family of the 2007 GMC driver denied he had any problems sleeping or snored. They described him as a morning person, an early riser, and easy to get up in the morning. They stated the driver typically would arise at 6:00 a.m. in order to be at work by 7:00 a.m. They also stated that the driver would typically be home by 10:30 p.m. each night. The driver's family indicated that the night prior to the accident, the driver was out with friends. Two of those friends were interviewed and stated they and the driver went boating on the river and to the country club.

## **3. Operational Factors**

### **3.1. Licensing**

The driver of the 2007 GMC Sierra held a valid Missouri Class "F" driver's license<sup>27</sup> issued in November 2008 and expiring in October 2011. He held no endorsements and was subject to no restrictions.<sup>28</sup>

### **3.2. Training / Experience**

#### **3.2.1. General Experience**

The 2007 GMC driver's family indicated he was familiar with both the truck he was driving and the roadway. He had driven the truck before, and he had extensive experience with the both that vehicle and other Chevrolet vehicles owned by the family. According to the family, the driver had never expressed having any issues or problems with this vehicle.

When asked about the roadway, the driver's family stated he drove it every day and was aware of the construction zone. He had not mentioned any particular problems with the construction to his parents.

### **3.3. Accident / License History**

A check of Missouri driver record for the 2007 GMC driver showed no moving violations or accidents.

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<sup>27</sup> A Missouri Class "F" license is the basic driver (operator) license, required to operate any vehicle that does not require commercial driver's license (Class A, B, C) or a for-hire license (Class E).

<sup>28</sup> Human Performance Group Chairman's Factual Report Attachment 11: Missouri Driver Record for 2007 GMC Driver.

## **4. Task Factors**

### **4.1. Accident Trip**

At the time of the accident, the driver of the 2007 GMC was returning to work after taking his vehicle to Leo. J. Peirick's in Union, Missouri for a state safety inspection. According to the driver's father, they had an appointment for the inspection for 9:20 a.m. The driver of the 2007 GMC was to wait at the shop while the inspection was performed, then return to work.

### **4.2. Workload / Distraction**

#### **4.2.1. Internal Workload / Distraction**

##### **(a) Cell Phone Use**

A check of the 2007 GMC driver's cell phone records indicated he received a voice call at 9:15 a.m. That call lasted 35 seconds. The driver of the 2007 GMC also received an incoming text message at 10:09 a.m. The 10:09 a.m. text message was one of 11 the driver sent or received between 9:58 a.m. and 10:09 a.m.

The person exchanging text messages with the driver was located and interviewed by NTSB investigators. That person, a friend of the driver, could not recall the specifics of the messages, but did state they were discussing their activities the previous night and their plans for that evening. According to his friend, the driver did not mention the traffic and seemed to be his normal self. The friend did not recall being concerned that he did not receive a response to his last text message to the driver.

##### **(i) Cell Phone Laws**

In Missouri, drivers 21 years old and younger are prohibited from texting while driving.

##### **(b) Other Internal Distractions**

When asked about potential distractions in the vehicle, the driver's family stated the truck had an AM/FM radio but no other electronic sending/receiving devices.

## G. DRIVER OF THE 2003 BLUEBIRD SCHOOL BUS

### 1. Behavioral Factors

#### 1.1. 72-hour History

Based on an interview with the driver of the 2003 Bluebird school bus<sup>29</sup> and her cellular telephone records,<sup>30</sup> the following table of the driver's activities in the 72 hours prior to the accident was generated. All times in the table are expressed in Central Daylight Time (CDT).

**Table 4. 2003 Bluebird Driver Activities in the 72 hours prior to the crash**

<b>Monday, August 2, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
4:30-5 a.m.	Driver awakes	St. James, MO	Interview
10:56 a.m.	Driver makes first outgoing cell call		Cell Records
9:30 p.m.	Driver goes to bed	St. James, MO	Interview
9:53 p.m.	Driver makes last outgoing cell call		Cell Records
<b>Tuesday, August 3, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
5:45 a.m.	Driver awakes	St. James, MO	Interview
9:59 a.m.	Driver receives incoming cell call		Cell Records
10:19 a.m.	Driver receives last cell call of day		Cell records
UNK	Driver goes to town to pay bills	St. James, MO	Interview
5:00 p.m.	Driver has dinner	St. James, MO	Interview
9:00-15	Driver goes to bed	St. James, MO	Interview
<b>Wednesday, August 4, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
UNK	Driver arises	St. James, MO	Interview
UNK	Driver cuts the grass	St. James, MO	Interview
6:05 p.m.	Driver makes only outgoing cell call		Cell Records
UNK	Driver goes to bed	St. James, MO	Interview
<b>Thursday, August 5, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
5:30 a.m.	Driver awakes	St. James, MO	Interview
8:00 a.m.	Driver leaves home for Copeland	St. James, MO	Interview
UNK	Driver loads personal items on bus	St. James, MO	Interview
UNK	Driver performs pre-trip inspection	St. James, MO	Interview
8:35 a.m.	Driver fuels bus	St. James, MO	Interview
8:55 a.m.	Driver arrives at school	St. James, MO	Interview
9:10 a.m.	Driver departs for 6 Flags	St. James, MO	Interview
<b>10:11 a.m.</b>	<b>ACCIDENT OCCURS</b>	<b>Gray Summit, MO</b>	

<sup>29</sup> See Human Performance Group Chairman's Factual Report Attachment 1: Narratives of Investigative Interviews.

<sup>30</sup> See Human Performance Group Chairman's Factual Report Attachment 12: 2003 Bluebird Driver Cellular Telephone Records.

## **2. Medical Factors**

As part of the investigation, medical records for the driver of the 2003 Bluebird were requested from local physicians. A review of those records by the Safety Board's Medical Officer did not reveal any medical conditions on the part of the 2003 Bluebird driver that would have caused or contributed to this accident.<sup>31</sup>

### **2.1. Commercial Driver Fitness Determination Exam**

Commercial drivers in the United States are required by the Federal Motor Carrier Safety Regulations (FMCSRs) to be medically certified as physically qualified for commercial vehicle operation.<sup>32</sup> The driver's most recent examination prior to the crash was conducted in August of 2009 by a doctor in St. James, Missouri; her employer sends all its drivers to the same physician.

Commercial driver fitness examinations result in one of four outcomes with respect to medical certification:

- The driver is found to meet the standards in 49 CFR §391.41 and is given a 2-year certificate;
- The driver is found to meet the standards, but requires periodic evaluation for one or more conditions and is qualified for 3 months, 6 months, or 1 year;
- The driver is temporarily disqualified due to a condition or medication; or;
- The driver is found to not meet the standards.

The driver of the 2003 Bluebird was medically qualified until August 2011.<sup>33</sup>

### **2.2. Missouri Exam**

In Missouri, in addition to the requirements specified in 49 CFR §391.41, the Department of Elementary and Secondary Education requires all school bus drivers transporting pupils for a public school to have a statement on file from a medical examiner that indicates the driver is physically qualified to operate a school bus. This statement shall be completed annually.

In July of 2010, the driver of the 2003 Bluebird had a doctor in St. James complete the "Annual Physical Examination for School Bus Drivers"; the driver was found to physically qualified to safety operate a school bus.<sup>34</sup>

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<sup>31</sup> For further details, please see "Medical Records Information" in the docket.

<sup>32</sup> 49 Code of Federal Regulations §391.41.

<sup>33</sup> See Human Performance Group Chairman's Factual Report Attachment 13: 2003 Bluebird Driver Commercial Driver Fitness Determination.



### **2.3. General Health**

At the time of the crash, the driver of the 2003 Bluebird was 75 years old. During her Commercial Driver Fitness Determination Exam in August of 2009, her height was recorded as 64 inches and her weight was recorded as 153 pounds. The only abnormality noted by the physician in any examined body system<sup>35</sup> was varicose veins in the driver's legs. During that exam, the only significant health history indicated by the driver was soreness in the right leg a month prior to the exam. The driver stated she was no longer taking any medication for that soreness.

When asked about her general health, the driver of the 2003 Bluebird described it as “pretty good for her age”. She denied any pre-existing medical conditions or being under the care of a physician before the accident.

### **2.4. Vision**

When asked about her vision, the driver of the 2003 Bluebird stated she wears glasses due to astigmatism. She stated she was wearing her glasses at the time of the crash.

In the most recent Commercial Driver Fitness exam performed on the driver of the 2003 Bluebird, the performing physician recorded her corrected Snellen distant visual acuity<sup>36</sup> as 20/40 with the right eye and 20/25 with the left and both eyes. The driver’s horizontal field of vision was noted as 120° with the right eye and 125° with the left eye. The performing physician indicated the driver could distinguish red, green, and amber colors.

### **2.5. Hearing**

When asked about her hearing, the driver of the 2003 Bluebird said she could hear a whisper made at the back of her bus.

In the driver’s most recent Commercial Driver Fitness Determination, she was noted to be able to hear a forced, whispered voice at 8 feet with both her left and right ears.

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<sup>34</sup> See Human Performance Group Chairman's Factual Report Attachment 14: 2003 Bluebird Driver Annual Physical Examination for School Bus Drivers.

<sup>35</sup> General appearance, eyes, ears, mouth and throat, heart, lungs and chest, abdomen and viscera, vascular system, genito-urinary, extremities, spine and other musculoskeletal, and neurological.

<sup>36</sup> Snellen fractions are a measure of visual acuity (sharpness of sight). In the Snellen fraction, the first number represents the test distance (20 feet) and the second represents the distance at which the average eye could see the letters on a certain line of the chart. A fraction of 20/20 is considered normal vision.

## **2.6. Medications (Prescription, Over-the-Counter, Other)**

The driver of the 2003 Bluebird denied taking any prescription medications, herbal supplements, over-the-counter medications, or illegal drugs both in general and in the three days prior to the accident. She stated she tries not to take any drugs of any kind at all.

## **2.7. Alcohol Consumption**

The driver of the 2003 Bluebird stated she does not drink alcohol.

## **2.8. Post-accident Toxicology**

### **2.8.1. Law Enforcement**

On August 6, 2010, officers from the Missouri State Highway Patrol stated the driver of the 2003 Bluebird had submitted to alcohol breath testing after the accident, and that no alcohol was detected. Documentation of this testing has not been received at the time of this writing.

### **2.8.2. Employer/DOT Required**

The driver of the 2003 Bluebird underwent post-accident alcohol and drug testing on August 5, 2010, at the direction of her employer. The testing was performed at Employee Screening Services in Springfield, Missouri. A urine sample was taken shortly after 5:00 p.m. local time.<sup>37</sup> Testing of that sample performed by the Advanced Toxicology Network in Memphis, TN was negative for marijuana, cocaine, amphetamines, opiates, and PCP at the cutoff levels specified in 49 CFR Part 40.<sup>38</sup>

## **2.9. Sleep / Fatigue**

When asked about the quality of her sleep, the driver of the 2003 Bluebird described it as very good. She stated that ever since she was a child, she would have to get up once in the middle of the night to use the restroom, but has never had any problems falling right back to sleep. She denied any history or diagnosis of sleep apnea. She stated her typical amount of sleep is between 7.5 and 8 hours; and that amount of sleep leaves her feeling well rested. She occasionally takes a nap in the middle of the day, ranging in length from 15 to 60 minutes.

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<sup>37</sup> The exact time is not legible on the provided copy of the results.

<sup>38</sup> See Human Performance Group Chairman's Factual Report Attachment 15: 2003 Bluebird Driver Results of DOT Controlled Substance Test.

### 3. Operational Factors

#### 3.1. Licensing

At the time of the accident, the driver of the 2003 Bluebird school bus held a valid Missouri Class “B” Commercial Drivers license issued in June 2010 and expiring in June 2011. She held passenger-vehicle (“P”) and school bus (“S”) endorsements and was subject to non-airbrake commercial vehicle (“L”) and corrective lenses (“A”) restrictions.<sup>39</sup>

#### 3.2. Training / Experience

##### 3.2.1. Training

The Missouri Department of Revenue, which oversees driver licensing, requires drivers 70 years of age and over to submit proof a school bus skills test to retain the "S" endorsement on their license at the time of renewal.

The Missouri Commercial Driver License Manual<sup>40</sup> states that commercial drivers need to keep 1 second of space between their vehicle and the vehicle in front of them for each 10 feet of the commercial vehicle’s length at speeds under 40 miles per hour (MPH). For speeds greater than 40 MPH, one second should be added for safety.

Missouri state law requires drivers transporting pupils for a public school district to complete training of at least 8 hours duration on school bus driving annually. It is the responsibility of the employer/school district to verify that the required training has been completed.<sup>41</sup>

Annual training records provided by the 2003 Bluebird driver's employer are summarized in table 5 below:

**Table 5. 2003 Bluebird Driver Training**

<b>Year</b>	<b>Hours</b>	<b>Description</b>
<b>2008</b>	2	Driving Skills/Pre-trip
	1	Missouri Hwy Patrol Driver License Renewal Test
	2	Daily Pre-trip inspection
	2	Sexual Abuse and Bullying
		School Bus Evacuation Drill
	<b>7</b>	<b>(TOTAL HOURS)</b>
<b>2009</b>	2	Railroad Crossing

<sup>39</sup> Human Performance Group Chairman's Factual Report Attachment 16: 2003 Bluebird Driver Missouri Driver History Information.

<sup>40</sup> Version 4.0, revised August 2009, pages 2-16 and 2-17. Available from: [http://dor.mo.gov/forms/Commercial\\_Driver\\_License.pdf](http://dor.mo.gov/forms/Commercial_Driver_License.pdf), accessed January 20, 2011.

<sup>41</sup> <http://dor.mo.gov/faq/drivers/schoolbus.php#q8>; accessed on September 28, 2010.

	2	Student Behavior Management
		School Bus Evacuation Drill
	2	Driving Skills/Pre-trip
	1	Missouri Hwy Patrol Driver License Renewal Test
	2	Loading and Unloading Students
		School Bus Evacuation Drill
	1	Student Behavior Management
	1	AGOSNET <sup>42</sup>
	<b>11</b>	<b>(TOTAL HOURS)</b>
<b>2010</b>	2	Other Training
	2	Pre-trip Inspections
		School Bus Evacuation Drill
	2	Driving Skills/Pre-trip
	0.5	Pre-trip Inspection Review
	1	Missouri Hwy Patrol Driver License Renewal Test
	<b>7.5</b>	<b>(TOTAL HOURS)</b>

### 3.2.2. General Experience

When asked about her driving experience, the 2003 Bluebird driver stated she first was licensed to drive a commercial vehicle in 1972. She drove for Copeland Bus Services<sup>43</sup> during 1972 and 1973, and then drove part time for the company as a substitute. She also has driven buses for a business owned by herself and her husband. She resumed driving for Copeland in 1987, stating that it worked out well for her to drive for Copeland during the school year and for her family's business during the summer.

When asked, the driver of the 2003 Bluebird stated the bus she was driving had been her assigned "trip bus" for approximately four years.<sup>44</sup>

### 3.3. Accident / License History

A check of Missouri driver record for the 2003 Bluebird driver showed no moving violations or accidents in the past 10 years.

<sup>42</sup> In this context, AGOSNET refers to a line of web-based training offered by in2vate, LLC. Generally, the training offered covers employment practices, risk management, safety, and human resources topics. See <http://www.agosnet.com>.

<sup>43</sup> Her current employer, then owned by the current owner's father.

<sup>44</sup> A "trip bus" is used for longer trips, typically school activities such as sporting events, and not for the daily pickup and drop-off of students.

## **4. Task Factors**

### **4.1. Accident Trip**

At the time of the accident, the 2003 Bluebird bus was the lead vehicle of a two-bus element travelling from the St. James School District High School to the Six Flags St. Louis Amusement Park in Eureka, Missouri. The driver had made this trip before and was familiar with the route and the roadway.

### **4.2. Workload / Distraction**

#### **4.2.1. Distractions External to the Vehicle**

When asked about external distractions, the driver of the 2003 Bluebird stated she saw a tour bus on the side of the road, and a man came out and walked around in front of it. She stated she moved a little to the left, creating additional space between the tour bus and her school bus. She stated she watched the man, then looked in her right mirror to be sure she was past, and then moved right. She stated that as soon as she moved right, the accident occurred. She described what she struck as a “mass”. When asked, she stated she did not have time to brake or steer.

#### **4.2.2. Internal Workload / Distraction**

When asked about internal distractions, the driver indicated the children on the bus were well behaved and quiet for the entire trip. She stated the bus was equipped with both a Citizens Band (CB) radio and an AM/FM radio; neither was in use at the time of the crash. She denied eating or drinking at the time of the crash.

##### **(a) Cell Phone Use**

The driver of the 2003 Bluebird owns a cellular telephone and stated she was not using it at the time of the crash; it was sitting on the vehicle's console, charging. A check of her records indicated no cell phone use at or near the time of the accident.

## H. DRIVER OF THE 2001 BLUEBIRD SCHOOL BUS

### 1. Behavioral Factors

#### 1.1. 72-hour History

Based on an interview with the driver of the 2001 Bluebird school bus<sup>45</sup> and her cellular telephone records,<sup>46</sup> the following table of the driver's activities in the 72 hours prior to the accident was generated. All times in the table are expressed in Central Daylight Time (CDT).

**Table 6. 2001 Bluebird Driver Activities in the 72 hours prior to the crash**

<b>Monday, August 2, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
7:00-30 a.m.	Driver awakes	St. James, MO	Interview
10:26 a.m.	Driver makes outgoing cell call		Cell Records
1:00 p.m.	Driver goes to work, sporting goods store	St. James, MO	Interview
5:00 p.m.	Driver gets off work	St. James, MO	Interview
6:00 p.m.	Driver takes son to football practice and stays	St. James, MO	Interview
8:00 p.m.	Football practice ends, driver goes home	St. James, MO	Interview
9:12 p.m.	Driver makes outgoing cell call		Cell Records
9:30-10 p.m.	Driver goes to bed	St. James, MO	Interview
<b>Tuesday, August 3, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
3:54 a.m.	Driver makes outgoing cell call		Cell Records
7:30-8 a.m.	Driver awakes	St. James, MO	Interview
8:34 a.m.	Driver receives cell call		Cell Records
9:30 a.m.	Driver goes to work, sporting goods store	St. James, MO	Interview
1:15 p.m.	Driver leaves work	St. James, MO	Interview
3:00 p.m.	Driver completes H.S. registration of daughter	St. James, MO	Interview
3:30 p.m.	Driver returns to work, sporting goods store	St. James, MO	Interview
9:00 p.m.	Driver gets off work, goes home	St. James, MO	Interview
9:30 p.m.	Driver arrives home	St. James, MO	Interview
9:34 p.m.	Driver receives cell call		Cell Records
10:47 p.m.	Driver sends SMS message		Cell Records
11:00 p.m.	Driver goes to bed	St. James, MO	Interview
<b>Wednesday, August 4, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
6:46 a.m.	Driver sends SMS message		Cell Records
7:30-8 a.m.	Driver awakes	St. James, MO	Interview
9:00-30 a.m. <sup>47</sup>	Driver goes to work, sporting goods store	St. James, MO	Interview

<sup>45</sup> See Human Performance Factual Report Attachment 1.

<sup>46</sup> Human Performance Group Chairman's Factual Report Attachment 17: 2001 Bluebird Driver Cellular Telephone Records.

<sup>47</sup> According to the driver's mother, the actual time she went to work was closer to 10:45 a.m.

<b>Wednesday, August 4, 2010 (continued)</b>			
9:42 a.m.	Driver receives cell call		Cell Records
9:00 p.m.	Driver leaves work, goes home	St. James, MO	Interview
9:31 p.m.	Driver makes cell call		Cell Records
10:30 p.m.	Driver goes to bed	St. James, MO	Interview
<b>Thursday, August 5, 2010</b>			
<u>Time (CDT)</u>	<u>Event</u>	<u>Location</u>	<u>Source</u>
7:00-30 a.m.	Driver awakes	St. James, MO	Interview
7:14 a.m.	Driver makes cell call		Cell Records
8:00 a.m.	Driver leaves home and goes to Copeland	St. James, MO	Interview
UNK	Driver performs pre-trip inspection	St. James, MO	Interview
UNK	Driver talks to Ron Copeland for 5 to 10 minutes	St. James, MO	Interview
	Driver fuels bus	St. James, MO	Interview
9:00 a.m.	Driver arrives at High School	St. James, MO	Interview
9:08 a.m.	Driver makes cell call		Cell Records
9:15 a.m.	Driver departs for Six Flags	St. James, MO	Interview
<b>10:11 a.m.</b>	<b>ACCIDENT OCCURS</b>	<b>Gray Summit, MO</b>	

## **2. Medical Factors**

As part of the investigation, medical records for the driver of the 2001 Bluebird were requested from local physicians. A review of those records by the Safety Board's Medical Officer did not reveal any medical conditions on the part of the 2001 Bluebird driver that would have caused or contributed to this accident.<sup>48</sup>

### **2.1. Commercial Driver Fitness Determination Exam**

Commercial drivers in the United States are required by the Federal Motor Carrier Safety Regulations (FMCSRs) to be medically certified as physically qualified for commercial vehicle operation.<sup>49</sup> The driver's most recent examination prior to the crash was conducted in August of 2009 by a doctor in St. James, Missouri; her employer sends all its drivers to the same physician. Specific information from that exam regarding the driver's general health, vision, hearing, and medications is contained in sections 2.2 through 2.4 (below).

Commercial driver fitness examinations result in one of four outcomes with respect to medical certification:

- The driver is found to meet the standards in 49 CFR §391.41 and is given a 2-year certificate;
- The driver is found to meet the standards, but requires periodic evaluation for one or more conditions and is qualified for 3 months, 6 months, or 1 year;

<sup>48</sup> For further details, please see "Medical Records Information" in the docket.

<sup>49</sup> 49 Code of Federal Regulations §391.41.

- The driver is temporarily disqualified due to a condition or medication; or;
- The driver is found to not meet the standards.

The driver of the 2001 Bluebird was medically qualified until August 2011.<sup>50</sup>

## **2.2. Missouri Exam**

In Missouri, in addition to the requirements specified in 49 CFR §391.41, the Department of Elementary and Secondary Education requires all school bus drivers transporting pupils for a public school to have a statement on file from a medical examiner that indicates the driver is physically qualified to operate a school bus. This statement shall be completed annually.

In July of 2010, the driver of the 2001 Bluebird had a doctor in St. James complete the "Annual Physical Examination for School Bus Drivers"; the driver was found to physically qualified to safely operate a school bus.<sup>51</sup>

## **2.3. General Health**

At the time of the crash, the driver of the 2001 Bluebird was 38 years old. During her Commercial Driver Fitness Determination Exam in August of 2009, the performing physician did not note any abnormalities in any of the examined body systems.<sup>52</sup> Also during that exam, the driver did not indicate she had any significant health history or that she was taking any medications regularly. Sugar was detected in her urine, but the performing physician indicated the driver had a history of this and was not diabetic.

When asked, the driver described her general health as excellent. She stated she did not have a family physician.

## **2.4. Vision**

When asked about her vision, the driver of the 2001 Bluebird stated she had undergone LASIK surgery and had good vision as a result. She went on the state she does not wear glasses or contact lenses.

In the most recent commercial driver fitness exam performed on the driver of the 2001 Bluebird, the performing physician recorded her uncorrected Snellen

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<sup>50</sup> Human Performance Group Chairman's Factual Report Attachment 18: 2001 Bluebird Driver Commercial Driver Fitness Determination.

<sup>51</sup> Human Performance Group Chairman's Factual Report Attachment 19: 2001 Bluebird Driver Annual Physical Examination for School Bus Drivers.

<sup>52</sup> General appearance, eyes, ears, mouth and throat, heart, lungs and chest, abdomen and viscera, vascular system, genito-urinary, extremities, spine and other musculoskeletal, and neurological.



distant visual acuity<sup>53</sup> as 20/20 with the right, left and both eyes. The driver's horizontal field of vision was noted as 120° with both the right and left eyes. The performing physician indicated the driver could distinguish red, green, and amber colors.

## **2.5. Hearing**

When asked by investigators, the driver of the 2001 Bluebird described her hearing as good.

In the driver's most recent Commercial Driver Fitness Determination, she was noted to be able to hear a forced, whispered voice at 8 feet with both her left and right ears.

## **2.6. Medications (Prescription, Over-the-Counter, Other)**

When asked if she takes any medications, the driver of the 2001 Bluebird stated she takes hormones and an antidepressant once a day. She denied taking any herbal supplements or illegal drugs. She stated she does take over-the-counter medication as needed but did not take any in the three days prior to the accident. She confirmed that she had taken all her normal medications on the day of the accident.

## **2.7. Alcohol Consumption**

When asked if she consumed alcohol, the driver of the 2001 Bluebird stated she does so occasionally, but had not consumed any in the three days prior to the accident.

## **2.8. Post-accident Toxicology**

### **2.8.1. Law Enforcement**

On August 6, 2010, officers from the Missouri State Highway Patrol stated the driver of the 2001 Bluebird had submitted to alcohol breath testing after the accident, and that no alcohol was detected. The Missouri State Highway Patrol Accident Reconstruction Report<sup>54</sup> provided to the Safety Board states that there was no evidence to indicate the driver of the 2007 Volvo was under the influence of intoxicants or controlled substances at the time of the crash.

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<sup>53</sup> Snellen fractions are a measure of visual acuity (sharpness of sight). In the Snellen fraction, the first number represents the test distance (20 feet) and the second represents the distance at which the average eye could see the letters on a certain line of the chart. A fraction of 20/20 is considered normal vision.

<sup>54</sup> Available in the Official Use Only portion of the docket.

### **2.8.2. Employer/DOT Required**

The driver of the 2001 Bluebird underwent post-accident alcohol and drug testing on August 5, 2010, at the direction of her employer. The testing was performed at Employee Screening Services in Springfield, Missouri. A urine sample was taken shortly before 5:00 p.m. local time.<sup>55</sup> Testing of that sample performed by the Advanced Toxicology Network in Memphis, TN was negative for marijuana, cocaine, amphetamines, opiates, and PCP at the cutoff levels specified in 49 CFR Part 40.<sup>56</sup>

### **2.9. Sleep / Fatigue**

When asked about her sleeping habits, the driver of the 2001 Bluebird stated she normally sleeps “like a rock” and denied any history of sleeping disorders or snoring. She went on to state she normally gets between nine and ten hours of sleep a night and indicated this amount typically leaves her feeling well rested. Her normal time of waking is between 7:30 and 8:00 a.m.

## **3. Operational Factors**

### **3.1. Licensing**

At the time of the crash, the driver of the 2001 Bluebird held a valid Missouri Class “B” Commercial Drivers license issued in August 2009 and expiring in May 2009. She held passenger-vehicle (“P”) and school bus (“S”) endorsements and was subject to the non-airbrake commercial vehicle (“L”) restriction. Her license lists her height as five feet eight inches and her weight as 160 pounds.<sup>57</sup>

### **3.2. Training / Experience**

#### **3.2.1. Training**

Missouri state law requires drivers transporting pupils for a public school district to complete training of at least 8 hours duration on school bus driving annually. It is the responsibility of the employer/school district to verify that the required training has been completed.<sup>58</sup>

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<sup>55</sup> The exact time is not legible on the provided copy of the results.

<sup>56</sup> Human Performance Group Chairman's Factual Report Attachment 20: 2001 Bluebird Driver Results of DOT Controlled Substance Test.

<sup>57</sup> Human Performance Group Chairman's Factual Report Attachment 21: 2001 Bluebird Driver Missouri Driver History Information.

<sup>58</sup> <http://dor.mo.gov/faq/drivers/schoolbus.php#q8>; accessed on September 28, 2010.

The Missouri Commercial Driver License Manual states that commercial drivers need to keep 1 second of space between their vehicle and the vehicle in front of them for each 10 feet of the commercial vehicle's length at speeds under 40 miles per hour (MPH). For speeds greater than 40 MPH, one second should be added for safety.

Annual training records provided by the 2001 Bluebird driver's employer are summarized in table 7 below:

**Table 7. 2001 Bluebird Driver Training**

<b>Year</b>	<b>Hours</b>	<b>Description</b>
<b>2009</b>	1	Initial Driver Training
	2	Initial Driver Training
	2	Driving Skills/Pre-trip (testing review)
	1	Missouri Hwy Patrol CDL Test
	2	Loading and Unloading
		School Bus Evacuation Drill
	1	Student Behavior Management
	1	AGOSNET
	<b>10</b>	<b>(TOTAL HOURS)</b>
<b>2010</b>	2	Other Training
	2	Pre-trip Inspections
		School Bus Evacuation Drill
	<b>4</b>	<b>(TOTAL HOURS)</b>

### **3.2.2. General Experience**

When asked about her driving experience, the 2001 Bluebird driver stated she had held a Commercial Driver's License (CDL) for approximately a year and has spent her entire career with Copeland Bus Services.

### **3.3. Accident / License History**

A check of Missouri driver record for the 2001 Bluebird driver for the previous 10 years showed a suspension in 2006 for failure to appear for speeding in a non-commercial vehicle. That suspension was lifted in 2006.

## **4. Task Factors**

### **4.1. Accident Trip**

At the time of the accident, the 2001 Bluebird bus was the second vehicle of a two-bus element travelling from the St. James School District High School to the Six Flags St. Louis Amusement Park in Eureka, Missouri. The driver had made this trip before and was familiar with the route and the roadway.

#### **4.1.1. On-board Video Recording**

The 2001 Bluebird bus was equipped with an on-board video recording system configured to record the interior of the bus. The system is intended to serve as a method for monitoring the behavior of students/passengers while being transported. Investigation determined the system was recording at the time of the crash. For a full description of the recording, see the Video Study in the docket. The following events from the video are noted for the Human Performance investigation:

- A passenger on the bus can be seen speaking to the driver. Examination of the video indicated the passenger begins turning away from the driver at time stamp 10:18:54 and is fully seated at time stamp 10:19:00; and
- The driver's steering maneuver begins at time stamp 10:19:06 and impact occurs at 10:19:07.8.

#### **4.2. Workload / Distraction**

##### **4.2.1. Distractions External to the Vehicle**

When asked by investigators about possible distractions outside the vehicle, the driver of the 2001 Bluebird denied having a problem with the sun or glare, and did not recall any other external distractions. She stated that traffic was lighter at the time of the accident than it was when she first got on the Interstate and went on to state that she was not aware that traffic ahead of the first bus had slowed or stopped. When asked, she specifically did not recall passing a motor coach on the side of the road.

##### **4.2.2. Internal Workload / Distraction**

When asked about potential distractions in the vehicle, the driver of the 2001 Bluebird stated that the bus was equipped with a CB radio, and denied using it at the time of the crash. She also stated the AM/FM radio was not on, and that she was not eating or drinking at the time of the crash, explaining that Copeland had a policy against doing so.

###### **(a) Cell Phone Use**

The driver of the 2001 Bluebird owned a cellular telephone and had it with her at the time of the accident. She denied using the phone at the time of the crash. A check with her cellular provider indicated a cell phone call at 9:08 a.m. and another at 10:14 a.m.

**(b) Passenger Activity**

As noted in Section 4.1.1, a passenger on the 2001 Bluebird approached the driver prior to the accident. That passenger returned to his seat approximately 12 seconds before the driver's reaction to the collision between the 2003 Bluebird and the GMC.

## I. COMMON HUMAN PERFORMANCE FACTORS

### 1. Environmental Factors

In order to acquire accurate weather and illumination information, NTSB investigators used a Global Positioning System (GPS) to obtain precise location information for the scene of the crash.

**Table 8. GPS location information**

Latitude:	38.46092 N
Longitude:	90.86404 W
Compass Heading:	65 degrees

#### 1.1.1. Illumination

While visiting the accident scene, NTSB investigators observed the position of the sun near the time of the accident (between 10:15 and 10:30 a.m.) and made the following observations:

- The sun was overhead;
- For an eastbound driver, the sun would be slightly to the right of the driver's direction of travel;
- The sun would not be in the forward field of view of an eastbound driver.

Astronomical data for Pacific, Missouri,<sup>59</sup> for August 5, 2010 was obtained from the United States Naval Observatory's Astronomical Information Center.<sup>60</sup> Sun data for that date was as follows:<sup>61</sup>

Begin civil twilight:	5:39 a.m.
Sunrise:	6:08 a.m.
Sun transit:	1:09 p.m.
Sunset:	8:09 p.m.
End civil twilight:	8:38 p.m.

For Pacific at 10:11 a.m., the altitude of the sun was 56.4 degrees above the horizon and 121.7 degrees east of true north.

<sup>59</sup> The closest location to Gray Summit that could be found in the data source.

<sup>60</sup><http://www.usno.navy.mil/USNO/astronomical-applications/astronomical-information-center/astronomical-information-center>.

<sup>61</sup> Human Performance Group Chairman's Factual Report Attachment 22: Astronomical Data.

### 1.1.2. Weather

Weather data from PWS<sup>62</sup> IDNS14 for the time closest to the time of the accident was as follows:<sup>63</sup>

<b>PWS Station ID:</b>	IDNS14
<b>Latitude:</b>	N 38.484
<b>Longitude:</b>	W 90.746
<b>Time:</b>	10:15
<b>Temperature:</b>	80.7 °F
<b>Dew Point:</b>	72.4 °F
<b>Pressure:</b>	29.82 in
<b>Wind Direction:</b>	NE
<b>Wind Speed:</b>	2.0 MPH
<b>Wind Gust:</b>	2.0 MPH
<b>Humidity:</b>	76%
<b>Hourly Rainfall:</b>	0.00 inches

Based on GPS coordinate location information, this PWS is located 6.58 miles as the crow flies from the accident scene.

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<sup>62</sup> Personal Weather Station.

<sup>63</sup> Human Performance Group Chairman's Factual Report Attachment 23: Weather Data.

**J. LIST OF ATTACHMENTS:**

<b>Attachment</b>	<b>Title</b>	<b>Pages</b>
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2	E-mail Communication with Climate Express, Inc. Attorney	8
3	2007 Volvo Driver Cellular Telephone Records	11
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9	St. Louis University Toxicology Laboratory Report	2
10	Final Forensic Toxicology Fatal Accident Report	2
11	Missouri Driver Record for 2007 GMC Driver	2
12	2003 Bluebird Driver Cellular Telephone Records	3
13	2003 Bluebird Driver Commercial Driver Fitness Determination	4
14	2003 Bluebird Driver Annual Physical Examination for School Bus Drivers	2
15	2003 Bluebird Driver Results of DOT Controlled Substance Test	2
16	2003 Bluebird Driver Missouri Driver History Information	2
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19	2001 Bluebird Driver Annual Physical Examination for School Bus Drivers	2
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**END OF REPORT**

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