

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

**SURVIVAL FACTORS GROUP CHAIRMAN'S  
FACTUAL REPORT**

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**A. CRASH INFORMATION**

Location: 17000 Block 480<sup>th</sup> Street, Oakland, Pottawattamie County, Iowa  
Vehicle #1: 2004 IC, Model 3S530, 65 passenger school bus  
Operator #1: Riverside Community School District  
Date: December 12, 2017  
Time: Approximately 06:52 a.m. CST  
NTSB #: **HWY18MH003**

**B. SURVIVAL FACTORS GROUP**

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## **C. CRASH SUMMARY**

For a summary of the crash, refer to the Crash Summary Report in the docket for this investigation.

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

The Survival Factors investigation focused on the elements of the crash relating to survivability which included the occupants' ability to evacuate the school bus after the collision with the ditch, the presence and availability of emergency equipment (i.e. fire extinguishers), emergency egresses and access to the interior of the school bus by bystanders and first responders. The investigation will examine the interior environment of the school bus and its effects on the morbidity and mortality of the occupants. Lastly, the Survival Factors investigation will examine the timeliness, effectiveness and efficiency of the first responders.

### **1. 2004 IC, Model 3S530 School Bus**

The crash school bus is operated by the Riverside Community School District which is comprised of elementary, middle and high schools in the cities of Oakland, Carson and Macedonia in Pottawattamie, County Iowa. The school bus was occupied by a driver employed with the school district and one student.

The school bus is rated for 65 passengers and has an overall interior length of 30 feet and 5 inches measured from the front dashboard area to the rear emergency exit door. The school bus is 6 feet in height and has an aisleway width of 12 inches. There are 11 rows of seats on both the left side and right side of the school bus. The first ten rows on each side have the wider bench seats to accommodate multiple students. The bench seat measures 39 inches across and is 15 inches in depth at the seat-pan. The last row on the right side has a wide bench seat while the last row on the left side contains a smaller seat measuring 26 inches across with a depth of 15 inches. The elimination of the wider bench seat on the left side provides additional aisleway clearance in front of the rear emergency exit door.



Photo #1: Exemplar school bus showing the location of the emergency exit windows.

There are twelve windows on the left side of the school bus to include the driver’s window. Window number #5 and number #9 on the left side and window number #4 and number #8 on the right side are designated emergency exit windows. These emergency exit windows are located adjacent to seat row #4 and between seat row #7 and #8 on the interior of the school bus and are marked on both the exterior and the interior surface. The measurements of the school bus windows are provided in **Table 1**.

Table 1

| <b>Left side</b>                          | <b>Dimensions</b>                     |
|---|---------------------------------------|
| Window #1 (driver’s)                      | Length 32 ½ inches Height 21 inches   |
| Window #2                                 | Length 32 ½ inches Height 21 inches   |
| Window # 3-11                             | Length 24 inches Height 21 inches     |
| Window #12                                | Length 32 ½ inches Height 21 inches   |
| <b>Right side</b>                         |                                       |
| Window #1                                 | Length 32 ½ inches Height 21 inches   |
| Window #2-10                              | Length 24 inches Height 21 inches     |
| Window #11                                | Length 32 ½ inches Height 21 inches   |
| <b>Rear windows (left and right side)</b> | Length 20 ¼ inches Height 20 ¼ inches |

One of the witnesses reported that she attempted to break out window #2 on the left side to rescue the occupants. The witness advised that she succeeded in creating a small hole that allowed thick black smoke to escape through. The interior of the school bus quickly erupted in flames and the window eventually failed, breaking out completely.

### **1.1. Exterior Damage**

The school bus sustained minimal damage due to the collision with the ditch. However; it sustained extensive exterior damage resulting from the post-crash fire. The engine cowling and the hood were consumed in the fire. All the windows in the school bus broke out during the fire to include the window panes in the rear emergency exit door. The hard-plastic covers for the two roof hatches and the front-loading door were missing.



Photo #2: Exterior view of the crash school bus on scene.

### **1.2. Interior Damage**

The school bus sustained extensive damage to the interior of the bus resulting from the post-crash fire. All non-metallic materials in the school bus were consumed in the fire. The interior of the school bus was exposed to intense heat and direct flame impingement. The fire spread quickly throughout the interior. The structural frame supports failed buckling and deforming the roof.



Photo #3: Interior view of damage to school bus caused by intense heat and fire.

### **1.3. Access and Emergency Egress**

#### **1.3.1. Front-loading door**

The front-loading door is comprised of two vertical doors that are 6 feet 8  $\frac{3}{4}$  inches in height from the bottom step to the top of the door frame and are 36 inches in width. The door is operated by using the manual release handle. To operate the door, the driver completes the following steps.

- Lift up on the spring-loaded door handle control latch that locks the door control handle in place.
- Grasp the door control arm handle.
- Lift up on the sliding collar that is attached to the control arm handle.
- Pull the door control arm handle to release it from its locking point
- Push door control arm handle towards the door to open.

The door control arm handle acts on the lever arm which exerts force against the door to open. To close the door, the driver simply pulls up on the collar and pulls the door control arm handle towards him and then pushes it into the spring-loaded control latch which catches the handle and secures the door in the closed position. This manual door release has a locking feature that prevents the door from being inadvertently opened while the school bus is in motion.

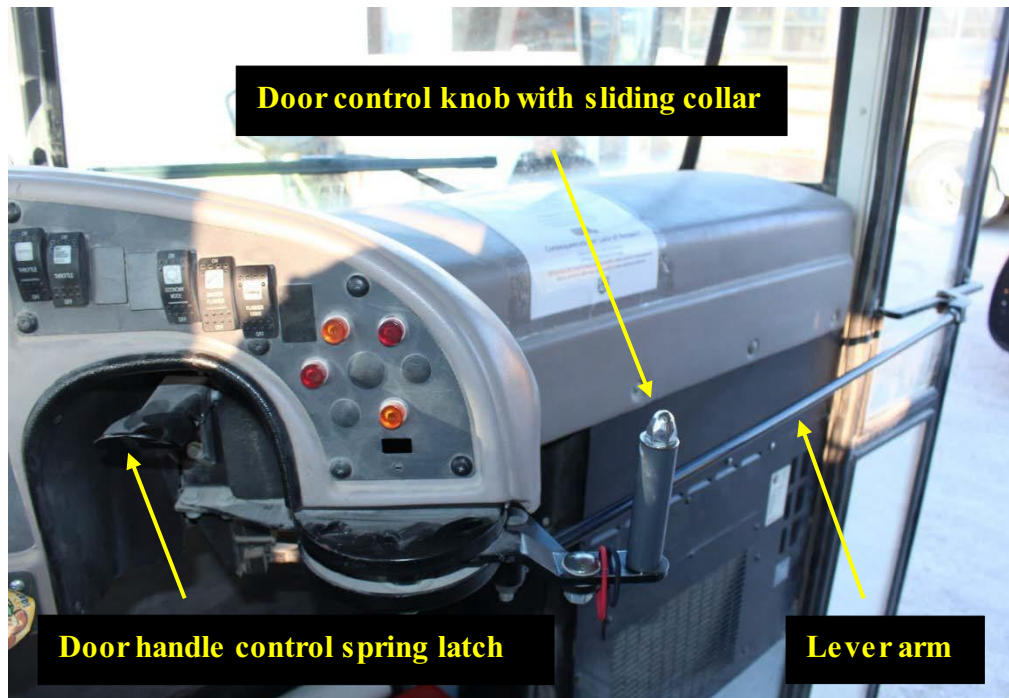


Photo #4: Manual door release for the front-loading door.

An examination of several exemplar buses was performed. A load-cell was used to determine the pounds-force required to open the front-loading door. There was no standardization regarding the force required to open the doors. The determining factor was how well the vehicle was maintained. It was found that between 9-22 pounds of force was required to be exerted to open the manual door. An exemplar bus with very little preventative maintenance was found and the door was tested. It required a significantly higher amount of force to open the door. The examination of the door control assembly revealed a lack of lubrication and the formation of rust on the control parts.

In 2010 the Fifteenth National Congress on School Transportation adopted the National School Transportation Specifications and Procedures. The document outlines the recommended procedures that govern manually operated doors on school buses. The organization recommended that “manual door control shall not require more than 25 pounds of force to operate at any point through the range of operation, as tested on a 10% grade, both uphill and downhill.”<sup>1</sup>

School Districts, in the state of Iowa, are required to provide emergency evacuation training to all students that utilize school transportation. National Organizations, such as AAA, provide videos for school districts to use to supplement their own training. These videos demonstrate the proper way for students to evacuate a school bus in the event of an emergency. Students are told that unless the conditions dictate otherwise, the preferred method of evacuation is the same way they boarded the bus; through the front-loading door. The videos usually show the drivers

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<sup>1</sup> Fifteenth National Congress on School Transportation: National School Transportation Specifications and Procedures, May 2010.

directing the students from the bus and does not provide the student (or viewer) with an alternative in the event the driver becomes incapacitated and the front-loading door is used as an emergency egress.<sup>2</sup>

The issues that surrounded the providing of passengers with easily understood instruction on how to release the front-loading door for emergency egress; in the event of driver incapacitation was examined by Volpe Center and an Interim report was published in 2009 regarding motorcoaches. Part of the study focused on the ability of passengers to evacuate a motorcoach, if the driver is incapacitated. It was recommended that changes be implemented to facilitate the passengers' ability to utilize the front-loading door to increase passenger egress rates, reduce risk of injury and assist emergency responders in gaining access to the interior of the motorcoach.<sup>3</sup>

On April 26, 2018, the Director of Transportation for the Iowa Department of Education announced that he would seek assurances from the state's school districts that emergency evacuation curriculum for its students would be provided twice a year. The Director of Transportation in the I-35 School District in Iowa has also included as, part of that training, the familiarizing of students with the operation of the front-loading door in the event of the driver's incapacitation.<sup>4</sup>

In the last fifteen years, over 70,000 school buses were manufactured equipped with the manual front-loading door control. These buses are still in production and represent a portion of the annual sales of buses offered for sale by the manufacturers.

### 1.3.2. Rear emergency exit door

The emergency rear exit door is 4 feet 4¼ inches in height and 36 inches in width. The distance from the floor of the school bus at the rear emergency exit door to the (level) ground is 35 inches. The emergency rear exit door operates by a pull-down latch. It was not possible to verify the presence of the required door markings due to the fire damage.

There was no evidence that the door sustained any damage resulting from the collision with the ditch. There were no indications that the school bus occupants attempted to escape via the rear emergency exit door. The first arriving witnesses on the scene reported a grass fire at the rear of the bus which would have likely discouraged the occupants' use of the door. The first arriving law enforcement officer attempted to gain access into the bus through the door but was unable to due to the fire that had intensified by that time. The post-crash examination of the door found that it was operational.

### 1.3.3. Emergency exit windows

The school bus is equipped with two emergency exit windows on each side of the bus. Neither of the occupants attempted to use the windows to escape the school bus. None of the glass or the surrounding frame molding survived the fire. The post-crash examination of the windows

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<sup>2</sup> AAA Foundation video: <https://www.youtube.com/watch?v=7xPFw8PyAo>

<sup>3</sup> Volpe Center: Human Factors Issues in Motorcoach Emergency Egress Interim Report 1, August 2009

<sup>4</sup> <http://whotv.com/2018/04/26/channel-13-investigation-our-most-precious-cargo/>

was unable to confirm the proper operation of the windows or presence of the required window markings prior to the incident.

#### 1.3.4. Emergency roof hatch

The school bus was equipped with two emergency roof hatches. The hatches are located adjacent to seat row #2 and seat row #9. The roof hatch opening is 2 feet by 2 feet wide. The roof hatch is located at a height of 6 feet from the school bus floor. There were no indications that either occupant attempted to utilize the roof hatch as a means of evacuation.

## **2. School Bus Operations**

### **2.1. Iowa State regulations**

The State of Iowa, through the Iowa Department of Education, regulates all school bus transportation operations in the state. The state outlines requirements for driver qualifications, training, the maintaining of records for daily inspections by drivers and the requirement for bi-annual bus inspection by the state.

### **2.2. Riverside Community School District**

The base of operation for the Riverside Community School District is a central garage or bus barn located in the city of Oakland, Iowa. The transportation operation is overseen by a transportation supervisor.

His duties include; the dispatching of drivers for pick-ups, the receiving and tracking of all requests for services either to be suspended or resume based on the students need, overseeing the maintenance of the school buses, and the required qualification, training and re-certification of the drivers.

Next door to the bus barn is the Riverside Elementary school which is used as a transportation terminal for the transferring of pupils from one school bus to another and is the central communications hub for the Riverside Community School Transportation service. The operation of transporting students to their various schools starts with drivers tasked with picking up pupils from distant rural areas; known as country routes, and then picking up pupils closer in, within the city limits called city routes. The students are dropped off at the elementary school where they transfer or board another school bus which will transport them to their assigned schools.

The school bus pick-up routes are designated and approved by the local school board. Several of the routes require school buses to travel on rural roadways with various obstructions or hazards, such as ditches or drop-off of roadway edges, limited sight distances, etc. Regulations prohibit school buses from leaving the public highway to receive or discharge pupils unless their safety is enhanced by doing so and the private road is maintained in the same manner as the public

roadway. The driveway adjacent to the passenger's residence is gravel and well maintained. There was space available in the driveway for the school bus to maneuver.<sup>5</sup>

The current school year routing was developed by another of the school bus drivers. The changes in the pick-up routes usually occur when a student no longer needs to utilize the transportation service or the student either ages into or out of the transportation system. The driver has been driving for the school district since 2001 and this was his normal route.

In addition to the state of Iowa regulations, the Riverside Community School District requires the training of all elementary and middle-school aged students, utilizing the school district transportation, to undergo a safety briefing at the beginning of each school year. This safety briefing instructs the students on the best way to evacuate the bus in the event of an emergency. High school aged children are exempted from participating due to the belief that due to age; they have been exposed to the safety briefing on numerous occasions and do not require any refresher training. These briefings are usually given by the bus drivers but on some occasions, the briefings have been provided by school personnel without drivers being present. There is no written guideline or standardization regarding how these briefings are to be performed.

### **2.3. Safety Equipment**

Each of the school buses are equipped with a radio that not only allows the driver to communicate with the base station at the bus barn but also to communicate directly to the Pottawattamie County Communications Center through an installed "emergency 911" button. Normally, the school transportation personnel operate off a separate channel that is monitored in the Emergency Communications Center. By activating the 911 button, an alert is sent to the Communication Center and the driver can speak directly to a police dispatcher utilizing the "hands-free" feature of the system. The drivers go through no formalized training regarding the use of the "911 button" and no written procedures regarding its application is provided to them.

Each school bus is equipped with a first aid kit and a fire extinguisher. Whereas the location of the first aid kit may vary from bus to bus; the fire extinguisher is stored in a large compartment located behind the large interior rearview mirror. The compartment is above the front windshield and the contents of the compartment are not marked on the outside of the compartment door. The fire extinguisher is not readily accessible to the driver or the passenger.<sup>6</sup>

## **3. The Occupants**

### **3.1. The Driver**

The driver of the school bus was a 74-year-old male with a history of back problems. This resulted in the driver needing to utilize a cane and a walker to walk, stand or support himself. The family of the driver reported that he couldn't walk for extended periods without the cane or walker.

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<sup>5</sup> Reference: <https://www.legis.iowa.gov/law/administrativeRules/agencies> section 285.11

<sup>6</sup> Reference: <https://www.educateiowa.gov/pk-12/school-transportation/school-transportation-code-references> chapter 44.

In addition, the deteriorating condition of his back resulted in the driver losing his balance and falling over. However; the family denies that the driver's back problems affected his ability to operate a motor vehicle. The driver's deteriorating physical condition was noted by several co-workers and the principal of the local high school. Two of these individuals expressed their lack of surprise that in an emergency, the driver could not extricate himself.

During the incident, the driver was unable to evacuate the burning school bus and was forced to wait for bystanders to break open a window in hopes of extricating him. During this time, the driver stated that he did not know where the passenger was and could not assist her with evacuation. The driver suffered fatal injuries resulting from the exposure to both the smoke filled toxic environment and superheated air.

The State of Iowa, Department of Education, mandates that a driver be of "sufficient physical capacity to operate the bus effectively and to render assistance to the passengers in case of illness or injury..."<sup>7</sup>

### **3.2. The Passenger**

The passenger in the school bus was a 16-year-old female with no known medical history. The teenage passenger had no physical or mental disabilities that would have prevented her from being able to self-extricate from the school bus.

Interviews conducted with family and acquaintances revealed that the female passenger normally sat close to the driver; near the front of the bus. The passenger was known to be good friends with the driver and the two would normally chat during the first half of the trip. It was commonly believed that the passenger and the driver mutually liked each other. After the fire was extinguished, the passenger was found lying on the floor adjacent to the driver's seat.

## **4. Emergency response**

The Pottawattamie County in Iowa is approximately 960 square miles. The Pottawattamie County Sheriff's Office Communications Center provides the emergency and non-emergency communications for both law enforcement and fire department services in the region. This includes 5 law enforcement agencies and 14 Volunteer Fire and Rescue agencies for 16 cities and townships. The largest city is Council Bluffs which has its own law enforcement agency and a full-time paid Fire Department/EMS services. In addition to Council Bluffs; Carter Lake and Avoca have their own law enforcement agencies which are supplemented by personnel from the Sheriff's Office.

The Communications Center is staffed 24 hours a day with a minimum of four call taker/dispatcher on duty. One dispatcher is assigned to the county, another to the city of Council Bluff, a third dispatcher is assigned to fire department operations and the fourth is responsible for information services to support the law enforcement agencies. Incoming 911 calls are answered

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<sup>7</sup> Reference: <https://www.educateiowa.gov/pk-12/school-transportation/school-transportation-code-references> chapter 43.

by the first available dispatcher. If the call is for the channel (agency) that dispatcher is handling, the dispatcher will dispatch the call his/herself. If the call is for another agency, the dispatcher puts the information provided by the 911 caller into the CAD system which is sent to the appropriate radio zone to be dispatched.

#### **4.1. Law Enforcement**

The incident occurred in an area that is primarily serviced by the Pottawattamie County Sheriff's Department. The call was dispatched at 7:02 a.m. The first arriving sheriff's deputy was approximately 24 miles from the scene when he received the call. Upon his arrival at 7:18 a.m., he attempted to extinguish the fire by using a department supplied fire extinguisher on the fully engulfed school bus. The deputy noted that the fire extinguisher had no effect on the fire. An attempt was made to enter the school bus from the rear, utilizing the rear emergency exit door. The door was extremely hot to the touch and the deputies on the scene could not gain access.

#### **4.2. Fire Department**

The incident occurred in an area that receives both fire and rescue services from three local fire departments. These agencies are Carson Fire Department, Macedonia Volunteer Fire Department and the Oakland Volunteer Fire Department. Each of these agencies are approximately 5 miles apart from each other. The Carson Volunteer Fire Department is located 11 miles from the scene. The Macedonia Volunteer Fire Department is approximately 13.5 miles from the scene.

#### **4.3. Event timeline**

- **6:35 a.m. Driver leaves bus barn in route to passenger pick up**
- **6:50 a.m. Passenger's mother report that the school bus arrives and passenger steps outside to meet it.**
- **6:56 a.m. Driver calls into bus barn and reports the collision, fire and entrapment to the transportation supervisor.**
- **? Transportation Supervisor calls the elementary school secretary and advises her of the incident and a possible delay in picking up students.**
- **? Transportation Supervisor calls the substitute driver and coordinates the retrieval of the spare bus. The supervisor gets into his privately-owned vehicle (POV) and drives to the scene.**
- **? Approximately 2 minutes after the original transmission to the transportation supervisor by the driver, the elementary school secretary calls a second driver, who is a family member of the passenger. The secretary asks the uncle to call the residence and confirm that the child was picked up.**
- **6:59 a.m. Uncle (second bus driver) calls the residence and speaks to sister-in-law. She confirms that passenger had left the residence to get on the school bus. The mother walks outside and reports that the bus is in a ditch and on fire.**
- **? The uncle radios in that the bus was on fire and the occupants were onboard.**

- 7:02 a.m. The secretary of the elementary school calls 911 and reports the incident.
- 7:02 a.m. The Pottawattamie County Sheriff's Department receives the call.
- 7:02 a.m. The Carson Fire Department is dispatched to the scene. The Macedonia Fire Department personnel receive text messages about the incident.
- 7:05 a.m. The mother of the passenger calls 911.
- 7:08 a.m. The Transportation Supervisor arrives on the scene and finds school bus fully engulfed in flames.
- 7:11 a.m. The Macedonia Fire Department are dispatched to the scene.
- 7:18 a.m. The first Sheriff's Deputy arrives
- 7:23 a.m. The first piece of fire department apparatus arrives on the scene from the Macedonia Fire Department.
- 7:30 a.m. The Carson Fire Department arrives on the scene.<sup>8</sup>

## 5. Interviews

Interviews were conducted with members of the Riverside Community School Transportation, a principal from the local high school, members of the Pottawattamie Sheriff's Department and the Pottawattamie County Medical Examiner's Office and the Iowa State Office of the Chief Medical Examiner.

### 5.1. Riverside Community School Transportation

- Several bus drivers heard the initial radio transmission between the bus driver and the transportation supervisor. They confirmed that the driver had informed the supervisor that the school bus was in a ditch, the bus was on fire and that "he" couldn't get out.
- The other drivers advised that they were aware of the physical limitations of the crash driver due to his back problems. Recently, the crash driver was observed using a cane and a walker to get around.
- Some of the other bus drivers had voiced their concerns over the crash driver still operating a school bus after his back condition worsen.
- The Transportation Supervisor advised that the driver was scheduled to undergo back surgery and the day of the crash was scheduled to be his last day until after the surgery was completed.

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<sup>8</sup> Survival Factors Attachment: Emergency Response 911 CAD/Incident reports

- The principal and one of the drivers advised that they knew if an emergency occurred that the crash driver would be unlikely to be able to self-extricate.
- It was believed that the passenger genuinely liked her driver and the feeling was mutual. Most of the drivers believe that the passenger would not have left the driver if he had been unable to extricate himself.
- The driver was an experienced driver and had driven that route for years. He knew the roadway and its characteristics.
- The principal confirmed that a complaint had been made in August regarding the driver's operation of the school bus.
- Drivers do undergo annual training to keep their certification to drive a school bus.
- A safety briefing is provided to the students at the beginning of each year. These safety briefings provide the student with training in the emergency evacuation of the school bus. The training is only provided to elementary and middle school kids.<sup>9</sup>

## **5.2. Pottawattamie County Sheriff's Department**

- By the time the first sheriff's deputy arrived, the school bus was fully engulfed in flames.
- The members of the sheriff's department were unable to extinguish the fire or gain entry to the school bus.
- Once the fire department arrived on the scene, they were able to extinguish the fire rather quickly.<sup>10</sup>

## **5.3. The Medical Examiner's Offices**

### **5.3.1. Pottawattamie County Medical Examiner's Office**

Investigators from the Pottawattamie County Medical Examiner's Office responded to the scene. Investigators documented the scene; to include the post-fire positions of the driver and the passenger within the bus. The driver was positioned in the driver's seat with his upper torso extending outside the bus through the driver's window. The passenger was positioned with her left leg on the driver's seat frame wedged beneath the driver's lower torso and lying posterior on the bus floor next to the driver's seat, with her head facing towards the east.

One of the investigators interviewed the passenger's family on the scene. The mother confirmed that her brother in law had called and asked her to step outside and check on the bus. The mother and the older sister reported to the investigator that when they approached the bus, the

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<sup>9</sup> Survival Factors Attachment: Riverside School District Interviews

<sup>10</sup> Survival Factors Attachment: Law Enforcement interview

driver was conscious and talking but that there was no sight or sound from the passenger. The fire had been visible in the grass and to the rear of the school bus. The driver advised the mother that it would be necessary to break a window to extricate them from the school bus. The older sister attempted to break out a window with a hammer. She was only able to punch a small hole in the window and reported a heavy stream of thick black smoke rolled out of the hole. This was shortly before the interior of the school bus ignited into flames.<sup>11</sup>

### 5.3.2. Iowa State Office of the Chief Medical Examiner

The autopsies of the driver and the passenger were performed by the Iowa State Office of the Chief Medical Examiner located in Ankeny, Iowa. In addition to the autopsies, toxicological samples from both victims were obtained and sent to NMS Laboratory for forensic testing. Additional samples were sent to the Civil Aerospace Medical Institute's (CAMI) Bioaeronautical Sciences Research Laboratory (BSRL) for testing.

The autopsy of the driver revealed that he had undergone a past surgical procedure to his back. There was no evidence that the driver sustained any other injury, resulting from the collision with the ditch, that would have incapacitated him or prevented him from evacuating the school bus. The autopsy report concluded that the cause of death for the driver was smoke and soot inhalation with thermal injuries. The forensic testing conducted by the NMS Laboratory on the driver's femoral blood found a carboxyhemoglobin saturation of 6% and cyanide at .79 mcg/ml. Additional forensic testing conducted by the BSRL detected carbon monoxide at less than 10% in the femoral blood.<sup>12</sup>

The autopsy of the passenger revealed no other medical conditions or injuries that would have prevented her from evacuating the bus. The passenger's cause of death was smoke and soot inhalation with thermal injuries. The passenger's heart blood was analyzed by NMS Laboratory and 47% carboxyhemoglobin saturation and cyanide at 3.2 mcg/ml was detected.

## **DOCKET MATERIAL**

The following attachments and photographs are included in the docket for this investigation:

### LIST OF ATTACHMENTS

Survival Factors Attachment- Emergency Response: 911 CAD/Incident reports

Survival Factors Attachment- Riverside School District Interviews

Survival Factors Attachment- Law Enforcement Interviews

Survival Factors Attachment- Pottawattamie County Coroner's Office Investigation reports

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<sup>11</sup> See Survival Factors Attachment- Pottawattamie County Coroner's Office Investigation report

<sup>12</sup> See Medical Officer's report included in the docket of this investigation

LIST OF PHOTOGRAPHS

- Survival Factors Attachment Photo #1- Exterior of school bus showing extensive fire damage at the scene
- Survival Factors Attachment Photo #2- Left side exterior view of school bus showing extensive fire exposure
- Survival Factors Attachment Photo #3- Front interior view of school bus showing extensive fire damage at location of manual door release handle
- Survival Factors Attachment Photo #4- Interior close-up of driver's area showing extensive fire damage
- Survival Factors Attachment Photo #5- Interior passenger compartment of school bus showing structural buckling
- Survival Factors Attachment Photo #6- Interior close-up of rear hatch, missing cover and deformation to roof
- Survival factors Attachment Photo #7- Interior view of the rear emergency door and fire damage to the passenger compartment
- Survival Factors Attachment Photo #8- Interior close-up of rear emergency door and interior handle
- Survival Factors Attachment Photo #9- Photo of fire damaged fire extinguisher in overhead compartment
- Survival Factors Attachment Photo #10- Close-up of fire damaged fire extinguisher in overhead compartment
- Survival Factors Attachment Photo #11- Close-up of fire damaged extinguisher
- Survival Factors Attachment Photo #12- Exterior side view of exemplar school bus showing location of emergency windows
- Survival Factors Attachment Photo #13- Interior view of driver's area in exemplar school bus showing manual door release handle
- Survival Factors Attachment Photo #14- Close-up of manual door release handle in exemplar school bus
- Survival Factors Attachment Photo #15- Interior view of passenger compartment in exemplar school bus
- Survival Factors Attachment Photo #16- Close-up of rear emergency door and handle in exemplar school bus

END OF REPORT

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Sheryl Harley

Survival Factors Group Chairman