

# National Transportation Safety Board

Office of Highway Safety

Washington, DC 20594



HWY23MH015

## **HUMAN PERFORMANCE**

Group Chair's Factual Report

## TABLE OF CONTENTS

A.	CRASH INFORMATION .....	4
B.	HUMAN PERFORMANCE GROUP .....	4
C.	CRASH SUMMARY.....	4
D.	DETAILS OF THE INVESTIGATION .....	4
1.0	BUS DRIVER .....	4
1.1	Background and License History .....	4
1.1	Drug Testing.....	6
1.2	Training .....	6
1.2.1	Fatigue Training.....	7
1.3	Pertinent Greyhound Policies.....	8
1.4	Pre-Crash Activities.....	10
1.5	Greyhound Policy Violation History.....	12
1.6	Health History .....	14
1.7	Toxicology .....	15
1.8	Phone Records .....	15
1.9	Fatigue .....	17
2.0	TRUCK DRIVERS.....	18
2.1	Freightliner Driver.....	18
2.2	Kenworth Driver .....	19
2.3	Mack Truck Driver .....	20
E.	GENERAL FACTORS .....	21
1.0	WEATHER .....	21
2.0	ASTRONOMICAL FACTORS.....	21
F.	DOCKET MATERIAL.....	21

## LIST OF TABLES

Table 1. Employment History.....	5
Table 2. Known Crash History.....	6
Table 3. Drug Tests Results.....	6
Table 4. On- and Off-Duty Times for Bus Driver, July 6 - July 12.....	11
Table 5. Duty Times for the Bus Driver, July 6 - July 12.....	12
Table 6. Bus Driver Greyhound Policy Violation History from July 2022 - July 2023..	13
Table 7. Bus Driver Greyhound Policy Violation History from May 2018 - September 2021.....	14
Table 8. Phone Calls from July 9 until the Time of the Crash.....	16
Table 9. Weather Data from Weather Station KILHIGH76.....	21

## **A. CRASH INFORMATION**

Location: Highland, Madison County, Illinois  
Date: July 12, 2023  
Time: 1:48 a.m. CDT

## **B. HUMAN PERFORMANCE GROUP**

Group Chair                      Rafael Marshall  
National Transportation Safety Board  
Washington, DC 20594

Group Member                  Scott Wobbe  
Illinois State Police  
Collinsville, IL 62234

## **C. CRASH SUMMARY**

For a summary of the crash, refer to the *Crash Information and Summary Report*, which can be found in the NTSB docket for this investigation.

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

The Human Performance factual investigation focused on the driver of the 2014 Prevost motorcoach (bus driver) and the behavioral, medical, operational, and environmental factors that may have contributed to the crash. Limited information is provided about the drivers of the 2019 Freightliner truck tractor-semitrailer (Freightliner driver), the 2000 Kenworth truck tractor-semitrailer (Kenworth driver), and the 2023 Mack Truck tractor-semitrailer (Mack Truck driver), who were all parked on the shoulder of the exit ramp from Interstate 70 to the Silver Lake rest area when the crash occurred.

### **1.0 Bus Driver**

#### **1.1 Background and License History**

The 59-year-old bus driver held a Missouri commercial driver's license (Class B) with a passenger endorsement. The license was issued in December of 2020 and is scheduled to expire in June of 2026. The bus driver was required to wear corrective lenses when driving. According to the Commercial Driver's License Information System (CDLIS), the bus driver did not have any previous suspensions, withdrawals,

restrictions, or crashes.<sup>1</sup> The bus driver had a valid medical certificate, issued in April 2023 and was valid for one year. See health history for additional information.

The bus driver was hired by Greyhound on April 16, 2018, and took part in Greyhound’s training program for new drivers. He drove for Greyhound until November 2021, when he resigned due to a family matter. The bus driver was rehired by Greyhound in April 2022. According to the bus driver’s 2018 pre-employment records, he had an extensive employment history as a driver prior to joining Greyhound, including 6 years as a transit bus driver. See Table 1 for a summary.

**Table 1.** Employment History.

Employment	Start date	End date	Position	Reason for leaving
Greyhound	4/28/2022	7/12/2023	Driver	N/A
Amazon	11/2021	4/2022	Package handler	N/A
Greyhound	4/16/2018	11/3/2021	Driver	Family Emergency
Hilton Grand Vacation	10/31/2017	1/18/2018	Sales representative	N/A
C3	8/31/2016	6/30/2017	Sales representative	Laid off
Bell Transportation	6/30/2016	9/29/2016	Limo/Bus driver	New employment
Manpower	5/31/2016	11/29/2017	Parking attendant	New employment
Unemployed	12/31/2015	6/29/2016	N/A	N/A
officer' Funeral Home	7/31/2014	1/30/2016	Driver	Moved to Las Vegas
Helping Hands	12/31/2008	N/A	Driver	New employment
Bi-State Metro	1/31/2008	12/30/2014	Bus driver	Laid off

According to CDLIS, the bus driver did not have a history of crashes. However, Greyhound data indicated that the bus driver had a reportable crash in a Greyhound bus in May 2018 (Table 2).<sup>2,3</sup> In this crash, the bus driver rear-ended a moving tractor-semitrailer on northbound Interstate 15 (I-15) in California. The crash occurred at 11:30 p.m. and the crash report indicated that the bus driver had been fatigued and that he had been driving at an unsafe speed for the present traffic conditions. Other Greyhound-documented non-reportable crashes involving the bus driver were minor. His pre-employment records also indicated that he caused a rear-end crash in April 2017 at a time he was not working as a commercial vehicle driver.

<sup>1</sup> Human Performance Attachment - Bus Driver CDLIS Report. The Commercial Driver’s License Information System (CDLIS) is a nationwide computer system that enables state driver licensing agencies to ensure that each commercial driver has only one driver license and one complete driver record.

<sup>2</sup> A reportable crash is one in which a vehicle was towed from the scene, or an injury or fatality occurred.

<sup>3</sup> Human Performance Attachment - 2018 Traffic Collision Report.

**Table 2.** Known Crash History.

Date	Commercial vehicle	Incident description	Severity
7/11/2023	Yes	Rear-end crash with trucks	3 fatal / 14 injured
5/02/2020	Yes	Pick-up truck struck bus rear	No injuries
3/11/2020	Yes	Truck struck bus side mirror	No injuries
8/02/2019	Yes	Bus struck construction barrier	No injuries
5/19/2018	Yes	Rear-end of truck	1 injured
4/16/2017	No	Non-CMV rear-end crash	N/A

## 1.1 Drug Testing

The bus driver had been drug and alcohol tested on nine occasions. He underwent pre-employment testing three times: (1) in February 2018 as part of his original application process to Greyhound, (2) after an extended absence, following the crash in May 2018, and (3) in April 2022 after quitting the previous November. The bus driver also passed six random drug tests between 2019 and 2023, as shown in Table 3.

**Table 3.** Drug Tests Results.

Date	Reason	Drugs	Alcohol	Result
4/11/2023	Random	*		Negative
4/26/2022	Pre-employment	*		Negative
11/10/2020	Random	*		Negative
7/10/2020	Random	*		Negative
11/25/2019	Random	*		Negative
11/4/2019	Random	*	*	Negative
6/7/2019	Random	*	*	Negative
12/17/2018	Pre-employment	*		Negative
2/16/2018	Pre-employment	*		Negative

## 1.2 Training

According to Greyhound records, the bus driver completed the company's driver training program in March 2018. This training was divided into three phases. The first phase was 10 hours of computer-based training, where students were taught about such topics as the basics of safe driving, navigating railroad crossings, merging, passing, driving in adverse weather, navigating intersections, and pedestrian awareness. The second phase consisted of 13 days of classroom time (52 hours) in which students learned about such topics as the DOT regulations, pre- and post-trip inspections, and completing logs. The classroom time in the second phase was also accompanied by at least 40 hours of behind-the-wheel time. The final phase consisted of 10 hours of computer-based training on such topics as substance abuse, bloodborne pathogens, hazard communication, and security awareness; this was accompanied by at least 70 additional hours of behind the wheel time. Each phase

ended with a proficiency test, where students were required to score at least 70% correct to pass. The bus driver attended further training in 2020 and 2021, which included Americans with Disability Act training, defensive driving, and hazard communication.

### 1.2.1 Fatigue Training

Among the items taught in the initial training was fatigue management. The coursework described fatigue as “a significant decrease in alertness, an increase in sleepiness and an all-around lack of energy due to several factors.”<sup>4</sup> These factors included insufficient or poor-quality sleep due to work patterns, lifestyle, or an untreated sleep disorder; long continuous hours of wakefulness; disrupted body clock; the use of alcohol, drugs, or medications that disrupt sleep or wakefulness; or environmental factors.

The coursework listed 17 signs and symptom of fatigue:

- Forgetfulness
- Apathy
- Poor judgment
- Lethargy
- Slowed reaction time
- Bad mood
- Irritability
- Poor communication
- Squirming and fidgeting
- Nodding off
- Inability to concentrate
- Red eyes
- The tendency to daydream
- Yawning
- Fixation
- Heavy eyelids
- Drowsiness

Several methods to combat fatigue were given, including naps, exercise, or an activity break. It also encouraged drivers to call dispatch if they found themselves too fatigued to report for work, or if already on duty, to stop in a safe area to stretch or walk around.

In 1999, the NTSB investigated a fatigue-related Greyhound bus crash that occurred in Burnt Cabins, Pennsylvania.<sup>5</sup> The NTSB issued recommendation H-00-006 to Greyhound, recommending that it revise its driver scheduling practices to reduce scheduling variability that results in irregular work-rest cycles. Greyhound contracted with Alertness Solutions to conduct a thorough review and study of Greyhound’s fatigue management program, including Greyhound’s training practices, scheduling

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<sup>4</sup> Human Performance Attachment - Excerpts from Greyhound’s Fatigue Management Training.

<sup>5</sup> National Transportation Safety Board. 2000. Greyhound Motorcoach Run-off-the-Road Accident, Burnt Cabins, Pennsylvania, June 20, 1998. Highway Accident Report NTSB/HAR-00/01. Washington, DC.

practices, and operations.<sup>6</sup> Greyhound subsequently updated its training, scheduling, and operations based on the recommendations of Alertness Solutions.<sup>7</sup> According to Greyhound, its training program is still based on this information.

### 1.3 Pertinent Greyhound Policies

Per Greyhound policy, all drivers are given a 34-page rulebook that covers 1) general rules, 2) driver behavior and image, 3) schedule performance, 4) customer relations, and 5) bus operation/safety. Pertinent human performance-related topics in the rulebook include alcohol and drug use, maintaining logs, driver [Department of Transportation (DOT)] physicals, and distraction.

Greyhound management maintains a safety manual that contains policies on several topics, including human performance-related items such as controlled substance testing, hours of service, [DOT] physical examinations, use of cellphones, onboard safety technology (dashcams and driver alert systems), a driver awards program, and obstructive sleep apnea (OSA) screening. The OSA screening policy is described further below.<sup>8</sup> The latest update to these policies was in 2015.

The OSA policy describes the identification and evaluation of drivers who might have obstructive sleep apnea. The STOP-BANG screening tool is the method used to identify drivers with a predisposition for OSA.<sup>9</sup> STOP is an acronym for **S**nores loudly, **T**ired, **O**bststruction (stop breathing while sleeping), and **P**reventative (hypertension or diabetes mellitus and on medication); and BANG is an acronym for **B**ody Mass Index, **A**ge (over 50), **N**eck circumference (over 16-inches for females and 17-inches for males), and **G**ullet (referring to the Mallampati Score, which assesses the size and shape of a patient's tongue and esophageal airway).

Greyhound requires OSA testing via a sleep study for any driver who had at a combination of least 1 item in the STOP and 3 in the BANG category. Greyhound also requires OSA testing for any driver with a BMI over 40, even if no other risk factors are present. If a sleep study identifies OSA, then a driver may use a CPAP (continuous positive airway pressure) device or opt for surgery. Noncompliance with treatment methods could lead to disqualification.

Greyhound generally requires its drivers to obtain their DOT medical examination certificate (MCSA-5876) from certified medical examiners employed by

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<sup>6</sup> Alertness Solutions was founded by Dr. Mark Rosekind, a renowned fatigue management expert, former NTSB board member, and former administrator of the National Highway Traffic Safety Administration.

<sup>7</sup> [CAROL Query \(nts.gov\)](https://www.nts.gov/press-releases/2015/03/2015-03-04-carol-query)

<sup>8</sup> Human Performance Attachment - Excerpts from Greyhound's OSA Screening Policy.

<sup>9</sup> Nagappa M, Liao P, Wong J, et al. Validation of the STOP-Bang Questionnaire as a Screening Tool for Obstructive Sleep Apnea among Different Populations: A Systematic Review and Meta-Analysis. *PLoS One*. 2015;10(12):e0143697. Published 2015 Dec 14.

Concentra.<sup>10</sup> In areas not served by Concentra, drivers may go to clinics inspected and approved by Greyhound. All these facilities are given a copy of Greyhound's OSA policy. A driver using a CPAP must present a CPAP compliance report to the medical examiner when obtaining or renewing a medical examiner's certificate. The compliance report must show that the driver used a CPAP for at least four hours during 70% of his/her sleep periods for the driver to be medically qualified for a certificate. To qualify for a one-year certificate, the driver must provide a CPAP compliance report for the past 90 days. Shorter compliance reports would medically qualify the driver for shorter periods of time. Greyhound collects the completed medical examination reports (MCSA-5875) for all its drivers. It employs a medical administrator, who reviews each driver's medical examination report and who lends further scrutiny to reports for drivers who were given a medical certificate that is valid for less than two years.<sup>11</sup>

Greyhound has a voluntary program through Nox Health that allows drivers to be tested and monitored for OSA.<sup>12</sup> If a bus driver is found to have OSA, Greyhound provides the bus driver with CPAP equipment for free in return for the company being able to monitor the driver's CPAP usage via the Nox Health sleep portal. Nox Health also provides Greyhound with a weekly compliance report of driver CPAP usage. Bus drivers in the program who do not meet the minimum required CPAP usage are pulled out of service until they again achieve compliance. According to Greyhound, it is not unusual for four to five drivers a month to be pulled out of service due to compliance issues. The Greyhound driver involved in the Highland crash had OSA but was not in the program.

Another Greyhound policy governs a regular driver's commute time, stating that a "regular drivers' commute time plus the "on-duty" time of the run may not exceed 16 hours," although exceptions could be granted by local management in conjunction with the Safety department.<sup>13</sup> The bus driver was a regular bus driver and was therefore subject to the 16-hour limit. Additionally, substitute drivers (referred to as Extra Board drivers) were required to live close enough to their home terminal so they can report to work within 2 hours of a call. Greyhound defined commute time as "the time from when a driver leaves home until his/her report-to-work time." Based on Google Maps, the commute time between the bus driver's home in O'Fallon, Missouri and National City, Illinois, (where most of his trips departed) was between 40 and 50 minutes.

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<sup>10</sup> The Federal Motor Carrier Administration, which regulates commercial vehicle operation, requires all health professionals who examine the fitness of commercial drivers to be certified as knowledgeable in the pertinent federal regulations and guidance material. See [National Registry of Certified Medical Examiners | FMCSA \(dot.gov\)](https://www.fmcsa.dot.gov/certified-medical-examiners).

<sup>11</sup> Greyhound's medical administrator is a certified medical assistant with several years of experience evaluating DOT physical examination records. The medical administrator consults with a physician employed by Concentra on more complex cases.

<sup>12</sup> Human Performance Attachment - Greyhound's Nox Health Poster and Information.

<sup>13</sup> Human Performance Attachment - Drivers - Greyhound's Prepared for Work Policy.

## 1.4 Pre-Crash Activities

According to the bus driver's electronic logging data, the bus driver was off-duty on July 9 and 10, 2023.<sup>14</sup> He went back on-duty in the St. Louis, Missouri, area at 12:51 p.m. on July 11, 2023. He began driving at 1:29 p.m. and drove until reaching Effingham, Illinois, where he logged in as "on-duty not driving" for 20 minutes. He then drove to Terre Haute, Indiana, where he logged in as "on-duty not driving" for two minutes. He changed his status to "on-duty not driving" in Indianapolis at 5:54 p.m. and he did not resume driving for about four hours and thirty minutes. It is not known what the bus driver did during that time. According to Greyhound, bus drivers may check-in to a hotel room at Greyhound's expense while laying over; however, there is no evidence that this bus driver used that benefit on this trip. Greyhound also stated that the Indianapolis terminal had a driver break room that drivers can use during layovers; but there is no evidence that the driver stayed in the break room. The bus driver began driving at 10:23 p.m. and drove three hours and twenty-five minutes until the crash in Highland, Illinois.<sup>15</sup> Table 4 provides a summary of the driver's logged activities for the week before the crash. Table 5 summarizes the bus driver's duty hours each day. See the Motor Carrier Factual report for additional information about the bus driver's schedule.

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<sup>14</sup> Human Performance Attachment - Bus Driver Logs.

<sup>15</sup> Logging data from June 28 through July 12 indicate that the bus driver had not stopped at the Highland rest stop prior to the crash.

**Table 4. On- and Off-Duty Times for Bus Driver, July 6 - July 12.<sup>16</sup>**

Date	Start Time	Stop Time	Location	Status	Approximate duration h:m
7/6/2023	N/A	N/A	N/A	Off-duty	Whole day off-duty
7/7/2023	11:18	11:20	St. Louis, MO	On-duty not driving	0:02
7/7/2023	11:20	11:26	National City, IL	Off-duty	0:06
7/7/2023	11:26	11:26	National City, IL	On-duty not driving	0:00
7/7/2023	11:26	12:02	National City, IL	Off-duty	0:36
7/7/2023	12:02	12:03	National City, IL	On-duty not driving	0:01
7/7/2023	12:03	13:31	National City, IL	Off-duty	1:28
7/7/2023	13:31	13:45	National City, IL	On-duty not driving	0:14
7/7/2023	13:45	15:36	From St. Louis	On-duty driving	1:51
7/7/2023	15:36	15:52	Effingham, IL	On-duty not driving	0:16
7/7/2023	15:52	16:59	N/A	On-duty driving	1:07
7/7/2023	16:59	17:03	Terre Haute, IN	On-duty not driving	0:04
7/7/2023	17:03	18:18	N/A	On-duty driving	1:15
7/7/2023	18:19	23:19	Indianapolis, IN	Off-duty	5:00
7/7/2023	23:19	23:59	N/A	On-duty driving	0:41
7/8/2023	0:00	5:33	N/A	On-duty driving	5:33
7/8/2023	5:33	7:23	Lake View Acres, IL	On-duty not driving	1:50
7/8/2023	7:23	7:48	N/A	On-duty driving	0:25
7/8/2023	7:48	7:50	National City, IL	On-duty not driving	0:02
7/8/2023	7:50	7:57	N/A	On-duty driving	0:07
7/8/2023	7:57	8:11	St. Louis, MO	On-duty not driving	0:14
7/8/2023	8:11	N/A	N/A	Off-duty	N/A
7/9/2023	N/A	N/A	N/A	Off-duty	Whole day off-duty
7/10/2023	N/A	N/A	N/A	Off-duty	Whole day off-duty
7/11/2023	12:51	13:29	National City, IL	On-duty not driving	0:38
7/11/2023	13:29	15:09	N/A	On-duty driving	1:40
7/11/2023	15:09	15:29	Effingham, IL	On-duty not driving	0:20
7/11/2023	15:29	16:37	N/A	On-duty driving	1:08
7/11/2023	16:37	16:39	Terre Haute, IN	On-duty not driving	0:02
7/11/2023	16:39	17:54	N/A	On-duty driving	1:15
7/11/2023	17:54	22:23	Indianapolis, IN	On-duty not driving	4:29
7/11/2023	22:23	11:59	N/A	On-duty driving	1:37
7/12/2023	0:00	1:57	N/A	On-duty driving	1:48
7/12/2023	1:48	1:48	Highland, IL	Crash	N/A

<sup>16</sup> Because seconds are not considered when estimating start and end times, there may be slight discrepancies between the times in this table and the official duty times in Table 5.

**Table 5.** Duty Times for the Bus Driver, July 6 - July 12.

Date	Driving	On duty not driving	Total hours	location
7/6/2023	0	0	0	National City, IL
7/7/2023	4:54	0:35	5:29	National City, IL
7/8/23	6:04	2:06	8:11	Jenkinssville, IN
7/9/23	0	0	0	N/A
7/10/23	0	0	0	N/A
7/11/23	5:38	5:29	11:08	National City, IL
7/12/23	1:57 (up to crash)	8:45 (post-crash)	10:43	Indianapolis, IN

Five bus passengers interviewed by the Illinois State Police (ISP) mentioned that the bus driver had drifted out of his lane several times during the trip, with a few suggesting that he was falling asleep.<sup>17</sup> One passenger stated that although he had been asleep at the time of the crash, he was awoken several times during the trip (about 4 or 5) when he heard the bus run over the strips/bumps on the edge of the roadway. A second passenger stated through an interpreter that about an hour into the drive, the bus started to leave the roadway. This happened a few more times during the trip, although subsequent occasions were not as bad as the first time. He stated that he woke up approximately 10 minutes before the crash and put his seatbelt on because he was afraid of how the driver was operating the bus. A third passenger stated through an interpreter that an hour before the accident, he noticed that the driver was falling asleep because he was swerving outside the lane. This happened approximately 3 times.

Two different passengers interviewed by the NTSB told of similar experiences (see docket for passenger interview transcripts). One passenger stated that the bus driver had told them to ask him questions before departing the Indianapolis terminal because he did not want to be bothered when driving due to the number of construction projects along the route; however, she stated that even when not in a construction area, the bus driver would drift over the rumble strips and had wondered if it was due to cross winds. The second passenger stated that the bus driver would override the rumble strips and correct; but right before the crash, *"the [bus driver] wasn't trying to correct the path of the bus whatsoever, not turning the steering wheel. And then, I heard the other tires, you know, hit those rumpers [sic]. And I looked up, and I saw the tractor trailer, the back of it, a white one, coming towards us. And I immediately was like, okay, we're going to hit."*

## 1.5 Greyhound Policy Violation History

Greyhound buses were equipped with Lytx fleet management systems that reported instances when a driver exceeded bus operation thresholds set by Greyhound policy (e.g., speeding, hard braking). As detailed in the Motor Carrier Factual Report, the bus driver had 71 reportable events from July 2022 to July 2023. These events were graded from 0 to 10 for severity, with 10 being the most severe. The

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<sup>17</sup> Human Performance Attachment - ISP Bus Passenger Interviews.

bus driver scored a 10 on seven occasions - all for violating the speed limit and the company's speeding policy. Greyhound was unable to supply NTSB investigators with records of disciplinary actions taken for any of these policy violations. The reason given was that records were lost when Greyhound moved its terminal out of downtown St. Louis. Triggering behaviors are listed in Table 6.

**Table 6.** Bus Driver Greyhound Policy Violation History from July 2022 - July 2023.

Violation	Number of occurrences	Assigned score
Posted speed violation, speed policy violation	7	10
Speed policy violation	4	5
Posted speed violation	2	5
Failed to stop [at stop sign or light]	13	5
Failed to stop, other communication device	1	5
Following distance: < 1 second	5	5
Red light [braking response]	1	5
Following distance: ≥ 1 sec to < 2 sec	20	4
Late response [braking]	1	4
Incomplete stop [at stop sign or light]	5	3
Incomplete stop, other comm device	1	3
Late departure	1	3
Handheld device	1	3
Other concern [lane departure]	1	3
Other communication device	2	0
Lens obstruction	4	0
Near collision - unavoidable	1	0
Collision	1	0

Greyhound was able to locate written records of 13 additional policy violations by the driver between March 2019 and October 2021, which included nine for speeding, one for exceeding hours of service regulations, one for late departures from the terminal, one for following too closely, and one for a property collision (Table 7). Finally, although there are no records or descriptions associated with these policy violations, three such violations are listed in the bus driver's personnel record from May 2018 to February 2019. For the span of time for which the NTSB has records, the bus driver accumulated 87 policy violations between May 2018 to July 2023.

**Table 7.** Bus Driver Greyhound Policy Violation History from May 2018 – September 2021.

Date	Violation	Description	Source
5/19/2018 <sup>18</sup>	Not mentioned	Drive Cam	Personnel Record (Form HR-02)
1/25/2019	Not mentioned	No further information	Personnel Record (Form HR-02)
2/17/2019	Not mentioned	Drive Cam	Personnel Record (Form HR-02)
2/21/2019	Speeding	Drive Cam. Exceeded speed limit by 22 mph	Notice of Personnel Record Entry
3/9/2019	Speeding	Drive Cam. Exceeded speed limit by 18 mph	Notice of Personnel Record Entry
7/19/2019	Speeding	Drive Cam. Exceeded speed limit	Notice of Personnel Record Entry
8/2/2019	Property damage	Made wrong turn and damaged bus	Notice of Personnel Record Entry
11/30/2019	HOS <sup>19</sup> violation	Accepted work assignment before having 8 hours off-duty	Notice of Personnel Record Entry
1/14/2020	Schedule	Late departures and arrivals during past week	Notice of Personnel Record Entry
1/17/2020	Following distance	Following Distance: $\geq 1$ sec to $< 2$ sec	Notice of Personnel Record Entry
6/2/2020	Speeding	Drive Cam. Exceeded speed limit by 13 mph	Notice of Personnel Record Entry
8/2/2020	Speeding	Drive Cam. Exceeded speed limit by 14 mph	Notice of Personnel Record Entry
10/20/2020	Speeding	Drive Cam. Exceeded speed limit by 11 mph	Notice of Personnel Record Entry
2/27/2021	Speeding	Drive Cam. Exceeded speed limit by 18 mph	Notice of Personnel Record Entry
3/4/2021	Speeding	Drive Cam. Exceeded speed limit by 12 mph	Notice of Personnel Record Entry
9/14/2021	Speeding	Drive Cam. Exceeded speed limit by 15 mph	Notice of Personnel Record Entry

## 1.6 Health History

Greyhound provided investigators with completed Department of Transportation Medical Examination (MCSA-5875) forms for the bus driver from 2020 until 2023. The bus driver's most recent MCSA-5875 was completed in April 2023. The medical examiner was a physician who was certified under Federal Motor Carrier Safety Administration's (FMCSA) National Registry of Commercial Medical Examiners (NRCME). According to the completed examination form (long form), the bus driver admitted to having high blood pressure, diabetes, and a sleep test. He indicated that he took medication to control his diabetes and high blood pressure. Additionally, the driver stated that he used a CPAP device to manage his sleep apnea. Notes from the physician stated that the bus driver provided a CPAP compliance report that indicated

<sup>18</sup> Date of violation given on Form HR-02 was overwritten, making it difficult to decipher. The date of the violation may be May 17, 18, or 19, 2018.

<sup>19</sup> Hours of Service.

83.3% usage and more than 4 hours/night in the past 90 days. The MCSA-5875 indicated the bus driver was 5-feet 10-inches tall and weighed 265 pounds (BMI of 38). His corrected vision and field of view were within regulatory requirements. His hearing was also within regulatory requirements. Upon physical examination, the physician noted that the driver's body systems appeared normal and restricted the qualification of the bus driver to one year due to his hypertension, diabetes, and sleep apnea.

The NTSB obtained the bus driver's CPAP compliance report from the bus driver's attorney for June 27, 2023, through July 12, 2023. According to this report, the driver's CPAP usage totaled 4 hours or greater on 64% of 24-hour noon-to-noon periods for the 14 such periods prior to the crash period. The reported apnea-hypopnea index (AHI) over this date range was normal on CPAP.<sup>20</sup> According to a graphical record of the times of the driver's CPAP use, his last use before the crash was for almost 6.5 hours in the early morning hours of July 11, 2023 (from a little past 11 p.m. on July 10 to about 5:30 a.m. July 11). He also used his CPAP for about 7 hours the night before (from about 10:30 p.m. on July 9 until about 5:30 a.m. on July 10). Note that these windows of CPAP usage may or may not reflect actual sleep times.

## **1.7 Toxicology**

The bus driver was taken to Barnes-Jewish Hospital in St. Louis, Missouri, after the crash, and blood and urine specimens were collected by the hospital. At the request of the NTSB, the unused portion of the driver's blood sample was sent to the Bioaeronautical Sciences Research Branch of the Federal Aviation Administration (FAA) Civil Aerospace Medical Institute in Oklahoma City, Oklahoma for additional testing. The results indicated that the bus driver was negative for alcohol and other common drugs of abuse, and positive for two non-impairing drugs known to be prescribed to him.

## **1.8 Phone Records**

The bus driver possessed a personal cell phone and a Greyhound-issued cell phone. AT&T was the carrier for both phones.<sup>21</sup> The work phone was a Samsung Galaxy A13 phone. Records obtained from AT&T indicate that between July 9-12, 2023, two calls were made to the bus driver's work phone and both calls were sent to voicemail. In addition, 27 text messages were sent to the bus driver's work phone during this time frame, all from Greyhound's headquarters in Dallas, Texas. The bus driver did not respond to these texts or make phone calls from this phone during this timeframe.

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<sup>20</sup> The severity of OSA often is classified by the AHI, which is the number of apnea and hypopnea episodes that occur per hour of sleep. An AHI of less than 5 is normal. Mild OSA corresponds to an AHI of 5 to less than 15, moderate OSA corresponds to an AHI of 15 to 30, and severe OSA corresponds to an AHI of more than 30.

<sup>21</sup> Human Performance Attachment - Bus Driver Phone Records.

The bus driver's personal phone was an Apple SE/2. The phone call times in Table 8 are based on his AT&T personal phone records. The bus driver was off duty on July 9-10, 2023, and began his crash shift on July 11. These records only indicated that the bus driver made voice calls and not text messages on this phone. However, it must be noted that texts between Apple phones are not recorded as a text message but are instead recorded as data transfers. Although the records contained information on data transfers to and from the phone, a representative from AT&T stated that it is not possible to distinguish text-related data transfers from other types of data transfers. In addition, the records did not record calls and texts sent and received via third-party applications.

**Table 8.** Phone Calls from July 9 until the Time of the Crash.

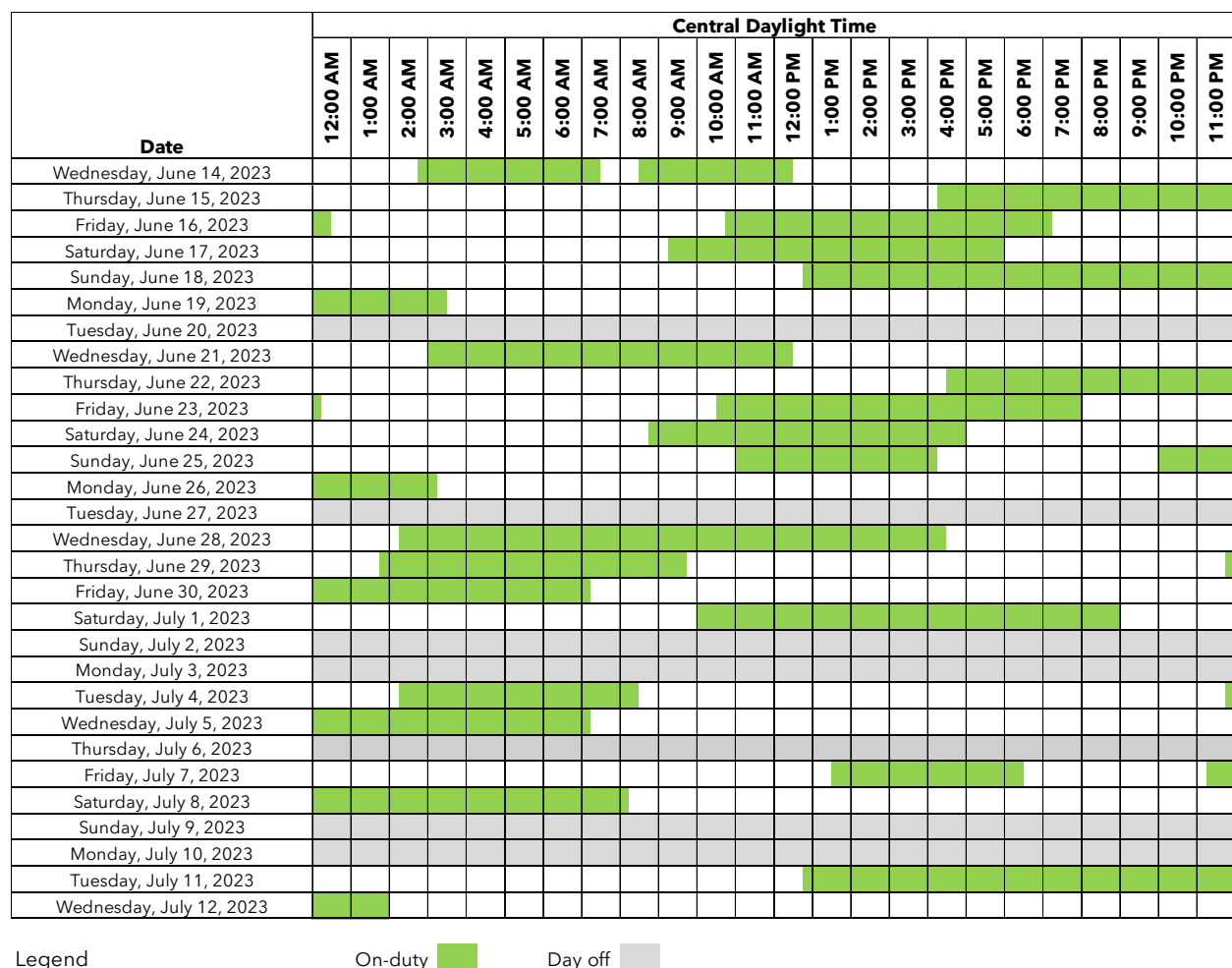
Connection Date (local time)	Converted Time (UTC-5)	Seizure Time	ET Originating
07/09/23	4:54:57	0:23	0:02
07/09/23	5:08:59	0:02	0:04
07/09/23	5:45:44	0:01	7:25
07/09/23	13:00:42	0:11	2:49
07/09/23	13:10:56	0:02	13:12
07/09/23	13:38:22	0:17	0:52
07/09/23	13:49:02	0:15	4:10
07/09/23	14:14:19	0:13	0:00
07/10/23	10:10:01	0:12	0:40
07/10/23	10:22:50	0:13	1:09
07/10/23	10:38:36	0:04	0:10
07/10/23	12:38:12	0:08	0:53
07/10/23	12:53:59	0:08	0:26
07/10/23	13:01:26	0:02	1:16
07/10/23	13:03:19	0:23	0:06
07/10/23	13:03:33	0:06	0:18
07/10/23	14:46:17	0:05	0:12
07/10/23	14:47:08	0:03	0:10
07/10/23	19:32:35	0:01	11:47
07/11/23	11:45:55	0:01	15:01
07/11/23	18:07:06	0:01	2:09
7/11/2023	10:09:06	0:00	6:47

The Illinois State Police recovered the bus driver's personal cell phone from the wreckage and extracted the contents using the Cellebrite UFED program. At the request of NTSB investigators, Greyhound also provided the Illinois State Police with the bus driver's work phone, which was extracted. The extractions were shared with the

NTSB, which analyzed their contents. The extraction identified additional times that the bus driver used his phone for Web searches. See the docket for information on the phone extraction data.

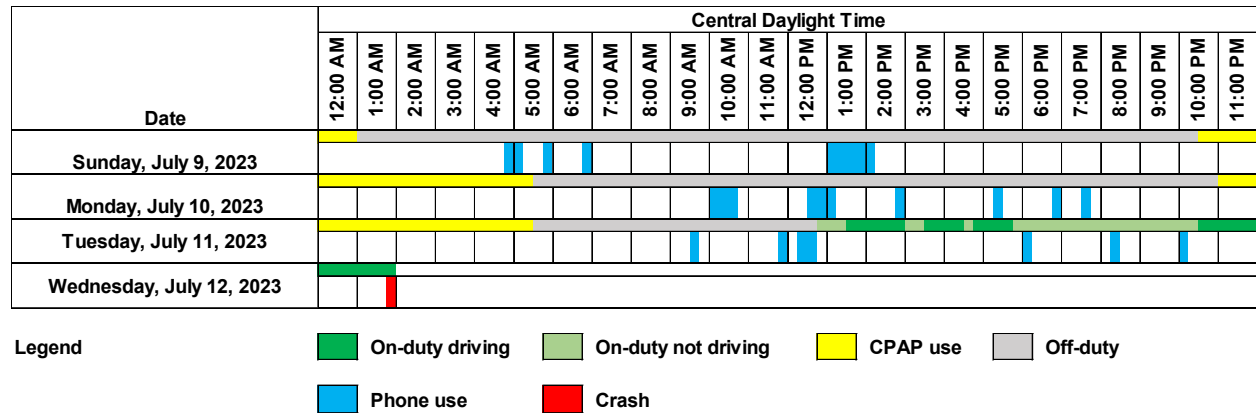
### 1.9 Fatigue

Based on his logs for the month before the crash, the bus driver had a rotating-type schedule and drove a fixed set of routes. He would go on-duty at any time during a 24-hour period (Figure 1). His days off also did not seem to have a pattern. According to Greyhound’s Director of Safety, Greyhound schedules are created by corporate with input from the union. Bus drivers bid on a schedule three times a year, with the most recent bid in June 2023 (one month before the crash). The schedules are created to meet HOS regulations, bus driver availability at each terminal, and routing needs across the country.



**Figure 1.** Approximate bus driver on-duty times, illustrated in 15-minute increments. Off-duty and on-duty times less than 15 minutes are not shown.

The bus driver was off duty from the morning of July 8 until the afternoon of July 11. Based on the extraction performed on his phone as well as his phone records, the bus driver had long blocks of time when he did not use his phone for calls or texts on the native application (Figure 2. Times when the bus driver used his personal phone (includes texts, calls, web use, and photos) during the three days prior to the crash, based on phone records and data extraction. Phone records obtained from the carrier began at 4:54 a.m. on July 9, 2023. Phone use after the crash is not shown. Phone use is shown as a contiguous block if less than 15 minutes separated the time between outgoing texts or phone calls.). These times could have been used to rest.



**Figure 2.** Times when the bus driver used his personal phone (includes texts, calls, web use, and photos) during the three days prior to the crash, based on phone records and data extraction. Phone records obtained from the carrier began at 4:54 a.m. on July 9, 2023. Phone use after the crash is not shown. Phone use is shown as a contiguous block if less than 15 minutes separated the time between outgoing texts or phone calls.

## 2.0 Truck Drivers

All three truck drivers struck by the bus were parked on the right shoulder of the Silver Lake rest area exit ramp, near Highland, Illinois.

### 2.1 Freightliner Driver

The Freightliner was the first tractor-semitrailer struck by the bus. It was driven by a 39-year-old male with a valid Tennessee Class A CDL.<sup>22</sup> He did not have endorsements or restrictions on his license. The license was issued October 2020, with an expiration date of August 2028. He possessed a valid medical certificate that was issued in October 2022, with an expiration date of October 2024. The certificate was issued by a chiropractor listed in the FMCSA’s NRCME. The Freightliner driver’s CDLIS record listed 17 convictions, 7 accidents, and 11 withdrawals.

<sup>22</sup> Human Performance Attachment - Freightliner Driver CDLIS Report.

The ISP interviewed the Freightliner driver at 4:39 a.m. on July 12.<sup>23</sup> According to the driver, he was in his sleeper berth resting. He stated that he normally parked inside the rest area, but when he arrived at about 10 p.m. it was full, so he parked on the ramp with the other trucks. He stated that he awoke when the bus collided with his truck. He called 9-1-1 after the crash.

## **2.2 Kenworth Driver**

The Kenworth was the second tractor-semitrailer struck by the bus. It had been parked on the right shoulder of the exit ramp to the rest area ahead of the Freightliner. It was driven by a 59-year-old male with a valid Ohio Class A CDL.<sup>24</sup> He did not have endorsements or restrictions on his license. His license was issued October 2021, with an expiration date of May 2025. He possessed a valid medical certificate that was issued in February 2023, with an expiration date of February 2024. The certificate was issued by a physician listed in the FMCSA's NRCME. The Kenworth driver's CDLIS record listed 16 convictions, 2 accidents, and 7 withdrawals.

The Kenworth driver was interviewed by NTSB investigators on July 13, 2023.<sup>25</sup> The Kenworth driver had been working for Richard Wolf Trucking for 6 months at the time of the crash. He had been traveling from Coshocton, Ohio, to Kansas City, Missouri. He entered the rest area at 10:30 p.m. because he was "out of hours." He stated that he had been asleep in his sleeper berth at the time of the crash. During the crash sequence, the driver fell to the floor; however, he was not injured. He left the truck after the crash and attempted to render aid.

The driver was familiar with I-70 and the rest stops along the highway. He described them as good but that they could get crowded at night. When he arrived at the rest stop, he saw trucks parked along the ramp and assumed that the rest stop was full. According to the Kenworth driver, he had his parking lights on at the time of the crash to aid with his truck's visibility. He described the rest area as well illuminated. When asked about his strategy to find a parking space to rest, he stated that he would just continue to look until he found a place to park. He stated that *"you can't get a parking spot at night. You got to get there early to find a parking spot...Anything after 8 p.m. is too late."* The Kenworth driver stated that he did not know the regulations in Illinois regarding parking on the ramp shoulder but stated that staff at the rest area had previously said he could do so. Investigators noted that there were no signs on the ramp stating that trucks could not park there.

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<sup>23</sup> Human Performance Attachment - ISP Interviews with Truck Drivers

<sup>24</sup> Human Performance Attachment - Kenworth Driver CDLIS Report.

<sup>25</sup> Human Performance Attachment - Interview with Kenworth Driver.

## 2.3 Mack Truck Driver

The Mack tractor-semitrailer was the third truck struck by the bus. It had been parked on the right shoulder of the exit ramp ahead of the Kenworth. It was driven by a 55-year-old male with a valid Texas Class A CDL.<sup>26</sup> He did not have endorsements or restrictions on his license. His license was issued in December 2022 and it was scheduled to expire in November 2031. He possessed a valid medical certificate that was issued October 2022, with an expiration date of October 2023. The certificate was issued by a chiropractor listed in the FMCSA's NRCME. The CDLIS for the Mack driver lists 0 convictions, 0 accidents, and 0 withdrawals.

The ISP interviewed the Mack truck driver at about 5:35 a.m. on July 12. According to the Mack driver, he arrived at the rest area around 8:20 p.m. on July 11 and had been sleeping at the time of the crash.<sup>27</sup> The collision caused him to be bounced around the cab, dazing him. He exited the truck and realized that a bus had hit his truck. A young male approached him and asked if he could use this phone to call his mother. The male appeared disoriented and was bleeding. The driver observed people exiting the bus. He called 9-1-1 and walked back to the bus. While on his phone, he checked on the status of the bus driver, who was seated upright in the driver's seat. The front windshield of the bus was broken, so he climbed up and asked the bus driver if he was okay. The Mack driver stated that he thought the bus driver was dead because he was unresponsive when he shook him, and he could not detect a pulse. The Mack driver walked back to a window behind the bus driver and started extricating people from the bus. He stated that he detected the odor of burning plastic, so he went back to the front of the bus and turned off the ignition with the help of the young male. The Mack driver stated that when he went back to turn off the bus, the bus driver was no longer in the driver's seat, so he initially thought the bus driver had gotten out of the bus.

The Mack driver stated that an area in front of the bus rear axles had been smoldering but was now on fire, so he used a fire extinguisher from his truck to extinguish the fire. He also extricated one more person from the bus. By this time, emergency medical services (EMS) had arrived and were trying to extricate a man and woman from the bus. The Mack driver went back to the front of the bus to see if there was anyone else inside the bus and noticed that the bus driver had fallen out of the driver's seat and was wedged in the debris. He stated that he doesn't know how the driver would have gotten out of the driver's seat. He further stated that while everybody thought the driver may have fallen asleep, he thought the bus driver may have had a stroke of something because the driver was non-responsive after the accident -- no facial movements or anything.

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<sup>26</sup> Human Performance Attachment - Mack Truck Driver CDLIS Report.

<sup>27</sup> The Mack truck driver was not asked by ISP why he parked on the shoulder of the ramp instead of in the rest area.

## E. GENERAL FACTORS

### 1.0 Weather

The closest official National Weather Service weather station to the crash site was located approximately 3.5 miles southeast, in the town of Highland (KILHIGHL76). The observation closest to the time of the crash is shown in Table 9.

**Table 9.** Weather Data from Weather Station KILHIGHL76.

<b>Time (EST)</b>	1:50 a.m.
<b>Temperature</b>	73.9° F
<b>Dew Point</b>	63.9° F
<b>Humidity</b>	71%
<b>Pressure</b>	29.96 in
<b>Wind Dir.</b>	SW
<b>Wind Speed</b>	0.9 mph
<b>Wind Gust Speed</b>	2
<b>Precipitation</b>	0.0
<b>Events</b>	None
<b>Conditions</b>	N/A

### 2.0 Astronomical Factors

According to the Earth System Research Laboratory/Global Monitoring Division of the National Oceanic and Atmospheric Administration, apparent sunrise in the immediate area of this crash occurred at 5:44 a.m., and apparent sunset occurred at 8:25 p.m. This crash occurred at 1:48 a.m., during the nighttime hours.

## F. DOCKET MATERIAL

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

### LIST OF ATTACHMENTS

Human Performance Attachment - Bus Driver CDLIS Report

Human Performance Attachment - 2018 Traffic Collision Report

Human Performance Attachment - Excerpts from Greyhound's Fatigue Management Training

Human Performance Attachment - Excerpts from Greyhound's OSA Screening Policy

Human Performance Attachment - Greyhound's Nox Health Poster and Information

Human Performance Attachment - Drivers - Greyhound's Prepared for Work Policy

Human Performance Attachment - Bus Driver Logs

Human Performance Attachment - ISP Bus Passenger Interviews

Human Performance Attachment - Bus Driver Phone Records

Human Performance Attachment - Freightliner Driver CDLIS Report

Human Performance Attachment - ISP Interviews with Truck Drivers

Human Performance Attachment - Kenworth Driver CDLIS Report

Human Performance Attachment - Interview with Kenworth Driver

Human Performance Attachment - Mack Truck Driver CDLIS Report

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