

# National Transportation Safety Board

Office of Highway Safety

Washington, DC 20594



HWY23FH014

## **HUMAN PERFORMANCE**

Group Chair's Factual Report

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## **A. CRASH**

Location: Philadelphia, Philadelphia County, Pennsylvania  
Date: June 11, 2023  
Time: 6:17 AM (Eastern)

## **B. HUMAN PERFORMANCE GROUP**

Group Chair                      Rafael Marshall  
    National Transportation Safety Board  
    Washington, D.C.

## **C. CRASH INFORMATION AND 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 2017 International truck-tractor in combination with a 2004 Heil Specification Package 406 tank-trailer (truck driver) and the behavioral, medical, operational, and environmental factors that may have contributed to the crash.

### **1.0 Truck Driver**

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

##### **1.1.1 License History**

The 53-year-old male driver held a Class A commercial driver's license that was last issued June 2019 and set to expire June of 2023. He had endorsements for passengers, doubles and triples, and combined tank/hazmat.<sup>1</sup> He had a valid Department of Transportation Medical Examiner's Certificate (MEC), Form MCSA-5876, issued October 2021 and expiring October 2023. His medical examiner was a physician assistant listed in the Federal Motor Carrier Safety Administration's (FMCSA) National Registry of Certified Medical Examiners.

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<sup>1</sup> Human Performance Attachment - Truck Driver CDLIS Report.

The Commercial Driver License Information System (CDLIS) included 30 years of records for the truck driver, listing a history of traffic-related convictions, accidents, and withdrawals (Table 1).<sup>2</sup> During the past 30 years, the truck driver had 14 traffic-related convictions (with 2 other convictions for failing to attend a trial or court appearance). Half (seven) of the violations were related to speeding, careless driving, or driving too fast for conditions. None of the convictions were for traffic offenses while in a commercial vehicle. The information in the truck driver's state motor vehicle record (MVR) was consistent with that in CDLIS.<sup>3</sup>

**Table 1.** Truck driver violations in the thirty years preceding the 2023 fatal crash.

Citation Date	Conviction Date	State	Violation	CMV
8/3/2022	9/15/2022	NJ	Fail to use/improper signal	No
6/19/2019	9/10/2019	VA	Fail to yield row to emergency vehicle	No
7/13/2017	10/30/2017	NJ	Stopping, standing or parking: obstructing or impeding traffic with a motor vehicle	No
3/10/2016	6/27/2016	VA	Speeding 15 MPH or more above regulated or posted speed limit	No
12/24/2011	6/12/2012	PA	DUI of alcohol with BAC at/over 0.10	No
11/9/2009	12/15/2009	NJ	Obstructing or impeding traffic with a motor vehicle	No
6/12/2006	7/20/2006	DC	Speeding 15 MPH or more above regulated or posted speed limit	No
3/22/2004	4/21/2004	PA	Prima facie speed violation/drive too fast for conditions	No
12/2/1999	3/21/2000	PA	Expired or no non-commercial license or permit	No
1/24/1998	2/3/1998	PA	Speeding 15 MPH or more above regulated or posted speed limit	No
3/1/1997	4/22/1997	PA	Speeding 15 MPH or more above regulated or posted speed limit	No
3/1/1997	4/22/1997	PA	Drive while license withdrawn	No
3/1/1997	3/1/1997	PA	Failure to attend trial/court appearance	No
7/29/1996	7/29/1996	PA	Failure to attend trial/court appearance	No
10/9/1995	12/7/1995	PA	Careless driving	No
5/8/1993	6/28/1993	PA	Careless driving	No

<sup>2</sup> 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>3</sup> Human Performance Attachment - Truck Driver Motor Vehicle Records.

The CDLIS report also indicates that the truck driver was involved in 4 crashes since 2009, all while in a commercial vehicle. On September 27, 2009, while working as a Southeastern Pennsylvania Transportation Authority (SEPTA) driver, he collided with a passenger vehicle that was making a right turn from the wrong lane, injuring the driver and causing minor damage to the passenger vehicle. On March 22, 2011, when the truck driver worked as a SEPTA bus driver, an unhelmeted motorcyclist collided with the bus he was driving, killing the motorcyclist.<sup>4</sup> On August 15, 2021, a driver who had been driving under the influence of alcohol sideswiped his truck while on westbound Interstate 76. And on May 1, 2023, the truck driver was traveling northbound on US-130, a vehicle ran a red light and collided with the truck. He was not cited in each of these four crashes.

Finally, the driver’s license privileges were suspended a total of six times, with the most recent suspension occurring in June 2012, when he was convicted of driving a private vehicle under the influence of alcohol. As a result of this conviction, in accordance with 49 CFR §383.51, his commercial driving privileges were suspended for one year until June 2013.

Based on the truck driver’s application to TK Transport, he had worked as a truck driver for at least 12 years. He does not list any other companies before September 2011, although a crash report from 2009 indicated that he had previously worked for SEPTA. His previous employment at Riggins, Inc., indicated some prior experience operating a fuel truck (Table 2).

**Table 2.** Employment history of truck driver.

Dates	Company	Position	Reason for leaving
Sept 2018 - Sept 2021	Riggins, Inc	Tank trailer driver	N/A
June 2017 - Sept 2018	Foodliner	Truck driver	Not enough work
May 2016 - June 2017	7 Oil Company, Inc	Truck driver	To drive Class A vehicles
Sept 2014 - May 2016	JB Hunt	Truck driver	Find local company / more money
Sept 2011 - Aug 2014	Westerman Express	Truck driver	Find local company / more money

## 1.2 Employment with TK Transport

### 1.2.1 Training

The truck driver was an owner-operator (AJBM, LLC) who worked for TK Transport. He started work for TK Transport in October 2021. TK Transport began as

<sup>4</sup> Human Performance Attachment - Truck Driver Crash Reports.

an independent company in 1990 but became an affiliate of Penn Tank Lines in 2001 and operates under Penn Tank Line's DOT number. As such, TK Transport relied on Penn Tank Lines to process and vet driver applications and conduct the initial background check. TK Transport also utilized the training policies and procedures of Penn Tank Lines.

The truck driver passed the background check and a driver road test, which was conducted in a tank trailer. He signed for the following policies on October 7, 2021:

- Claims Reporting Procedures and Policies
- Speed Policy (must stay under 65 mph)
- [Drug] Clearinghouse Release for Limited Query
- Cell Phone Policy
- On-board computer policy
- Tobacco Policy
- Notice of Traffic Violation Policy

The driver passed a Hazmat Transportation course in January 2022. He also signed for the following documents in January 2022:

- Emergency Response Guidebook
- Hazardous Materials Compliance Pocketbook
- FMCSR Pocketbook

According to TK Transport's Operations Manager, the truck driver learned of the position through an acquaintance who already worked at TK Transport.<sup>5</sup> The Operations manager described the truck driver as doing his work and never complaining.<sup>6</sup> He further stated that the truck driver was very regimented. He never had a speeding event the entire time he worked at TK Transport.<sup>7</sup> The truck driver's files included a May 2022 recognition for "awareness to surroundings and attention to the road ahead in reacting to several deer crossing his path on rural road," based on dash camera video evidence of the event.<sup>8</sup>

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<sup>5</sup> The NTSB left voicemail for the acquaintance on several occasions to learn more about the truck driver, but he never returned the call.

<sup>6</sup> See Motor Carrier Hazardous Materials Factual Report.

<sup>7</sup> The truck's electronic logging device was programmed to trigger a speeding event if a driver went over 68 mph for over 30 seconds.

<sup>8</sup> According to Penn Tank Lines, vehicles in operation for the company are equipped with a telematics system, including a dash camera. The truck driver's truck was equipped with a system by Omnictracs.

## 1.2.2 Drug Testing

Penn Tank Lines queried the Drug and Alcohol Clearinghouse and found no open violations on the driver. The Clearinghouse stated that the driver was not prohibited from hire. The truck driver submitted to a pre-employment-controlled substance test on October 13, 2021. That test showed negative results. The driver had not been subject to any other test for controlled substances or alcohol prior to the crash.

## 1.2.3 Pre-Crash Activities

The truck driver's normal work schedule was from Sunday to Thursday. He was paid by the trip and generally made three trips a day. His routes took him mostly on the interstate. He was on his 3<sup>rd</sup> trip of the day at the time of the crash. He had done this route at least 30 times in 2023 alone. In the two weeks before the crash, the truck driver typically worked from 10 p.m. until 8 a.m. (Table 3).<sup>9</sup> The operations manager stated that the truck driver preferred working during this time of day because there was less traffic.

**Table 3.** Truck driver hours of service for each shift. As reflected below, he shifts started at night and finished the next morning.

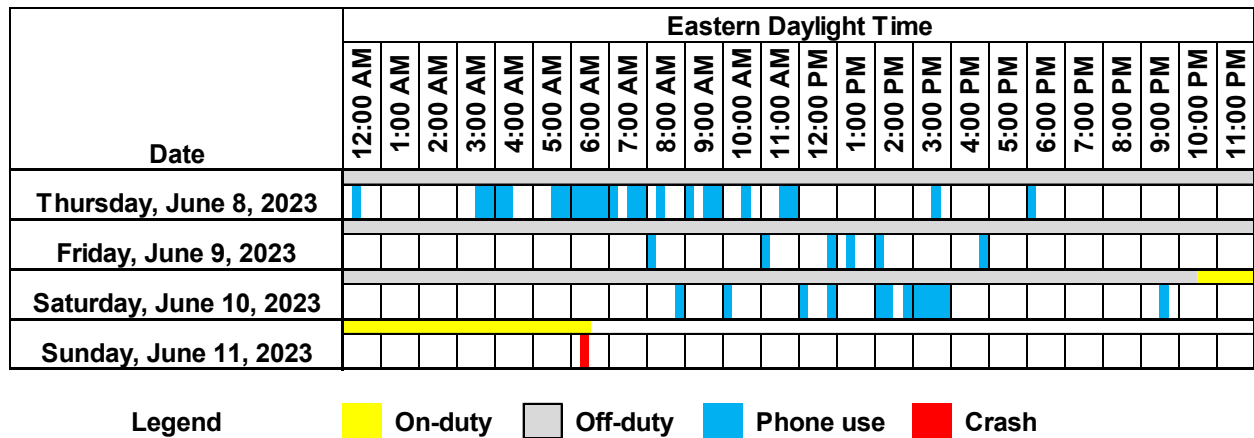
Shift Date	On-duty start time	On-duty end time	Total on-duty shift hours
5/28-5/29	5/28/23 10:08 PM	5/29/23 7:24 AM	9:16:00
5/29-5/30	5/29/23 11:13 PM	5/30/23 7:50 AM	8:37:13
5/30-5/31	5/30/23 9:58 PM	5/31/23 7:06 AM	9:07:39
5/31-6/1	5/31/23 11:13 PM	6/1/23 7:23 AM	8:10:09
6/1-6/2	N/A	N/A	N/A
6/2-6/3	N/A	N/A	N/A
6/3-6/4	6/2/23 10:46 PM	6/3/23 9:46 AM	11:00:02
6/4-6/5	6/3/23 11:14 PM	6/4/23 8:53 AM	9:38:47
6/5-6/6	6/4/23 11:18 PM	6/5/23 7:27 AM	8:08:14
6/6-6/7	6/5/23 11:50 PM	6/6/23 8:37 AM	8:47:53
6/7-6/8	6/6/23 11:17 PM	6/7/23 8:01 AM	8:43:52
6/8-6/9	N/A	N/A	N/A
6/9-6/10	N/A	N/A	N/A
6/10-6/11	6/10/23 10:41 PM	6/11/23 6:18 AM	7:36:24

<sup>9</sup> Human Performance Attachment - Truck Driver Logs.

### 1.3 Phone Usage

The truck driver’s cellular phone records showed that from June 8-10, the truck driver’s days off, he registered calls and native text activity between the hours of 8 a.m. and 6 p.m. (Figure 1).<sup>10</sup> This suggests that on his days off, the truck driver reverted to a daytime schedule. Phone records also indicated that the truck driver did not use his phone for long stretches of the day, during which time he could have been resting; although, it is important to note that these records do not reflect additional phone usage on non-native third-party applications.

Based on these phone records, on the night of June 8, the truck driver had over 13 hours of uninterrupted sleep opportunity. On the night of June 9, the truck driver had over 15 hours of uninterrupted sleep opportunity. On the evening of June 10, prior to starting his shift, the truck driver had another 5.5 hours of sleep opportunity.



**Figure 1.** 72-hour history of truck driver based on phone usage and duty hours. Phone use is shown as a contiguous block if less than 15 minutes separated the time between outgoing texts or phone calls.

### 1.4 Shiftwork

Based on the hours he worked, the truck driver would be considered a shift worker. Shift work is defined as working outside the hours of 7 a.m. to 6 p.m.<sup>11</sup> His phone records show that on the two days off prior to the crash, the driver used his phone frequently during the daylight hours, indicating that he likely reverted to a diurnal schedule.

<sup>10</sup> Human Performance Attachment - Truck Driver Phone Records.

<sup>11</sup> Rosa, Roger Rudolph. Plain language about shiftwork. US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Division of Biomedical and Behavioral Science, Education and Information Division, 1997.



## 1.5 Toxicology

The NTSB provided the Federal Aviation Administration's Forensic Sciences Laboratory (FAA) with blood samples obtained from the truck driver's body cavities. The results indicated an absence of alcohol and drugs of abuse. Diphenhydramine was detected at a level below 25 ng/mL. The FAA used gas chromatography / mass spectrometry to detect the diphenhydramine, but its instruments were unable to quantitatively measure concentrations below 25 ng/mL.

Diphenhydramine is a first-generation antihistamine commonly used to relieve symptoms of allergies or colds, such as sneezing, runny nose, and itchy watery eyes. Due to its sedating effects, it is also used to treat insomnia.<sup>12</sup> As an antihistamine, the recommended dose for adults is 25-50 mg every 6-8 hours, not to exceed 50-100 mg every 4-6 hours.<sup>13</sup> It reaches its peak effects about 2-3 hours after it is taken and its effects usually last 4-6 hours. The typical elimination half-life of diphenhydramine is about 3-14 hours.<sup>14,15</sup> Following a single oral dose of 50 mg, average peak plasma concentrations of 83 ng/mL diphenhydramine were detected at 3 hours, declining to 9 ng/mL by 24 hours. A single oral 100 mg dose resulted in average peak plasma concentrations of 112 ng/mL at 2 hours post dose. Effective antihistamine concentrations are greater than 25 ng/mL, and drowsiness can be observed at 30-40 ng/mL, and mental impairment may be observed with concentrations above 60 ng/mL.

## 1.6 Health Records

The truck driver's most recent Department of Transportation Medical Examination Report Form, MCSA-5875 (referred to as the 'long form'), was obtained from American Family Care Urgent Care in June 2023.<sup>16</sup> The long form was completed on October 13, 2021 and was required for employment with TK Transport and Penn Tank Lines. The physician assistant who performed the examination was listed in the Federal Motor Carrier Safety Administration's National Registry of Certified Medical Examiners. The records indicate that the truck driver self-reported that he had once been denied or issued a MEC for less than two years; however,

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<sup>12</sup> Diphenhydramine: MedlinePlus Drug Information. Accessed September 29, 2023.

<sup>13</sup> Couper, Fiona J., and Barry K. Logan. Drugs and Human Performance Fact Sheets [2014]. No. DOT HS 809 725. Washington State Patrol. Forensic Laboratory Services Bureau, 2014.

<sup>14</sup> Federal Aviation Administration Civil Aerospace Medical Institute. Diphenhydramine. Forensic Toxicology's WebDrugs. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50>. Updated January 16, 2019. Accessed November 3, 2023.

<sup>15</sup> Schulz M, Schmoldt A, Andresen-Streichert H, Iwersen-Bergmann S. Revisited: therapeutic and toxic blood concentrations of more than 1,100 drugs and other xenobiotics. *Crit Care*. 2020;24(1):195. doi:10.1186/s13054-020-02915-5.

<sup>16</sup> Commercial drivers operating vehicles over 10,000 pounds or operating vehicles that seat more than 16 occupants are required to have a fitness examination at least every two years. See 49 Code of Federal Regulations 391.41-49.

there was no further discussion of this in the long form. The truck driver reported a clean health history except for high blood pressure, where he checked “not sure.” He further stated that his blood pressure was “slightly high at one time.” During the exam, the medical examiner measured a blood pressure of 143/90. According to guidance published in FMCSA’s Medical Advisory Criteria for 49 Code of Federal Regulations 391.41(b)(6), drivers with a systolic blood pressure of 140–159 mmHg and/or a diastolic blood pressure of 90–99 mmHg are low risk for a hypertension-related event that is likely to interfere with the ability to operate a commercial motor vehicle safely and may be medically certified to drive for a 1-year period.<sup>17</sup> The truck driver’s uncorrected visual acuity was 20/40 for each eye and 20/30 for both eyes. His hearing was normal. Upon examination, the medical examiner did not find any issues with the truck driver’s body systems and provided the truck driver with a MEC that was valid for two years, from October 2021 to October 2023.

The NTSB contacted Riggins, Inc., the truck driver’s previous employer, to determine if the company had kept an earlier copy of the truck driver’s long form. Riggins sent the NTSB a long form from August 2021, two months prior to the truck driver’s most recent long form. For this form, the truck driver left blank the question as to whether he had been denied or issued a MEC for less than two years. The truck driver reported a clean health history except for high blood pressure, where he checked “yes.” He also checked “yes” for alcohol use (later explaining that he would drink wine twice a week). Under Section 2 of the long form, the truck driver stated that his blood pressure had been 150/90 last year. During the examination, the medical examiner initially recorded a blood pressure of 142/80, then 132/80 later in the examination visit. The examiner directed the truck driver to speak with his personal care physician about starting on hypertension medication. The truck driver’s uncorrected visual acuity was 20/40 for each eye and 20/30 for both eyes. His hearing was normal. Upon examination, the medical examiner did not find any issues with the truck driver’s body systems and provided the truck driver with a MEC that was valid for two years, from August 2021 to August 2023.

The NTSB contacted one independent pharmacy and two pharmacy chains near the truck driver’s home. Of these, only one had records pertaining to the truck driver. The drugs were pain medication, prescribed in December 2022 by an emergency room physician – aside from these, no other drugs were listed.

## **1.7 Surveillance Footage**

Surveillance footage of the truck as it left northbound Interstate 95 (I-95) onto the Cottman Avenue off-ramp showed that the truck rolled over as it negotiated the ramp at what appeared to be a high rate of speed. An explosion can be seen before the truck reached the underpass under I-95. In addition, video footage of the truck at

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<sup>17</sup> 49 CFR Appendix-A-to-Part-391 II.E.3. [https://www.ecfr.gov/current/title-49/appendix-Appendix%20A%20to%20Part%20391#p-Appendix-A-to-Part-391\(II.\)E.\(3.\)](https://www.ecfr.gov/current/title-49/appendix-Appendix%20A%20to%20Part%20391#p-Appendix-A-to-Part-391(II.)E.(3.)).

his previous stop indicated that the truck driver neglected to close the manhole cover at the top of the tank before driving away.

## E. GENERAL FACTORS

### 2.0 Weather

The closest official National Weather Service weather station to the crash site with historical weather information was located approximately 13 miles southwest, at Philadelphia International Airport (KPHL). Observations closest to the time of the crash are shown in

Table 4 and Table 5.

**Table 4.** Weather data from weather station KPHL at 5:54 a.m.

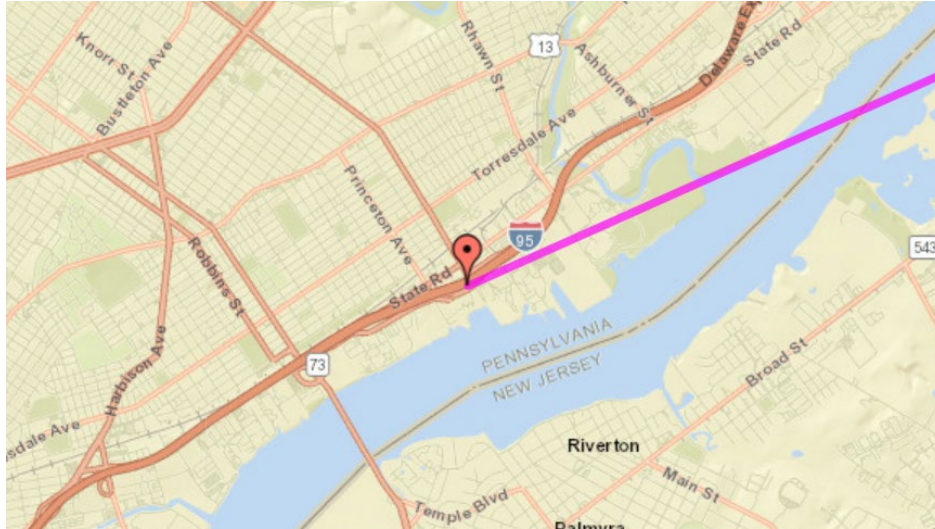
<b>Time (EST)</b>	5:54 a.m.
<b>Temperature</b>	63° F
<b>Dew Point</b>	57° F
<b>Humidity</b>	81%
<b>Pressure</b>	29.86 in
<b>Wind Dir.</b>	SSE
<b>Wind Speed</b>	3 mph
<b>Wind Gust Speed</b>	0
<b>Precipitation</b>	0.0
<b>Events</b>	None
<b>Conditions</b>	Mostly Cloudy

**Table 5.** Weather data from weather station KPHL at 6:54 a.m.

<b>Time (EST)</b>	6:54 a.m.
<b>Temperature</b>	65° F
<b>Dew Point</b>	57° F
<b>Humidity</b>	75%
<b>Pressure</b>	29.86 in
<b>Wind Dir.</b>	S
<b>Wind Speed</b>	5 mph
<b>Wind Gust Speed</b>	0
<b>Precipitation</b>	0.0
<b>Events</b>	None
<b>Conditions</b>	Mostly Cloudy

### 3.0 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 5:31 a.m., and apparent sunset occurred at 8:29 p.m. This crash occurred at 6:17 a.m., during the daylight hours. The sun would have been at 65.6 degrees in the sky. The truck's direction would have been towards the sun, although it was mostly cloudy at the time of the crash (Figure 2).



**Figure 2.** The pink line represents the azimuth of the Sun at the time of the crash. This indicates the Sun was shining from the Northeast direction at the time of the crash.

### F. ATTACHMENTS

Human Performance Attachment - Truck Driver CDLIS Report

Human Performance Attachment - Truck Driver Motor Vehicle Records

Human Performance Attachment - Truck Driver Crash Reports

Human Performance Attachment - Truck Driver Logs

Human Performance Attachment - Truck Driver Phone Records

Submitted by:

Rafael Marshall  
Human Performance Group Chairman