Federal Railroad Administration
Office of Railroad Safety
Accident and Analysis Branch

Accident Investigation Report
HQ-2015-1062

Kansas City Southern Railway Company (KCS)
Vivian, LA
July 3, 2015

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2015-1062

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Kansas City Southern Railway Company	KCS	15070301
2. Name of Railroad Operating Train #2	**2a. Alphabetic Code**	**2b. Railroad Accident/Incident No.**
Kansas City Southern Railway Company	KCS	15070301

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Kansas City Southern Railway Company	KCS	15070301
2. U.S. DOT Grade Crossing Identification Number	**3. Date of Accident/Incident**	**4. Time of Accident/Incident**
	7/3/2015	7:45 AM

5. Type of Accident/Incident
Rear End Collision

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated	10. Subdivision
4	0	0	0	Shreveport

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
Vivian	525.7	LA	CADDO

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
78 ˚F	Day	Clear	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Main	Freight Trains-60, Passenger Trains-80	46.65	South

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2015-1062

OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	OHTSM 03

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross exluding power units)	6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter	Code
23 MPH	R	7097		0

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Signal Indication

Supplemental/Adjunct Codes:

Q

7. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First Involved *(derailed, struck, etc.)*	KCS 4610	1	no		0	0
(2) Causing *(if mechanical, cause reported)*	N/A	0	no	9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	0	0	0	(1) Total in Equipment Consist	50	0	0	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	0	0	0	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
105000	4000

14. Primary Cause Code

H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

15. Contributing Cause Code

H199 - Employee physical condition, other (Provide detailed description in narrative)

Number of Crew Members				Length of Time on Duty	
16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen	20. Engineer/Operator	21. Conductor
1	0	1	0	Hrs: 7 Mins: 0	Hrs: 7 Mins: 0

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device?	26. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	27. Caboose Occupied by Crew?	
Nonfatal	2	0	0		N/A

28. Latitude	29. Longitude
32.859318000	-93.985291000

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2015-1062

OPERATING TRAIN #2

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	HKCSH 30

4. Speed (recorded speed, if available) R - Recorded E - Estimated	Code	5. Trailing Tons (gross exluding power units)	6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter	Code
0 MPH	R	7918		0

6. Type of Territory

Signalization:

Signaled

Method of Operation/Authority for Movement:

Signal Indication

Supplemental/Adjunct Codes:

Q

7. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box.	Alcohol	Drugs
(1) First Involved *(derailed, struck, etc.)*	KCS 4623	88	no		0	0
(2) Causing *(if mechanical, cause reported)*	N/A	0	no	9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	1	0	0	0	1	(1) Total in Equipment Consist	54	0	32	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	5	0	2	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
54289	0

14. Primary Cause Code

H605 - Failure to comply with restricted speed in connection with the restrictive indication of a block or interlocking signal.

15. Contributing Cause Code

H199 - Employee physical condition, other (Provide detailed description in narrative)

Number of Crew Members				Length of Time on Duty	
16. Engineers/Operators	17. Firemen	18. Conductors	19. Brakemen	20. Engineer/Operator	21. Conductor
1	0	1	0	Hrs: 12 Mins: 30	Hrs: 12 Mins: 30

Casualties to:	22. Railroad Employees	23. Train Passengers	24. Others	25. EOT Device?	26. Was EOT Device Properly Armed?
				Yes	Yes
Fatal	0	0	0	27. Caboose Occupied by Crew?	
Nonfatal	0	0	0		N/A

28. Latitude	29. Longitude
32.859318000	-93.985291000

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File #HQ-2015-1062

CROSSING INFORMATION

Highway User Involved		Rail Equipment Involved
1. Type		5. Equipment
2. Vehicle Speed *(est. mph at impact)*	3. Direction *(geographical)*	6. Position of Car Unit in Train
4. Position of Involved Highway User		7. Circumstance
8a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials?		8b. Was there a hazardous materials release by
8c. State here the name and quantity of the hazardous material released, if any.		

9. Type of Crossing Warning	10. Signaled Crossing Warning	11. Roadway Conditions
1. Gates 4. Wig wags 7. Crossbucks 10. Flagged by crew 2. Cantilever FLS 5. Hwy. traffic signals 8. Stop signs 11. Other *(spec. in narr.)* 3. Standard FLS 6. Audible 9. Watchman 12. None		

12. Location of Warning	13. Crossing Warning Interconnected with Highway Signals	14. Crossing Illuminated by Street Lights or Special Lights

15. Highway User's Age	16. Highway User's Gender	17. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train	18. Highway User

19. Driver Passed Standing Highway Vehicle	20. View of Track Obscured by *(primary obstruction)*

Casualties to:	Killed	Injured	21. Driver was	22. Was Driver in the Vehicle?
23. Highway-Rail Crossing Users			24. Highway Vehicle Property Damage *(est. dollar damage)*	25. Total Number of Vehicle Occupants *(including driver)*

26. Locomotive Auxiliary Lights?	27. Locomotive Auxiliary Lights Operational?

28. Locomotive Headlight Illuminated?	29. Locomotive Audible Warning Sounded?

10. Signaled Crossing Warning

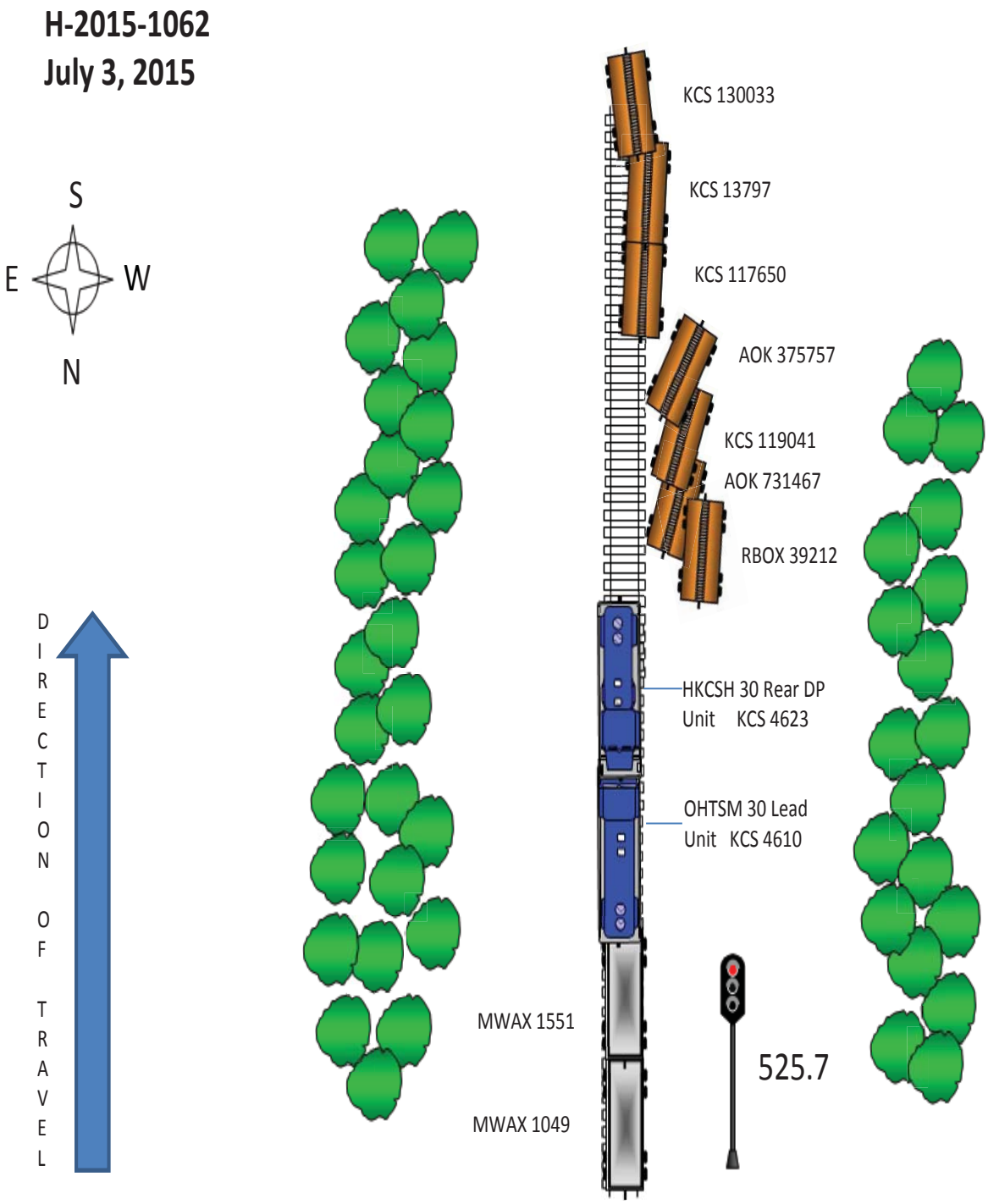
1 - Provided minimum 20-second warning
2 - Alleged warning time greater than 60 seconds
3 - Alleged warning time less than 20 seconds
4 - Alleged no warning
5 - Confirmed warning time greater than 60 seconds
6 - Confirmed warning time less than 20 seconds
7 - Confirmed no warning
N/A - N/A

Explanation Code

A - Insulated rail vehicle
B - Storm/lightning damage
C - Vandalism
D - No power/batteries dead
E - Devices down for repair
F - Devices out of service
G - Warning time greater than 60 seconds attributed to accident-involved train stopping short of the crossing, but within track circuit limits, while warning devices remain continuously active with no other in-motion train present
H - Warning time greater than 60 seconds attributed to track circuit failure (e.g., insulated rail joint or rail bonding failure, track or ballast fouled)
J - Warning time greater than 60 seconds attributed to other train/equipment within track circuit limits
K - Warning time less than 20 seconds attributed to signals timing out before train's arrival at the crossing/ island circuit
L - Warning time less than 20 seconds attributed to train operating counter to track circuit design direction
M - Warning time less than 20 seconds attributed to train speed in excess of track circuit's design speed
N - Warning time less than 20 seconds attributed to signal system's failure to detect train approach
O - Warning time less than 20 seconds attributed to violation of special train operating instructions
P - No warning attributed to signal systems failure to detect the train
R - Other cause(s). Explain in Narrative Description

SKETCHES

Overhead Drawing



SYNOPSIS

Synopsis

On Friday, July 3, 2015, at 7:45 a.m., CST, Kansas City Southern Railroad (KCS) southbound loaded rock train, OHTSM 03, operating with 2 head-end locomotives and 50 loaded rock cars, struck the rear of a standing manifest train, HKCSH-30, operating with one head-end locomotive and one rear-end distributed power unit (DPU), with 54 loaded and 32 empty rail cars at an recorded 23 mph.

The collision occurred north of Vivian, Louisiana, on the Shreveport Subdivision at Milepost 525.7 on single main track. Movements on this part of the railroad are governed by centralized traffic control, with maximum authorized speed of 55 mph through the town of Vivian.

No equipment was derailed from Train OHTSM 03. Derailed equipment from Train HKCSH 30 included the rear seven cars. The rear DPU, which was the first equipment struck, did not derail. Track damage was estimated at $4,000. There was no signal damage, and equipment damages were estimated at $159,289. There were two reported injuries to crew members of Train OHTSM 03. There was no release of hazardous materials.

At the time of the rear-end collision, the weather was clear with a temperature of 78 degrees F.

The probable cause of the accident was failing to comply with restricted speed or its equivalent not in connection with a block or interlocking signal. Fatigue was noted as a contributing factor.

NARRATIVE

Narrative

Circumstances Prior to the Accident

Train OHTSM 03 (Train 1)

The crew of southbound Kansas City Southern Railroad (KCS) Train OHTSM 03 included a locomotive engineer and a conductor. The crew first went on duty at 12:45 a.m., CST, on July 03, 2015, at DeQueen, Arkansas, their away-from-home terminal. Both employees received more than the statutory off-duty period, approximately 72 hours each, prior to reporting for duty.

They were assigned to Train Symbol OHTSM 03 (Train 1), consisting of two lead locomotives, KCS 4610 and KCS 4787, 50 loaded rock cars, and zero empty cars. At the time of the collision, Train 1 was 2,566 feet long, and weighed 7,097 tons. The train was scheduled to travel to Shreveport, Louisiana.

The crew of Train 1 performed a Class 1 initial terminal air brake test, noted on the conductor of Train 1's (C1) Conductor's Log on July 3, 2013, at 1:45 a.m. in Hatton, Arkansas. The crew of Train 1 departed Hatton, at 3:45 a.m., July 3, 2013, as noted on Dispatcher's Record of Train Movement.

As Train 1 approached the accident area, the engineer of Train 1 (E1) was seated at the controls on the east side of the leading locomotive. C1 was seated on the west side of the leading locomotive.

The railroad timetable direction of this train was south.

Train HKCSH 30 (Train 2)

The crew of KCS Train HKCSH 30 (Train 2) included a locomotive engineer and a conductor. They first went on duty at 7:15 p.m., on July 2, 2015, at Heavener, Oklahoma. This was their home terminal. The engineer of Train 2 (E2) had approximately 10 days off and the conductor of Train 2 (C2) had approximately 44 hours off duty prior to this assignment.

They were assigned to Train 2, consisting of one lead locomotive and one distributed power unit (DPU) at the rear of the train. Train 2 included 54 loads and 32 empty rail cars, weighed 7,918 tons, and was 5,097 feet long. The train was standing on the Main Track at approximately Milepost (MP) 526.5 near the vicinity of the Alabama Avenue crossing, in Vivian, facing southward.

The railroad timetable direction for both trains is south. The geographical direction for both trains is also south. In this area of the railroad, there is a 2-degree curve to the left. Timetable directions are used throughout this report.

At the time of the rear end collision, the weather was clear with a temperature of 78 degrees F.

The Accident

Train OHTSM 03 (Train 1)

At about 7:40 a.m., Train OHTSM 03 traveling southbound at 43 mph, passed over a trackside warning detector at Milepost (MP) 523. The C1's log notes that the crew encountered a Yellow aspect signal. A Yellow aspect indicates to the crew to approach prepared to stop at the next signal. Trains exceeding 35 mph should immediately reduce to that speed. This is in accordance with KCS' General Code of Operating Rule (GCOR) 9.1.6.

At 07:45 a.m., Train 1 was traveling southbound at 33 mph negotiating a 2-degree left-hand curve approximately 150 yards north of an Intermediate Signal, at MP 525.7, which was displaying a Red aspect, Restricting Signal, indicating proceed at restricted speed. At this time, the rear DPU locomotive, KCS 4623, of HKCSH 30 (Train 2) came into view. E1 applied full dynamic braking, emergency and full independent brake applications but was unable to stop his train. Train 1 collided with the rear-end of the HKCSH30 at MP 525.7, at a recorded speed of 23 mph.

Train 1 crew remained in the locomotive and rode to impact.

C1 was treated and released at the emergency room of the North Caddo Medical Facility, Vivian. E1 was admitted for observation with initial diagnosis of multiple bruises, lower back pain, and a possible concussion.

HKCSH 30 (Train 2)

Train 2 was stopped on the Main Track at MP 527 with the crew awaiting a taxi to transport them to Shreveport. The crew expired their allotted hours of service. The crew felt their locomotive move but was unaware their DPU had been struck. The rear DPU traveled approximately 108 feet and got up to 11 mph after being struck. Lead locomotive of the Train 2 traveled approximately 18 feet and got up to a speed of 3 mph. Train 2 had not applied hand brakes to their train and the train brakes were not set. No injuries were sustained to this crew.

Method of Operation

At the accident site, the trains are governed by centralized traffic control. The collision happened at MP 525.7. The railroad at this location is single main track with sidings, rail car set-outs and pick-ups in route. Trains operate in both directions on the single main track. The authorized timetable speed for trains operating on this part of the main track is 55 mph. Operating Rules governing employees on KCS are the GCOR, 7th Edition, effective April 1, 2015. Also governing train movements on KCS is Timetable Number 12, effective April 1, 2015. KCS Track Bulletin Number 145-23 was initially in effect the morning of July 3, 2015.

Analysis and Conclusions:

Analysis –Toxicological Testing

Federal Railroad Administration (FRA) Post-Accident Toxicology Result Reports indicate that both crew members of Train 1 were negative. Urine was tested for Amphetamines (Amphetamine, Methamphetamine, Ecstasy), Cocaine, Marijuana, Phencyclidine, Opiates (Codeine, Morphine, 6-MAM). Both crew members were also given a DOT Alcohol test. KCS determined the crew of the struck train (Train 2; HKCSH 30) and the Dispatcher were not at fault and were not tested.

Conclusion – Drug or alcohol impairment was not a factor.

Analysis – Fatigue

FRA uses an overall effectiveness rate of 77.5 percent as the baseline for fatigue analysis, which is equivalent to blood alcohol content (BAC) of 0.05. At or above this baseline, we do not consider fatigue as probable for any employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default software settings.

FRA obtained fatigue-related information, including a 10-day work history, for both engineers and conductors involved in this accident.

Fatigue Review:

Employee E1 (77.64) was suffering from acute sleep loss and circadian dysthymia. Although this subject had only been awake for approximately 9 hours the subject only had 3 hours sleep* in the last 24-hour period. As noted in the analysis, E1's reaction time was 129 percent of normal. This would include mental processing time of changes in the operational environment. Because the individual at 77.64 percent is marginally above the cut-off point of 77.5 percent and because the analysis used the default sleep quality index of "Excellent," it is concluded that this individual's performance was impaired by fatigue.

Employee C1 (73.51) was suffering from acute sleep loss and circadian dysthymia. As in the case of E1, this subject had only been awake for 10 hours, but had only had 3 hours sleep* in the past 24-hours. It is concluded this individual's performance was impaired by fatigue.

Employee E2 (77.43) was suffering from a combination of acute sleep loss and circadian dysthymia. This subject had almost 16 hours of continuous wakefulness with only 2 hours of sleep* in the 24-hours prior to the accident. It is concluded this individual's performance was impaired by fatigue.

Employee C2 (71.28) was suffering from a combination of acute sleep loss and circadian dysthymia. Similar to E2, this subject had almost 16 hours of continuous wakefulness with only 2 hours of sleep* in the 24-hours prior to the accident. It is concluded this individual's performance was impaired by fatigue.

*Note: 2–3 hours of sleep, while helpful in providing some relief to fatigue, are more effective in physical recovery and not so much in the area of cognitive functioning. Short naps do not provide deep recovery rejuvenation.
Conclusion – Based on these analyses, all four employees involved in HQ-2015-1062 were suffering from cognitive fatigue at the time of the accident. This cognitive fatigue resulted in a substantial increase their reaction time and a decreased in their mental capacity to process information from the operational environment.

Analysis – Cell Phone/Electronic Device Usage

KCS has a rule governing the use of electronic devices and FRA supports their application of the rule. Cell phone records were obtained for the striking train crew and reviewed.

Conclusion – There is no evidence electronic devices were used on a moving train. Use of cell phones was not a factor in this accident.

Analysis – Locomotive Engineer performance, OHTSM 03

The Engineer was a certified locomotive engineer with a certification date of October 24, 2012, an expiration date of October 24, 2015, and last annual train ride on January 8, 2014. He has been a qualified engineer for 9 years, with previous experience as a qualified conductor. His last rules exam was August 26, 2014. FRA reviewed this Engineer's operational testing records and found no exceptions.

Conclusion – Engineer was properly trained in compliance with Federal regulations and familiar with this territory.

Analysis – Event Recorder from Train 1 OHTSM 03 (KCS 4610)

A locomotive event recorder download on Locomotive KCS 4610 was conducted by KCS Senior Road Foreman on July 3, 2015. The following time notes and events summarize data retrieved from the event recorder download from Train 1.

The train was traveling below maximum authorized speed of 55 mph when the crew encountered an Approach signal and passed over a trackside warning detector at 43 mph at 07:41 at MP 523.

7:42:19 a.m., MP 523.52, running on an Approach Signal, speed 42 mph, the dynamic brake was increased to the number 4 position.

7:42:40 a.m., MP 523.75, running on an Approach Signal, the speed was 37 mph.

7:43:06 a.m., MP 524.02, running on an Approach Signal, speed 34 mph, the dynamic brake was reduced to the number 3 position.

7:43:07 a.m., MP 524.03, running on an Approach Signal, speed 34 mph, the dynamic brake was reduced to the number 2 position.

7:43:09 a.m., MP 524.05, running on an Approach Signal, speed 34 mph, the dynamic brake was reduced to idle.

7:43:19 a.m., MP 524.14, running on an Approach Signal, speed 34 mph, the throttle was advanced to the number 1 position.

7:43:20 a.m., MP 524.15, running on an Approach Signal, speed 34 mph, the throttle was advanced to the number 2 position.

7:43:21 a.m., MP524.16, running on an Approach Signal, speed 34 mph, the throttle was advanced to the number 4 position.

7:43:24 a.m., MP524.19, running on an Approach Signal, speed 33 mph, the throttle was advance to the number 5 position.

7:43:26 a.m., MP 524.21, running on an Approach Signal, speed 33 mph, the throttle was advanced to the number 6 position.

7:43:30 a.m., MP 524.24, running on an Approach Signal, speed 33 mph, the throttle was advanced to the number 7 position.

KCS Senior Road Foreman made milepost adjustment.

7:43:37 a.m., MP524.14, running on an Approach Signal, speed 33 mph, the horn was activated for the private crossing MP 524.24 DOT 328-995-L and Industrial Loop MP 524.35 DOT 328-994-E. The duration was 24 seconds with a frequency of 2 longs, short, and a long repeated twice.

7:44:00 a.m., MP 524.35, running on an Approach Signal, speed 32 mph, the throttle was reduced to the number 5 position.

7:44:04 a.m., MP 524.39, running on an Approach Signal, speed 32 mph, the throttle was reduced to the number 4 position.

7:45:28 a.m., MP 525.41, running on an Approach Signal, speed 33 mph, the throttle was reduced to the number 3 position.

7:45:29 a.m., MP 525.42, running on an Approach Signal, speed 33 mph, the throttle was reduced to the number 2 position.

7:45:31 a.m., MP 525.44, running on an Approach Signal, speed 33 mph, the throttle was reduced to the number 1 position.

7:45:32 a.m., MP 525.45, running on an Approach Signal, speed 33 mph, the throttle was reduced to idle.

7:45:50 a.m., MP 525.62, running on an Approach Signal, speed 33 mph, the dynamic brake handle was moved to set-up.

7:45:52 a.m., MP 525.64, running on an Approach Signal, speed 33 mph, the dynamic brake handle was moved to the number 2 position.

7:45:45 a.m., MP 525.65, running on an Approach Signal, speed 33 mph, the dynamic brake handle was moved to the number 4 position.

At 7:45:54 a.m., MP 525.66, running on an Approach Signal, speed 33 mph, Intermediate Signal MP 525.7 was indicating a Restricting Signal. The rear DPU Locomotive KCS 4623 came into view. The Engineer-Induced Emergency was activated.

7:45:59 a.m., MP 525.70, running on a Restricting Signal, speed 31 mph, the train was in Emergency from Engineer-Induced Emergency. The dynamic brake was set to the

7:45:59 a.m., MP 525.70, running on a Restricting Signal, speed 31 mph, the train was in Emergency from Engineer-Induced Emergency. The dynamic brake was set to the number 8 position. Independent brake was fully applied.

At 7:46:08 a.m., MP 525.77, running on a Restricting Signal, impact occurred at 23 mph. The train was in Emergency with the dynamic brake and independent brake fully applied.

At 7:46:25 a.m., MP 525.80, Locomotive KCS 4610 came to a complete stop.

Conclusion – The locomotive Engineer was not in compliance with applicable railroad operating and train handling requirements. Train 1 was being operated at a speed that prevented the Engineer from being prepared to stop at the next signal. The Engineer placed Train 1 into emergency brake application. At the time of impact, Train 1 was being operated at a recorded speed of 23 mph. The Engineer was clearly not in compliance with KCS' GCOR 6.27, which is defined as "A speed that will permit stopping within half the range of vision, short of train, engine, obstruction, railroad car, men or equipment fouling track, any signal requiring a stop, derail or switch lined improperly and looking out for a broken rail, but not exceeding 20 mph."

Analysis - Conductor performance, Train 1 OHTSM 03

The Conductor was last certified on October 6, 2014, with an expiration date of October 6, 2017. He was last tested on June 4, 2015, on Title 49 Code of Federal Regulations Part 218, Subpart F, and his last rules exam was August 15, 2014. The Conductor had made multiple runs on this territory and it was his regularly assigned job. FRA reviewed the Conductor's operational testing records and found no exceptions.

Conclusion – In relation to the operation of the train, Lead Locomotive KCS 4610, the Conductor took no action to have the Engineer to slow to the required speed of 35 mph and be prepared to stop at the next signal as required by KCS' GCOR 9.1.6. He logged the signal in his Conductor's log, but there is no evidence he took action to comply. The impact speed of 23 mph is clearly noncompliant with the intent of Restricted Speed, as defined by KCS Operating Rules, GCOR 6.27, "A speed that will permit stopping within half the range of vision, short of train, engine, obstruction, railroad car, men or equipment fouling track, any signal requiring a stop, derail or switch lined improperly and looking out for a broken rail, but not exceeding 20 mph."

Analysis- Signals

The signals are governed under KCS' GCOR.

The last four signals encountered were as follows:

Train OHTSM 03 traveling southbound encountered at MP 488 a Yellow aspect (indicates approach prepared to stop at next signal, trains exceeding 35 mph immediately reduce to that speed (GCOR 9.1.6).

The next signal encountered by Train OHTSM 03 proceeding southbound was a Red aspect (Stop) indication at the UP Interlocker at MP 489.4

The next signal Train OHTSM 03 encountered at MP 523 displayed a Yellow aspect (indicates approach prepared to stop at next signal, trains exceeding 35 mph immediately reduce to that speed (GCOR 9.1.6).

The last signal encountered by Train OHTSM 03 proceeding southbound was an Intermediate Signal – MP. 525.7, which displayed a Red aspect (Restricting indication)

On July 3, 2015, KCS' Signal Department along with FRA performed vital tests on the following Control Points and Signal Equipment involved/examined/tested in the incident:

INTERMEDIATE SIGNAL – MP. 525.5/6

Pursuant to this incident, FRA requested and reviewed all pertinent signal data documentation and records of tests both prior to and after the incident.

KCS Signal Maintenance personnel, who, under the direction of KCS Signal Supervision, performed all operational and FRA tests for all of the above listed signal locations.

FRA took no exception to the data and tests records provided, or functionality and operation of the signal system in relation to this incident.

Conclusions – Control Points and Signal Equipment were working as intended.

Overall Conclusions:

Train 1 was not in compliance with KCS operating rules. The signal system and the train's air brake system functioned properly. The data reviewed from the event recorder and from the interview process revealed that the Engineer and Conductor of Train 1 were not in compliance with applicable railroad operating and train handling requirements. It was determined that the Engineer was not attentive to his job-related duties pertaining to the requirements of restricted speed.

Applicable Rules and Regulations:

General Code of Operating Rules

9.1.6 Approach Signal

Proceed immediately reducing speed to 35 mph, and be prepared to stop at next signal.

6.27 Movement at Restricted Speed

When required to move at restricted speed, movement must be made at a speed that allows stopping within half the range of vision short of:

- Train.
- Engine.
- Railroad car.
- Men or equipment fouling the track.
- Stop signal.
- Derail or switch lined improperly.

When a train or engine is required to move at restricted speed, the crew must keep a lookout for broken rail and not exceed 20 mph. They must comply with these requirements until the leading wheels reach a point where movement at restricted speed is no longer required.

Probable Cause and Contributing Factors:

FRA's investigation determined the probable cause of the accident was Cause Code H607 - Failure to comply with restricted speed or its equivalent not in connection with a block or interlocking signal.

A contributing cause code of H199, "Employee physical condition, other," has been determined. The Fatigue Analysis determined all four employees were suffering from cognitive fatigue at the time of the accident.