RAILROAD SIGNAL & TRAIN CONTROL GROUP
FACTUAL REPORT OF INVESTIGATION

Head-On Collision between
Westbound UP Freight Train KG1LAC-13 and
Eastbound UP Freight Train LCK41-14 near
Granger, Wyoming on
March 14, 2016

DCA 16 FR 005

(6 Pages)

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF RAILROAD, PIPELINE & HAZ-MAT INVESTIGATIONS
WASHINGTON, D.C. 20594

RAILROAD SIGNAL & TRAIN CONTROL – FACTUAL REPORT

A. ACCIDENT

Location:	Control Point G844, Evanston Subdivision
Carrier:	UP Railroad
Train 1:	Westbound Intermodal Freight Train KG1LAC-13
Train 2:	Eastbound Local Freight Train LCK41-14
Date:	March 14, 2016
Time:	9:41 p.m., Mountain Daylight Time
NTSB No.:	DCA 14 FR 011

B. SIGNAL & TRAIN CONTROL GROUP

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C. SYNOPSIS

On Monday, March 14, 2016, at about 9:41 p.m., mountain daylight time (MDT), a westbound UP freight train KG1LAC-13 collided with eastbound UP local freight train LCK41-41 on the "long siding" near Granger, Wyoming. The westbound train had been authorized to enter the suspended signal territory at CP G844 and proceed from main track 1 to main track 1 at the maximum authorized speed of 49 mph. The dispatcher controlled switch was lined for the siding. The westbound train engineer saw the switch was improperly lined and while entering the siding at approximately 46 mph he applied emergency braking. The lead locomotive of the standing train was stopped about 1,600 feet west of the east switch. The train slowed to approximately 30 mph and collided with the standing local train. The local train crew had left the locomotive when the saw the pending collision. The westbound crew stayed in the locomotive cab until impact.

As a result of the collision, the three crewmembers of the eastbound train and two crewmembers of the westbound local train were transported to a medical facility for minor injuries.

Damage was estimated at $2 million. Environmental conditions were dark and cloudy skies with light winds and a temperature of 20° Fahrenheit.

Parties to the investigation included the Federal Railroad Administration (FRA), Union Pacific Railroad (UP), Brotherhood of Locomotive Engineers and Trainmen (BLET), Sheet Metal, Air, Rail and Transportation Workers (SMART) and Brotherhood of Maintenance of Way Employes Division (BMWED).

D. DETAILS OF THE INVESTIGATION

D.1 Railroad Signal System

D.1.1 UP Evanston Subdivision

The Evanston Subdivision extended from MP 816.9 (CP G817) in Green River, Wyoming to MP 993.6 (CP G993) in Ogden, Utah in a timetable east-west direction. The maximum authorized timetable speed on the subdivision was 70 mph for freight trains and 79 mph for passenger trains with permanent speed restrictions between posted timetable mileposts. In the vicinity of the accident area, the UP operated trains on two main track territory with passing sidings with a Traffic Control System (TCS) and supplemented with an Automatic Cab System (ACS). Train movements were coordinated by a train dispatcher located at the Harriman Dispatch Center in Omaha, Nebraska. Train movements on the Evanston Subdivision were governed by operating rules, special instruction, timetable instructions, and the signal indications of the traffic control system and automatic cab system.

The TCS used coded track circuits for train occupancy detection and signal communication (Electro Code 4). Control Point G844 (MP 843.9 - MP 844.1) was equipped with wayside colorlight signals with upper and lower signal heads capable of displaying green, yellow, and red aspects for train movements in either direction.

D.1.2 UP Signal Cutover Procedures

The UP cutover procedure manual provided guidelines to assist signal personnel determine the testing required and when it should be completed.[1] The cutover procedures included sections on tests forms, location testing procedures, Form C bulletins, pre-cutover checklists, and job briefings for signal cutovers. The manual did not designate the method of operation to be used during signal suspensions.

D.2 Postaccident Signal Data Logs

UP dispatchers monitored and coordinated train movements utilizing the signal system. Field signal and train control equipment transmit data to the UP dispatch center where it was displayed on the dispatcher's terminal. Table 1 summarizes signal and train control events recorded for CP G844 and CP G847 at the UP dispatch center.

Table 1 ***Postaccident signal data log from the UP Harriman Dispatch Center***

Time[2]	Control Point	Event
20:11:22	G844	Siding switch (3) was requested reverse by dispatcher

[1] UP Signal Department, PB-24099 (revision date: July 31, 2015)
[2] The UP, Harriman Dispatch Center computer clocks are synchronized to UTC time.

Time[2]	Control Point	Event
20:11:41	G844	Siding switch (3) indicated lined reverse
21:18:00	G847	Siding track circuit (32) indicated occupied by train LCK41
21:34:42	G844	Westbound approach track circuit on 1 main track indicated occupied by train KG1LAC (approach track circuit to control point)
21:41:07	G844	OS track circuit indicated occupied by train KG1LAC

D.3 Postaccident Signal System Examination/Testing

The postaccident inspection found the signal equipment and appurtances at CP G844 locked and secured with no indications of tampering or vandalism. Following the accident, UP railroad signal officials sealed the signal bungalows as requested by FRA and NTSB.

CP G844 was relay-based and was not equipped with field data loggers. The main track to main track crossover switches were tested and no defects were noted during the examination. The 1 main track to siding switch was also tested and no defects were noted.

There were no defects noted during the postaccident examination and testing of the signal system nor the associated signal appurtenances. Railroad maintenance, inspections and tests records were reviewed for the last monthly, quarterly, yearly, 4-year and 10-year inspections at CP G844. The records were found to be in accordance with FRA requirements and did not identify any defects with the signal system.

D.3.1 UP Signal Construction Upgrade Project

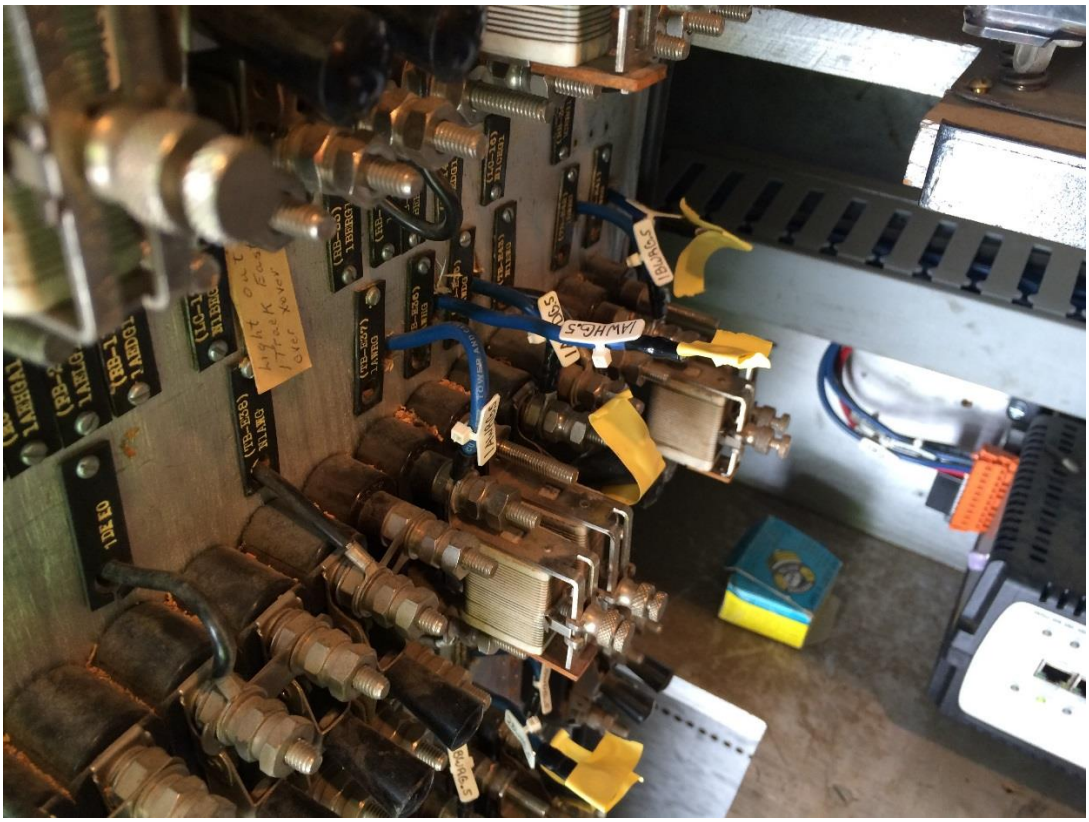
On March 13, 2016, UP Track Bulletin Form C (number 10054) was issued. The Form C was effective 8:00 am on March 14 and suspended the signal system from CP G002 to CP G844 on the Evanston Subdivision. The planned signal suspension was put in effect for a signal construction project to install and test wayside signal equipment.

During the signal construction project, dual-control power switches at the limits of the signal suspension remained under dispatcher control while the dual-control power switches within the signal suspension limits were placed in the hand-throw position. Signals within the signal suspension were arranged to display Red signal aspects for all directions. Signal personnel disabled the green and yellow aspects at each location going into the signal suspension limits. The signals were set to display a stop, red aspect and were not capable of displaying a more permissive aspect (See Figure 1). Dispatchers were able to request routes and signals for train movements leaving the signal suspension limits at CP G002 on the Pocatello Subdivision and at CP G844 on the Evanston Subdivision

During the signal suspension, the UP established absolute blocks to continue operating trains through the area. Each absolute block, extending from one control point to the next adjacent control point was assigned to a conductor pilot. The entire suspended section (made up of multiple absolute blocks) was managed by a conductor Employee-In-Charge (EIC) which communicated with the train dispatcher at the dispatch center. Signal personnel working on the

signal construction project were managed by a signal department EIC. The signal EIC and the conductor EIC coordinated to provide for train movements and signal construction.

Figure 1 ***Disabled Lighting Circuits at CP G844***



D.3.2 Job Briefings

On Sunday March 13, 2016, a UP Signal Construction Manager held a job briefing in preparation for the signal construction project that was scheduled to start the next day. The job briefing was conducted with the conductor pilots that would be stationed at the different control points during the signal suspension.

In postaccident interviews, the UP Signal Construction Manager stated that at the job briefing with the conductor pilots, they discussed the Form C that was issued, the signal suspension limits for the project, the location of the red boards on each track at the first suspended signals, and the control point locations where a conductor pilot would be assigned

The UP Signal Construction Manager provided a copy of his job briefing notes for the meeting he held with the conductor pilots and the notes indicated a discussion point regarding the need for conductor pilots to verify the position of the power switches before authorizing train movements into the suspension limits at CP G002 and CP G844. He also stated he discussed that the power switches within the signal suspension would be clamped and tagged by signal department personnel. Conductor pilots would be able to designate the speed through the signal suspension up to 49 mph.

A second job briefing was held with the signal personnel that were assigned to the signal construction project. Radio channels were assigned as well as locations. At the time of the accident, signal personnel were at CP G847 testing signal routes.

D.3.3 Hours of Service Records for Signal Personnel

Signal personnel were typically working 12 hour days during the signal construction upgrade project. Hours of service records were reviewed for signal department employees at no exceptions were noted.

D.4 Signal System Damages

The UP communication system, signal system and appurtenances did not sustain as a result of the accident.

END OF SIGNAL & TRAIN CONTROL FACTUAL