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Issued: August 19, 2024

Railroad Investigation Report: RIR-24-07

Union Pacific Railroad Head-On Collision with Stationary Intermodal Railcars

Imperial County, California
September 8, 2022

1. Factual Information

1.1 Accident Description

On September 8, 2022, about 2:40 a.m. local time, a conductor and engineer of Union Pacific Railroad (UP) train ISILB5-07 were killed when the train collided with railcars stored in a siding in Imperial County, California.¹ Train ISILB5-07 had been traveling timetable eastbound on main track 2 of the Yuma Subdivision when, because of a change of route plans, the train reversed direction into Bertram siding, a signal-controlled siding at milepost 646.1.² Upon entering the siding, with helper locomotives in the lead, the train traveled about 802 feet before colliding with a string of 74 empty intermodal railcars that had been stored in the siding since December 2021.³ The two lead locomotives and one intermodal railcar of train ISILB5-07 derailed, along with two of the empty stored intermodal railcars. (See figure 1.) Visibility conditions at the time of the accident were dark and clear with a haze near the ground, there was no precipitation,

¹ (a) All times in this report are local time unless otherwise noted. (b) Visit [nts.gov](https://www.nts.gov) to find additional information in the [public docket](#) for this National Transportation Safety Board (NTSB) accident investigation (case number RRD22LR014). Use the [CAROL Query](#) to search safety recommendations and investigations.

² (a) A *timetable* is a publication containing information on the movement of trains or equipment. Timetable directions are based on the rail network, so they can differ from compass directions. (b) *Signal-controlled siding* refers to the remote control of railway signals and block systems that control train movements onto other tracks.

³ (a) *Helper locomotives* are attached to trains and provide additional horsepower to assist on grades. (b) At the time of the accident, train ISILB5-07 was traveling 28 mph. The maximum authorized speed for trains diverting into Bertram siding is 30 mph.

and the temperature was 86°F. UP estimated damage to track and equipment to be about \$1.2 million.

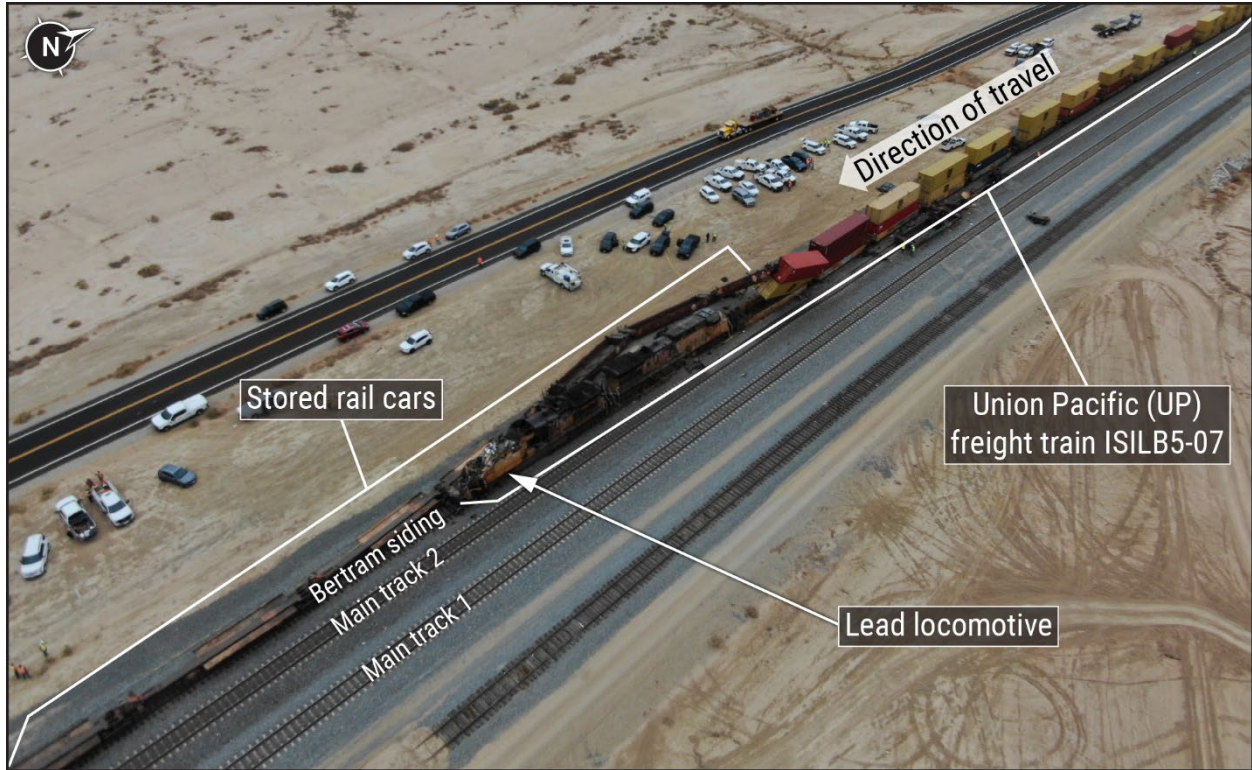


Figure 1. Aerial view of accident scene. (Source: UP.)

1.2 Union Pacific Railroad

Union Pacific Railroad operates primarily in the western and midwestern United States, with 32,534 route miles in 23 states and service at both the northern and southern US borders.⁴ The 194 track miles in UP's Yuma Subdivision extend from milepost 732.4, in Yuma, Arizona, to milepost 538.2 in Colton, California, in a timetable west-east direction. The Yuma Subdivision runs alongside the Salton Sea, a shallow, highly saline body of water in the Imperial Valley of southern California. Bertram siding is about 1,700 feet from the sea. (See figure 2.)

⁴ Union Pacific Railroad is the principal operating company of Union Pacific Corporation.

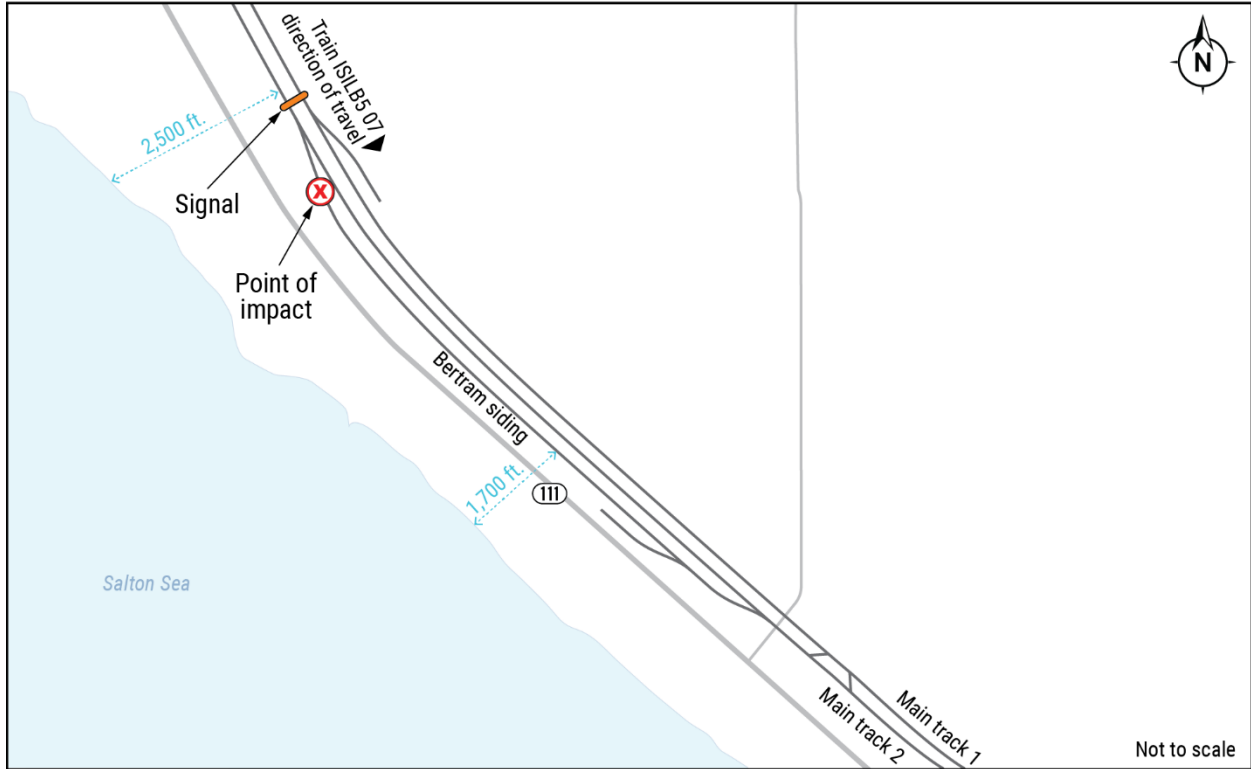


Figure 2. Tracks at the accident location.

UP uses signal indications in a traffic control system for train movements on the Yuma Subdivision, supplemented by positive train control, wayside signals, timetables, and special instructions.⁵ Direct-current track circuits within control point SP646, which governs movement into the west end of Bertram siding, use electrical currents to indicate track occupancy.⁶ UP dispatchers operate from the Harriman Dispatch Center (HDC), UP's rail traffic control headquarters in Omaha, Nebraska, where the movement of trains is controlled and monitored. Train dispatchers at HDC use a computer-aided dispatching (CAD) system to perform operations that include lining signals and switches and issuing restrictions and authorities.

⁵ (a) Under a *traffic control system*, train movements are authorized by block signals controlled remotely by dispatching personnel. (b) The Federal Railroad Administration (FRA) defines a *positive train control* system as one "designed to prevent train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a switch left in the wrong position." (c) *Wayside signals* are signals located along a railroad track.

⁶ (a) When a train occupies a segment of track, the electrical current of the *track circuit* passes through the train's metal wheelsets instead of through a relay (an electrical switch), communicating to the signal system that a train is present. (b) A *control point* is an area where the signal is controlled remotely by a dispatcher at a central location.

On the CAD screens at HDC, a blue line, also known as a blue block, indicates that a section of track has a block on it but that it is unoccupied by railcars or equipment.⁷ A red line, also known as a track occupied indication, means that track circuits detect railcars or equipment occupying a track section. When a blue block is in place along with a red track occupied indication, the line appears magenta on the CAD display. Blue and magenta track blocks often are accompanied by a track tag, an electronic notation associated with a specific section of track, added to the CAD system by a dispatcher.⁸

1.3 Before the Accident

1.3.1 Harriman Dispatch Center

During a postaccident interview with the National Transportation Safety Board (NTSB), a dispatcher stated that on August 29, 2022, 10 days before the accident, he saw a blue block on the Bertram siding track’s CAD display.⁹ The dispatcher also stated that he also saw a track tag stating “CARS” associated with the blue block on the display. (See figure 3.) According to CAD logs viewed by the NTSB, both the track tag and blue block had been manually applied by a dispatcher when railcars had been stored at Bertram siding in December 2021.

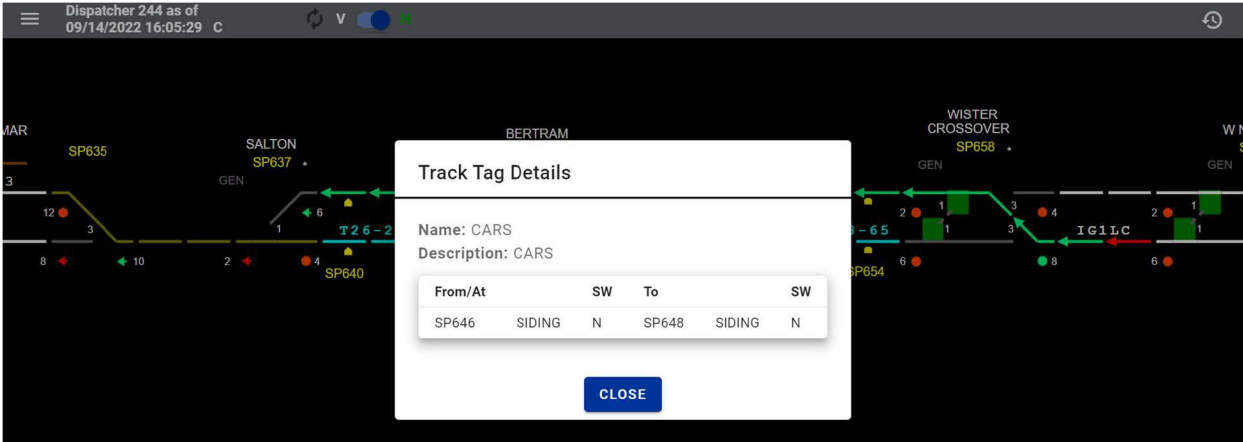


Figure 3. The Bertram siding track tag that was removed on August 29, 2022. (Source: UP.)

⁷ A *block* is a function in the CAD system to prevent a dispatcher from lining a switch to allow entry into a section of track without intervention. A dispatcher must remove the block to allow trains to enter the siding.

⁸ A *track tag* conveys information about the track, for example, the reason for a block.

⁹ This was the same dispatcher who worked the second shift (2:00 p.m. to 10:00 p.m. CDT) on the night of the accident. He is referred to in this report as the second-shift dispatcher.

The second-shift dispatcher recalled that because he saw no track occupancy indication/track block (that is, no magenta-colored line), he removed the Bertram siding track tag but left the blue block in place. (See figure 4.) In his interview, he stated that he left the block in place to prevent trains from entering the siding and that it is common both for a dispatcher to forget to remove a track tag after a section has been cleared of rail equipment and for another dispatcher to later remove a forgotten tag, as he did.¹⁰ He did not confirm the track was clear of standing equipment before removing the track tag, which he was required to do according to UP operating rules.¹¹ (See section 1.6 for more on these rules.)

¹⁰ The second-shift dispatcher stated that if the CAD display had showed a magenta line, he would not have removed the track tag.

¹¹ He stated that there were no operating rules for confirming a track was clear before removing CAD protection.

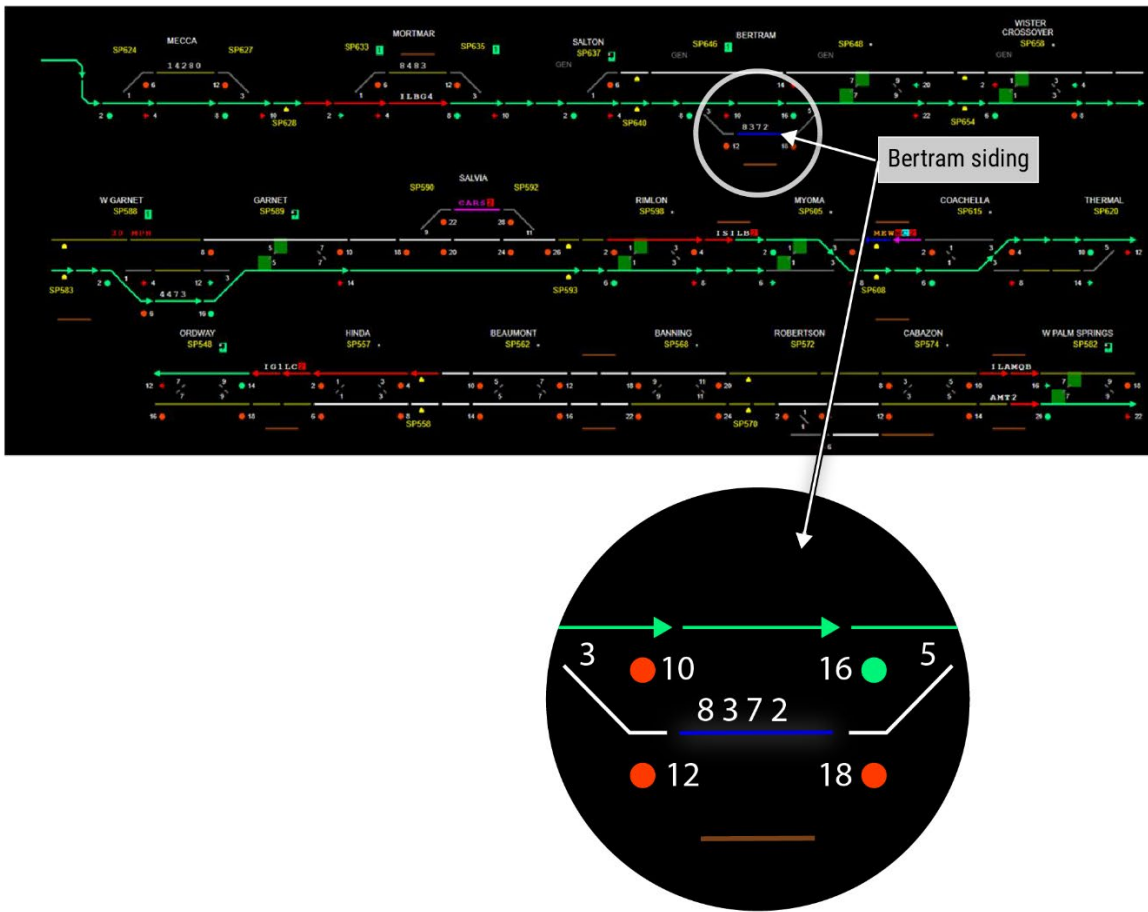


Figure 4. Bertram siding had a blue block when the second-shift dispatcher removed the track tag on August 29. (Source: UP.)

1.3.2 Train ISILB5-07

On September 6, 2022, UP train ISILB5-07 originated at the Santa Teresa Intermodal Terminal in New Mexico. The conductor and engineer of train ISILB5-07 (main crew) went on duty about 6:10 p.m. on September 7, 2022, in Yuma, Arizona. In interviews with the NTSB, the main crew stated that their initial paperwork indicated that they would drop off railcars at Bertram siding and that a colleague told them that there were railcars stored there. Before departure, the second-shift dispatcher at HDC told the crew that their destination was Long Beach, California; that they would not stop at Bertram siding; and that at some point during the trip, helper service locomotives would be added to the rear of the train. The train then departed Yuma.

As the evening progressed, train ISILB5-07 traveled westward on main track 1 and, about 11:50 p.m., stopped at control point SP605 Myoma to pick up the two helper locomotives. The main crew conducted a job briefing with the engineer and conductor

of helper train HWCWC-08 (helper crew) and attached the two helper locomotives to the rear of train ISILB5-07.¹² The new train, which now had a 4-person crew, retained train symbol ISILB5-07 and consisted of:

- 2 lead locomotives, NS 7575 and UP 6655;
- 122 loaded intermodal railcars; and
- 2 rear (helper) locomotives, UP 6018 and UP 5599.¹³

About 12:27 a.m. on September 8, train ISILB5-07 approached milepost 584.00 on main track 1. Another dispatcher, who was working the third shift that evening, informed the main crew of a change in plans—they would not be continuing to Long Beach.¹⁴ The dispatcher instructed the crew to stop their train at a safe point and reverse direction onto main track 2 and into Bertram siding. In interviews with the NTSB, the main crew stated that during this discussion they told the third-shift dispatcher that there were already railcars stored at Bertram siding based on what they had heard from their colleague at the start of their shift.¹⁵ They further recalled the third-shift dispatcher telling them that the CAD system at HDC showed that the siding was unoccupied. When the NTSB interviewed the dispatcher, he stated that his CAD display indicated a blue block, which meant that the siding had a block but was unoccupied.

After the conversation with the main crew of train ISILB5-07, the third-shift dispatcher removed the blue block and routed the train into the siding, where it collided with the stored railcars.¹⁶ He stated in his interview that he had not confirmed whether the Bertram siding track was unoccupied, as required by UP operating rules, when he had removed the track block and routed train ISILB5-07 into the siding.¹⁷

¹² UP train HWCWC-08 consisted of two locomotives and was used to help other trains on the Yuma Subdivision by providing extra horsepower when needed.

¹³ The helper crew remained in the lead helper locomotive, UP 6018.

¹⁴ The third shift was from 10:00 p.m. to 6:00 a.m. CDT. This dispatcher is referred to in this report as the third-shift dispatcher.

¹⁵ The engineer and conductor of the main crew stated they did not recall seeing railcars stored in Bertram siding when they passed it.

¹⁶ To do this, the dispatcher lined the wayside signal at the siding for entry, and the signal displayed a permissive indication.

¹⁷ The third-shift dispatcher told the NTSB that he routinely confirms with operating crews of trains whether railcars have been removed from a siding and checks that the CAD display shows that the track is clear. He stated that he did not do this on the night of the accident.

1.4 Personnel Information

1.4.1 Train Crews

The engineer of train ISILB5-07 was hired by UP in February 1998, and his most recent engineer certification was June 26, 2020.¹⁸ The conductor of train ISILB5-07 was hired by UP in May 2006, and his most recent conductor certification was on January 12, 2022. Employee records indicated that both members of the main crew received an off-duty rest period before reporting for duty.

Both the engineer and the conductor of helper train HWCWC-08, who were fatally injured in the accident, went on duty about 3:30 p.m. on September 7 at the helper train's origination point, West Colton, California. The crew's regular work assignment was helper service. The engineer was hired by UP in January 1993, and his most recent engineer certification was on November 20, 2020. The HWCWC-08 conductor joined UP in June 2021, and his most recent conductor certification was September 30, 2021. Employee records indicated that both the helper train engineer and conductor received an off-duty rest period before going on duty.

The NTSB reviewed footage from inward-facing cameras in both occupied locomotives on the accident train. The footage showed no evidence of cell phone use by either crew during the accident sequence.

1.4.2 Dispatchers

The second-shift dispatcher began working for UP in 2018. A review of the second-shift dispatcher's employment records showed that he was qualified on the Yuma Subdivision in 2019. He told the NTSB that on each of his workdays, including the night of the accident, he went to bed no later than midnight and generally woke up between 8:00 a.m. and 8:15 a.m. feeling rested.

The third-shift dispatcher began working for the railroad in 2004 as a conductor, transitioning to dispatching in 2011. On the night of the accident, he had worked the previous 2 days, with 2 rest days before that. He stated in an interview with the NTSB that he maintained a regular off-duty schedule in which he typically slept during the day and that he felt "neutral" in terms of alertness at the start of his shifts.

¹⁸ Locomotive engineers are recertified every 3 years under Title 49 *Code of Federal Regulations* Part 240.

1.5 Postaccident Examinations

1.5.1 Track

The NTSB examined main tracks 1 and 2 between mileposts 646.00 and 648.00 and observed no track defects or conditions that, if unaddressed, would lead to track defects. Throughout the Bertram siding track, the NTSB observed surface rust along the top of the rail head, web, and base of the rail. (See figure 5.) Surface rust, or corrosion, can cause oxidation of a metal surface, which leads to a decrease in electrical conductivity. Title 49 *Code of Federal Regulations* 236.56 states that “each track circuit controlling home signal or approach locking shall be so maintained that track relay is in deenergized position, or device that functions as a track relay shall be in its most restrictive state if, when track circuit is dry, a shunt of 0.06-ohm resistance is connected across the track rails of the circuit, including fouling sections of turnouts.”¹⁹ (The prescribed shunt sensitivity of 0.06 ohms allows for some contaminants on the track, such as grease, rust, and other foreign materials.) When the NTSB conducted a shunt sensitivity test on the Bertram siding track, the rust buildup prevented a 0.06-ohm shunt from connecting and prevented the track circuit from appearing occupied.

¹⁹ A *shunt* on a track circuit is a low-resistance wire apparatus that creates a short circuit between parallel tracks when a locomotive or railcar is present, causing the track to appear occupied.



Figure 5. Rail conditions on Bertram siding (*left*) and main track (*right*).

The NTSB noted no exceptions in rail restraint function of the elastic fasteners or in crosstie or ballast condition in the area of the collision and no obstructions on both turnouts at Bertram siding.²⁰ The NTSB further noted that no spikes or clamps had been applied to the switches leading into Bertram siding.²¹

1.5.2 Equipment

UP train ISILB5-07 was 7,368 feet in length and had 6,398 trailing tons. On September 8, the NTSB conducted a Class I air brake test on the 117 intermodal railcars that had not been damaged in the accident, and the air brakes performed as designed.²² Postaccident examinations of the derailed equipment disclosed no preexisting defective

²⁰ Rail restraint function is the ability of rail fasteners to restrict longitudinal movement of the rail.

²¹ *Spiking or clamping* a switch temporarily disables it.

²² (a) The five lead railcars of train ISILB5-07 were damaged in the accident and could not be tested. (b) The air brake tests were conducted within the regulations of Title 49 *Code of Federal Regulations* Part 232 for an enroute train.

conditions. The NTSB observed rust on the wheels of the 74 standing empty intermodal railcars in Bertram siding.

1.5.3 Signal Data Review

The NTSB reviewed field data logs for the intermediate signal at milepost 644.37 and the signals at control points SP646 and SP648.²³ The logs recorded that at the time of the accident, the wayside signal at control point SP646 displayed a red-over-yellow diverging approach indication for train ISILB5-07.²⁴

The data logs further showed that since late August 2022, the track circuit had intermittently indicated it was unoccupied. This is known as an intermittent track occupancy indication. At the time of the accident, the CAD display indicated the track was unoccupied. The NTSB reviewed screenshots of the CAD display from the 24 hours before the accident.²⁵ The NTSB identified the intermittent track occupancy indication by comparing screenshots: the line color for Bertram siding was sometimes blue (unoccupied but blocked) and sometimes magenta (occupied and blocked).²⁶ This condition occurred 56 times between August 29 and September 7, 2022, and 22 times in the 24 hours that preceded the accident.

1.6 Union Pacific Operating Rules and Procedures

Rule 1.1.13 in the UP *Signal Tests and Standards* (Yellow Book) states that railcars in storage for more than 10 days must be protected. This process involves dispatchers issuing a track bulletin to remove from service the track where the railcars are stored.²⁷ Engineering personnel must spike or clamp all switches that lead to the siding or track in which railcars are being stored and must tag the switches as out of service. Rule 1.1.13 also states that derails must be placed to protect railcars stored in controlled sidings. The

²³ *Field data logs* are electronic records of data from the dispatch office or from wayside and control point signals.

²⁴ A *diverging approach indication* is a signal that tells a train crew to proceed on a diverging route at a prescribed speed and to be prepared to stop before any part of the train or engine passes the next signal. This was a permissive signal indication, meaning that it indicated that train ISILB5-07 could proceed into the siding.

²⁵ The screenshots were obtained by the investigative team to review the CAD system data leading up to the accident.

²⁶ A review of UP records indicated that the stationary intermodal railcars had not been moved from the siding in the 24 hours preceding the accident.

²⁷ A *track bulletin* contains orders and information in real time for a specific section of track.

rules in the Yellow Book are applicable to UP's signal department and, at the time of the accident, were not made available to personnel in other departments.

UP rule 22.4.2, "Removing Protection for Standing Equipment," is contained in UP's operating rules and was available to all UP personnel at the time of the accident. The rule stated that a train dispatcher must confirm that a track is clear of equipment and that portable derails have been removed before removing protection such as a block or track tag from a section of the track and allowing a train to enter. The rule did not specify how or with whom the dispatcher must confirm the track is clear.

1.7 Postaccident Actions

After the accident, UP conducted a safety briefing for dispatchers, reviewing with each individual dispatcher the rules and processes for removing protection for standing equipment. UP updated operating rule 22.4.2 to require that the dispatcher confirm verbally that a track is clear of standing equipment before removing protection.

The railroad further updated its operating rule for protecting equipment on main tracks or controlled sidings with a new process. Now, a dispatcher adds a "cars tied down" track bulletin line item, which connects a track tag with a block on the CAD display.²⁸ This process requires the dispatcher to coordinate with the corridor manager and field personnel to determine how long the railcars will be stored. If railcars are to be stored for more than 10 days, the corridor manager will work with the signal or maintenance-of-way departments to remove the track from service by disabling signals and switches according to the process in rule 1.1.13 in UP's Yellow Book.²⁹

UP also made permanent changes to the signals at Bertram siding. At both ends of the siding, a restricting signal (red over flashing red) is now the most permissive aspect into the siding.³⁰ The signal design and program changes were completed by April 27, 2023.

²⁸ The "cars tied down" bulletin line item process (1) generates a track tag with the number of railcars secured in the track and a number from one of the railcars for tracking purposes and (2) creates an entry about the stored railcars in the track bulletin. The information from this bulletin entry also populates a report that is reviewed daily by UP management.

²⁹ The process of removing the track from service also triggers a report that includes all the track bulletin line items for stored railcars. This report is available to the dispatching center to track stored railcars and is reviewed daily.

³⁰ A *restricting signal* requires a train to proceed at restricted speed, a speed at which they can stop within one-half their range of vision.

2. Analysis

On the night of the accident, UP train ISILB5-07 traveled west from Yuma, Arizona, to Long Beach, California. Just before midnight on September 8, 2022, locomotives and a helper crew from helper train HWCWC-08 joined ISILB5-07 to provide extra horsepower. Partway into ISILB5-07's trip, the dispatcher at HDC in Nebraska told the train's main crew that they would not continue to Long Beach and directed them to go back to Bertram Siding instead. The train then reversed direction near West Palm Springs, proceeding eastbound with the helper locomotives and the helper crew on the head end of the train. Upon entering Bertram siding, the train collided with 74 empty intermodal railcars that had been stored there since December 2021.

2.1 Signal Rules

UP rule 1.1.13 requires railcars in storage for more than 10 days to be protected by a process that includes clamping or spiking the switches leading to the track on which railcars were being stored. This action mechanically locks the switches in place, preventing trains and equipment from entering or leaving the siding. The NTSB found no spikes or clamps applied to the switches leading into Bertram siding, indicating that UP personnel had not followed its own rules for protection of railcars in long-term storage.

Management of railcars in long-term storage is overseen by field personnel in UP's operations department and is coordinated among multiple departments, including dispatch, track, and signal. However, UP rule 1.1.13 for protecting railcars in long-term storage with derails and disabled switches was located only in the Yellow Book, a collection of rules specific to UP's signal department. The rule was not made available to all the relevant roles and departments at HDC, particularly the corridor manager in dispatch, who is responsible for train movement throughout the subdivision.

Following the accident, UP changed its operating rules for protecting railcars stored in a siding or on a main track. The new process requires the dispatcher to work with the corridor manager and field personnel to determine how long railcars will be stored on a siding or main track; if the railcars are to be stored for more than 10 days, the corridor manager works with the signal or maintenance-of-way departments to remove the track from service.

2.2 Rusty Rails

After the accident, the NTSB examined the derailed equipment and tracks at Bertram siding and observed that the wheels of the stored railcars, as well as the tracks they sat on, were covered in surface rust. Bertram siding track runs alongside the Salton

Sea, a large, highly saline lake. Corrosion on steel rails and other steel equipment can be severe in salt-lake areas or coastal zones because of the high levels of salt in the atmosphere.³¹

Friction between a traveling train's wheels and the rail removes rust and other contaminants from the rail surface. The amount of rust removed from the rail surface in this manner depends on a track's traffic flow—an inactive track will therefore have rustier rails than an active one. In this accident, the Bertram siding track had not been used since the 74 empty intermodal railcars were first stored there in December 2021, leaving rust to build up on the rail surface and the wheels of the railcars themselves for more than 8 months.

When a train shunts the rail, it creates an electrical short circuit on that section of the track, also called a track circuit. Although clean steel rail and clean steel wheels are good conductors of electricity, rust buildup is known in the rail industry to degrade the electrical path between rail and wheels.³² This can create poor shunting conditions and degrade track circuit performance, as it did in Bertram siding. When investigators tested the track circuit, it failed to meet federal regulations: a test with a 0.06-ohm shunt did not cause the track circuit to register as occupied.

According to the FRA, track circuit performance degradation has “potentially significant safety consequences for track circuit-based train detection devices.”³³ This was borne out in the weeks leading up to the accident: because the surface rust on the rails and wheels of the stored railcars had degraded the track circuit performance in Bertram siding, the CAD system at HDC inaccurately and intermittently indicated the siding was unoccupied dozens of times.

2.3 Dispatching Rules

In December 2021, when the empty railcars were first stored on the siding, personnel at HDC had placed a track block and track tag on the CAD display for Bertram siding. But about 2 weeks before the accident, the second-shift dispatcher removed the track tag and left the blue block in place without verifying that the siding was

³¹ Eric Schindelholz, Bailey E. Risteen, and Robert G. Kelly. 2014. “Effect of Relative Humidity on Corrosion of Steel under Sea Salt Aerosol Proxies: I. NaCl,” *Journal of The Electrochemical Society* 161, no. 10: C450-C459.

³² Zibo Pei, Xuequn Cheng, Xiaojia Yang, Qing Li, Chenhan Xia, Dawei Zhang, and Xiaogang Li. 2021. “Understanding environmental impacts on initial atmospheric corrosion based on corrosion monitoring sensors,” *Journal of Materials Science & Technology* 64: 214-221.

³³ FRA, 2021. *Track Circuit Shunting Performance Study*. RR 21-13. Washington, DC: FRA.

unoccupied, contrary to UP operating rules directing dispatchers to confirm that a track is clear of equipment before removing protection. Then, on the night of the accident, the third-shift dispatcher looked at the CAD display to route train ISILB5-07 into Bertram siding and saw a blue line, incorrectly indicating that the siding was unoccupied. The dispatcher was therefore able to line the wayside signal at the siding for entry, and did so also without first confirming that the Bertram siding track was unoccupied.

The third-shift dispatcher told the NTSB that he was aware of and routinely followed UP's rule 22.4.2 requiring confirmation that a track is unoccupied before removing protection, but that he did not follow it on the night of the accident. The second-shift dispatcher stated there was no such rule, indicating he was unaware of it. After the accident, UP conducted a safety briefing for dispatchers and updated its operating rule 22.4.2 to require dispatchers to confirm verbally that a track is clear before removing protection at the dispatching center.

3. Probable Cause

The National Transportation Safety Board determines that the probable cause of the Imperial County, California, collision was the routing of Union Pacific Railroad train ISILB5-07 into Bertram siding, which was occupied by 74 empty intermodal railcars, made possible by the inappropriate removal of a computer-aided dispatching system block on the siding at the dispatch center. Contributing to the cause of the accident were (1) the Bertram siding track not being spiked or clamped, as Union Pacific Railroad rules require for tracks where railcars are being stored long-term, and (2) the surface rust on the rails and wheels of the stored railcars that degraded the performance of the track circuit in Bertram siding and caused the computer-aided dispatching system to inaccurately indicate the siding was unoccupied.

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in the other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)).

For more detailed background information on this report, visit the [NTSB Case Analysis and Reporting Online \(CAROL\) website](#) and search for NTSB accident ID RRD22LR014. Recent publications are available in their entirety on the [NTSB website](#). Other information about available publications also may be obtained from the website or by contacting –

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