



**ANNUAL RAILROAD SAFETY REPORT
TO THE
CALIFORNIA STATE LEGISLATURE**



Pursuant to Public Utilities Code
Sections 916, 916.1, 916.2, and 916.3

**November 30, 2017
for
Fiscal Year 2016 - 17**

**CALIFORNIA PUBLIC UTILITIES COMMISSION
SAFETY AND ENFORCEMENT DIVISION
OFFICE OF RAIL SAFETY
RAILROAD OPERATIONS AND SAFETY BRANCH**

CALIFORNIA PUBLIC UTILITIES COMMISSION

Michael Picker, President

Martha Guzman Aceves, Commissioner

Carla Peterman, Commissioner

Liane M. Randolph, Commissioner

Clifford Rechtschaffen, Commissioner

Tim Sullivan, Executive Director

SAFETY AND ENFORCEMENT DIVISION

Elizaveta Malashenko, Director

OFFICE OF RAIL SAFETY

Roger Clugston, Deputy Director

RAILROAD OPERATIONS AND SAFETY BRANCH

Robert Grimes, Program Manager

Table of Contents

List of Abbreviations	i
Executive Summary	i
I. Introduction	1
II. Proactive Safety Efforts	2
A. Risk Management Status Reports	3
B. Crude Oil Reconnaissance Team	4
C. Railroad Bridge Evaluation Program	9
D. Railroad Tunnel Evaluation Project	9
E. Rail Head Wear Loss Project	10
F. Operation Lifesaver Presentations	12
G. Near-Miss Reporting and Analysis	13
H. Positive Train Control	16
I. California High-Speed Rail	19
III. Rail Safety Activities	22
A. Regular Inspections	23
B. Focused Inspections	28
C. Accident Investigations	29
D. Security Inspections	30
E. Safety Complaint Investigations	32
F. Penalties and Citations	33
IV. Investigations of Runaway Trains	34
V. Local Safety Hazard Sites	35
VI. Regulatory Fee Impact on Competition	37
VII. Challenges for Rail Safety	39
A. Reporting of Accidents and Incidents	39
B. Recruitment and Retention	40
Appendix A – State Railroad Safety Laws and General Orders	42
Appendix B – Examples of Risk Management Status Reports	46
Appendix C - Examples of Operation Lifesaver Presentations	47
Appendix D - Examples of Regular Inspections	50
Appendix E - Examples of Focused Inspections	59
Appendix F – Examples of Accident Investigations	62

List of Abbreviations

BNSF	Burlington Northern Santa Fe Railway
CFR	Code of Federal Regulations
CHSRA	California High Speed Rail Authority
CORT	Crude Oil Reconnaissance Team
CPUC	California Public Utilities Commission
DOT	Federal Department of Transportation
FRA	Federal Railroad Administration
GO	General Order
HHFT	High-Hazard Flammable Train
HSR	High Speed Rail
LSHS	Local Safety Hazard Site
OES	Office of Emergency Services
ORS	Office of Rail Safety
PTC	Positive Train Control
PU Code	California Public Utilities Code
RMSR	Risk Management Status Report
ROSB	Railroad Operations and Safety Branch
RSAC	Rail Safety Advisory Committee
SED	Safety and Enforcement Division
SMART	Sonoma-Marin Area Rail Transit
UPRR	Union Pacific Railroad

Annual Railroad Safety Activity Report

Fiscal Year 2016-2017

Pursuant to California Public Utilities Code Sections 916, 916.1, 916.2, and 916.3

Executive Summary

The mission of the California Public Utilities Commission (CPUC) railroad safety program is to ensure the safe operation of freight and passenger in California. The CPUC performs statewide railroad safety responsibilities through its Safety and Enforcement Division (SED), Office of Rail Safety (ORS), Railroad Operations and Safety Branch (ROSB).

This report complies with California Public Utilities (PU) Code Sections 916, 916.1, 916.2, and 916.3.¹

- California Public Utilities (PU) Code Section 916 requires the California Public Utilities Commission² to report to the Legislature on its rail safety activities on or by November 30 of each year. In addition, PU Code Section 916.3 requires the CPUC to report on the actions the CPUC has taken to comply with Section 765.5, which requires the CPUC to take all appropriate action necessary to ensure the safe operation of railroads in this state. This report chronicles the rail safety activities of the ROSB and identifies the proactive efforts CPUC's railroad safety inspectors (hereinafter, "inspectors") take to promote the safe operation of railroads during the previous fiscal year.
- PU Code Section 916.1 requires the CPUC to annually report the results of its investigations of runaway trains or other uncontrolled train movement that threatens public health and safety. All results of investigations into runaway trains or other uncontrolled train movements are included in this report.
- PU Code Section 916.2 requires the CPUC to report to the Legislature on sites on railroad lines in the state it finds to be hazardous, and list all derailment accidents sites in the state on which accidents have occurred within at least the previous five years. In addition, Section 916.2 permits this report to be combined with the report required by Section 916. The list of derailment sites are documented by calendar year.
- PU Code Section 916.3 requires the CPUC to report annually on the impact on competition, if any, of the regulatory fees assessed railroad corporations for the support of the CPUC's activities. This report includes the assessment.

¹ Chapter 612, Statutes of 2015 (SB 697) moved the reporting requirements from PU Code Sections 309.7, 765.6, 7661, and 7711 to Sections 916, 916.1, 916.2, and 916.3.

² In this report, "Commission" refers to the five-member commission authorized by the California State Constitution, Article XII, Section 1. "CPUC" refers to the staff of the Commission, under the auspices of the executive director, appointed by the Commission pursuant to Public Utilities Code Section 308.

ROSB protects California communities and railroad employees from unsafe practices on freight and passenger railroads by promoting and enforcing rail safety laws, rules and regulations; performing inspections; and identifying and mitigating risks and potential safety hazards before they create dangerous conditions.

Safety culture improvement and risk management are paramount to the CPUC culture and mission. CPUC inspectors cite violations of federal and state laws, and CPUC General Orders (see Appendix A for a list of state railroad safety laws and regulations). In addition to specific violations, CPUC inspectors, as well as all ROSB staff, look beyond the regulations toward more comprehensive overall proactive safety oversight.

Proactive Safety Efforts

The CPUC performs proactive safety efforts to mitigate risks associated with railroads. CPUC inspectors complete Risk Management Status Reports (RMSRs), staff the Crude Oil Reconnaissance Team (CORT), and perform Railroad Bridge evaluations, in addition to other safety activities discussed in more detail later in this report.

CPUC inspectors complete RMSRs when they identify risks that may not be addressed by existing railroad rules or regulations and make recommendations to reduce or eliminate such risks. During 2016-17, CPUC inspectors created 11 new RMSRs.

The CPUC established the Crude Oil Reconnaissance Team in Fall 2013 after an unattended 74-car freight train rolled down a slope and derailed. The resulting explosion killed 47 people and destroyed large portions of the town of Lac-Mégantic, Quebec, Canada. At that time, US railroads had been planning on developing an infrastructure capable of transporting large amounts of very volatile crude oil to California refineries. Over the past fiscal year, 55 oil-by-rail unit trains traversed California.³ None contained the highly combustible Bakken crude, which was present in the Canadian disaster. CORT monitored the operations of the 19 crude oil facilities in California, as well as following the progress of proposed new facilities before they came online.

CPUC inspectors from the CPUC Railroad Bridge Evaluation Program performed 143 bridge observations and created 9 RMSRs to improve the safety of the state's railroad bridges.

A new CPUC effort, the Railroad Tunnel Evaluation Project, began in 2017 to acquire historical data and perform onsite inspections of California railroad tunnels to assess tunnel conditions, inspection practices, and potential risks.

Another new project is a study regarding rail head wear loss. Excessive rail head wear can lead to derailments. It is imperative that railroads have adequate contingency plans to deal with excessive rail head wear conditions before they become problematic. There is no current federal

³ A unit train is a train that is composed of cars carrying a single type of cargo. A unit crude oil train carries only crude oil.

regulation regarding rail head wear loss. However, the CPUC is working with the Federal Railroad Administration on efforts to potentially promulgate a new regulation regarding this concern. CPUC railroad safety staff is examining rail head wear loss conditions in California.

Additional proactive safety activities by the CPUC inspectors in 2016-17 included:

- Collection and analysis of 2,700 near-miss incidents to detect high-risk areas.
- Performance of 17 Positive Train Control (PTC) field tests and demonstrations, performance 45 PTC surveillance observations, and monitoring of 20 PTC status meetings.
- Presentation of 168 Operation Lifesaver orientations. These railroad safety awareness campaigns reached more than 13,000 people who live or work in proximity to railroad tracks.

Rail Safety Activities

The CPUC employs 41 inspectors who possess expertise in specific railroad safety disciplines: hazardous materials; motive power and equipment, which includes locomotives and rail cars; railroad operating practices; signal and train control; track; and bridges and tunnels.⁴ The inspectors also identify and address additional public safety risks associated with railroad systems.

During 2016-17, CPUC inspectors conducted the following activities:

- Performed 4,064 inspections and follow-up inspections to monitor the railroads' compliance with federal and state laws, and CPUC General Orders (GOs).
- Identified 10,089 federal regulation defects.
- Recommended civil penalties for 258 federal regulation violations, and 2 citations for violations of state laws.
- Completed 248 CPUC GO reports that identified 828 defects.
- Performed 17 focused inspections.
- Investigated 154 accidents and incidents.
- Performed 37 security inspections for risk assessment and to ensure each railroad that operates in California has a complete infrastructure protection plan.

⁴ The FRA certifies the inspectors as experts in these disciplines, except for bridges and tunnels. The CPUC proactively identified bridges and tunnels as risks to public safety, and employs one track-certified inspector and one bridge inspector, both with extensive experience, to focus on bridge and tunnel observations.

- Investigated and resolved 22 railroad safety complaints from railroad employees, other public agencies, and the general public.

Investigations into Runaway Trains or Other Uncontrolled Train Movement

PU Code Section 916.1 requires the CPUC to annually report the results of its investigations of runaway trains or other uncontrolled train movements that threatens public health and safety. In 2016-17, the CPUC investigated four instances of runaway trains and uncontrolled train movement.

Local Safety Hazard Sites

PU Code Section 7711 requires the CPUC to report to the Legislature on sites on railroad lines in the state it finds to be hazardous. The sites on railroad lines the CPUC identified as hazardous were identified in 1997 in a formal Commission Decision, D.97-09-045, and were termed Local Safety Hazard Sites.⁵

Section 7711 also requires the CPUC to include a list of all railroad derailment accident sites in the state on which accidents have occurred within at least the previous five years, describe the nature and probable causes of the accidents, and indicate whether the accidents occurred at or near sites that the Commission has determined to be hazardous. This report, in addition to the electronically available list of all railroad derailment accidents over the past five years and the causes, fulfills those requirements.⁶ This report also includes a list of the accidents that have occurred “at or near” an identified local safety hazard site within the previous five years.

Within the previous five calendar years, California experienced 320 derailments. Of that total, 48 derailments, or nearly 15 percent, occurred at or near local safety hazard sites. The majority of those derailments were at local safety hazard sites #3 (Yuma subdivision) and #20 (Mojave subdivision). See table in section V, Local Safety Hazard Sites.

Fee Impact on Competition

The railroad user fees assessed in 2016-17 on Union Pacific Railroad (UPRR) and BNSF Railway (BNSF), the two largest contributors, represented just over one fourth of one percent of revenues and were unlikely to have had any effect on competition.

Challenges

The CPUC Office of Rail Safety foresees challenges ahead. The most significant challenge, also described in previous Annual Reports, is the slowly improving issue of inconsistent reporting of accidents and incidents by the railroads.

⁵ The ROSB currently is using the term “high hazard areas” to distinguish from the legal term “local safety hazard” sites, as used in the preemption exemption language of the Federal Railroad Administration (49 U.S.C. § 20106).

⁶ A list of all derailments is located at <http://www.cpuc.ca.gov/rosb/>

An additional challenge continues to be employee retention, mostly due to the pay disparity between the state railroad safety inspectors and their federal counterparts. The much higher pay scales for federal inspectors with fewer responsibilities than state inspectors has caused problems in the recruitment and retention of qualified personnel. The resultant vacancies and time spent on training new staff adversely affects productivity and actual field inspection time. The CPUC has identified this issue as a significant public safety risk in past Annual Reports over the past 13 years.

I. Introduction

The mission of the ROSB is to ensure that California communities and railroad employees are protected from unsafe practices on freight and passenger railroads by enforcing state and federal rail safety rules and regulations, performing proactive inspections, and identifying and mitigating risks and potential safety hazards before they create dangerous conditions.

The CPUC railroad safety program is one of the most comprehensive railroad safety programs in the nation. The California Constitution states that the PU Code is the highest law in the state, grants the Legislature plenary authority to regulate public utilities under the PU Code, and provides that the Constitution's provisions override any conflicting provision of state law which addresses the regulation of public utilities.⁷

Federal law, Title 49 of the Code of Federal Regulations (49 CFR) Part 212, established the State Safety Participation Program with the FRA. The purpose of this state-federal partnership is to provide an enhanced investigative and surveillance capability by having state agencies assume responsibility for compliance investigations and other surveillance activities as a federal partner.

California state laws complement the federal State Safety Participation Program and provide even greater protection to railroad employees and the public. State laws require the CPUC to perform inspections, surveillance, and investigations of the railroads, and to advise the Commission on all matters relating to rail safety. A summary of applicable California PU Code sections and CPUC General Orders is provided in Appendix A.

The CPUC employs inspectors who possess expertise in specific disciplines: hazardous materials, motive power and equipment, operating practices, signal and train control, and track, as well as railroad bridges and tunnels.⁸ The inspectors also identify and address additional public safety risks associated with railroad systems.

The CPUC requires entry-level railroad inspectors to have a minimum of five years of direct railroad experience within a specific discipline. Most CPUC inspectors have accumulated over 20 years, and some more than 40 years, of railroad experience. This experience is critical to understanding what constitutes safe railroad practices. The CPUC also requires each applicant to pass a written and oral exam.

The CPUC and the Federal Railroad Administration (FRA) require all new-hires to undergo about one year of on-the-job training, depending on their depth of experience. To gain the FRA certification, all CPUC inspectors actively participate in at least two week-long classroom training sessions with the FRA to start, followed by at least one week of training every year thereafter. Newly hired ROSB inspectors are each assigned a FRA on-the-job training manual.

⁷ *California State Constitution*. Article 12, Sections 3, 5, and 8.

⁸ The FRA certifies the inspectors as experts in these disciplines, except for bridges and tunnels. The CPUC proactively identified bridges and tunnels as risks to public safety, and employs one track-certified inspector and one bridge inspector, both with extensive experience, to focus on bridge and tunnel observations.

As they complete specific required tasks, the CPUC or FRA railroad safety trainer signs off on the task. When the all of the required tasks are completed, the CPUC inspector must then pass a certification field test. An FRA safety specialist (discipline specific) takes the CPUC inspector out for a day or more in the field to test the person's knowledge and ability to perform as an independent inspector.

The CPUC employs 41 FRA-certified inspectors to perform safety inspections and investigations pursuant to the State Participation Program.⁹ The federally-certified inspectors enforce railroad safety and operating rules, and rail safety regulations, by performing inspections and accident investigations. The CPUC's rail safety responsibilities include:

- Inspecting railroads for compliance with railroad safety and operating rules, and state and federal railroad safety laws.
- Investigating railroad accidents and safety-related complaints.
- Recommending railroad safety improvements to the Commission and federal government.

II. Proactive Safety Efforts

PU Code Section 916.3 requires the CPUC to report on the actions the CPUC has taken to comply with section 765.5, which requires the CPUC to take all appropriate action necessary to ensure the safe operation of railroads in this state. Safety culture improvement and proactive risk management are integral to the CPUC mission. In addition to investigating specific violations of state and federal regulations, CPUC inspectors, as well as support and analytical staff, look beyond the regulations toward more comprehensive overall proactive safety oversight.

The CPUC strives to achieve a goal of zero accidents and injuries across all the utilities and businesses it regulates, and within all CPUC facilities. To achieve that goal, the CPUC embraces a comprehensive safety management approach that integrates public policy, risk management, and compliance with federal and state laws and CPUC GOs. This approach is used as a foundation for continuous improvement of the regulated utilities' safety as well as the CPUC's safety oversight role.

The CPUC inspectors identify public safety risks, "beyond the regulations." The CPUC works to continuously enhance the safety culture of the railroad industry as well as its own safety culture. To promote a comprehensive safety culture, the CPUC uses proactive tools, cooperative engagement, and presentation methods, such as:

- Risk Management Status Reports
- Crude Oil Reconnaissance Team

⁹ Pursuant to 49 CFR Part 212.

-
- Railroad Bridge Evaluation Program
 - Railroad Tunnel Evaluation Project
 - Operation Lifesaver Presentations
 - Near-miss Reporting and Analysis
 - Positive Train Control Team
 - High-Speed Rail Oversight

A. Risk Management Status Reports

The CPUC Office of Rail Safety utilizes a risk management process that enables staff to record any unsafe act, condition or situation they may find that are not addressed by regulations. During 2016-17, CPUC inspectors created 11 new RMSRs. CPUC inspectors complete RMSRs when they identify risks that may not be addressed by existing regulations and make recommendations to reduce or eliminate such risks.

In the course of field work, CPUC inspectors identify items of concern that are either (1) out of their area(s) of expertise, (2) outside of formal/official reporting and action protocols, or (3) despite prior formal or informal regulatory action, are still safety risks.

Once an RMSR is documented, the assigned inspector works with their supervisor to mitigate the risk. The inspector and supervisor meet with the responsible railroad, shipper or associated entity's responsible representative and convey the safety risk linked with the issue, and define a time period in which the risk should be addressed. The CPUC inspector performs a follow-up inspection to determine whether the risk was mitigated. If the railroad fails to eliminate or sufficiently mitigate the risk, the CPUC Program Manager will pursue resolution with the responsible railroad officials, and if necessary, may elevate the issue to the Deputy Director or to the full Commission for further enforcement action.

Examples of RMSRs are presented in Appendix B.

During 2016-17:

- 1 RMSR from 2015-16 was closed out (i.e., the recommendations were implemented and or an alternative resolution was reached with the railroad).
- 11 new RMSRs were created:
 - 9—Bridge safety issues
 - 1—Issue related to CPUC General Orders or federal law requirements
 - 1—Right-of-way protection (fencing)

One of the new reports was closed. ROSB seeks to resolve the remaining 10 during the next fiscal year.

B. Crude Oil Reconnaissance Team

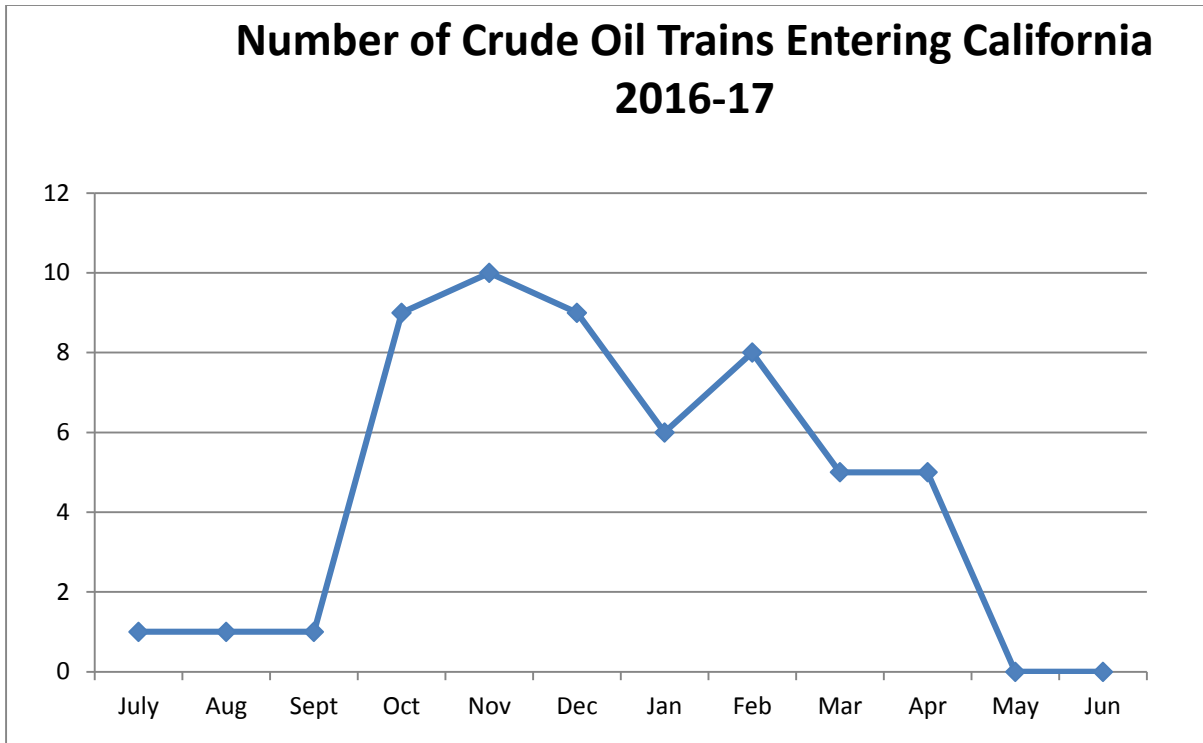
The CPUC established the Crude Oil Reconnaissance Team in Fall 2013 after an unattended 74-car freight train rolled down a slope and derailed on July 6, 2013. The resulting explosion killed 47 people and destroyed large portions of the town of Lac-Mégantic, Quebec, Canada. At that time, US railroads had been planning on developing an infrastructure capable of transporting large amounts of very volatile crude oil to California refineries.

CORT is an interdisciplinary team that includes CPUC rail safety inspectors certified in the specialties of track, signal, hazardous materials, or operating practices. They are joined by CPUC professional engineers who specialize in risk assessment. The team identifies risks and provides mitigation recommendations to railroads to improve the safety of crude oil rail transportation in California.

CORT monitors the railroads' infrastructure related to the transportation of crude oil and assesses and mitigates risks to public safety. CORT performs frequent observations of crude oil transfer facilities and related infrastructure. CORT members inspect such facilities to verify that they comply with relevant railroad-related federal and state laws, and CPUC GOs. They also obtain monthly reports on actual and expected crude-by-rail California imports. These reports are utilized to develop inspection plans, including surveillance of trains entering state jurisdiction. In addition, CORT members have observed training of facility staff and acted as a liaison with other state agencies such as the California Office of Emergency Services.

Currently, there are 19 crude oil refineries operating in California. Only 2 are active crude-oil-by-rail, unit train facilities.¹⁰ The initial projections of participating railroads, estimated at upwards of one unit crude oil train per day for a single facility, have not yet come to fruition. The most active facility continues to be the Plains All American facility in Taft, near Bakersfield. The other facility is the Kern Oil Refining facility, in Bakersfield.

¹⁰ A unit train is a train that is composed of cars carrying a single type of cargo. A unit crude oil train carries only crude oil.



Over the past fiscal year, a total of 55 oil-by-rail unit trains traversed through the state. Plains All American facility received 46 unit-oil trains in 2016-17; no trains contained Bakken crude oil. The unit oil trains averaged 100 tank cars. They originated from Edmonton Canada, traversed through Klamath Falls, Oregon, entered California, and traveled to Taft via the BNSF and UPRR rail lines.

The Kern Oil facility received 9 unit oil trains from July 2016 to June 2017. No trains contained Bakken crude oil. The unit oil trains averaged 88 cars, originated out of Carlsbad, New Mexico and entered California through Needles via the BNSF and UPRR rail lines.

The Kinder Morgan oil-by-rail facility that operated for a short time in Richmond ceased operation and was dismantled in December 2015.

The Valero Crude Oil Facility submitted an application to the Benicia Planning Commission for a Use Permit to receive volatile crude oil. On February 11, 2016, the Planning Commission denied the application. Subsequently, the Benicia City Council voted to uphold the Planning Commission’s denial of a use permit.

Regarding another permitting request to receive volatile crude oil shipments, the Phillips 66 Santa Maria Refinery Oil by Rail Spur project was denied on March 14, 2017 by the San Luis Obispo County Board of Supervisors.

As shown in the graph below, the number of oil-by-rail shipments into California has declined. However, this may change in the future. The US Energy Information Administration (EIA) reports that U.S. crude oil production is expected to increase in 2018. Crude oil production is forecast to average 9.3 million barrels per day (b/d) in 2017, up 0.5 million b/d from 2016. In

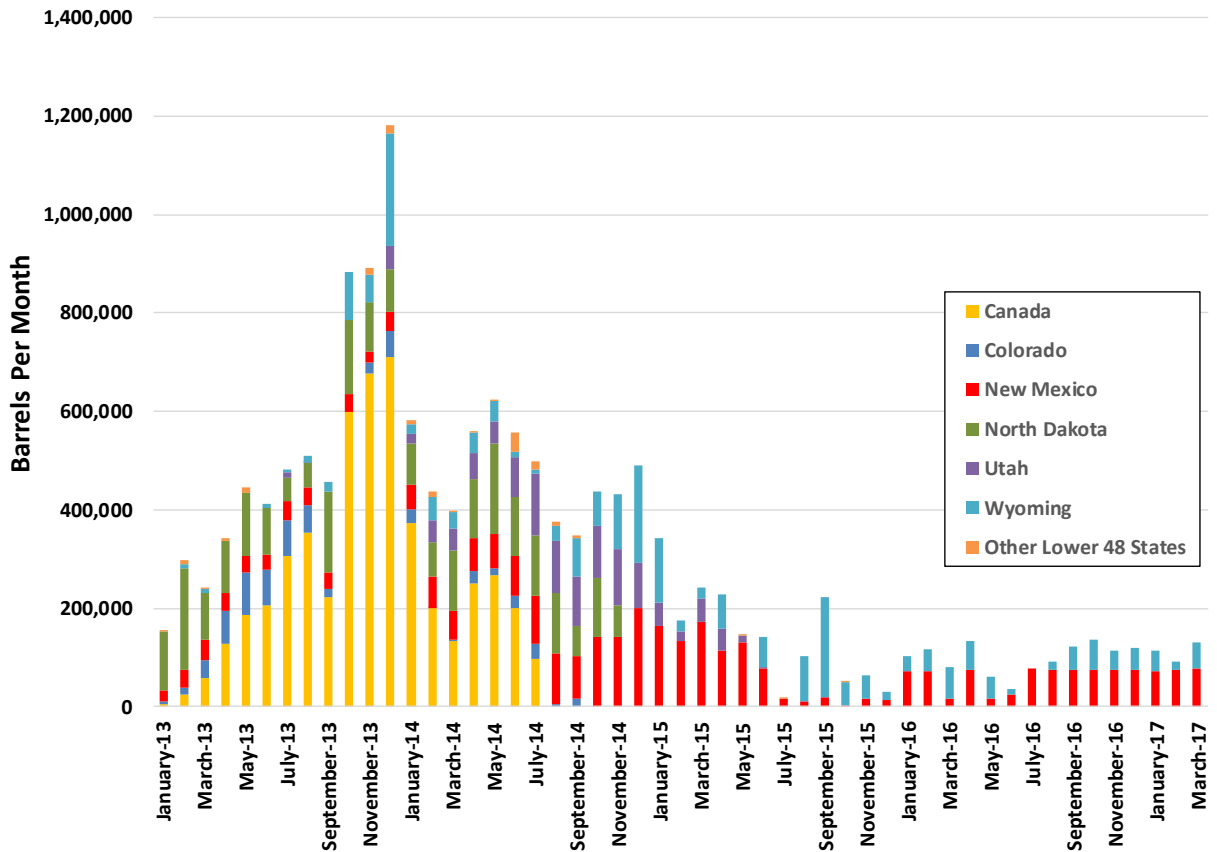
2018, EIA expects crude oil production to reach an average of 9.9 million b/d, which would surpass the previous record of 9.6 million b/d set in 1970.¹¹



A CPUC hazardous materials inspector performing a safety inspection at a California refinery

¹¹ US Energy Information Administration: *US Crude Oil Production Forecast Expected to Reach Record High in 2018*. July 25, 2017.

California Crude Oil Imports via Rail Tank Cars



Source: California Energy Commission

To minimize damage caused by transporting hazardous materials by rail, on May 1, 2015 the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the FRA issued "Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains (HHFTs).¹² The standards require that tank cars be constructed and retrofitted with additional materials so that in the event of a breach from a train derailment or catastrophic event, the additional material may prevent the hazardous materials from venting to the atmosphere. Specifically, the Tank Car Standards require:

- New tank cars constructed after October 1, 2015 to meet enhanced DOT Specification 117 design or performance criteria.

¹² Source: U.S. Department of Transportation, "Rule Summary: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains," <https://www.transportation.gov/mission/safety/rail-rule-summary>. A "high-hazard flammable train" is defined as "a continuous block of 20 or more tank cars loaded with a flammable liquid or 35 or more tank cars loaded with a flammable liquid dispersed through a train."

- Existing tank cars must be retrofitted in accordance with the DOT-prescribed retrofit design or performance standard.
- Retrofits to be completed pursuant to a prescriptive retrofit schedule.
- Consignees owning or leasing tank cars to meet the initial retrofit deadline.



Crude oil tank car without retrofitting



Crude oil tank car with enhanced or retrofitted material applied to the bulk head (end of car)

PHMSA and the FRA also required speed reductions to reduce the risk of equipment breaching in the event of a derailment. The regulation:

- Restricts all HHFTs to 50-miles per hour (mph) in all areas.
- Requires HHFTs that contain any tank cars not meeting the enhanced tank car standards required by this rule operate at a 40-mph speed restriction in high-threat urban areas.¹³

The CORT team will enforce these regulations in concert with FRA, continue to monitor crude oil trains and facilities, and identify risks to public safety posed by existing and planned operations associated with transporting crude oil by rail.

In 2016-17, CORT activities included the following:

- Monitored 5 crude oil facilities from the planning stages through full operation.¹⁴
- Reported on monthly operations of the 19 existing California crude oil refineries.
- Monitored all 55 of the oil-by-rail unit trains that traversed through California.

¹³ As defined the Transportation Security Administration regulation: 49 CFR 1580.3.

¹⁴ Only 2 became fully operable.



A CPUC hazardous materials inspector preparing to inspect crude oil tank cars

C. Railroad Bridge Evaluation Program

Railroad bridges pose potentially significant safety risks due to age, silt build-up, excessive loads, and many other factors. A number of these bridges are over a hundred years old. In addition, many of California's railroad bridges span large bodies of water, major highways, and/or areas of high population density, and can carry highly volatile crude oil as well as other hazardous materials.

Title 49 CFR, Part 237 requires railroad track owners to create a bridge management program, perform annual bridge inspections, and calculate load capacities. The CPUC and the FRA have agreed to work in concert to ensure that railroad track owners complete their bridge management programs. They also conduct joint railroad bridge observations.

Two CPUC inspectors focus on bridge and tunnel integrity, collaborate with the FRA railroad bridge program, and perform railroad bridge and tunnel program observations.

CPUC inspectors prioritized bridge observations based on the proximity to the identified Local Safety Hazard Sites across the state.

During 2016-17, the CPUC inspectors who specialize in bridges performed the following:

- 143 total bridge observations.¹⁵
- 6 bridge field activities held jointly with the FRA.¹⁶
- 9 RMSRs (notifications to railroads about bridge safety concerns).

¹⁵ The Railroad Bridge Evaluation Program was limited to just 1.0 inspector for half of the 2016-17 fiscal year.

¹⁶ The FRA has only 5 railroad bridge inspectors to cover approximately 80,000 railroad bridges in the United States. One FRA inspector is assigned to California, as well as to 11 other states.

-
- 3 responses to a bridge-related informal complaint.



CPUC railroad safety bridge inspectors review bridge structure integrity and associated potential risks during field inspections

D. Railroad Tunnel Evaluation Project

Railroad tunnel structural integrity can be weakened by natural events, such as earthquakes, flooding and soil erosion, and by derailments and other railroad accidents. This in turn can lead to significant risks to trains transiting such tunnels.

There are significant gaps in the state and federal regulatory coverage of railroad tunnels. CPUC is helping to redress this problem by assigning staff to evaluate railroad tunnel conditions. From a public safety standpoint, it is imperative that CPUC have as much information as possible on railroad tunnels and their conditions. To that end, CPUC has begun Rail Tunnel Evaluation Project to develop our own data, ensuring that railroad tunnels are photographed from end to end, lengths and heights are measured, and portals and linings are inspected. The Rail Tunnel Evaluation Project also includes the collection of historic data (e.g., construction dates and materials) that will be useful in assessing tunnel conditions.



CPUC risk assessment team at a tunnel observation in the Tehachapi Pass area

E. Rail Head Wear Loss Project

Another new 2016-17 initiative for CPUC regards rail head wear loss. Excessive rail head wear can cause train derailments, especially on sinuously curved track in mountainous areas. Rail head wear can cause problems affecting uniform track gage and train balance while the train is traversing a curve. If the rail head wears too far, two main issues arise: (1) the track gage widens and (2) the rail is subject to rolling over under the weight of lateral dynamic train forces. It is imperative that railroads establish good rail wear monitoring and maintenance plans with remedial contingencies based on the monitored rail head wear life expectancy, especially in multi-curved mountainous areas.

The CPUC is monitoring rail head wear loss by utilizing high-grade manual rail head wear gages in critical areas throughout California. CPUC staff measure rail head loss during inspections and compare such measurements with data collected by the FRA and the railroads themselves. By collecting evidence of the seriousness of head wear loss, CPUC can influence the responses of railroads and the FRA to this problem.

Currently, there are no regulations mandating when rail should be replaced due to headwear loss. The CPUC is participating in the FRA Rail Safety Advisory Committee (RSAC) Rail Integrity Working Group, which meets intermittently in Washington DC to explore promulgation of a new federal regulation for rail head wear loss, which would identify when rail should be replaced and, potentially, establish a national procedure for replacing worn rails based on condemnable wear limitations. For example, the rail head wear limit that may decide when the rail is condemnable and thus must be replaced might be a 5/8 inch or 3/4 inch reduction from the original new rail contour. The exact amount of this reduction is under discussion by RSAC.

CPUC plans to continue its collection of head wear loss information and based on this evidence, advocate effective counter-measures. This goal is consistent with the Office of Rail Safety's practice of looking beyond the regulations. This new, ongoing project has already allowed the CPUC to make railroads aware of pitfalls in some of their currently-existing rail replacement plans.



CPUC staff examining worn rail on a curve



Rail head wear gage depicting 22/32" wear loss

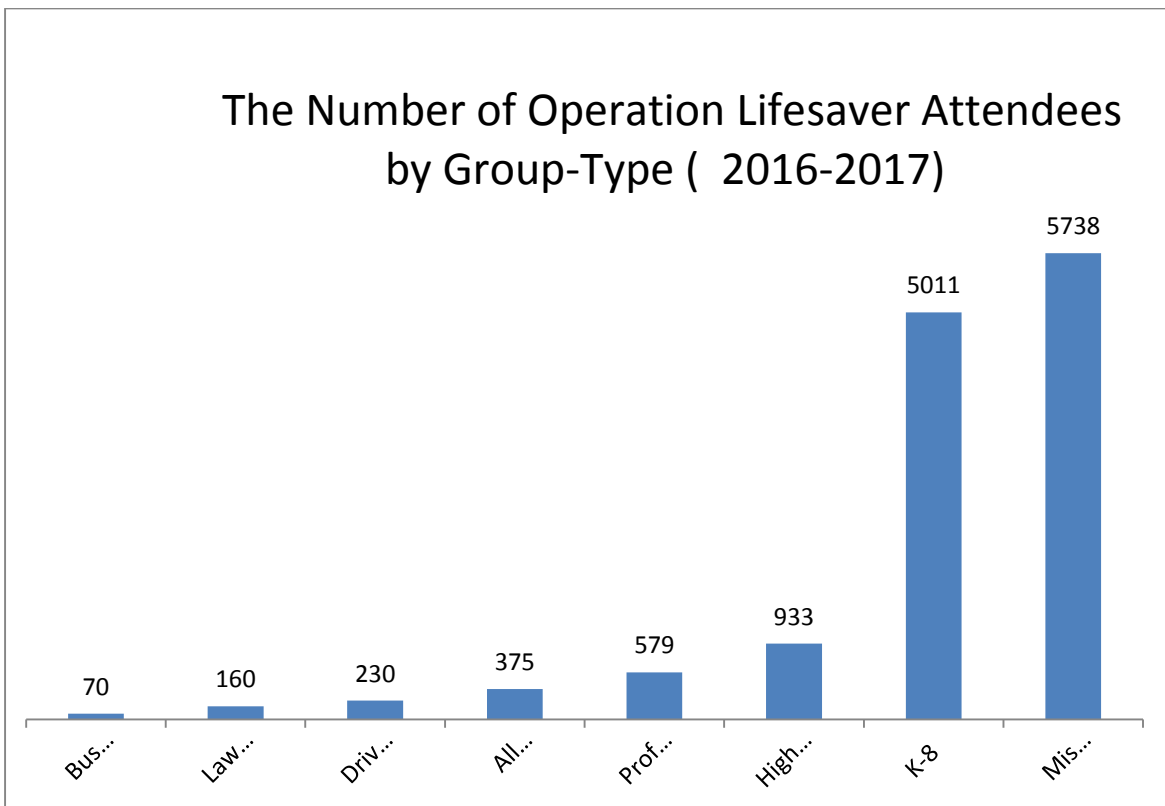
F. Operation Lifesaver Presentations

Operation Lifesaver, Inc., a nonprofit organization, administers a public safety awareness campaign and is funded primarily by grants from the FRA. Operation Lifesaver’s mission is to end collisions, deaths and injuries at highway-rail grade crossings and on rail property through a nationwide network of volunteers who work to educate people about rail safety.

Operation Lifesaver volunteers provide specialized training for law enforcement, professional truck drivers, and emergency first-responders. The programs provide valuable information on how to be safe around trains, illustrate how drivers can safely navigate highway-rail grade crossings, and reinforce that it is illegal and unsafe to ever walk on or use railroad tracks for recreation.

CPUC inspectors and engineers have volunteered for Operation Lifesaver over the past decade. CPUC inspectors and support staff volunteer throughout the state, providing presentations to schools, community organizations, drivers’ education classes, bus driving workshops and trucking organizations, as well as educating the public at weekend events such as festivals and safety fairs.

Appendix C provides examples of Operation Lifesaver presentations.



During 2016-17, CPUC railroad safety staff:

- Performed 168 Operation Lifesaver presentations.

-
-
- Attended 33 community wide events.
 - Reached more than 13,000 people.

Operation Lifesaver events included:

- Agricultural Industry -Zenith Insurance AgSafe partnership events
- AgVenture events for students "Farm to Table"
- Fullerton Railroad Days
- Get Real Behind the Wheel - Highlighting New Driver Education
- Los Angeles City Attorney's Office
- International Level Crossing Awareness Day Events - Fairfield - Davis Safety Train
- May Day! May Day! Healthcare & Safety Event - Fresno
- Outreach to Schools soon to have new train service -Sonoma/Marin County
- Rail Safety to Schools in established Communities - San Bernardino
- San Bernardino 66'er's Game Outreach
- Safe Routes to School
- San Clemente Earth Day
- School Presentations Outreach - Riverside
- Special Safety Train Fresno - Safety Train Oakland
- Stockton PD Safety Day Event
- Story Time at the Stockton Library
- University of California, Riverside Commuter Events

G. Near-Miss Reporting and Analysis

PU Code Section 7711.1 requires the CPUC to collect and analyze near-miss data for incidents in California occurring at railroad crossings and along the railroad right-of-way. For the purpose of this code section, "near-miss" is defined as including runaway train or any other uncontrolled train movement that threatens public health and safety.

In support of this requirement, the CPUC has developed a process for managing the risks discovered through the collection and analyzing of such near-miss data. Using near-miss data to identify locations where there are conditions which may pose a greater likelihood of accidents, and/or have greater consequences in the event of an incident, enables the CPUC railroad risk assessment team to improve railroad safety.

To proactively mitigate risks, the CPUC has broadly interpreted the term “near-miss” to include an incident that does not result in the occurrence of an accident, but presents an unintended condition or exposure to a hazard that may have caused an unwanted incident. An accident may be preceded by one or more near-miss events, making near-miss data useful information for identifying potential threats to public health and safety.

The Class 1 freight railroads (BNSF and UPRR) provide the CPUC with monthly near-miss reports. The CPUC railroad safety staff analyzes the near-miss data to detect “hot spots” or areas with a high frequency of near-miss incidents. These “hot spots” are noted and can be further explored to determine if there are safety issues that can be mitigated by taking additional action.

Unfortunately, the data are not comprehensive. Reporting of most near-miss data is voluntary and as there is no standardized format, the railroads differ in how they report this information. Among other problems, the railroads do not use a uniform threshold for determining what conditions qualify as a near-miss incident. As such, the near-miss data may not be useful for comparisons. Nevertheless, when the data indicate hazardous conditions that cause accidents, some of these conditions can be improved voluntarily by the railroads or via action by CPUC or other regulatory authorities.

In 2016-17 there were just over 2,700 near-miss incidents reported in California. In 2015-16 there were over 2,300. This increase could result from new data from the Southern California Regional Rail Authority, or Metrolink, which only recently began reporting near misses.

Imperial County continues to experience the greatest number of near misses. Out of the 734 near-miss incidents reported in that county in 2016-17, 718 occurred at one grade crossing, the Clark Road grade crossing in the city of El Centro (DOT# 760857J). The Clark Road crossing is a major roadway to the downtown area, an elementary school, and the County Airport. The crossing is currently protected with crossbuck passive warning devices. As the population of Imperial County continues to grow, so will roadway traffic. In their California County-Level Economic Forecast 2015-16, the California Department of Transportation projects that Imperial County will experience the following growth in 2016 – 2021:

- The population is expected grow by 1.5 percent, faster than the state average.
- The number of vehicles is expected to increase by 9.5 percent.

Improvements to the Clark Road crossing were authorized by the CPUC through GO 88-B in March 2017. GO 88-B authorizations provide three years to complete construction of the improvements. The improvements include CPUC Standard 9 (flashing light signal assembly with automatic gate) warning devices, new asphalt near the tracks, new edge line and centerline striping with reflective raised pavement markers, and new street lights.

Los Angeles County continues to experience a great number of near misses. This can be attributed to the population density and the large number of grade crossings and rail traffic. For the fiscal year 2016-17, Los Angeles County experienced 411 near misses or a decrease of nearly

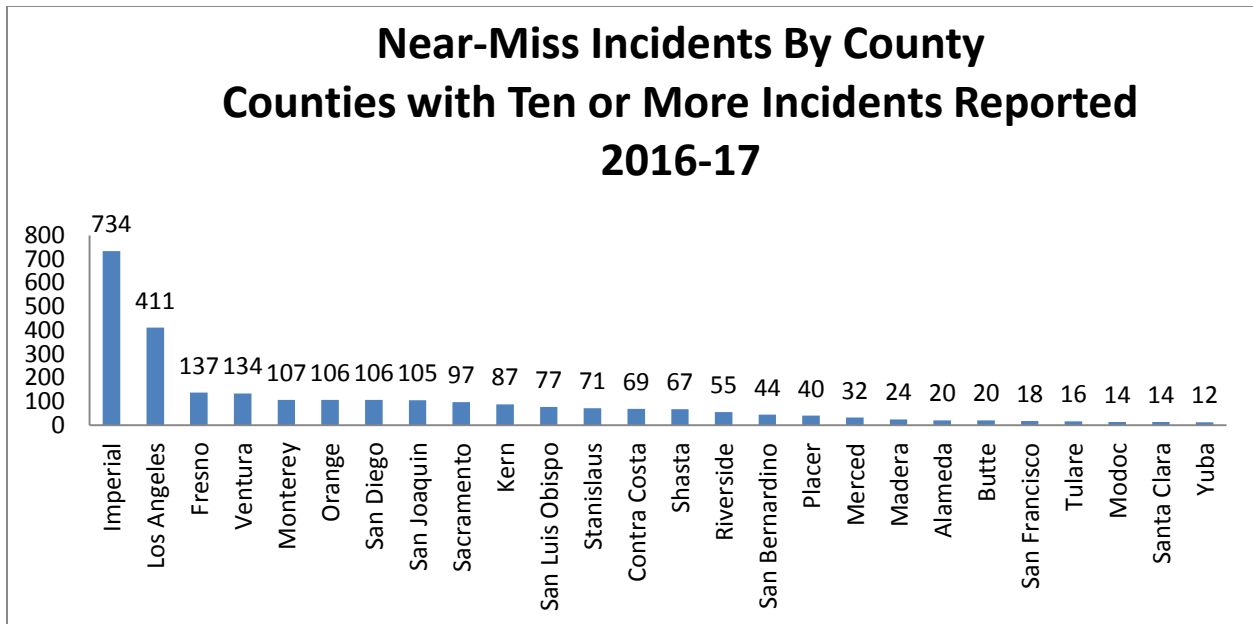
54 percent (890 to 411) from the previous year. This decrease may be attributed to the inconsistent reporting practices of the railroads.

A notable increase in Ventura County, from 20 in 2015-16 to 134 in 2016-17, is largely attributed to the near-miss reporting by Metrolink. There were no particular “hot spots” where a significant number of incidents took place. The large number of near misses may also be attributed to the number of trespasser incidents, which accounted for 37 of the near-miss incidents or about 28 percent of total near misses in Ventura County.

Monterey County experienced a large increase in the number of near-miss incidents, from 10 in 2015-16 to 107 in 2016-17. The increase in near-misses may be due to the number of homeless encampments that are appearing and encroaching around and on railroad property. Of the 107 near-miss incidents reported, 55 incidents were attributed to homeless encampments.

The CPUC Risk Assessment team is performing further review to mitigate risks that have been identified by the near-miss data.

The following graph shows near-miss incidents in the counties with the greatest number of such incidents.



In 2016-17, the CPUC:

- Collected and analyzed 2,700 near-miss incidents to detect high-risk areas.
- Identified high-risk crossings and the counties with the greatest number of near-miss incidents.

H. Positive Train Control

The Rail Safety Improvement Act of 2008 (P.L.110-432) requires all railroads to install Positive Train Control (PTC) devices in specified areas by December 31, 2015. On October 29, 2015, President Obama signed H.R. 3819 – 114, the Surface Transportation Extension Act of 2015, which included a three-year extension of PTC implementation. Railroads now have until December 31, 2018 to implement PTC, and as late as 2020 under certain circumstances.

PTC is a global positioning system-based technology to provide real-time location and speeds of trains to avoid collisions, such as in the event of an operating rule violation, missing a signal whose indication requires a speed change, route change, or a stoppage. PTC systems are designed to avoid human error by providing computerized control of trains to ensure train separation (collision avoidance), rail line speed enforcement, temporary speed restrictions, and railroad worker wayside safety.¹⁷

Each railroad that owns track (host) needs to implement PTC support along all tracks applicable to federal guidelines. Each railroad (tenant) using another railroad's track needs to have interoperable onboard equipment that conform to federal guidelines in order to traverse host territory. There is not a designated vendor standard for implementation of a system, as long as it meets federal guidelines. Interoperability between dissimilar systems would most likely result in trains being equipped with whatever equipment is required for travelling over a host railroad that has a dissimilar system, increasing complexity and the challenges for interoperability to function properly. Most railroads are currently focused on the host system and the functionality of their own trains. One passenger railroad (Metrolink) and one freight railroad (BNSF) are the closest to testing interoperability of their respective equipment on each other's host railroads.

CPUC has two PTC Specialist inspectors. One has expertise in railroad operations; the other has an extensive computer background, which is essential in understanding the complexities of PTC software design. The PTC inspectors have been actively engaged in observations of design review, component and wayside appurtenance testing, PTC system and train interface operations and inspections during the development and construction of PTC systems in California.

While the implementation of PTC has made significant progress in passenger service, not all passenger lines will meet the 2018 deadline. However, many California passenger railroads will likely meet this deadline:

--	--	--

¹⁷ The 2014 and 2015 Annual Reports to the Legislature provide more detail on PTC technology.

	Passenger Railroad	Stage of PTC Implementation
1.	Metrolink	In Revenue Service Demonstration (RSD). ¹⁸ Interoperability with tenants is next challenge. Slow implementation by UPRR as a host and tenant is a significant challenge to interoperability.
2.	North Coast Transit District (NCTD)	Waiting for RSD approval for Coaster.
3.	Sonoma Marin Area Rail Transit (SMART)	Waiting for RSD approval to begin passenger service. SMART utilizes signals in the rail versus radio frequencies for PTC operation.
4.	Amtrak	Waiting for interoperability testing. Amtrak is a tenant railroad in California.
5.	Caltrain	Progress is halted due to termination of the PTC contractor, litigation, and new contractor search.
6.	Altamont Corridor Express (ACE)	Waiting for UPRR as host railroad to be ready to test interoperability. On-board equipment for ACE locomotives has been on backorder but should arrive by the end of 2017.

In the freight industry, PTC made mixed progress during the first half of 2017. As of June 30, 2017, only 4 of the 36 freight railroads in California were implementing PTC: UPRR, BNSF, Pacific Sun (PacSun), and San Joaquin Valley Railroad (SJVR). UPRR and BNSF are required to implement a PTC system as per federal regulations as set forth in 49 CFR 236.1005 (Requirements for Positive Train Control Systems). PacSun and SJVR do not fall under the federal requirements to install PTC systems; however, both railroads were served notices by other railroads to equip their locomotives with PTC equipment to allow them to operate on tracks owned by the Class 1 carriers.

--	--	--

¹⁸ After reaching the required level of installation and testing, the railroad files an application with the FRA to begin Revenue Service Demonstration with PTC. RSD entails operating revenue (passenger and/or freight) trains with PTC in operation. RSD allows the railroad to collect data on the behavior of the system under normal railroad operational conditions, and allows the railroad to collect required data to support assertions made in the PTC Safety Plan.

	Freight Railroad	Stage of PTC Implementation
1.	BNSF	All subdivisions in California have PTC installed and in revenue service. BNSF reported that 88.8 percent of their PTC runs are uneventful. ¹⁹ All of the required BNSF employees have been trained (1,800 employees). ²⁰ BNSF anticipates PTC interoperability with other railroads by the following dates: Metrolink by December 2017, UPRR by the first quarter of 2018, NCTD by the first quarter of 2018, and Amtrak by the first quarter of 2018.
2.	UPRR	As of June 30, 2017, the CPUC is aware of only two subdivisions in Southern California that have PTC in RSD: the Los Angeles subdivision and the Alhambra subdivision. Other subdivisions in the UPRR system are in varying states of installation and implementation. UPRR does not have interoperability with BNSF or Metrolink. A timeline for full PTC implementation has not been announced. The crews who are operating on the PTC equipped subdivisions are receiving training as required.
3.	PacSun	The NCTD served PacSun a notice to equip their locomotives with PTC because PacSun operates on NCTD lines. PacSun has three locomotives, all of which are equipped. They are currently conducting interoperability testing with NCTD. Initial training for the employees has been contracted. PacSun anticipates full operability by December 2017.
4.	SJVR	SJVR shares track with BNSF and UPRR, which have served notice to SJVR to equip their locomotives with PTC. SJVR's parent company, Genesee & Wyoming Inc., plans to start testing on one of their railroads in Oregon in the third quarter of 2017. No SJVR locomotives are equipped with PTC and there is no anticipated date when this will take place.



A BNSF locomotive with PTC screen

¹⁹ Uneventful runs equate to successful initialization of PTC, i.e., no en-route issues and no braking events.

²⁰ The remaining employees are in yard service or in a non-active status.

The CPUC PTC specialists will continue to monitor the progress of PTC in California and make recommendations to ensure that carriers operate and maintain safe and effective systems.

During 2016-17, the CPUC PTC specialists performed the following:

- Conducted observations of 17 field activities.
- Performed 45 PTC surveillance observations.
- Monitored and participated in 20 PTC status meetings.
- Provided ongoing correspondence with the railroads to determine status, challenges, and issues of implementation
- Provided monthly reports of PTC activities to CPUC management.

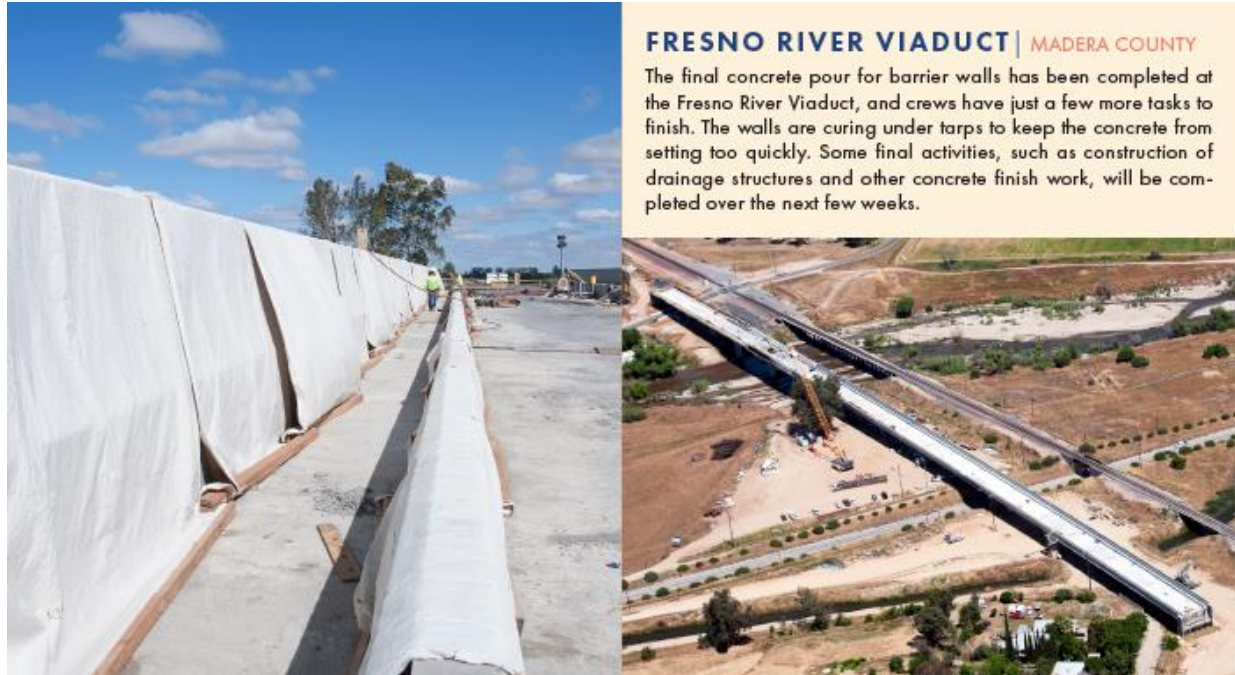
I. California High-Speed Rail



CPUC staff at the San Joaquin River Pergola and Viaduct construction site

The California High Speed Rail (HSR) system will be the first high-speed rail system in the nation. The California High Speed Rail Authority (CHSRA), located within the California State Transportation Agency, is responsible for planning, designing, building and operation of the system.

An example of recent HSR construction activities is shown below:²¹



High Speed Rail Construction Activities at Fresno River Viaduct at the Fresno County and Madera County line.

Under current plans, by 2029, the system will travel from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour. Within that corridor, the initial operating segment that connects San Jose to a to-be-determined location in the Central San Joaquin Valley will begin operations in 2025. More than 100 miles of the HSR system are under construction, from Madera to north of Bakersfield. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations.

The HSR system will be double-tracked and operate primarily on dedicated track, with relatively small portions of the route shared with other existing passenger and freight rail operations. The system will use high speed train technologies similar to those used in other countries, including steel-wheel-on-steel-rail, overhead electric power, safety and signaling systems, and automated train control.

With its high top speeds and hundreds of passengers on each train, HSR poses large potential accident risks. Even at low speeds, accidents can have significant consequences. The Office of Rail Safety, with its regulatory authority over high speed rail as a passenger rail system, has important responsibilities in helping to ensure the safety of HSR.

²¹ Source: CHSRA, "Construction Update, June 2017," http://cert1.mail-west.com/d4a39a21sZyjfM/6b5/sZo8z5/5e8gj7rfbj41/ej41sZqvnqsZxvi/8ov590ocw/c2dvj?_c=d%7C12n93n4q5o65m8b%7C14wrjpb095ib82p&_ce=1497976287.937ef2ccb85285e8a9e7f5af4152fc5d



HSR construction work on Cedar Viaduct and San Joaquin River Pergola and Trestle

The CPUC currently has two dedicated HSR staff. The CPUC railroad safety staff attends meetings to stay apprised of the project and conduct site inspections to monitor progress. In concert with federally certified inspectors, the HSR staff helps to ensure compliance with state and federal laws.

Applicable CPUC GOs that are enforced during the planning and initial stages of construction include:²²

- GO 22-B Accident Reporting
- GO 26-D Clearances
- GO 88-B Highway-Rail Crossings
- GO 118-A Walkways

Most of these General Orders are incorporated in HSR design criteria documents issued by the CHSRA. CPUC railroad safety staff review HSR design documents for compliance with the GOs listed above. In particular, CPUC rail crossings engineers have reviewed numerous applications for alterations of railroad crossings under GO 88-B. CPUC electric safety staff and a rail crossings engineer have participated in discussions with rail carriers regarding the electrification of the Caltrain system running from San Jose to San Francisco, which will also be used by the HSR system.

At the present time, CPUC railroad safety staff is monitoring HSR developments and making sure that HSR planning is incorporating CPUC General Order requirements. Staff are obtaining and reviewing planning documents, and observing HSR construction activities as they proceed. Once construction advances and operations are ready to begin, the CPUC oversight will include discipline-specific inspections, as well as incident investigations in the event of violations of state and federal laws, pursuant to 49 CFR 213 Subpart G, Train Operations at Track Classes 6

²² A list of railroad-specific General Orders is presented in Appendix A. General Order 176, Overhead 25 kV Electrification for HSR, is enforced by a different unit within the Safety and Enforcement Division, the Electric Safety and Reliability Branch.

and Higher.

In 2016-17, the CPUC HSR staff performed the following:

- Railroad safety inspectors performed 5 inspections of the initial phase of HSR construction to ensure compliance with GO clearance requirements.
- Rail crossings engineers reviewed a number of applications for alterations of railroad crossings and made recommendations to improve pedestrian and automobile safety.
- Rail crossings engineers discussed vertical clearances with Caltrain to verify that the overhead catenary structures safely complied with CPUC GOs.
- Two HSR designated staff attended 12 meetings of the CHSRA Fire and Life Safety & Security Committee (see below), 8 meetings with Caltrain, and visited the construction sites on a quarterly basis.

CHSRA Fire and Life Safety & Security Committee meetings are attended by representatives of state and local agencies involved in security aspects of HSR regulation. Topics of discussion in the 2016-17 meetings included:

- Emergency access to and egress from HSR fenced structures and elevated tracks.
- Lessons learned from several railroad and rail transit incidents: Amtrak accident in Philadelphia (May 12, 2015); BART Transbay Tube fire (January 17, 1979); and Washington Metropolitan Area Transit Authority Metrorail smoke incident at L'Enfant Plaza (January 12, 2015).
- Overview of proposed HSR rolling stock, including emergency lighting, PTC, shutdown of HVAC systems, emergency windows and door openings, and emergency braking systems.
- Overview of proposed HSR tunnel systems, including emergency walkways, emergency lighting, blue light phones, signage, passive/active ventilation, access/egress points, cross passages, and fire doors.
- Emergency service resource gap analysis.

III. Rail Safety Activities

PU Code Section 916 requires the CPUC to report to the Legislature on its rail safety activities annually. The CPUC employs 41 inspectors who are federally-certified in the five FRA railroad disciplines: hazardous materials, motive power and equipment, operations, signal and train control, and track.

CPUC inspectors perform regular inspections, focused inspections, accident investigations,

security inspections and complaint investigations. In addition, the inspectors also address public safety risks that, while not violations of regulatory requirements, pose potential risks to public or railroad employee safety.

A. Regular Inspections



View from inside a Union Pacific Railroad hi-rail vehicle during a CPUC regular inspection.

Over the past year, CPUC inspectors have engaged in proactive safety efforts and retroactive accident investigations to reduce public safety risks, as well as regular inspection work. Examples of regular inspections are listed in Appendix D.

During 2016-17 CPUC inspectors:

- Performed 4,064 inspections and follow-up inspections to monitor the railroads' compliance with federal and state laws, and CPUC GOs.
- Cited 10,089 federal regulation defects.
- Recommended civil penalties for 258 violations of federal regulations.
- Completed 248 CPUC GO reports that identified 828 state regulation defects.
- Recommended civil penalties for 2 violations of state regulations.

CPUC Hazardous Materials inspectors:



A CPUC hazardous materials inspector scrutinizing a container at the Port of Los Angeles

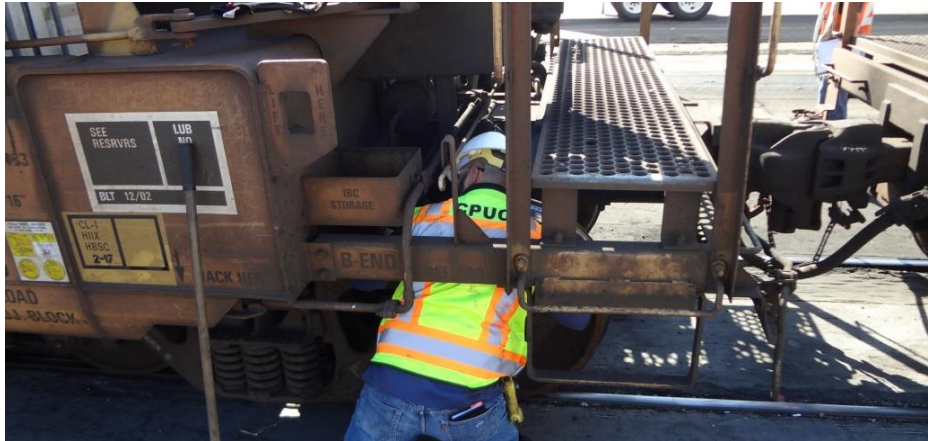
- Inspected or evaluated 45,425 units in 1,136 FRA inspection reports.
- Identified 1,206 federal regulation defects.
- Recommended 36 violations for civil penalties for federal defects identified during regular inspection activity.

Hazardous materials units include each tank car, each record to ensure accurate documentation of the substance contained in a hazardous materials rail car or package, each evaluation of a hazardous materials unintended release mitigation plan, each inspection of the shipper's paperwork, and other similar items.

CPUC hazardous materials inspectors conduct a variety of activities, including the investigation of accidents involving the actual or threatened release of hazardous materials as reported by the Governor's Office of Emergency Services 24-hour Warning Center. Inspectors also conduct unannounced inspections at the facilities of shippers, consignees, freight forwarders, intermodal transportation companies, and railroads.

CPUC hazardous materials inspectors also inspect facilities to ensure compliance with CPUC GO 161, Rules and Regulations Governing the Transportation of Hazardous Materials by Rail. Inspectors look for the appropriate grounding of cars to prevent dangerous static electricity buildup during unloading. GO 161 also has requirements for reporting the release or threatened release of hazardous materials where there is a reasonable belief that the release poses a significant present or potential harm to persons, property, or the environment.

CPUC Motive Power and Equipment inspectors:



A CPUC Motive Power & Equipment inspector under a rail car during an inspection

- Inspected or evaluated 49,554 units in 683 FRA inspection reports.
- Identified 1,606 federal regulation defects.
- Recommended 30 violations for civil penalties for federal regulation defects identified during regular inspection activity.

Motive power and equipment units include each locomotive, each rail car, inspection records or specific components thereof.

PU Code Section 765.5(d) requires the CPUC to establish, by regulation, a minimum inspection standard to ensure that at the time of inspection, that railroad locomotives, equipment, and facilities located in the Class I railroad yards will be inspected not less frequently than every 120 days (three times per year).²³

During 2016-17, CPUC inspectors did not satisfy the mandate. Of the 52 facilities, 42 sites were inspected three times or more during the fiscal year. Of the remaining 10 facilities, 5 were inspected twice and 5 were inspected once. Facilities that have greater numbers of train traffic are inspected more often than those with lesser train traffic.

The primary reason for not meeting the mandate is employee retention. When a certified CPUC inspector leaves, it takes at least one year to hire a new inspector, get the inspector appropriate training for federal certification, and train the inspector in the field using an experienced CPUC inspector. During that period of time, CPUC's ability to meet the mandate is reduced. In addition, the experienced inspectors may miss their individually assigned mandate segments because they spend a significant amount of time training new hires on California-specific laws and CPUC GOs.

²³ UPRR and BNSF are the only Class I freight railroads operating in California. The Surface Transportation Board defines a Class I railroad as "having annual carrier operating revenues of \$250 million or more" after adjusting for inflation using the Railroad Freight Price Index developed by the Bureau of Labor Statistics. (49 CFR, Part 1201).

CPUC Operating Practices inspectors:



CPUC Operating Practices inspectors performing locomotive inspection

- Inspected or evaluated 13,171 units in 1,022 FRA inspection reports.
- Identified 1,086 federal regulation defects.
- Recommended 120 violations for civil penalties for federal regulation defects identified during regular inspection activity.

Operating practices units include ensuring the accuracy of train consist records, observing crews performing switching operations, reviewing the accuracy and completeness of accident records, ensuring compliance with certifications and licenses, and other similar items.

CPUC Signal and Train Control inspectors:



A CPUC Signal & Train Control inspector during an at-grade crossing inspection

-
- Inspected or evaluated 1,858 units in 294 FRA inspection reports.
 - Identified 1,709 federal regulation defects.
 - Recommended 40 violations for civil penalties for federal regulation defects identified during regular inspection activity.

Signal and train control units include each signal system appurtenance, maintenance and testing records, warning devices at crossings, and other electronic or mechanical signaling systems.

CPUC Track inspectors:



A CPUC track inspector inspecting track over an open deck bridge

- Inspected or evaluated 13,488 units in 929 FRA submitted inspection reports.
- Identified 4,482 federal regulation defects.
- Recommended 32 violations for civil penalties for federal regulation defects found during regular inspection activity.

Track units include a mile of track, a switch, a Roadway Maintenance Machine, a record, and other similar items involving the track structure.

PU Code Section 765.5(d) requires the CPUC to establish by regulation a minimum inspection standard to ensure that all branch and main line track is inspected not less frequently than every 12 months. This mandate was not met due to extended vacancies and the difficulties associated with identifying and recruiting well-qualified and experienced candidates.

Inspectors use several methods to inspect track. Each method has its benefits and drawbacks depending on the terrain, steepness, and location.²⁴ The methods include:

²⁴ The 2013-14 Annual Report to the Legislature provides a detailed explanation about the methods of track inspections: <http://www.cpuc.ca.gov/rosb/>

-
- Physically walking the track.
 - Riding in a hi-rail vehicle (motor vehicle outfitted with steel rail guide wheels).
 - Riding in a FRA or railroad owned geometry car (a passenger coach equipped to identify geometric track deficiencies that create accident risks).

In 2016-17, CPUC inspectors surveyed 2,080 miles of track in California aboard track geometry vehicles. The track geometry vehicles identified 347 defective conditions. CPUC inspectors conducted numerous follow-up inspections to monitor the railroads' compliance and verify that the defects had been corrected.

B. Focused Inspections



CPUC inspectors during a focused inspection

PU Code Section 765.5(e) requires the CPUC to conduct focused inspections of railroad yards and track. A focused inspection is an inspection that may concentrate on a specific discipline's regulations and/or a specific location or theme. These inspections target railroad yards and track that posed increased safety risks, based on inspection data, accident history, and rail traffic density. Focused inspections involve inspectors from a variety of disciplines or multiple inspectors from a single discipline, working together at a specific location or rail facility. Typically, focused inspections are joint efforts between the FRA and CPUC, though PU Code Section 767.5 permits the CPUC to conduct the inspections as the Commission determines to be necessary.

Focused inspections allow CPUC inspectors to evaluate all aspects of a railroad or railroad facility's operational and maintenance practices and procedures. This includes evaluation of railroad personnel's technical expertise and experience, and organizational safety culture. If corrective actions are recommended by CPUC inspectors, a follow-up inspection is performed to determine progress by the railroad entity in carrying out the recommended actions.

In 2016-17, CPUC inspectors performed 17 focused inspections, which consisted of:

- 5 track inspections
- 4 hazardous materials inspections
- 3 operating practices inspections
- 2 signal and train control inspections
- 3 cross-discipline inspections

Appendix E provides examples of focused inspections.

C. Accident Investigations



A CPUC inspector at a 2017 derailment site near Elk Grove

In 2016-17, CPUC inspectors performed 154 accident investigations.

PU Code Section 315 requires the CPUC to investigate the cause of all accidents occurring within the state upon the property of any public utility directly or indirectly connected with its maintenance or operation, resulting in loss of life or injury to person or property damage. CPUC inspectors evaluate each accident when reported to the CPUC -- usually, by the California Office of Emergency Services (OES) -- and determine the appropriate investigative response based on accident severity criteria, including:

-
- Impact to the public (evacuations, injuries, fatalities).
 - Injuries or fatalities to railroad employees or passengers.
 - Environmental impact.
 - Impact on commercial transportation (highway closures, commuter interruptions).
 - Violations of state or federal railroad safety regulations or operating rules.

In 2016-17, there were 840 reported railroad-related incidents in California. Of that total, 381 were related to crossing or trespasser incidents, 249 were hazardous material spills, 172 were derailments, and 35 were in other categories. These incidents resulted in a total of 174 fatalities and 132 injuries, mostly to trespassers. CPUC railroad safety supervisors determined that 154 incidents required further investigation.

Appendix F lists examples of accident investigations performed by CPUC inspectors.

D. Security Inspections

Among other provisions, the Local Community Rail Security Act of 2006, PU Code Sections 7665 through 7667, requires that each railroad operator implement an infrastructure protection program to protect rail infrastructure in the state from acts of sabotage, terrorism, or other crimes. The infrastructure protection program is to be updated by the rail operator at least once every year, and the updated plan submitted to CPUC. CPUC reviews the programs, and it may conduct inspections to facilitate the reviews and order rail operators to improve, modify, or change their programs to comply with the Act. Also, every operator of rail facilities in the state is to provide CPUC with a risk assessment incorporating a broad range of risk-related information.

In 2016-17, CPUC railroad security inspectors performed security inspections on all 37 railroads that operate in California. All were in compliance with relevant state railroad security-related laws.²⁵ Amtrak, UPRR, and BNSF railroads have national security plans that are reviewed annually by the FRA. CPUC inspectors reviewed each railroad's security plan at various locations within the state.

All railroads were provided a copy of the CPUC Security Plan Guidance. This guidance was developed to provide all railroads uniform information on regulatory requirements. A majority of the railroads utilized this guidance. Genesee & Wyoming Company, which operates four railroads within California, has adopted the security plan guidance as a blueprint to develop a standard format for each railroad, and will incorporate it throughout their entire system.

²⁵ There were two new railroads added in 2016-17: Lake Railway located in Alturas, and the Northwestern Pacific Railroad Company located in Sonoma.

Below is a table identifying the railroad, inspection date, and compliance status:

Railroad	Date of Inspection	Compliant	Comments
Altamont Commuter Express	12/14/2016	Y	
Santa Maria Valley RR	11/15/2016	Y	
Fillmore Western	11/15/2016	Y	
San Joaquin Valley RR	11/7/2016	Y	
Modesto & Empire Traction	12/16/2016	Y	
Central California Traction Company	3/12/2017	Y	
Stockton Terminal & Eastern Railroad	12/14/2016	Y	
Sacramento Valley Railroad	12/14/2016	Y	
Quincy Railroad	6/1/2017	Y	
California Northern Railroad	3/13/2017	Y	
Richmond Pacific Railroad	3/13/2017	Y	
San Francisco Bay Railroad	3/14/2017	Y	
Cal Train	5/16/2017	Y	
Napa Valley Railroad	3/13/2017	Y	
Niles Canyon Railway	3/13/2017	Y	
Santa Cruz Monterey Bay	3/14/2017	Y	
Metrolink	3/2/2017	Y	
Amtrak Los Angeles	2/27/2017	Y	
San Diego & Imperial Valley	1/12/2017	Y	
Ventura County Railroad	1/12/2017	Y	
Trona Railway Company	10/26/2016	Y	
So Cal Ramp Services	5/12/2017	Y	
North County Transit District	11/16/2016	Y	
Pacific Sun Railroad	11/16/2016	Y	
Pacific Southwest Railway	11/17/2016	Y	

Museum			
Baja California Railroad	11/17/2016	Y	
West Isle Line	11/7/2016	Y	
Santa Cruz & Big Trees	5/16/2017	Y	
Amtrak Oakland	3/13/2017	Y	
Sierra Northern Railroad	12/14/2016	Y	
Pacific Harbor Lines	12/16/2016	Y	
Los Angeles Junction Railroad	4/17/2017	Y	
BNSF	3/2/2017	Y	
UPRR	5/31/2017	Y	Phone Interview. Security manager is located in Omaha NE.
Lake Railway	8/24/2016	Y	
Northwestern Pacific Railroad Company	11/3/2016	Y	
Oakland Global Rail Enterprise	3/13/2017	Y	

E. Safety Complaint Investigations

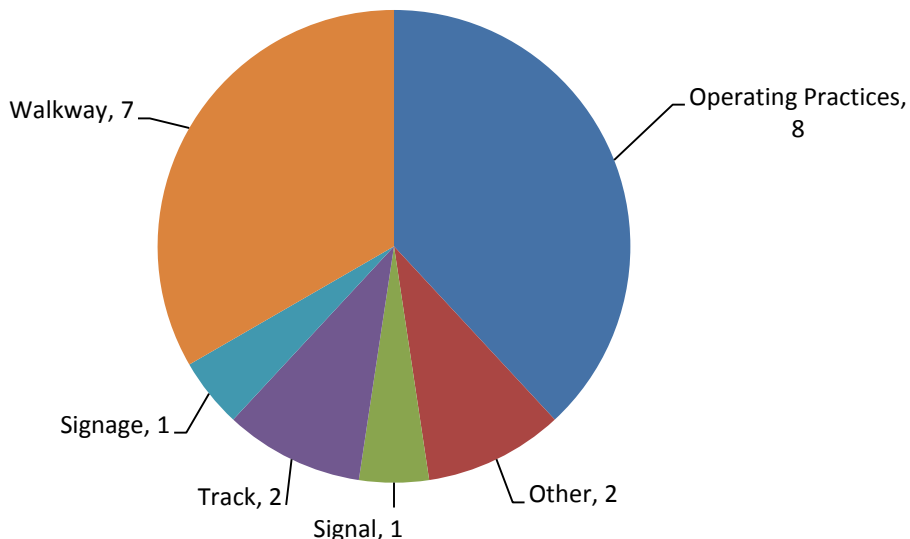
The CPUC receives railroad safety-related complaints from a variety of sources, including railroad employees, railroad unions (mostly from the Sheet Metal, Air, Rail, Transportation /United Transportation Union and the Brotherhood of Locomotive Engineers & Trainmen), the general public, and government personnel. CPUC inspectors communicate with the FRA to determine whether the complainant notified that agency as well. If the agencies determine that an investigation is warranted, CPUC and FRA determine which agency will perform an investigation to eliminate duplication.

For complaints investigated by the CPUC, an inspector discusses the issue with the complainant or a contact person. He or she visits relevant location and gathers data, including photographs and other pertinent information, and discusses the issue with railroad managers in an effort to gain compliance by pointing out unsafe conditions, practices or risks pertinent to the complaint. A formal or informal action plan is discussed with railroad management, including a timeframe for remediation. The inspector then prepares a written response, with proposals for resolving the complaint, for review by his or her supervisor. A response letter is prepared by one of the CPUC railroad safety supervisors and mailed to the complaining party or their representative. A follow-up inspection is performed to ensure compliance and/or remedial action.

In 2016-17, CPUC inspectors investigated and resolved 21 safety complaints.

Informal Complaints by Type 2016-2017

21 Total Closed Complaints



F. Penalties and Citations

CPUC inspectors make recommendations to the FRA for civil penalties, based on inspections that identify non-compliances with federal regulations that warrant a civil penalty. Upon receipt, the FRA Chief Counsel reviews the recommendations and determines the amount of the civil penalty, if any, to be assessed.

Some safety violations do not require FRA participation in assessing penalties. For noncompliance with certain CPUC GOs²⁶ and PU Code Section 7662, CPUC Resolution ROSB-002 gives the Director or Deputy Director of the Safety and Enforcement Division the authority to issue citations to railroad carriers. The GOs contain requirements for trackside walkways and clearances, and the PU Code provides requirements for wayside signage and certain railroad operating rules. A railroad issued such a citation may accept the fine or contest it through a process of appeal.

During 2016-17, CPUC inspectors::

- Recommended 258 violations for civil penalties for violations of federal laws.²⁷
- Recommended 2 citations for violations of state laws.²⁸

²⁶ GO 26-D and GO 118-A.

²⁷ Fines under federal regulations range from about \$1,000 to \$5,000 each, per day. The final penalty amount depends on the resolution of a claims conference between the railroad and the FRA.

IV. Investigations of Runaway Trains and Other Uncontrolled Train Movements

PU Code Section 916.1 requires the CPUC to annually report the results of its investigations of runaway trains or other uncontrolled train movements that threaten public health and safety. In 2016-17, the CPUC investigated four instances of runaway trains and uncontrolled train movement.

1. On December 15, 2016, a railcar containing refrigerated meat rolled uncontrolled within the UPRR West Colton railyard, in Bloomington, San Bernardino County. December 21, 2016, a CPUC inspector performed an investigation and spoke with the manager on duty. The manager stated that during coupling operations, which is the process of connecting railcars together, excessive momentum caused the railcars to escape the bowl yard tracks and head toward the east end of the yard. A manager on duty was able to secure and stop the railcar prior to it running through a switch and almost striking a nearby train. Retarders, which pinch rail car flange wheels to control rail car movement, were found to be in working order. The track was placed back in service after being out of service for a short period of time. The west end of the bowl has a warning system that activates if a railcar were to roll too far westward. However, none exists for the east end of the bowl. High costs were cited as the main deterrent for putting this warning system in place on the east end. This railyard previously used hand brakes on railcars in an attempt to keep these uncontrolled movements from occurring. However, the railroad determined that the manual application of hand brakes was labor-intensive and time-consuming. Instead, the railroad placed retarders in the bowl which eliminated the need to apply hand brakes.
2. On February 7, 2017, five railcars rolled uncontrolled during a switching operation at the Kloeckner Metals rail facility in Los Nietos, Los Angeles County. A CPUC inspector conducted an investigation and spoke with the UPRR manager by phone. The manager stated that Kloeckner Metals employees were switching railcars around with no air brakes or handbrakes applied to the railcars. A Kloeckner Metals employee operated a rail car coupler cut lever mistakenly and the railcars rolled until they reached a derailing device, where two of the five railcars derailed in an upright position off the track. CPUC railroad safety staff discussed switching operations with Kloeckner Metals managers to ensure that proper railroad industry switching operational instructions are followed by employees.
3. On March 5, 2017, a railcar containing lumber rolled uncontrolled in the UPRR West Colton railyard located in Bloomington, San Bernardino County. A CPUC inspector performed an investigation and discovered that during shoving operations, which is

²⁸ For violations of GO 118-A and PU Code Section 7662, the penalty allowed under ROSB-002 is \$500 per incident plus \$50 per day for each day in violation. For violations of GO 26-D, the penalty allowed under ROSB-002 is \$1,000 per incident.

the process of pushing cars in a bowl to be sorted, the railcar exited the bowl and travelled approximately 1 mile toward the departure track. At the moment of release, the railcar moved at a rate of at least 20 mph. The yardmaster immediately hit the breakaway alarm which warned the entire yard and caused all retarders to go into the closed position to slow all oncoming cars. The railcar passed through a series of retarders, each of which greatly reduced the railcar's speed until it finally stopped. The investigation found that the safety measures in place at the Colton railyard operated as intended.

4. On May 23, 2017, a railcar rolled uncontrolled for 50 feet in an industry railyard located in Indio, Riverside County. A CPUC inspector performed an investigation. A rail car inventory was performed and disclosed that one of two previously coupled railcars had separated and one car had moved to a different location 50 feet away. When the two rail cars were first placed there the day before, they were coupled together and both handbrakes were applied as required. No security footage or witnesses were available to verify how the handbrakes were released. However, transients and trespassers are known to frequent the area and may have released handbrake on the car that moved. Riverside Police were made aware of the incident and have increased patrols in the area. The track in which the railcars were stored was protected by a derailing device and there was no threat of the railcar exiting the industry and entering the mainline.

V. Local Safety Hazard Sites

PU Code Section 7711 requires the CPUC to report to the Legislature on sites on railroad lines in the state it finds to be hazardous. The sites on railroad lines the CPUC identified as hazardous were identified in 1997 in a formal Commission Decision, D.97-09-045, and were termed Local Safety Hazard Sites (LSHSs).²⁹ Two methods to determine sites were used: (1) sites determined by a statistically significant higher derailment rate than elsewhere on the line, and (2) sites determined by the operating railroad to require stricter operating practices than elsewhere on the line. For example, railroads place a limit on how much tractive effort (locomotive power) can be concentrated at any one point in a train in relation to the tonnage the locomotives are pulling on steep grade and tight curves. Too much tractive effort concentrated at any one point, such as the front or rear of a train, can cause cars to derail in tight curves.

Section 7711 also requires the CPUC to include a list of all railroad derailment accident sites in the state on which accidents have occurred within at least the previous five years, describe the nature and probable causes of the accidents, and indicate whether the accidents occurred at or near sites that the Commission has determined to be hazardous. This report, in addition to the electronically available list of all railroad derailment accidents over the past five years and the causes, fulfills those requirements.³⁰

²⁹ The ROSB currently is using the term "high hazard areas" to distinguish from the legal term "local safety hazard" sites, as used in the preemption exemption language of the Federal Railroad Administration (49 U.S.C. § 20106).

³⁰ A list of all derailments is located at <http://www.cpuc.ca.gov/rosb/>

The table below lists the accidents that have occurred “at or near” an identified local safety hazard site within the previous five years pursuant to PU Code Section 7711(a). The original analysis identifying these sites was based on the higher risk main line and siding accidents.

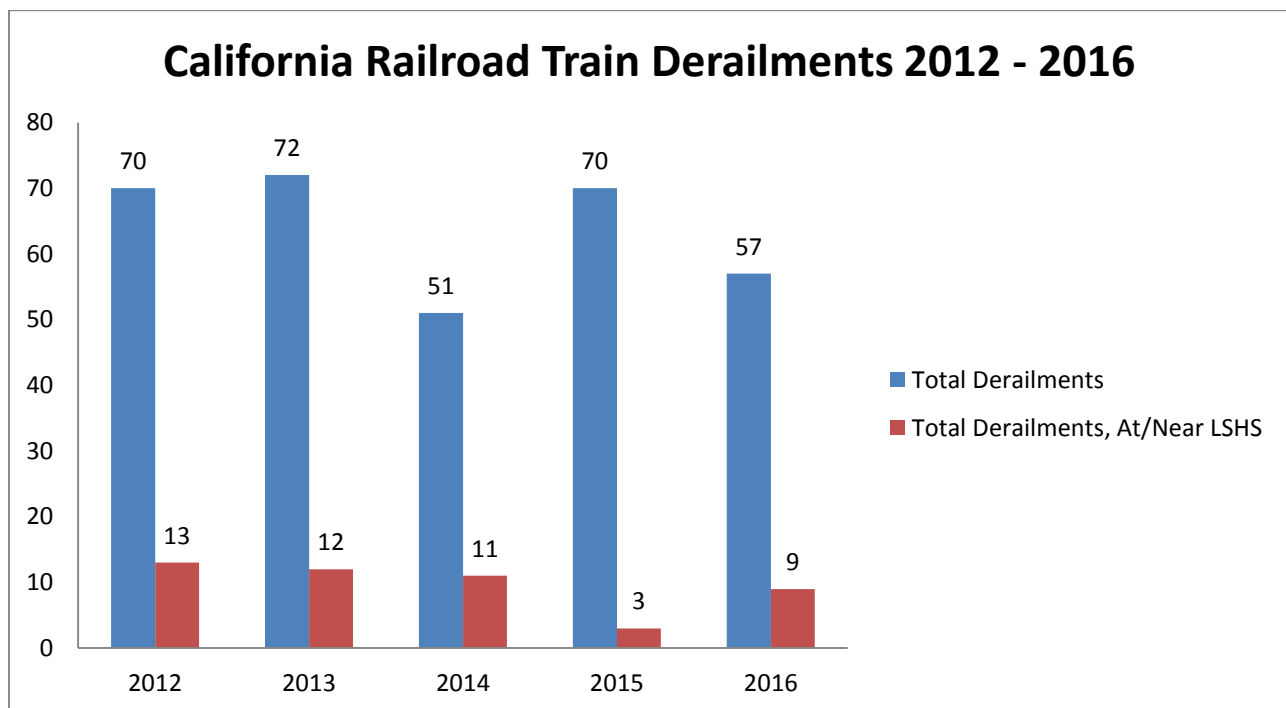
*LSHS #	Current LSHS Track Line	Previous LSHS Track line at time of D.97-09-045 ³¹	RR Milepost	Number of Derailments 2012-16	Overlap with Site #
16	UPRR Mojave Subdivision	SP Bakersfield Line	335.0 to 359.9	12	
9	UPRR Black Butte Subdivision	SP Shasta Line	322.1 to 332.6	2	#10
10	UPRR Black Butte Subdivision	SP Shasta Line	322.1 to 338.5	1	#9
19	UPRR Mojave Subdivision	SP Bakersfield Line	463.0 to 486	2	
12	UPRR Roseville Subdivision	SP Roseville District	150.0 to 160.0	1	
6	UPRR Yuma Subdivision	SP Yuma Line	542.6 to 589.0	0	#3, #4
22	UPRR Canyon Subdivision	UP Feather River Division	234.0 to 240.0	0	#25
25	UPRR Canyon Subdivision	UP Feather River Division	232.1 to 319.2	0	#22, #23
3	UPRR Yuma Subdivision	SP Yuma Line	535.0 to 545.0	2	#6
23	UPRR Canyon Subdivision	UP Feather River Division	253.0 to 282.0	0	#25
4	UPRR Yuma Subdivision	SP Yuma Line	586.0 to 592.0	0	#6
26	BNSF Gateway Subdivision	UP Bieber Line,	15.0 to 25.0	0	
31	BNSF San Diego Subdivision	ATSF San Diego	249.0 to 253.0	0	
1	UPRR Coast Subdivision	SP Coast Line	235.0 to 249.0	0	
7	Central Oregon and Pacific Railroad Siskiyou Subdivision	SP Siskiyou Line	393.1 to 403.2	0	
27	UPRR L.A. Subdivision, Cima Grade		236.5 to 254.6	0	
28	BNSF Cajon	ATSF Cajon	53.0 to 68.0	0	

³¹ In 1996, UPRR purchased Southern Pacific Railroad.

	Subdivision				
29	BNSF Cajon Subdivision	ATSF Cajon	81.0 to 81.5	0	
30	BNSF Cajon Subdivision	ATSF Cajon	55.9 to 81.5	0	

**The LSHS number (LSHS #) is for identification purposes only, and does not indicate any ranking.*

Within the previous five calendar years, California experienced 320 derailments. Of that total, 48 derailments, or nearly 15 percent, occurred at or near local safety hazard sites. For this report, “at or near” includes any location of railroad track along the railroad right-of-way that is contained in the segment of railroad designated to be a local safety hazard site, including the distance of track one mile on each side of the local safety hazard site. Maps of local safety hazard sites are included in Appendix G.



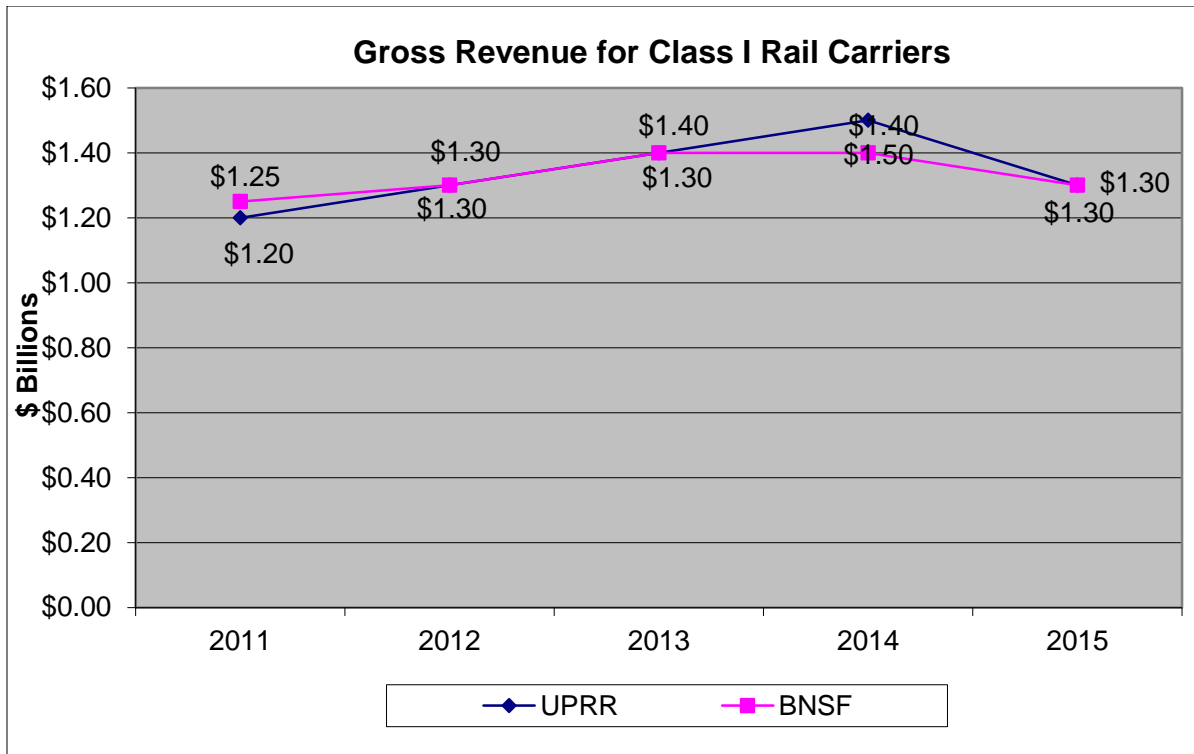
Source: Federal Railroad Administration, Office of Safety Analysis

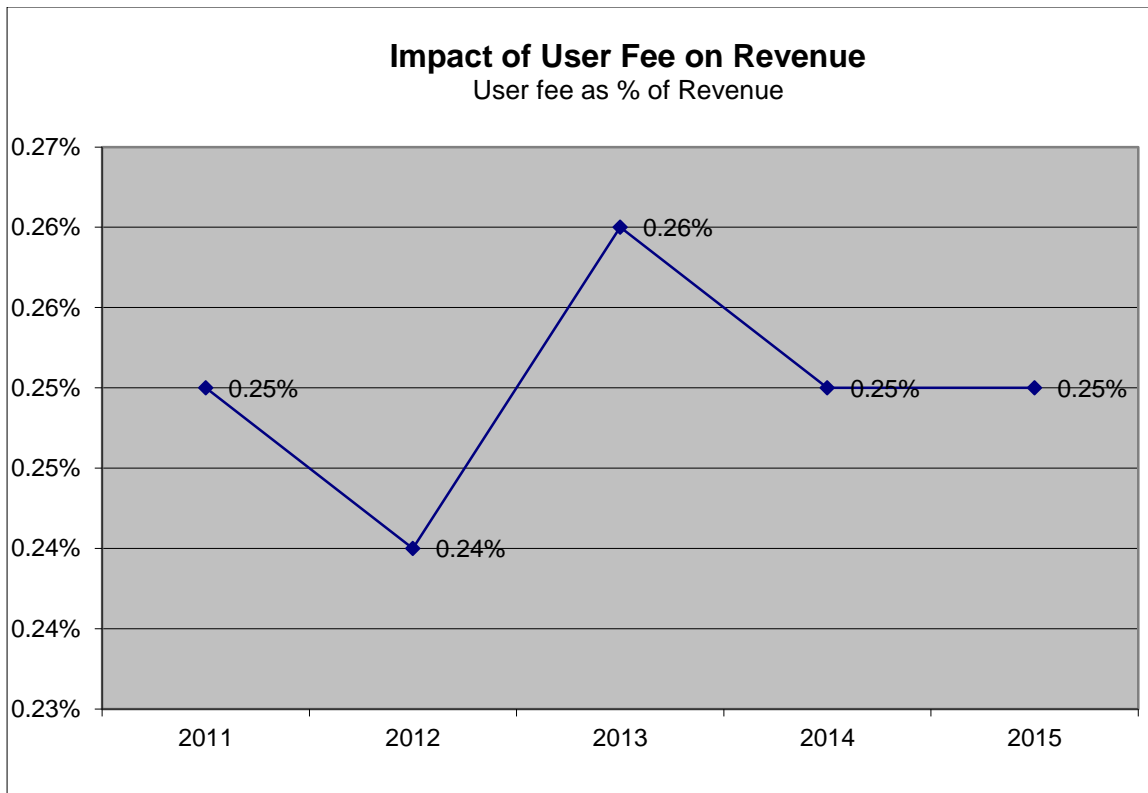
VI. Regulatory Fee Impact on Competition

PU Code Section 309.7 requires the activities of the CPUC that relate to safe operation of common carriers by railroad, other than those relating to grade crossing protection, to be supported by the fees paid by railroad corporations. In 2016-17, the Legislature appropriated \$8.5 million from the CPUC Transportation Reimbursement Account. The fees paid by the railroad corporations are deposited into a dedicated subaccount within the CPUC Transportation Reimbursement Account and are the sole funding source for the CPUC Railroad Operations and Safety Program. The fees do not fund any other CPUC programs.

PU Code Section 916.3 requires the CPUC to report annually on the impact on competition, if any, of the regulatory fees assessed railroad corporations for the support of the CPUC's activities. The railroad user fees assessed in 2016-17 on UPRR and BNSF constituted just over one fourth of one percent of revenues (0.25 percent) and were unlikely to have had any effect on competition.

The following two graphs show the percentage of user fees versus railroad revenue last year. No significant change is expected for 2016-17.





Source of revenue: The railroads report their revenues to the CPUC annually in order to determine the user fee that funds the ROSB.

VII. Challenges for Rail Safety

A. Reporting of Accidents and Incidents

California railroad accident reporting and investigation requirements include the following:

- PU Code Section 315 requires the CPUC to investigate the cause of all accidents that have occurred on the property of any public utility resulting in loss of life or injury to person or property and permits the CPUC to make an order or recommendation.
- PU Code Section 7661 requires the Safety and Enforcement Division to investigate any incident that results in notification of a runaway train or other uncontrolled train movement that threatens public health and safety, and report its findings concerning the cause or causes to the commission.
- PU Code Section 7662 requires railroads to provide immediate notification to OES³² of accidents and incidents.³³

³² The California Office of Emergency Services was formerly called the California Emergency Management Agency (CEMA).

-
-
- PU Code Section 7672.5 requires railroads to immediately report incidents resulting in a release or threatened release of a hazardous material to relevant agencies, including OES.³⁴
 - General Order 161 requires railroads to immediately notify the appropriate emergency-response agency in the event of a hazardous materials incident.
 - General Order 22-B requires that railroads immediately furnish the Commission notification of all train collision and derailments resulting in loss of life or injury, all bridge failures, and all highway crossing accidents resulting in loss of life or injury.

In the CPUC's 2015 and 2016 Annual Railroad Safety Activity Reports,³⁵ the CPUC reported that one of the most significant challenges facing railroad safety in California is the inconsistency of many railroads with the requirements for reporting incidents and accidents to the OES and/or CPUC. Such inconsistency limits the CPUC's ability to comply with PU Code Section 309.7, which requires CPUC inspectors to advise the Commission on rail safety issues, and propose regulatory remedies to address unsafe conditions. As a result, CPUC inspectors may potentially be unaware of an unsafe condition, and thus may be unable to address such condition in a timely manner.

Immediate reporting provides an opportunity to enhance safety. Information regarding an accident's circumstances and cause is often lost as time passes. This information is necessary for the CPUC to deploy inspectors to determine whether the railroad violated regulations or otherwise had unsafe operating or maintenance practices.

CPUC holds quarterly meetings with UPRR, BNSF, the California Short Line Railroad Association and railroad labor organizations. In these meetings, CPUC discusses reporting inconsistencies with railroad managers to improve their understanding of reporting requirements. Among other results, these discussions have produced more effective monitoring by railroads of their own reporting procedures so that the accident/incident information is disseminated back to the CPUC in a timely manner.

B. Recruitment and Retention

Recruitment and retention were identified in the 2015 and 2016 CPUC Annual Railroad Safety Activity Reports as major obstacles to fulfillment of CPUC's mandated railroad safety requirements. These continued to be challenges in 2016-17.

The 2016 Annual Report discussed the issue in detail.³⁶ In brief, the CPUC rail safety program

³³ OES immediately notifies the CPUC.

³⁴ OES immediately notifies the CPUC.

³⁵ <http://www.cpuc.ca.gov/rosb/>

³⁶ <http://www.cpuc.ca.gov/rosb/>

has difficulty in attracting and retaining qualified personnel, in large part due to salary differentials between state service on the one hand, and both federal and private sector employers on the other. The CPUC rail safety staff has received some salary increases through bargaining unit activities, which is helpful, but the gap still remains and additional pay increases are necessary to close the gap.

When a federally-certified inspector leaves CPUC, inspection requirements are difficult or impossible to meet. During 2016-17, CPUC inspectors did not satisfy the railroad equipment facility statutorily required inspection mandates. Of the 52 facilities, 42 sites were inspected three times or more during the fiscal year. Of the remaining 10 facilities, 5 were inspected twice and 5 were inspected once.

As a result of the ongoing recruitment and retention problem, there was a significant decrease in CPUC rail safety inspection activity in 2016-17 compared with previous fiscal years. Some of the hardest hit disciplines were Motive Power and Equipment, Operating Practices, and Signal and Train Control. Track and Hazardous Materials inspections also decreased but the decreases were less than the other disciplines.

- Motive Power and Equipment unit inspections decreased by 43 percent, CFR defect identifications decreased by 77 percent, and recommendations to the FRA for civil penalty violations decreased by 56 percent.
- Operating Practices unit inspections decreased by 75 percent.
- Signal and Train Control unit inspections decreased by over 1,000 percent, and CFR defect identifications decreased by 81 percent.
- Track unit inspections decreased by 45 percent.

Decreased inspections often result in undetected safety violations, which can compromise employee safety and public safety.

However, there has been an increase in CPUC's hiring of inspectors for 2017, which in turn will help with increased inspections, once the new staff are sufficiently trained and have received FRA discipline-specific certification. Currently, there are eight new inspectors participating in the FRA on the job training program:

- 2 Motive Power and Equipment inspectors
- 2 Signal and Train Control inspectors
- 2 Track inspectors
- 2 Operating Practices inspectors

Appendix A – State Railroad Safety Laws and General Orders

Authority	Statutory Specified Tasks (paraphrased)	CPUC-General Orders
PU Code Sec. 309.7 (a)	<p>SED responsible for inspection, surveillance, and investigation of the rights-of-way, facilities, equipment, and operations of railroads and public mass transit guideways, and for enforcing state and federal laws, regulations, orders, and directives relating to transportation of persons or commodities, or both, of any nature or description by rail.</p> <p>SED shall advise the commission on all matters relating to rail safety, and shall propose to the commission rules, regulations, orders, and other measures necessary to reduce the dangers caused by unsafe conditions on the railroads of the state.</p>	
PU Code Sec. 309.7 (b)	<p>SED shall exercise all powers of investigation granted to the commission, including rights to enter upon land or facilities, inspect books and records, and compel testimony.</p> <p>The commission shall employ sufficient federally certified inspectors to ensure at the time of inspection that railroad locomotives and equipment and facilities located in class I railroad yards in California are inspected not less frequently than every 180 days, and all main and branch line tracks are inspected not less frequently than every 12 months.</p>	GO 22-B: Requires that railroads immediately furnish the Commission notification of all train collision and derailments resulting in loss of life or injury, all bridge failures, and all highway crossing accidents resulting in loss of life or injury.
PU Code Sec. 309.7 (c)	SED shall, with delegated CPUC attorneys, enforce safety laws, rules, regulations, and orders, and to collect fines and penalties resulting from the violation of any safety rule or regulation.	Resolution ROSB-002 established a civil penalty citation program for enforcing compliance with safety requirements for railroad carriers
PU Code Sec. 309.7 (d)	<p>(d) The activities of the consumer protection and safety division that relate to safe operation of common carriers by rail, other than those relating to grade crossing protection, shall also be supported by the fees paid by railroad corporations.</p> <p>The activities of the division of the commission responsible for consumer protection and safety that related to grade crossing protection shall be supported by funds appropriated from the State Highway Account in the Public Transportation Fund.</p>	
PU Code Sec. 315	The commission shall investigate the cause of all accidents occurring within this State upon the property of any public utility or directly or indirectly arising from or connected with its maintenance or operation, resulting in loss of life or injury to person or property and requiring, in the judgment of the commission, investigation by it, and may make such order or recommendation with respect thereto as in its judgment seems just and reasonable.	
PU Code Sec. 421	<p>(a)-(d) The commission shall annually determine a fee and is permitted to expend funds for specified purposes.</p> <p>(g) The commission shall hire four additional operating practices inspectors who shall become federally certified.</p>	
PU Code Sec. 761	Whenever the commission finds that rules, practices, equipment, appliances, facilities, or service of any	GO 27-B: Filing and posting of railroad timetables and changes.

	public utility are unjust, unreasonable, unsafe, improper, inadequate, or insufficient, the commission shall fix the rules.	
PU Code Sec. 765.5	<p>(a) The purpose of this section is to provide that the commission takes all appropriate action necessary to ensure the safe operation of railroads in this state.</p> <p>(b) The commission shall dedicate sufficient resources necessary to adequately carry out the State Participation Program for the regulation of rail transportation of hazardous materials as authorized by the Hazardous Material Transportation Uniform Safety Act of 1990 (P.L. 101-615).</p> <p>(c) On or before July 1, 1992, the commission shall hire a minimum of six additional rail inspectors who are or shall become federally certified, consisting of three additional motive power and equipment inspectors, two signal inspectors, and one operating practices inspector, for the purpose of enforcing compliance by railroads operating in this state with state and federal safety regulations.</p> <p>(d) On or before July 1, 1992, the commission shall establish, by regulation, a minimum inspection standard to ensure, at the time of inspection, that railroad locomotives, equipment, and facilities located in class I railroad yards in California will be inspected not less frequently than every 120 days, and inspection of all branch and main line track not less frequently than every 12 months.</p> <p>(e) Commencing July 1, 2008, in addition to the minimum inspections undertaken pursuant to subdivision (d), the commission shall conduct focused inspections of railroad yards and track, either in coordination with the Federal Railroad Administration, or as the commission determines to be necessary. The focused inspection program shall target railroad yards and track that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density.</p>	
PU Code Sec. 768	<p>768. <u>The commission may, after a hearing, require every public utility to construct, maintain, and operate its line, plant, system, equipment, apparatus, tracks, and premises in a manner so as to promote and safeguard the health and safety of its employees, passengers, customers, and the public. The commission may prescribe, among other things, the installation, use, maintenance, and operation of appropriate safety or other devices or appliances, including interlocking and other protective devices at grade crossings or junctions and block or other systems of signaling. The commission may establish uniform or other standards of construction and equipment, and require the performance of any other act which the health or safety of its employees, passengers, customers, or the public may demand.</u></p>	<p>GO 26-D: Establishes minimum clearances between railroad tracks, parallel tracks, side clearances, overhead clearances, freight car clearances, and clearances for obstructions, motor vehicles, and warning devices to prevent injuries and fatalities to rail employees by providing a minimum standards for overhead and side clearance on the railroad tracks.</p> <p>GO 72-B: Formulates uniform standards for grade crossing construction to increase public safety.</p> <p>GO 75-D: Establishes uniform standards for warning devices for at-grade crossings to reduce hazards associated with persons traversing at-grade crossings.</p> <p>GO 118-A: Provides standards for the construction, reconstruction, and maintenance of walkways adjacent to railroad tracks to provide a safe area for train crews to work.</p>

		GO 126: Establishes requirements for the contents of First-Aid kits provided by common carrier railroads.
PU Code Sec. 916	Requires the CPUC to report to the Legislature on its rail safety activities annually, on or before November 30.	
PU Code Sec. 916.2	Requires the CPUC to report to the Legislature on sites on railroad lines in the state it finds to be hazardous, and list all derailment accidents sites in the state on which accidents have occurred within at least the previous five years.	
PU Code Sec. 916.3	Requires the CPUC to report on the actions the CPUC has taken to comply with section 765.5, which requires the CPUC to take all appropriate action necessary to ensure the safe operation of railroads in this state. Requires the CPUC to report annually on the impact on competition, if any, of the regulatory fees assessed railroad corporations for the support of the CPUC's activities.	
PU Code Sec. 7661	Requires Safety and Enforcement Division to investigate any incident that results in a notification to CEMA.	
PU Code Sec. 7662	Requires a railroad to place appropriate signage to notify an engineer of an approaching grade crossing and establishes standards for the posting of signage and flags, milepost markers, and permanent speed signs.	
PU Code Sec. 7665.2	By July 1, 2007, requires every operator of rail facilities to provide a risk assessment to the commission and the agency for each rail facility in the state that is under its ownership, operation, or control, and prescribes the elements of the risk assessment.	
PU Code Sec 7665.4	(f) Requires the rail operators to develop an infrastructure protection program, and requires the CPUC to review the infrastructure protection program submitted by a rail operator. Permits the CPUC to conduct inspections to facilitate the review, and permits the CPUC to order a rail operator to improve, modify, or change its program to comply with the requirements of this article. (g) Permits the CPUC to fine a rail operator for failure to comply with the requirements of this section or an order of the commission pursuant to this section.	
PU Code Sec. 7665.6	Requires every rail operator to secure all facilities that handle or store hazardous materials; store hazardous materials only in secure facilities; ensure that the cabs of occupied locomotives are secured from hijacking, sabotage, or terrorism; and, secure remote-control devices. Prohibits every rail operator from leaving locomotive equipment running while unattended or unlocked, from using remote control locomotives to move hazardous materials over a public crossing, unless under specified circumstances.	GO 161: Establishes safety standards for the rail transportation of hazardous materials.
PU Code Sec. 7665.8	Requires every rail operator to provide communications capability to timely alert law enforcement officers, bridge tenders, and rail workers	

	of the local or national threat level for the rail industry, i.e. sabotage, terrorism, or other crimes.	
PU Code Sec. 7673	Requires every railroad that transports hazardous materials to provide a system map showing mileposts, stations, terminals, junction points, road crossings, and location of pipelines in its rights of way.	
PU Code Sec. 7711	Requires the CPUC to identify local safety hazards on California railroads	
PU Code Sec 7711.1	Requires the CPUC to collect and analyze near-miss data.	

Appendix B – Example of a Risk Management Status Report

February 12, 2017: During routine surveillance work, a CPUC railroad safety bridge inspector noticed a drainage concern under a BNSF Railway bridge adjacent to Highway 138, along Cajon Creek, in San Bernardino County.

Due to recent heavy rains and flash flooding throughout the area, a large amount of silt had collected under the bridge. This silt collection had risen to a point where there was minimal clearance between the stream bed and the bottom of the bridge.



BNSF Railway Bridge at Cajon Creek, showing poor separation between the stream bed and the bottom of the bridge

The concern is that more storms bringing flooding conditions could easily cause debris build-up between the stream bed and the bridge that could lead to track damage or, more seriously, a bridge wash out. It was urgent that BNSF Railway take action to mitigate this concern.

BNSF was immediately notified of the potential risk. They were also advised that a Risk Management Status Report had been initiated regarding the condition. This was a situation where noting a non-compliance with federal regulations only might be insufficient to attract enough attention from the railroad for them to comprehend the high risk that the silt build up had produced.

BNSF Railway understood the concerns conveyed by the CPUC bridge inspector's RMSR and made arrangements to dredge the area around the bridge.



The same bridge after the BNSF Railway dredged out the silt to allow for more adequate water flow

Appendix C - Examples of Operation Lifesaver Presentations

August 26, 2016: A CPUC inspector conducted an Operation Lifesaver presentation to the students and staff of the John F. Kennedy Middle School in El Centro. The presentation discussed railroad hazards and unsafe acts, such as walking along a railroad track, and how to avoid personal injury. CPUC staff used visual aids and handouts to further explain the dangers associated with being around railroad tracks. Approximately 100 students and school staff attended.



Students at El Centro's John F. Kennedy Middle School during an operation Lifesaver presentation

September 24, 2016: CPUC railroad safety staff, working in conjunction with the Rio Vista Police Department, presented an Operation Lifesaver program on safety practices around railroad crossings and railroad property. The presentation took place at the Siempre Verde Park in San Leandro. The audience consisted of children, adults, emergency responders, professional drivers and bus drivers. Railroad safety awareness handouts were distributed at the conclusion of the presentation.



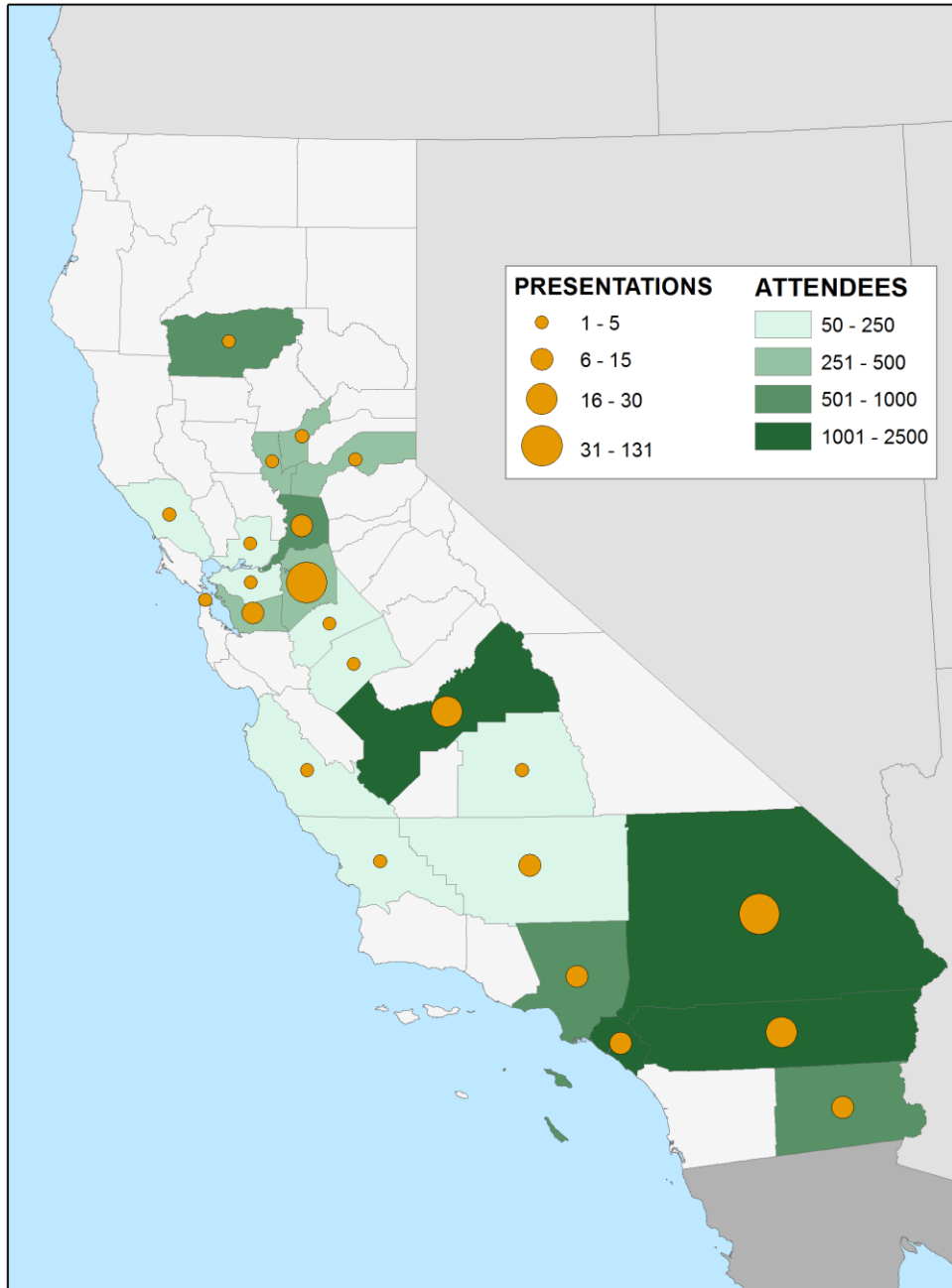
A CPUC inspector conducting an Operation Lifesaver presentation at Siempre Verde Park in San Leandro

April 19, 2017: CPUC inspectors conducted a crossing safety blitz in conjunction with Earth Day, the Los Angeles Police Department, Union Pacific Railroad and the California Highway Patrol in San Clemente. This included a presentation on crossing safety education and how to avoid crossing related railroad safety hazards. Over 100 people attended this event.



Two CPUC inspectors manning an Operation Lifesaver booth at the Earth Day festival in San Clemente

Operation Lifesaver Presentations by counties (FY2016-2017)



Appendix D - Examples of Regular Inspections

November 14, 2016: Two CPUC inspectors performed a routine inspection at the request of the Modesto and Empire Traction Company (M&ET), a short line railroad located in Modesto. M&ET asked the CPUC inspectors to review plans for a barrier wall that will be built next to a loading and unloading facility, to ensure compliance with federal and state laws.

The inspectors informed the M&ET representative that the barrier wall would not be in compliance with General Order 26-D, which requires at least an 8' 6" clearance area from the track center. The 8' 6" side clearance is required to provide railroad employees riding the side of a rail car adequate clearance from obstructions that could knock the employee off the rail car and potentially cause injury or death.

The M&ET track supervisor removed the existing construction markers and placed new markers and painted new lines on the ground to show where to safely construct the barrier wall in compliance with CPUC requirements.



CPUC inspector and M&ET Manager of Track Maintenance inspect the area of proposed barrier wall construction

November 15, 2016: A CPUC and FRA railroad safety inspector performed a routine inspection at the United States Steel (USS) Posco Steel Mill, located in Pittsburg. The inspectors were accompanied by a USS Posco manager.

USS Posco owns and operates a section of track used to switch cars from the steel mill to interchange with the BNSF Railway. BNSF operates an adjacent track that services Dow Chemical.

The inspectors identified several non-compliant federally-regulated track conditions that could cause a train derailment. In particular, a broken rail was discovered; the break was so severe that the entire top portion of the rail could be lifted out of the rail joint, creating an imminent derailment hazard. With two companies switching cars at this location, there was a derailment risk that could involve a hazardous materials release.

Federal law states that when there is a break out of the rail head, the track must either be removed from service, or if it is used, a qualified railroad employee must supervise all train

movements over the broken rail. The USS Posco manager immediately removed the track from service and replaced the rail the same day.



A CPUC inspector holding the broken rail piece

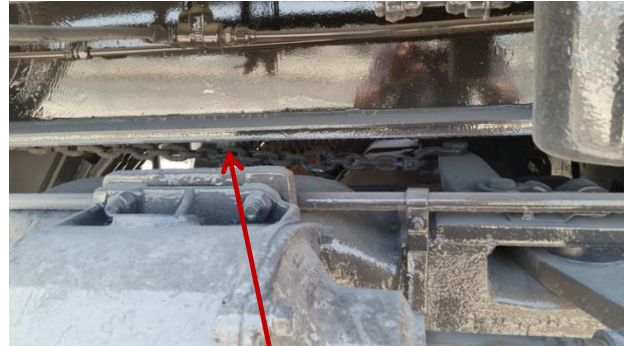
December 1, 2016: Two CPUC inspectors performed a routine inspection at the BNSF Railway Kaiser Yard, in Fontana, San Bernardino County. The inspectors identified an unattended locomotive that did not have a handbrake applied. Properly securing handbrakes is one of the most critical tasks railroad crews perform. 49 CFR Part 232.103 and BNSF's Air Brake Train Handling Rule 102.1.1 requires all brakes in an unattended locomotive consist to be applied. Kaiser Yard's trainmaster was promptly notified about this defect. It was immediately corrected and the CPUC inspectors performed a follow-up inspection that verified that the handbrakes were properly applied.



Photograph of the BNSF locomotive that did not have an appropriately applied hand brake



Before: The handbrake is not applied. Note the slack (dangling) in the chain, which indicates the hand brake is not applied



After: The handbrake is applied. The chain is now taut, indicating the hand brake is applied

March 1, 2017: A CPUC and a FRA railroad safety inspector performed a routine inspection on the California Northern Railroad in Tracy. Due to recent heavy rains at the time, the inspectors focused on railroad bridges. Railroad bridges can experience increased erosion and debris accumulation when the rivers swell, creating structural risks.

The inspectors identified an excessive amount of debris that had piled up underneath a bridge due to the increased water levels from storms, which could cause flooding damage to the surrounding area.

49 CFR Part 213.33 requires water drainage under or adjacent to a track roadbed to be maintained and kept free of obstructions to accommodate expected water flow for the area. The inspectors notified a California Northern Railroad manager of the excessive debris. The Manger made a plan to have the debris removed. A follow up inspection soon after confirmed that the debris had been removed.



Above and below: CFNR main track bridge near Westly, south of Tracy



March 21, 2017: A CPUC inspector performed a general operations observation and inspection at the Sonoma-Marín Area Rail Transit (SMART) facility in Novato. The inspector observed the testing of trains conducted by SMART personnel in their attempt to determine the results of their initial testing of Positive Train Control.

CPUC staff observed SMART personnel testing varying temporary speed restrictions on a specific segment of mainline track, relating to their overall testing of the PTC implementation process.

Testing validation by SMART personnel was conducted to support SMART's application to the FRA for Revenue Service Demonstration which was targeted for late spring 2017. As of June 30, 2017, SMART's application for passenger operations with active PTC in revenue service is still being reviewed by the FRA.



Sonoma-Marín Area Rail Transit (SMART) PTC Test train at Novato North station in Novato, Marin County



View of operator's cab of SMART PTC test train. The PTC console is a small, slim unit seen to the right of the operator.

May 20, 2017: CPUC railroad safety bridge inspectors have been performing ongoing monitoring of a railroad bridge repair project in the San Diego area that has been under construction for approximately two years. The bridge carries the Coaster passenger trains that run north and south through San Diego County for the North County Transit District (NCTD), serving eight stations between Oceanside and downtown San Diego. More than 20 trains run on weekdays, with additional service on the weekends. According to NCTD's website, annual Coaster ridership is over 1.7 million passenger trips.

The Coaster travels over a railroad bridge that crosses the Los Penasquitos lagoon. The bridge has experienced sinking pilings, which are vertical bridge substructure pole supports. The greatest amount of elevation loss is 11 to 12 inches. If the sinking condition is not stopped, it could cause damage to the bridge spans, which in turn could potentially derail a train into the water below.

To mitigate the condition, a railroad contractor first removed the track, ballast, and bridge spans, poured epoxy on the cap (horizontal bridge structure support), and installed precast concrete shims on top of the epoxy to compensate for the elevation loss. The track, ballast, and bridge spans were then reinstalled and the track was restored for train traffic. The contractor is performing what is called "tip grouting," which involves coring through the center of the piles

and pumping concrete 10' below the existing pilings. This process may stop further sinking issues.

There is currently a speed restriction of 20 mph (freight trains) and 30 mph (passenger trains) over the bridge that will stay in place until the tip grouting is complete. Monitoring the bridge stability afterwards will determine if the tip grouting is successful. Once the bridge is determined to be stable, train normal speeds will be restored. Normal operating speed over this bridge is 55 mph (freight trains) and 90 mph (passenger trains).

The CPUC railroad safety bridge inspection staff has been working with the railroad contractor and the bridge engineer to ensure that the repairs are appropriate and consistent with safe and acceptable bridge repairs. Due to the significant risks associated with the heavily-used passenger rail, the CPUC inspectors opened a Risk Management Status Report and are engaging in ongoing monitoring of this bridge, as well as three other bridges on the Coaster route.

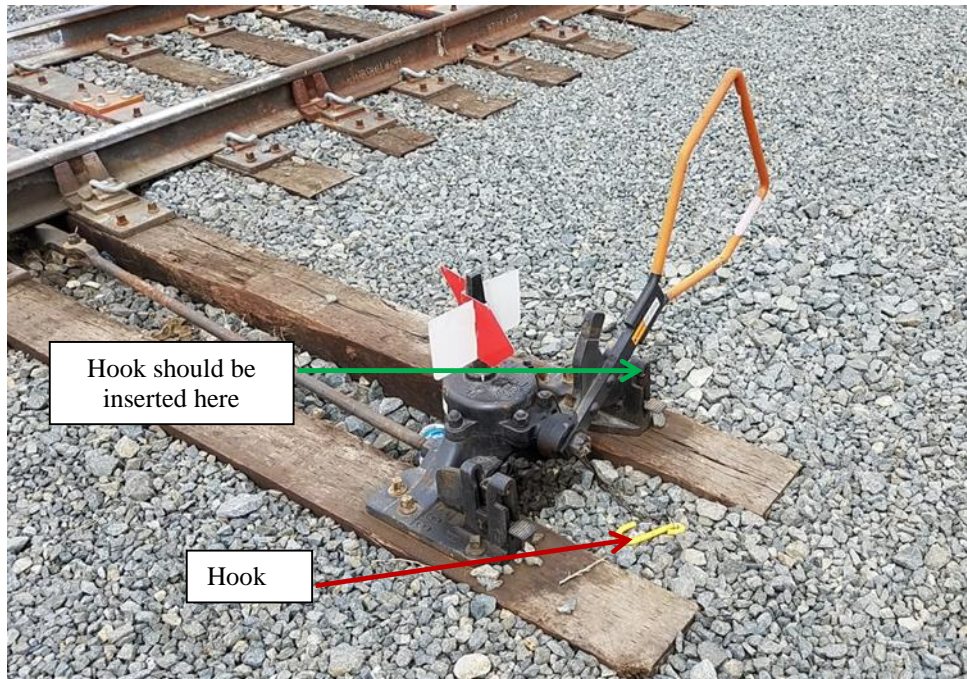


Railroad contractor removing a bridge span

May 31, 2017: Two CPUC inspectors performed an inspection at the Perris Valley Metrolink station located in Perris. The purpose of this inspection was to verify compliance by Metrolink personnel with Metrolink's operational rules, and prevent derailments and other uncontrolled movements of equipment.

The inspectors focused on securement of unattended equipment and the required use of hooks, latches, and locks on switches. The CPUC inspectors noted that a hook was not properly attached to a switch. The purpose of the hook is to prevent the switch from being thrown while locomotives and/or cars are moving over it, which would result in a derailment of the passenger rail cars.

The inspectors notified a Metrolink manager and the defective condition was quickly corrected by a Metrolink employee. During a prior inspection, the same defect had been observed and recorded on a report provided to the local manager and, consequently, a civil penalty was recommended.



The hook attached to the chain is not in the keeper that secures the handle. This situation can allow the switch to be inadvertently operated under a passing train and could cause a derailment

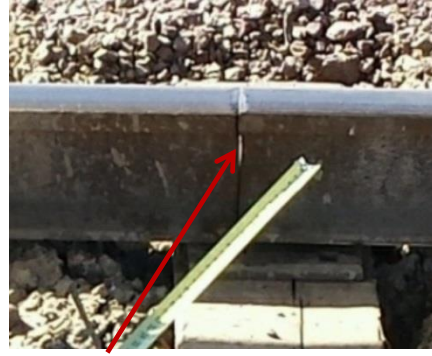
June 1, 2017: A CPUC inspector performed a routine track inspection of the BNSF rail yard between Martinez and Concord at the chemical plant within the Tesoro Refinery. The track is approximately 2,500 feet in length and is used to provide rail service to the chemical plant at the refinery. This location is within two miles of Highway 4 and in proximity to a densely populated residential area. BNSF serves the Tesoro Refinery with various hazardous commodities, including sulfuric acid and anhydrous ammonia. The purpose of the inspection was to evaluate track integrity to mitigate potential derailments and protect the public from hazardous materials releases resulting from derailments.

During the inspection the CPUC inspector identified a broken rail (specifically, a “detail fracture”) beneath a loaded rail car of anhydrous ammonia. 49 CFR Part 213.113(d)(7) states that when the defect is 100 percent of the rail, the track must be removed from service or have a person visually supervise each operation over the defective rail. If the rail had gone unnoticed, there would have been a potential for a derailment. In addition to releasing hazardous materials in this highly populated area, a derailment in this section could also block or “foul” the adjacent BNSF mainline track, which carries Amtrak passenger and freight trains between the Central Valley and the San Francisco Bay Area.

The CPUC inspector notified the BNSF track manager, who immediately briefed all train crews and managers and removed the track from service. The rail was replaced the next day.



A CPUC inspector pointing at the broken rail



A close up of the broken rail



These rail cars carrying hazardous materials are on top of the broken rail



View of the chemical plant track. Tesoro Refinery is on the right and the chemical plant is on the left. The truck is sitting on the BNSF main track between Oakland and Stockton with train speeds of 70 MPH.



Another view of how close the defective rail was to the BNSF 70 mph main track, and its proximity to the Tesoro Refinery in Martinez

June 26, 2017: CPUC inspectors conducted a routine safety inspection on the Oakdale Lead of the Sierra Northern Railroad between the Highway 49 grade-crossing and the town of Sonora. At Highway 49, it was noted that several fences encroached on the walkway adjacent to the track. The cattle guard posts at this location are no longer maintained as cattle guards, and the structures impair the side clearance of railroad equipment. A post had barbed wire attached and wrapped around it. The main line switching area at the JS West facility, located in Sonora near South Washington Street, has vegetation located throughout the switching area where train crews are required to walk. These posts and other encroachments create a tripping hazard and other safety hazards to train crews and other railroad employees that may have to conduct work in this area.

General Order 26-D requires side clearances of 8' 6" from the center of track. General Order 118-A requires railroads to maintain safe walkways, free from obstructions and tripping hazards. CPUC inspectors discussed the defects with a local railroad manager, and the manager agreed that all the defects would be corrected by the end of July.

On August 10, 2017, the CPUC inspectors performed a follow-up inspection and observed that all side clearances and walkways were in compliance with CPUC General Orders.



CPUC inspectors measure for side clearance compliance

Appendix E - Examples of Focused Inspections

January 10-20, 2017: A CPUC and FRA team of railroad safety inspectors performed a two-week focused inspection on the BNSF main line between Modesto and Fresno. Many freight trains and Amtrak passenger trains traverse this section of track daily, at up to 79 mph for passenger trains and 70 mph for freight trains.

The inspectors identified numerous non-compliant track conditions. One finding included fouled ballast. Ballast is typically made of crushed rock and forms the roadbed and supports the track structure. Mud had mixed in with the ballast, which can interfere with drainage from rain and snow and thus decrease the ability of the ballast to support the track structure and the rail cars and locomotives occupying the tracks. Fouled ballast conditions can also misalign the power switches that operate switch points (locations where trains traverse from one track to another), which can cause a train to derail. Unstable ballast can also cause derailment of a passing train.

49 CFR Part 213.103 requires railroads to maintain ballast to structurally support all track; transmit and distribute the load (trains) on the track; restrain the track laterally, longitudinally, and vertically; and provide adequate drainage for the track.

The team of safety inspectors informed the responsible BNSF track supervisor of the noncompliant track conditions. The BNSF track supervisor immediately placed “slow orders” to restrict the speed of trains over the defective conditions until those conditions were corrected.

During the two-week focused inspection, the team of inspectors identified a total of 103 defects and took seven violations (recommendations for civil penalties) for noncompliant federal safety conditions. BNSF immediately initiated remedial action on all defective conditions noted and completed the repairs within the same week.



CPUC and FRA inspectors observing a BNSF signal maintainer adjusting a power switch machine



***Before:** The ballast does not provide adequate drainage because it is “fouled” or contaminated with dirt and mud. It cannot provide adequate support for the track and can cause misalignment of the power switch, which could cause a derailment.*



***After:** The ballast was replaced to provide greater stability to the track.*

February 22, 2017: A team of two CPUC and one FRA railroad safety inspectors performed a joint focused inspection with a UPRR Hazardous Materials Manager in the UPRR yard in Roseville. The Roseville yard is UPRR’s largest classification yard in Northern California. Hundreds of hazardous materials shipments pass through this facility each day. UPRR employees inspect each tank car containing hazardous materials when the cars arrive at the facility. Another inspection is performed before the rail cars depart the facility to detect leaks of flammables, poisons, inhalation hazards, and other potential threats to human health and property. Accurate identification of the hazardous material contents is vital to emergency responders.

Federal regulations require secure tank car fittings and accurate identification. Loose bolts and unsecured valve handles can result in release of contents due to temperature changes, closure failures, or vandalism. The railroad safety inspection team found 16 tank cars with 21 defects. The defects included missing or incomplete markings, labels, and placards; loose bolts; and unsecured valve handles.

The railroad safety inspection team notified the UPRR Hazardous Materials Manager and Car Department Supervisor of the defects. The UPRR manager immediately had the loose closures tightened, and UPRR personnel were dispatched to correct the marking/label/placard issues.

The shippers were also notified of the defects so that they can review their safety procedures to prevent future occurrences of cars not being in compliance with federal regulations.



A CPUC inspector inspecting tank cars that carry hazardous materials for secure closures



Securement pin found hanging from chain, allowing the valve handle to move to an open position



Example of loose bolt marked for tightening

Appendix F – Examples of Accident Investigations

CPUC railroad safety supervisors review reported rail incidents and determine whether they need to dispatch an inspector or inspection team to investigate the accident. During 2016-2017, CPUC inspectors investigated 154 accidents and incidents. Examples include:

August 5, 2016: A Caltrain passenger train traveling northbound through San Jose struck a trespasser, resulting in a fatality. The engineer stated that he was operating northbound after departing the Caltrain San Jose station and was approaching the Virginia Street grade crossing just as a southbound Altamont Corridor Express (ACE) passenger train was passing through the same grade crossing.

CPUC railroad safety staff conducted an investigation and found that a person riding a bicycle went through the crossing after going around the grade crossing warning gates, which were down. The individual went around the rear end of the southbound ACE passenger train and into the path of the northbound Caltrain passenger train. The Caltrain train struck the bicyclist, resulting in a fatality.

The investigation determined that the train crew was following relevant railroad operating rules; and that the train's headlights and ditch lights were displayed as required. The locomotive event recorder download showed the train operating at 35 mph at the time of the incident. It also indicated that the locomotive horn was sounded, as required. The grade crossing warning lights and gates were reported operational. The Santa Clara County Coroner determined this incident to be "accidental".

January 13, 2017: An Amtrak train traveling south at the Cutting Boulevard grade crossing in Richmond collided with a stationary sport utility vehicle (SUV), resulting in minor injuries to the lone SUV occupant. Details of the accident were developed through interviews with Amtrak officers, examination of the Richmond Police Department police report, and an onsite investigation performed by a CPUC inspector.

The investigation found that the SUV was traveling eastbound on Cutting Boulevard and was stopped at the intersection with Carlson Boulevard in the left hand turn lane (north bound turn lane). There was another vehicle already stopped ahead of the SUV in the left turn lane. The left turn lane queue only had capacity for one average sized vehicle. Consequently, after crossing over the tracks and stopping in the left turn lane queue, the rear of the SUV was fouling the number 2 BNSF mainline track.

There was a train approaching the crossing on the number 2 mainline. After the activation of the grade crossing warning signals and gates by the approaching train, the SUV attempted to push the vehicle in front eastward, to try to clear the number 2 mainline. The driver obviously knew that his vehicle was fouling the main track. As the train moved through the crossing, it struck the rear of the SUV, pushing the SUV into the vehicle ahead of it. The driver of the SUV sustained minor injuries and the driver of the other vehicle was already outside of his vehicle at the time of impact, and did not sustain any injuries. The SUV driver was treated at the scene, cited by

Richmond Police, and released. After the accident, the train crew brought the train to a stop and alerted the train dispatcher of the accident.

The Cutting Boulevard public grade crossing is protected by flashers and warning gates. These warning devices were seen on the locomotive on board video download when CPUC railroad safety staff reviewed the video. The video clearly showed that all the crossing warning devices were active at the time of the accident.

The CPUC investigation determined that this accident was due to the SUV driver not stopping his vehicle before entering the crossing, and thus not clearing the tracks prior to impact. The driver saw the approaching train. He attempted to crowd into the left hand turn lane queue on the opposite side of the crossing, allowing his vehicle to be struck by the train.

February 10, 2017: A Union Pacific Railroad freight train traveling north on the UPRR Fresno Subdivision derailed 24 cars on the north end of a bridge at milepost (MP) 56.2 near Elk Grove.

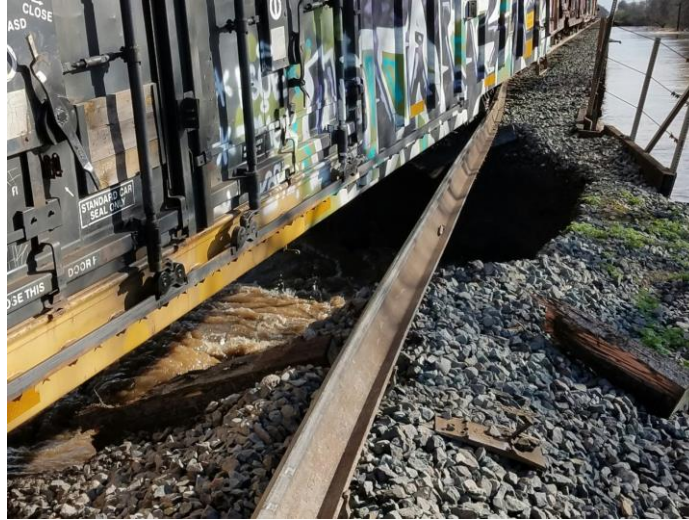
The cause of the derailment was an earthen washout on the north end of the bridge behind a back wall (abutment) that supports the bridge. Due to storms passing through Northern California at that time, the Cosumnes River reached levels in Sacramento County not seen since 1997. The river had breached and broken through levees upriver and the excess water spilled into the Cosumnes River bypass where the UPRR bridge is located.

This increased water flow added to water already present in the river bypass. Water saturated the railroad track roadbed and weakened the track structure ground support behind the earthen back wall on the bridge's north end. Strong currents created an eddy that quickly deteriorated the track road bed from underneath and washed it away. As a result, the UPRR freight train traversing this location derailed at the bridge.

Railroad personnel had been monitoring areas in Northern California during this period of unusually bad weather. There were many locations that were subjected to adverse conditions from the numerous weather fronts that passed through over a period of days and weeks. UPRR personnel were stretched thin in attempting to monitor a large number of rising water locations in California.

CPUC railroad safety staff reviewed the video from the lead locomotive involved in the derailment. The video revealed no visible indication that the track was unpassable at the point it traversed the bridge. The speed of the increasing water volume was swift and the eddy that it created at the bridge approach coincided with the train's passage.

Subsequently, CPUC railroad safety staff, in concert with FRA, conducted safety reviews with railroads throughout California. CPUC railroad safety staff and FRA discussed high water monitoring and action plans by the railroads to promote more effective adverse weather inspection practices by local railroad personnel.



The washout area at UPRR bridge, MP 56.2, near Elk Grove

June 15, 2017: CPUC inspectors responded to a derailment on Union Pacific Railroad tracks in the city of Colton. A CPUC inspector contacted a UPRR manager to perform a preliminary investigation over the phone.

UPRR was assembling a train in the rail yard preparing for departure. The 131 car train pulled eastward to clear a track switch, with the intent to back the train westward (reverse move) into that track until ready for final departure from the yard. However, while making this eastward movement, the coupler assembly between cars 32 and car 33 had broken while making the eastward movement, creating a gap in the train. Once the train locomotives and its 32 cars came to a stop, the rear 98 cars rolled freely into the front portion of the train. Upon impact, cars 59 through 68 derailed in an accordion-style arrangement. The 10 cars that derailed consisted of 7 empties and 3 loads; none contained hazardous materials.



The broken coupler "knuckle" that failed between rail cars 32 and 33

CPUC inspectors viewed the track image recorder footage from the locomotive and examined the locomotive event recorder. They concluded that the stopped head-end portion of the train and locomotives were shoved 49 feet forward from the impact. The derailed equipment spilled onto the adjacent track, fouling the main track. The derailed cars also struck a utility pole which caused a temporary power outage.

There were no injuries to railroad employees or the general public. The crew, consistent with UPRR policy, was toxicology tested and the results were negative.

The cause of the accident was a failed coupler assembly, or knuckle, which broke due to functional wear and stresses.



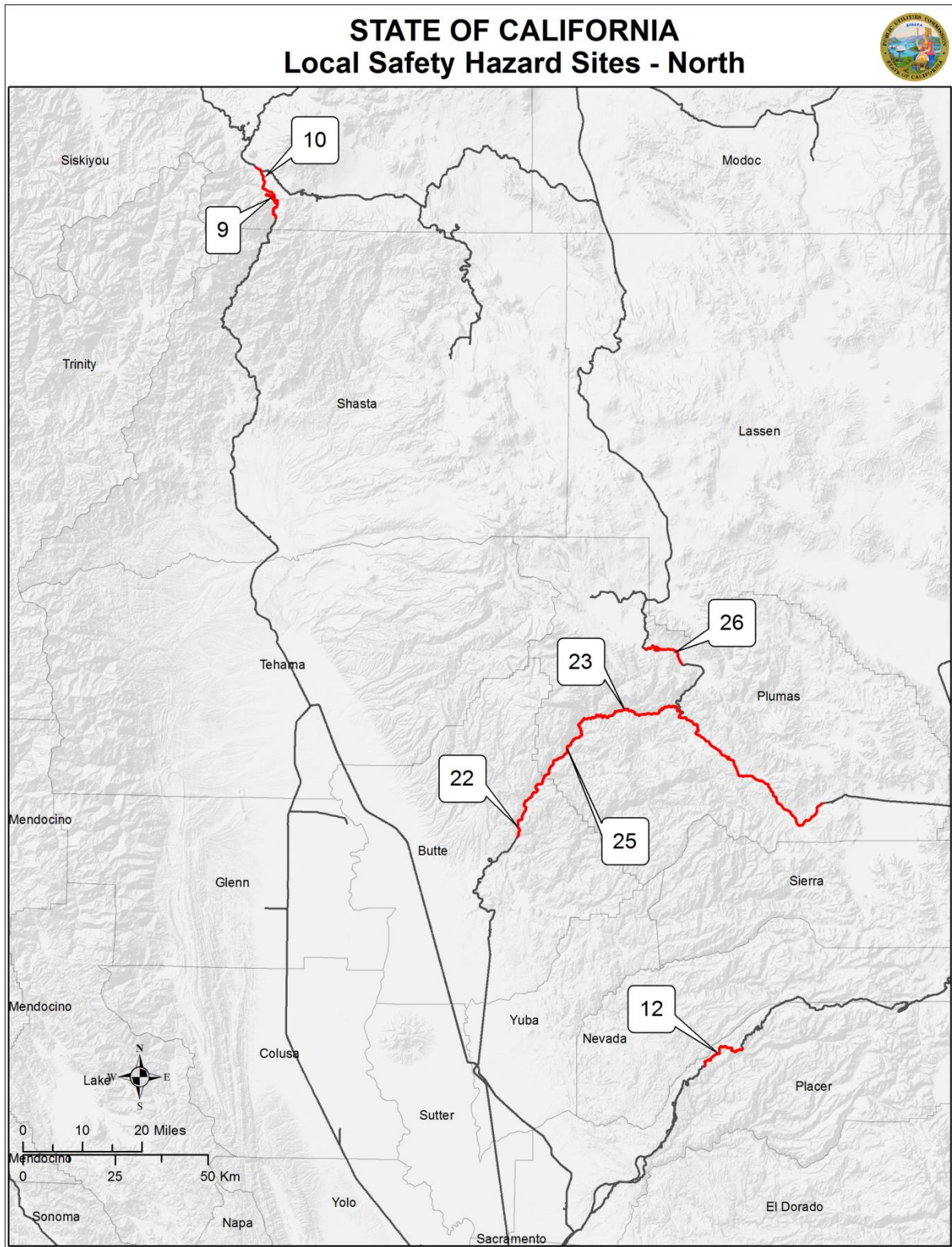
Derailment site at UPRR West Colton Yard on June 15, 2017

Appendix G – Local Safety Hazard Site Maps

Notes:

Maps are broken down into three areas: 1) Northern California, 2) California Central Coast/Desert Valley, and 3) Southern California and are listed on pages 61-63 in that order.

These maps are being updated, and soon should be available as interactive maps on the OES website.



STATE OF CALIFORNIA Local Safety Hazard Sites - Central



STATE OF CALIFORNIA Local Safety Hazard Sites - South

