



Crude Oil by Rail

**A REVIEW OF THE ISSUE,
STATE AND FEDERAL
OVERSIGHT AND LOCAL
IMPLICATIONS**

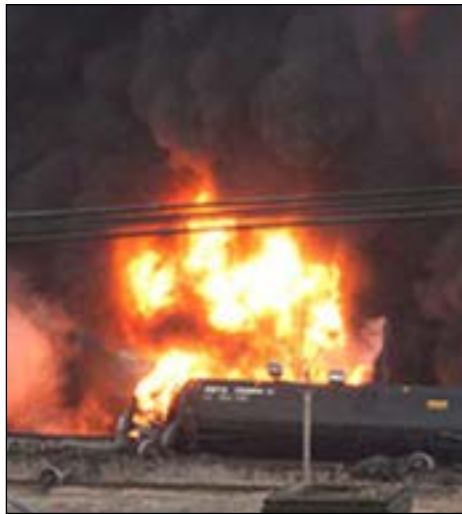
By Contra Costa Health Services Hazardous Materials Programs

THE ISSUE

There has been an increase in the number of train car derailments in the United States and Canada carrying petroleum crude. Shipping hazardous materials is inherently dangerous. Transporting petroleum crude oil can be problematic if the crude oil is released into the environment because of its flammability. This risk of ignition is compounded in the context of rail transportation because petroleum crude oil is commonly shipped in unit trains¹ that may consist of over 100 loaded tank cars. With the rising demand for rail carriage of petroleum crude oil throughout the United States, the risk of rail incidents increases along with the increase in the volume of crude oil shipped.

North Dakota Sweet or Bakken Crude is highly volatile compared to other petroleum crude. The Bakken crude has a high number of light ends (propane, butane, and pentane) that vaporizes at lower temperatures than heavier ends. The lighter ends in the Bakken Crude increases the flammability of this petroleum crude. The light ends could be removed at the source or at facilities close to the source before it is shipped by rail. If this occurred, there would be less chance of the Bakken Crude to catch on fire if there is a derailment.

There have been several significant derailments in the U.S. and Canada over the last year causing deaths and property and environmental damage that involved petroleum crude oil shipments. Four of these accidents are described below.



LYNCHBURG, VA

On April 30, 2014, an eastbound CSX Transportation, Inc. (CSX) unit train consisting of 105 tank cars loaded with petroleum crude oil derailed in Lynchburg, Virginia. Seventeen of the train's cars derailed, and one of the tank cars was breached. A petroleum crude oil fire ensued, and emergency responders evacuated approximately 350 individuals from the immediate area. Three of the derailed tank cars containing petroleum crude oil came to rest in the adjacent James River, spilling up to 30,000 gallons of petroleum crude oil into the river.

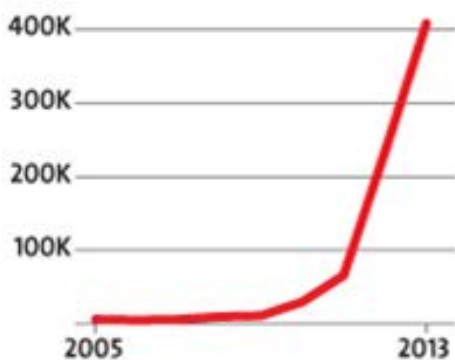


CASSELTON, NORTH DAKOTA

On December 30, 2013, 13 cars in a westbound BNSF Railway (BNSF) grain train derailed near Casselton, North Dakota, fouling an adjacent main track. At the same time, an eastbound BNSF petroleum crude oil unit train with 106 cars was operating on that adjacent main track. The petroleum crude oil unit train reduced its speed but collided with the derailed car that was fouling the main track, resulting in the derailment of the lead locomotives and the first 21 cars of the petroleum crude oil unit train. Eighteen of the 21 derailed tank cars ruptured, and an estimated 400,000 gallons of petroleum crude oil was released. The ruptured tank cars ignited, causing a significant fire. Approximately 1,400 people were evacuated. Damages from the derailment have been estimated at \$8 million.

¹A unit train is a freight train composed of cars carrying a single type of commodity that are all bound for the same destination.

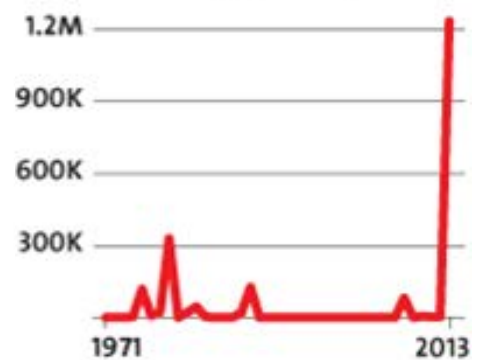
CARLOADS OF CRUDE OIL SHIPPED BY RAIL IN THE UNITED STATES



CRUDE OIL TRAIN ACCIDENTS



CRUDE OIL SPILLED IN RAIL ACCIDENTS (GALLONS)





STATE OVERSIGHT

The California Public Utilities Commission (CPUC) is the State agency charged with ensuring the safety of freight railroads, inter-city and commuter railroads, and highway-railroad crossings in California. CPUC performs these railroad safety responsibilities through the Railroad Operations and Safety Branch (ROSB) of the Safety & Enforcement Division.



ALICEVILLE, ALABAMA

On November 8, 2013, a 90-car petroleum crude oil train operated by Alabama & Gulf Coast Railway derailed in a rural area near Aliceville, Alabama. The petroleum crude oil shipment originated in North Dakota, and was bound for Walnut Hill, Florida, to be transported by a regional pipeline to a refinery in Saraland, Alabama. Twenty-six cars derailed, resulting in 11 cars impinged by a crude oil pool fire. An undetermined amount of petroleum crude oil escaped from derailed cars and found its way into a wetlands area nearby the derailment site. Clean up costs are estimated at \$3.9 million.

ROSB's mission is to ensure that California communities and railroad employees are protected from unsafe practices on freight and passenger railroads by enforcing rail safety rules, regulations, and inspection efforts; and by carrying out proactive assessments of potential risks before they create dangerous conditions. ROSB personnel investigate rail accidents and safety related complaints, and recommend safety improvements to the Commission, railroads, and the federal government as appropriate.

LAC-MÉGANTIC, QUEBEC

On July 6, 2013, a catastrophic railroad accident involving a U.S. railroad company occurred in Lac-Mégantic, Quebec, Canada, when an unattended freight train transporting petroleum crude oil rolled down a descending grade and subsequently derailed. The subsequent fires, along with other effects of the accident, resulted in the confirmed deaths of 47 individuals. In addition, derailment caused extensive damage to the town center, a release of hazardous materials that will require substantial clean-up costs, and the evacuation of approximately 2,000 people from the surrounding area.

ROSB INSPECTIONS ARE DIVIDED INTO FIVE RAILROAD DISCIPLINES:

- **OPERATING PRACTICES**—oversight of main, branch and yard train operations, including hours of service, carrier operating rules, employee qualification guidelines, and carrier training and testing programs to determine compliance with railroad occupational safety and health

standards, accident and personal injury reporting requirements, and other requirements

- **TRACK**—oversight of track construction, maintenance and inspection activities
- **SIGNAL & TRAIN CONTROL**—oversight

of signal system construction, maintenance and inspection activities

- **MOTIVE POWER & EQUIPMENT**—oversight of locomotives, freight and passenger rail cars, air brakes, and other safety appliances maintenance and inspection activities

- **HAZARDOUS MATERIALS**—oversight of the rail movements of hazardous materials, such as petroleum and chemical products; and inspection of hazardous materials shippers

UPGRADED DOT-111 RAILCAR

The Federal Rail Safety Act of 1970, the primary federal statute regulating freight rail safety, provides states with an exemption to the generally preemptive federal regulatory scheme of the federal railroad safety laws: A State may adopt or enforce an additional or more stringent law, regulation, or order related to railroad safety or security when the law, regulation, or order—

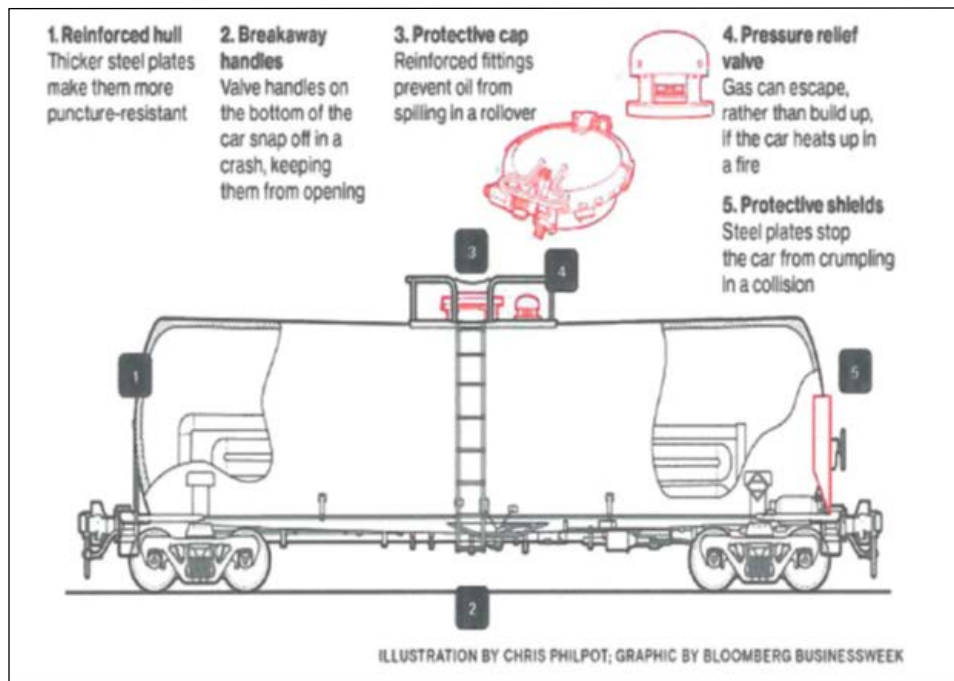
- Is necessary to eliminate or reduce an essentially local safety or security hazard;
- Is not incompatible with a law, regulation, or order of the United States Government; and
- Does not unreasonably burden interstate commerce. (49 U.S.C. Section 20106)

DOT/FEDERAL RAIL ADMINISTRATION

The Federal Rail Administration (FRA), which resides in the Department of Transportation (DOT), has the responsibility for regulating the shipment of petroleum crude by rail. This includes the design of the train cars carrying the crude, the speeds that the trains can travel, how the petroleum is packaged, and the safety of the rails that the petroleum crude is transported over. The FRA has established some voluntary requirements such as the speed that trains carrying the crude may travel and redirecting the traffic of the shipments around high hazard locations.

DOT is developing regulations that would require a safer tank car be used from the existing DOT-111 to transport Bakken crude. Train cars are now being built under a safer design that may be required for the transportation of Bakken crude. Some of the issues that should be addressed in the new regulations for these tankcars are shown in the illustration at the top of this page.

DOT on May 7, 2014 issued an emergency order requiring that each railroad carrier provide the State Emergency Response Commission (SERC) for each state in which it operates trains transporting 1,000,000 gallons² or more of Bakken crude oil, notification regarding the expected movement of such trains



through the counties in the state. The notification shall identify each county or a particular state or commonwealth's equivalent jurisdiction (e.g., Louisiana parishes, Alaska boroughs, Virginia independent cities), in the state through which the trains will operate.

The California Office of Emergency Services (Cal/OES) is the contact for the SERC in California. Cal/OES is establishing a means to distribute the information required under this emergency order to the appropriate agencies for each of the Counties within California.

The information that is to be submitted to the SERC must contain the following: (a) provide a reasonable estimate of the number of trains implicated by this Order that are expected to travel, per week, through each county within the state; (b) identify and describe the petroleum crude oil expected to be transported in accordance with 49 CFR part 172, subpart C; (c) provide all applicable emergency response information required by 49 CFR part 172, subpart G; and, (d) identify the routes over which the material will be transported. This notification also must identify at least one point of contact at the railroad (including name, title, phone number and address) responsible for serving as the point of contact for SERCs and relevant emergency responders

related to the railroad's transportation of Bakken crude oil.

On February 21, 2014, the Secretary of Transportation sent a letter to the President and Chief Executive Officer at the Association of American Railroads (AAR) requesting that he and his members subscribe to voluntary actions to improve the safe transportation of crude oil by rail. These include: speed restrictions, braking signal propagation systems, routing analyses, additional track and rail integrity inspections, more frequent mechanical inspections, development of an emergency response inventory, funding for emergency responder training, and continued communication with communities about the hazards of crude oil being transported by rail. To date, all Class I railroads³ have subscribed to the

²1,000,000 gallons is equivalent to approximately 35 traincars of crude oil.

³In the United States, 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. According to the Association of American Railroads, Class I railroads had a minimum carrier operating revenue of \$346.8 million (USD) in 2006, \$359 million in 2007, \$401.4 million in 2008, \$378.8 million in 2009, \$398.7 million in 2010 and \$433.2 million in 2011.

voluntary actions and several more have expressed their intent to sign.

DOT requires the railroads to develop the safest route from the origin of the shipment to the destination when transporting hazardous materials. Code of Federal Regulations, Title 49, Appendix D of part 172 "Rail Risk Analysis Factors"⁴ requires railroads to select the route of how hazardous materials are to be transported with the following factors to be considered in the performance of this safety and security risk analysis:

1. Volume of hazardous material transported;
2. Rail traffic density;
3. Trip length for route;
4. Presence and characteristics of railroad facilities;
5. Track type, class, and maintenance schedule;
6. Track grade and curvature;
7. Presence or absence of signals and train control systems along the route ("dark" versus signaled territory);
8. Presence or absence of wayside hazard detectors;
9. Number and types of grade crossings;
10. Single versus double track territory;
11. Frequency and location of track turnouts;
12. Proximity to iconic targets;
13. Environmentally sensitive or significant areas;
14. Population density along the route;
15. Venues along the route (stations, events, places of congregation);
16. Emergency response capability along the route;
17. Areas of high consequence along the route, including high consequence targets as defined in §172.820(c);
18. Presence of passenger traffic along route (shared track);
19. Speed of train operations;
20. Proximity to en-route storage or repair facilities;
21. Known threats, including any non-public threat scenarios provided by the Department of Homeland Security or the Department of Transportation for carrier use

in the development of the route assessment;

22. Measures in place to address apparent safety and security risks;
23. Availability of practicable alternative routes;
24. Past incidents;
25. Overall times in transit;
26. Training and skill level of crews; and
27. Impact on rail network traffic and congestion.

PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION (PHMSA) HIGH HAZARD FLAMMABLE TRAIN NOTICE FOR PROPOSED RULE MAKING

On July 23, 2014, PHMSA issued a Notice for Proposed Rule Making that will address the following issues and questions.

1. Better classification and characterization of mined gases and liquids
 - a. Written sampling and testing program for all mined gases and liquids, such as crude oil, to address:
 - i. frequency of sampling and testing;
 - ii. sampling at various points along the supply chain;
 - iii. sampling methods that ensure a representative sample of the entire mixture;
 - iv. testing methods to enable complete analysis, classification, and characterization of material;
 - v. statistical justification for sample frequencies; and, (6) duplicate samples for quality assurance.
 - vi. Require offerer to certify that program is in place, document the testing and sampling program, and make program information available to DOT personnel, upon request.
2. Rail routing risk assessment
 - a. Requires carriers to perform a routing analysis that considers

27 safety and security factors. The carrier must select a route based on findings of the route analysis. These planning requirements are prescribed in § 172.820 and would be expanded to apply to HHFTs.

3. Notification to SERCs
 - a. Require trains containing one million gallons of Bakken crude oil to notify State Emergency Response Commissions (SERCs) or other appropriate state delegated entity about the operation of these trains through their States
4. Reduced operating speeds
 - a. Restrict all HHFTs to 50-mph in all areas
 - b. PHMSA is requesting comment on three speed restriction options for HHFTs that contain any tank cars not meeting the enhanced tank car standards proposed by this rule:
 - i. a 40-mph maximum speed restriction in all areas;
 - ii. a 40-mph speed restriction in high threat urban areas⁵; and
 - iii. a 40-mph speed restriction in areas with a 100K+ population.
 - c. PHMSA is also requesting comment on a 30-mph speed restriction for HHFTs that do not comply with enhanced braking requirements.
5. Enhanced braking
 - a. Require all HHFTs be equipped with alternative brake signal propagation systems. Depending on the outcome of the tank car standard proposal and implementation timing, all HHFTs would be

⁴The factors are used to determine the safest route to take for transportation of selected hazardous materials, such as chlorine and ammonia.

⁵As defined in 49 CFR 1580.3—High Threat Urban Area (HTUA) means an area comprising one or more cities and surrounding areas including a 10-mile buffer zone, as listed in appendix A to Part 1580 of the 49 CFR.

operated with either electronic controlled pneumatic brakes (ECP), a two-way end of train device (EOT), or distributed power (DP).

6. Enhanced standards for both new and existing tank cars
 - a. Require new tank cars constructed after October 1, 2015 (that are used to transport flammable liquids as part of an HHFT) to meet criteria for a selected option, including specific design requirements or performance criteria (e.g., thermal, top fittings, and bottom outlet protection; tank head and shell puncture resistance). PHMSA is requesting comment on the following three options for the DOT Specification 117:
 - i. FRA and PHMSA Designed Car, or equivalent
 - ii. AAR 2014 Tank Car⁶ or equivalent
 - iii. Jacketed CPC-1232⁷ or equivalent
 - b. Require existing tank cars that are used to transport flammable liquids as part of a HHFT, to be retrofitted to meet the selected option for performance requirements, except for top fittings protection. Those not retrofitted would be retired, repurposed, or operated under speed restrictions for up to five years, based on packing group assignment of the lading.

PENDING CALIFORNIA LEGISLATION

SB 1319 is a bill authored by Senator Pavley with co-authors Senators Lara and Wolk. The bill would direct the Governor to require the administrator for oil spill response appointed by the Governor to amend the California oil spill contingency plan to provide for the best achievable protection of all state waters, not solely coastal and marine waters, and to submit the plan to the Governor and the Legislature on

or before January 1, 2017. The bill would require the regulations to provide for the best achievable protection of all waters and natural resources of the state.

The bill will require, if passed, that the oil spill contingency plan contain a regional and local planning element that shall provide the framework for the involvement of regional and local agencies in the state effort to respond to an oil spill, and shall ensure the effective and efficient use of regional and local resources, as appropriate, in all of the following:

1. Extends the Office of Spill Prevention and Response (OSPR) marine oil spill program to all waters of the state.
2. Extends the requirements in the OSPR oil spill program (including oil spill contingency plan requirements, financial assurance requirements, oil spill reporting requirements, civil and criminal liability), to trains transporting oil, oil pipelines, oil production wells, and oil refineries.
3. In addition to the existing requirements for an oil spill contingency plan, requires a rail to include all of the following in a plan:
 - a. A list of the types of train cars that may make up the consist;
 - b. A list of the types of oil and petroleum products that may be transported;
 - c. A map of track routes and facilities; and
 - d. A list, description, and map of any prestaged spill response equipment and personnel for deployment of the equipment.
4. Requires, as part of the California Oil Spill Contingency Plan, that the regional and local planning element provide provisions regarding the "identification and mitigation of public health and safety impacts."
5. Requires OSPR, in consultation with the appropriate local, state, and federal regulators, to conduct a comprehensive risk assessment of nonvessel

modes of transportation of oil and identify those operations that pose the highest risk of a pollution incident in state waters.

6. Requires OSPR to conduct a study and evaluation to improve response activities for inland areas of the state. Requires the study to include an analysis of likely spill scenarios, response requirements for oil of varying properties and urban, rural, and sensitive environments, and spill response equipment and resources.
7. Declares that it is the policy of the state that communities that face significant risks associated with the transport or planned transport of significant quantities of oil through or near those communities be notified of the quantities and properties of the oil in a timely manner. Requires OSPR to obtain and make publicly available, as allowed pursuant to existing state and federal law, previously filed information related to the transport of oil through, near, or into communities.
8. Adds four members to the TAC: a person with demonstrable knowledge of environmental protection and the study of ecosystems, a person with demonstrable knowledge of the railroad industry, and a person with demonstrable knowledge of the oil production industry.

⁶On March 9, 2011 AAR submitted petition for rulemaking P-1577, which was discussed in the ANPRM. In response to the ANPRM, on November 15, 2013, AAR and ASLRAA submitted as a comment recommendations for tank car standards that are enhanced beyond the design in P-1577. For the purposes of this rulemaking this tank car will be referred to as the "AAR 2014 tank car." See <http://www.regulations.gov/#!documentDetail;D=PHMSA-2012-0082-0090>.

⁷In 2011, the AAR issued Casualty Prevention Circular (CPC) 1232, which outlines industry requirements for additional safety equipment on certain DOT Specification 111 tanks ordered after October 1, 2011, and intended for use in ethanol and crude oil service.

9. Requires the CPUC to conduct expanded focused inspections, either in coordination with the FRA or as the CPUC determines to be necessary, of bridges and grade crossings over which oil is being transported and oil unloading facilities, including movement within these facilities and onside storage. Requires the expanded focused inspection program to target bridges, grade crossings, and oil unloading facilities that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density.
10. Authorizes the CPUC to regulate essential local safety hazards for the transport of oil more stringently than federal safety regulation.

AB 380, is a bill authored by Assembly-member Dickson. The bill would require the railroads to send data to the Office of Emergency Services on 25 hazardous materials that are shipped by rail. The Office of Emergency Services would require that this information be given to the appropriate Unified Program Agency. The bill also requires that the railroads estimate the amount of Bakken crude being shipped over a six-month period, and identify the counties where the shipments will pass through. The Office of Emergency Services will be required to send the information to the appropriate Unified Program Agencies.

1. Require railroads to provide to the Governor's Office of Emergency Services, on a quarterly basis, data for the 25 largest hazardous material commodities and crude oil or oil cargo transported through California. This data includes the type and amount of material and the carload type as broken down by county and track route. The Office of Emergency Services will be required to disseminate relevant information to Certified Unified Program Agencies (CUPAs) that may be impacted by a hazardous spill.
2. The bill would require a rail carrier to prospectively

- estimate and submit to the office notification of the weekly movements of trains through a county, as specified. The bill would require a rail carrier to update that notification once every 6 months. The bill also would require a rail carrier to update and notify the office within 30 days of the rail carrier determining that there will be a material change in the estimated volume of Bakken oil, as defined, plus or minus 25% per week relative to the most recent estimate previously submitted to the office.
3. Require railroads to maintain an emergency response communication center that can provide information on train composition in the event of a hazardous material spill.
4. Require railroads to provide the Office of Emergency Services a summary of the carrier's Hazardous Materials Emergency Response Plan. The Office of Emergency Services is required to provide a summary of the Plan to impacted CUPAs.



A crude oil train travels across the Clear Creek Trestle in Plumas County, California and through the Feather River Canyon on June 5, 2014.

OIL BY RAIL SAFETY IN CALIFORNIA PRELIMINARY FINDINGS AND RECOMMENDATIONS

STATE OF CALIFORNIA INTERAGENCY RAIL SAFETY WORKING GROUP—JUNE 10, 2014

The Governor established an interagency working group to research rail safety in California and report to him the findings of the workgroup. On June 10, the working group issued preliminary

findings in a twenty page report. Below are the recommendations from the working group:

1. Increase the Number of California Public Utilities Commission Rail Inspectors
2. Improve Emergency Preparedness and Response Programs
 - a. Expand the Oil Spill Prevention & Response Program to Cover Inland Oil Spills
 - b. Provide Additional Funding for Local Emergency Responders
 - c. Review & Update of Local, State and Federal Emergency Response Plans
 - d. Improve Emergency Response Capabilities
 - e. Request Improved Guidance from United States Fire Administration on Resources Needed to Respond to Oil by Rail Incidents
 - f. Increase Emergency Response Training
3. Request Improved Identifiers on Tank Placards for First Responders
4. Request Railroads to Provide Real-Time Shipment Information to Emergency Responders
5. Request Railroads Provide More Information to Affected Communities
6. Develop and Post Interactive Oil by Rail Map
7. Request DOT to Expedite Phase Out of Older, Riskier Tank Cars
8. Accelerate Implementation of New Accident Prevention Technology
 - a. Positive Train Control
 - b. Electronically-Controlled Pneumatic Brakes
9. Update California Public Utilities Commission Incident Reporting Requirements
10. Request Railroads Provide the State of California with Broader Accident and Injury Data
11. Ensure Compliance with Industry Voluntary Agreement
 - a. Increased Track Inspections

- b. Braking Systems
 - c. Use of Rail Traffic Routing Technology
 - d. Lower Speeds
 - e. Increased Trackside Safety Technology
12. Ensure State Agencies Have Adequate Data

CALIFORNIA RAILWAYS



CONTRA COSTA COUNTY OVERSIGHT

THE COUNTY’S AND RICHMOND’S INDUSTRIAL SAFETY ORDINANCES

The unloading of Bakken crude oil at the petroleum refineries from trucks, railcars, barges, and ships and storage of the Bakken crude would be covered under the County’s and the City of Richmond’s Industrial Safety Ordinances. The unloading of the crude would be required to meet all the requirements of the Industrial Safety Ordinances, including Inherently Safer Systems, Human Factors, Process Hazard Analysis, and the other prevention elements of the ordinance. If there are railcars being stored at the refineries with Bakken crude oil, the railcars would also be subject to the Industrial Safety Ordinances. When a material is in transportation it is not covered under the Industrial Safety Ordinances. Locations where crude oil is

off loaded from train cars into storage tanks and then into either pipelines or trucks are not covered under the Industrial Safety Ordinances.

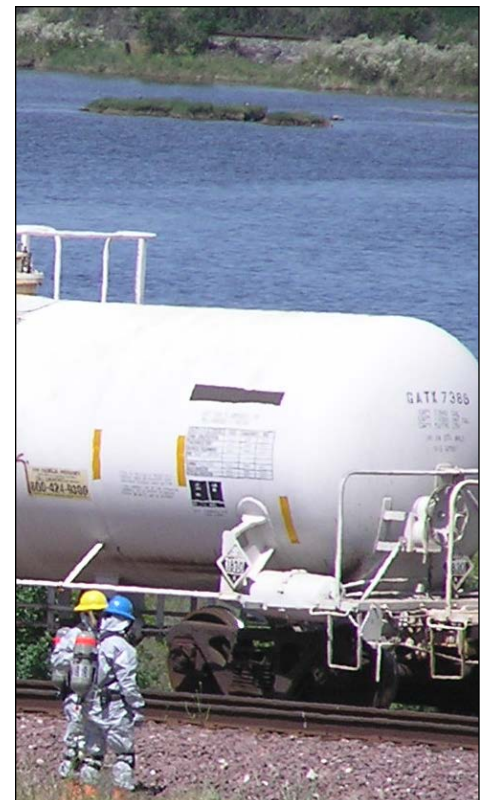
CONTRA COSTA COUNTY’S RESPONSE CRUDE TRAIN DERAILMENT

Contra Costa County has more resources than most of the jurisdictions in California. These resources include the fire departments and districts in the County that have some familiarity with petroleum and petroleum products. The fire departments and districts have performed drills and exercises with the refineries on incidents that may occur at a petroleum refinery. Oil spill exercises on the bay or delta have been done in cooperation with the refineries, Oil Spill Prevention and Response, the Coast Guard, and other response agencies. Petrochemical Mutual Aid Organization (PMAO) is an organization under the Contra Costa County CAER Group and is made up of the refineries, Dow, and emergency response agencies. PMAO has resources that are available, such as personnel, foam, and equipment that can be used in response to an oil spill or fire. Three hazardous materials response teams, including Contra Costa Health Services, Richmond Fire Department, and San Ramon Valley Fire Protection District are available to respond to an oil spill and/or fire.

ACTIONS CONTRA COSTA COUNTY CAN TAKE TO ADDRESS THIS ISSUE

1. Support the passage of SB 1319 and AB 380 (On July 8, 2014 the County’s Board of Supervisor approved supporting these two bills);
2. Training - Fire department and hazardous material response teams participate in training that is being provided for responding to crude train derailments;
3. Support and encourage the DOT to issue new regulations on phasing out the use of DOT-111 railcars for shipping light crude, including a timetable for the phase out, requiring that

- hazardous material shipments by rail are done using the safest routes, requiring that the light ends of crude oil be removed before shipping, and making public what hazardous materials are being shipped throughout the United States by County and track;
4. Conduct drills with PMAO, OSPR, and other emergency response agencies;
 5. Work with the different railroad companies to learn their emergency contacts and what resources are available to respond to a spill;
 6. Request that CPUC determine the lowest speed that is feasible in areas of the greatest concern, such as sensitive environmental, urban, and difficult rail arrangements; and
 7. Endorse the State of California Interagency Rail Safety Working Group’s “Oil by Rail Safety in California” report recommendations.



For more information, visit <http://www.cchealth.org/hazmat>