

# Crude by Rail in the Bay Area

LWV Berkeley-Albany-Emeryville

Environmental Affairs

January 12, 2015

# Some Definitions

- Unit train - A train of approximately 100 cars carrying the same commodity
- Sweet or sour crude - refers to sulfur level; sour has the most sulfur
- Light or heavy crude - refers to the amount of “light ends” in the crude, which are the most volatile components and easiest to distill
- Bakken - a geologic formation, mostly in North Dakota, producing light crude by “fracking”

# Definitions, continued

- Fracking - Hydraulic fracturing: injecting steam, water and various chemicals to loosen underground crude deposits and allow extraction
- Tar sands - extremely heavy crude oil (bitumen) mixed with sand, extracted with steam or surface pit mining, diluted with chemicals to transport; current source is Alberta, Canada
- Factoid: One rail car carries the same amount of crude oil as 30 tanker trucks (600-700 barrels of oil, up to 3 million gallons)

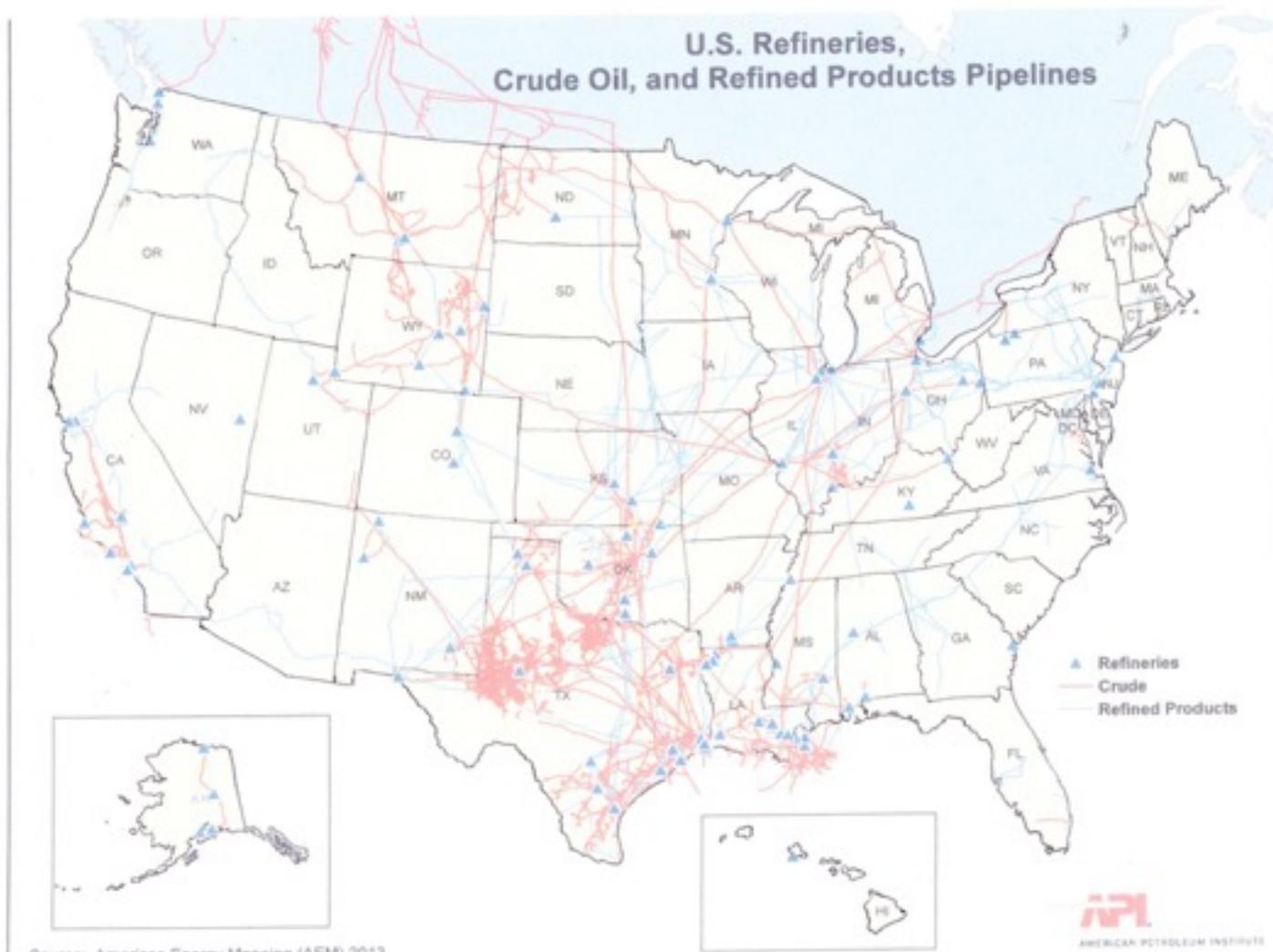
# The Old Days (pre-2013)

- Past crude sources for CA refineries:
  - San Joaquin oilfields (Kern Co), shipped by pipeline within the state
  - Santa Barbara offshore wells, shipped by pipeline
  - Alaska, via pipeline and then tanker ship
  - Non-US sources (Mexico, Venezuela, Mid-East), mostly shipped by marine tankers
- Rail cars previously carried some crude oil, and other hazardous materials, in “mixed” trains, interspersed with other freight for safety

# What Changed?

- Fracking the Bakken - lots of crude looking for new markets
- Tar sands extraction - another major source of heavy crude requiring new transportation techniques and new markets
- Both new sources were landlocked and not close to most existing pipelines
- Pipelines are difficult to site and expensive to build, making them a risky investment for a new unproven source of crude

# You Can't Get There From Here



# You Can't Get There From Here

Source: American Petroleum Institute



# Market Forces in Play

- Bakken wells were successful enough so producers could cut price, making crude + rail shipment competitive with marine shipments
- Burlington Northern (BNSF) jumped into shipping crude
  - East Coast, including PA, via Albany NY
  - Pacific NW -- Puget Sound, Columbia River, terminals proposed in Coos Bay, OR and Grays Harbor, WA
  - Both directly to refineries and also to terminals for shipping via tanker ship

# Bay Area Refineries Adapt

- Shell eliminating unit used for heavy (San Joaquin) crude processing
- Chevron modernization project to improve processing of heavy crude
- So far only one refinery (Tesoro) getting direct crude-by-rail (CBR) - delivered to Richmond and trucked to Martinez
- Some may be getting CBR indirectly (via pipeline or ship for final leg)

# Bay Area Refineries

- Chevron (Richmond) - no CBR, no plans
- Phillips 66 (Rodeo) - no direct CBR, no plans, does not process crude (but linked to Santa Maria refinery by pipeline)
- Shell (Martinez) - no CBR, no plans (but WA refinery is terminal that ships to Mtz)
- Tesoro (Martinez) - CBR to Richmond terminal
- Valero (Benicia) - proposal for CBR under review

# Proposals Could Affect Region

- WesPac (Pittsburg) - Proposal to bring crude by marine tanker or CBR (up to 100 cars/day) to store and ship out by pipeline to Bay Area refineries
- Valero (Benicia) - Two trains/day, 50 cars each
- Phillips 66 (Santa Maria) - Trains of up to 70 cars several times/week. One route could be through East Bay (other through SoCal).

# The Complex Issue of Risk

- What level of risk is acceptable to us?
- What level of risk are we being exposed to with CBR shipments to or through the region?
- Are there **acceptable** alternatives that would remove or reduce CBR shipments in the region?
- Can the level of risk be reduced in other ways? How?
- Are there other factors to consider, e.g. global warming?

# Known Risks of CBR

- Nature of crude
  - Bakken is highly volatile & flammable due to “light ends” not stripped from crude - history of explosive accidents (Lac Megantic, etc.)
  - Federal Railroad Authority has already required new shipping procedures for Bakken, including better description of cargoes
  - Tar sands oil is so heavy that spills seek the lowest point, including bottom of waterways, and cannot be skimmed

# Known Risks of CBR

- Rail equipment
  - DOT-111 railcars not designed for highly volatile and flammable crude oil
  - Some retrofits already made by railroads - better cars required already in Canada (CPC-1232)
  - New US federal regulations being adopted
  - Some shippers reluctant to purchase new cars or new cars not yet available

# BNSF Tank Car

**1. Reinforced hull**  
Thicker steel plates make them more puncture-resistant

**2. Breakaway handles**  
Valve handles on the bottom of the car snap off in a crash, keeping them from opening

**3. Protective cap**  
Reinforced fittings prevent oil from spilling in a rollover

**4. Pressure relief valve**  
Gas can escape rather than build up, if the car heats up in a fire

**5. Protective shields**  
Steel plates stop the car from crumpling in a collision

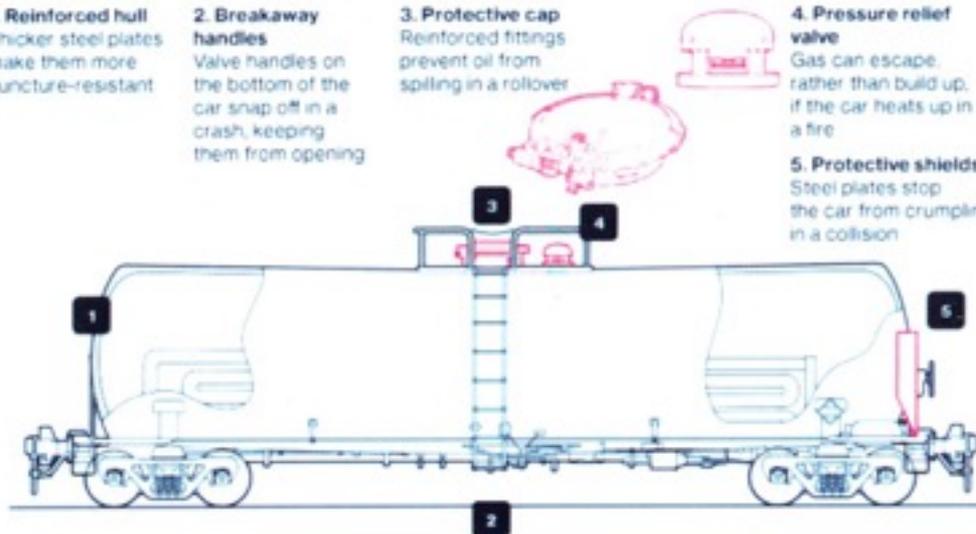
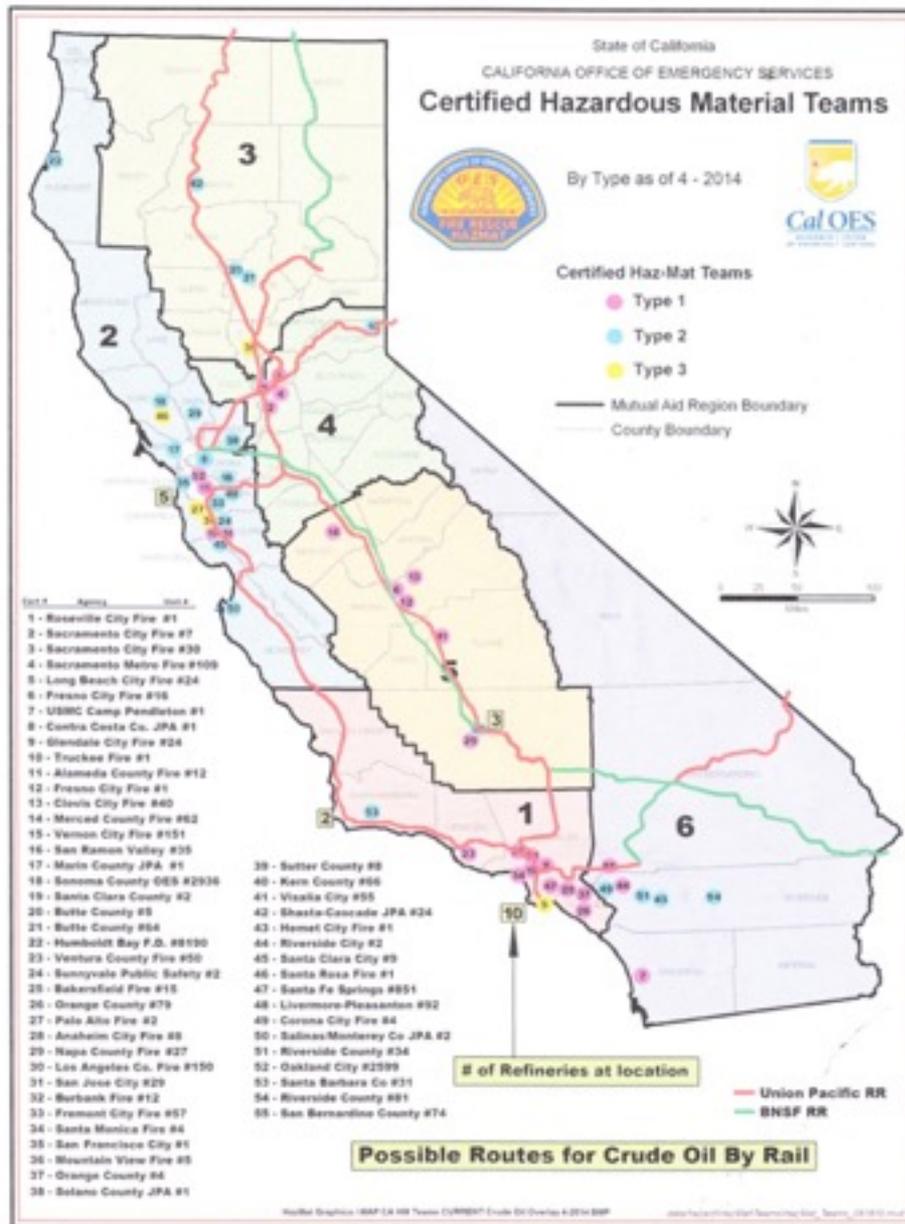


ILLUSTRATION BY CHRIS PHILPOT, GRAPHIC BY BLOOMBERG BUSINESSWEEK

# Known Risks of CBR

- Railroad procedures:
  - Poor track conditions, heavy trains increase derailment risk, leading to spills and fires
  - Railroads have agreed to increased inspections and more intensive track maintenance programs
  - Railroads have agreed to decrease speed in urban areas to 40 mph (already done for other hazmat)
  - Railroads have agreed to use routes that bypass urban areas (already done for other hazmat)



HazMat  
Responders  
in state  
not ready for  
CBR

# Known Risks of CBR

- Emergency response shortfalls:
  - Volume of crude involved may far outstrip available firefighting supplies and equipment
  - Mutual aid takes time to arrive
  - Types of crude may not match spill cleanup capabilities - too heavy, on ground not water
  - Inability to predict likely locations and plan/drill for response due to lengthy routes, multiple communities



## Oil by Rail Safety in California

Preliminary Findings and Recommendations



A train of oil tank cars crosses the Clear Lake trestle bridge in Butte County, California, through the Feather River Conservancy June 1, 2014.

State of California  
INTERAGENCY RAIL SAFETY WORKING GROUP | June 10, 2014

<http://www.caloes.ca.gov/HazardousMaterials/Pages/Oil-By-Rail.aspx>

# Acceptable Alternatives?

- No CBR to Bay Area refineries (refiners would have to agree, no way to impose)
  - Refiners using Bakken or tar sands crude would receive it via pipelines from terminals in Bakersfield or the Pacific Northwest
- No CBR on rail lines through Bay Area (would need changes in federal railroad regulations)
  - Probably not feasible and certainly a lengthy process involving Congress

# Can Risks Be Reduced?

- Some actions already taken by railroads & federal regulators
  - New rail car specifications
  - New shipping manifest requirements, testing of cargoes, etc.
  - Speed and route changes
  - Notification to state of shipment volume & frequency (trains carrying over 1 million gallons of Bakken crude)
  - Railroads providing training to emergency responders
- State actions already in place:
  - Increase in rail inspectors
  - New fees on rail shipments to pay for spill cleanup on ground rather than water

# Can Risks Be Reduced?

- Local actions:
  - Local terminals may need permits (land use, air) that can impose conditions to improve safety
  - Emergency responders can use state data on shipments (railroads are now required to provide, also in CEQA docs for new projects) to plan and budget for needed equipment, mutual aid
  - Public pressure can be maintained on refiners to avoid bringing CBR into Bay Area directly and to fully address risks in proposals for CBR shipments
  - Support adequate monitoring and oversight

# Constraints on Action

- Railroads subject only to federal regulation
- Multiple communities with varying risks (some en route, some terminals)
- Limited LWV positions addressing transportation of hazardous materials including crude - but other positions may be useful

# Other LWVs Have Commented

- LWV Bellingham/Whatcom County (WA) has spoken on the public's right to be informed about hazardous materials in their communities, including comments about inadequate information provided when approving projects such as oil terminals
- LWV Oregon testified in favor of a measure, HJM 201, to require safer standards for new and existing tank rail cars, based on LWV support for pollution prevention.
- LWV Washington “called for a broad examination that takes into account the effect of burning more oil on climate change.”
- LWV Grays Harbor (WA) has held community town hall meetings on oil train concerns (multiple online citations).
- LWV Albany County (NY) has been very active in requesting better community information regarding oil shipments and processing at the Port of Albany. Specifically, the LWV has said that the Department of Environmental Conservation “failed to follow its policies that require public participation in proposals early on as a way to promote ‘economic justice’ for poor and minority communities.”

INSIDE: AN ESSAY ON THE SUBURBANISATION OF THE WORLD

The  
Economist

DECEMBER 8TH-12TH 2014

[economist.com](http://economist.com)

Technology Quarterly

Shinzo Abe's last chance

Boost your business with a drone

P.D. James, queen of the sleuths

Our books of the year

# Sheikhs v shale

The new economics of oil



# Now What?

# Crystal Ball Time

- Bakken field is maturing, some byproducts including light ends are now being used locally, new refinery to be constructed soon
- Shift in world oil markets are making Bakken wells less financially viable, at least short-term
- Alberta tar sands are long-term investment, crude will eventually find its way through pipelines (Keystone, TransMountain)
- Additional fees and regulations imposed on shipment of Bakken crude may make it less economically desirable than other crudes (but some of those also need rail shipment)
- Mexico is increasing output again and is close to CA
- New BAAQMD emissions rule (20% refinery emissions reduction) may impact choice of crudes (“slate”) in local refineries

# Some Additional Links

- [http://www.energy.ca.gov/2014\\_energypolicy/documents/index.html#06252014](http://www.energy.ca.gov/2014_energypolicy/documents/index.html#06252014) [links to transcript, audio and PDF Powerpoints from CEC multi-agency workshop on Trends in Sources of Crude Oil, Berkeley, June 2014]
- <http://beniciaindependent.com/> [general CBR info and updates on Valero proposal]
- <http://www.ci.benicia.ca.us/index.asp?SEC={FDE9A332-542E-44C1-BBD0-A94C288675FD}> [City of Benicia site for Valero proposal information]

# More Additional Links

- <http://pittsburgdc.org/> [Pittsburg Defense Council, opposed to WesPac terminal]
- <http://www.ci.pittsburg.ca.us/index.aspx?page=700> [City of Pittsburg info on WesPac]
- <http://Oregonlive.com> [Portland Oregonian - search on oil trains for huge list of articles about CBR in the Northwest]

# Q & A Time

- My information:

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Member of LWV Hazardous Materials study committees for LWVBA and LWVC in mid-1980s

Member of UC Toxics Substances Research & Teaching Program Advisory Committee for over 10 years (1990s)

Member of Contra Costa Hazardous Materials Commission (advisory to Board of Supervisors) since 1985