



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

**AGENDA: 4**

# **Bay Area Energy Projects**

## **Stationary Source Committee**

**April 21, 2014**

**Jeff McKay**

**Deputy Air Pollution Control Officer**



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# OUTLINE

---

- Review of Relevant Emission Source Types
- Description of Emissions from Proposed Projects
- Status of each Project



# BAY AREA ENERGY PROJECTS

- Valero Crude by Rail Project (Benicia)
- WesPac Crude Oil Terminal (Pittsburg)
- Kinder Morgan Rail Operation (Richmond)
- Phillips 66: Propane/Butane Recovery (Rodeo)
- Chevron Hydrogen and Sulfur Recovery Project



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# BAY AREA ENERGY PROJECTS





BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Transport by Railcar Sacramento, CA



*Railcars and a truck transporting crude*



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# FLARING AT PHILLIPS 66

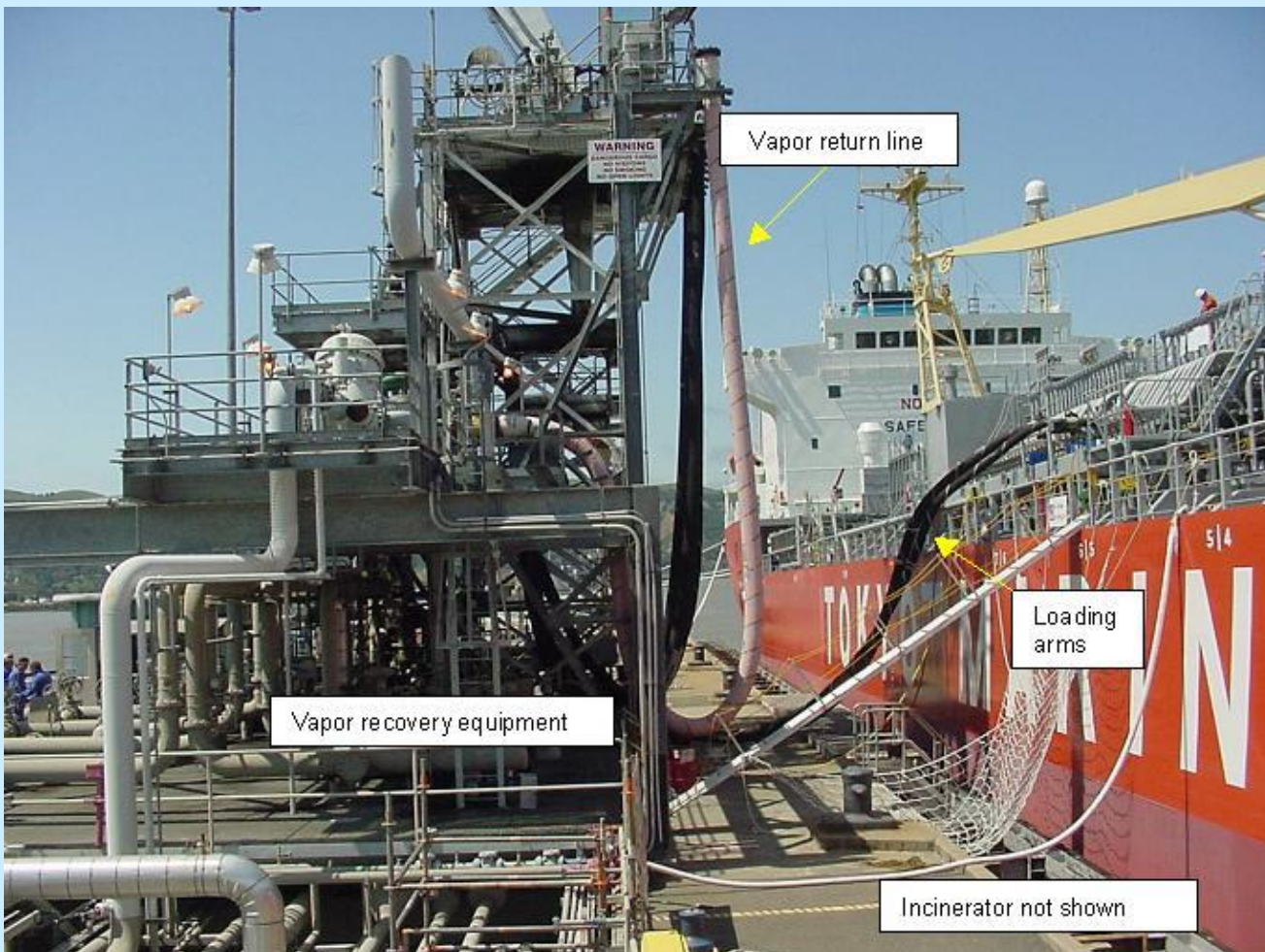


Excess refinery fuel gas is one of the reasons for flaring.



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Transport by Ship





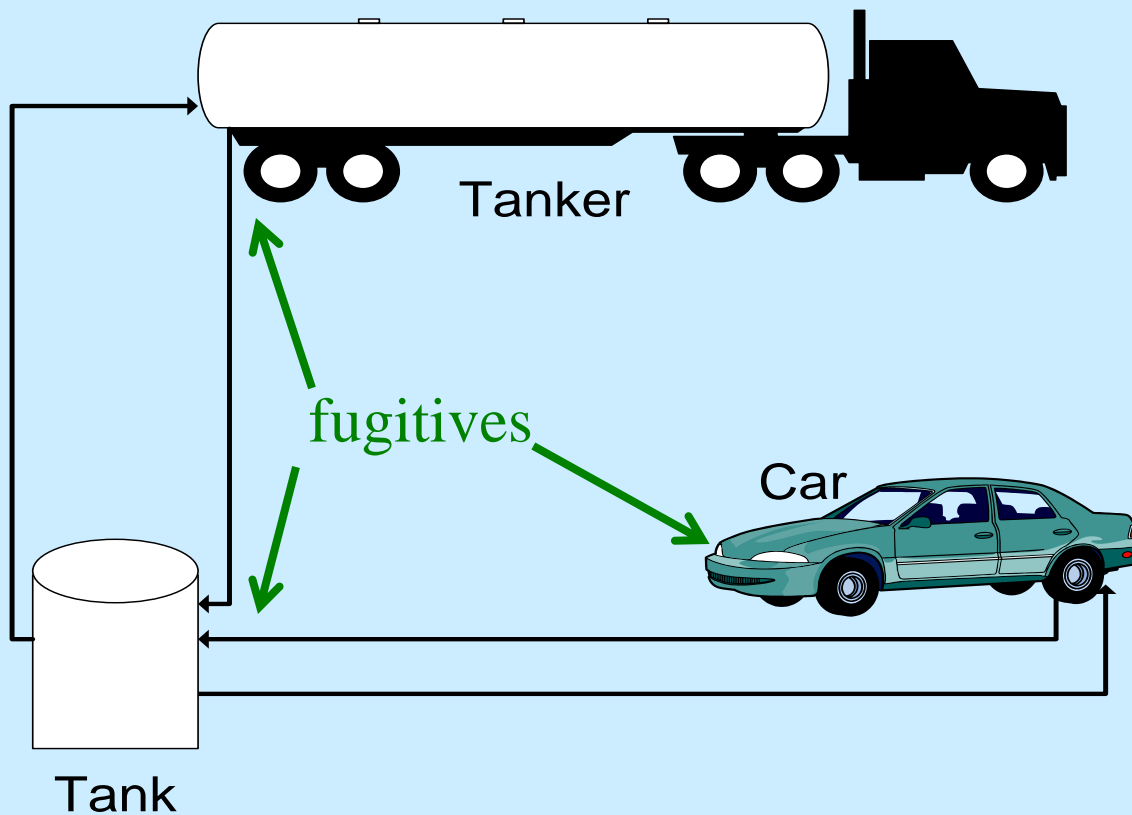
# EMISSIONS EXAMPLES

1. *Fugitive* Volatile Organic Compounds during transfer
2. Typical Bay Area refinery total *Processing* emissions
3. Ship Emissions associated with crude *Transport*





# GAS STATION



Size of GDF	Throughput (barrels / day)	Fugitive VOC (tons / year)
Smaller	100	0.5
Larger	800	4.2



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# REFINERY EMISSIONS

## Average Bay Area Refinery : tons / year

*Average throughput is 160,000 bbl/day*

- Volatile Organic Compounds (VOC) 900
- Nitrogen Oxides (NO<sub>x</sub>) 800
- Sulfur Dioxide (SO<sub>2</sub>) 500
- Greenhouse Gases (CO<sub>2</sub>e) 3 M



# SHIP TRANSPORT EMISSIONS

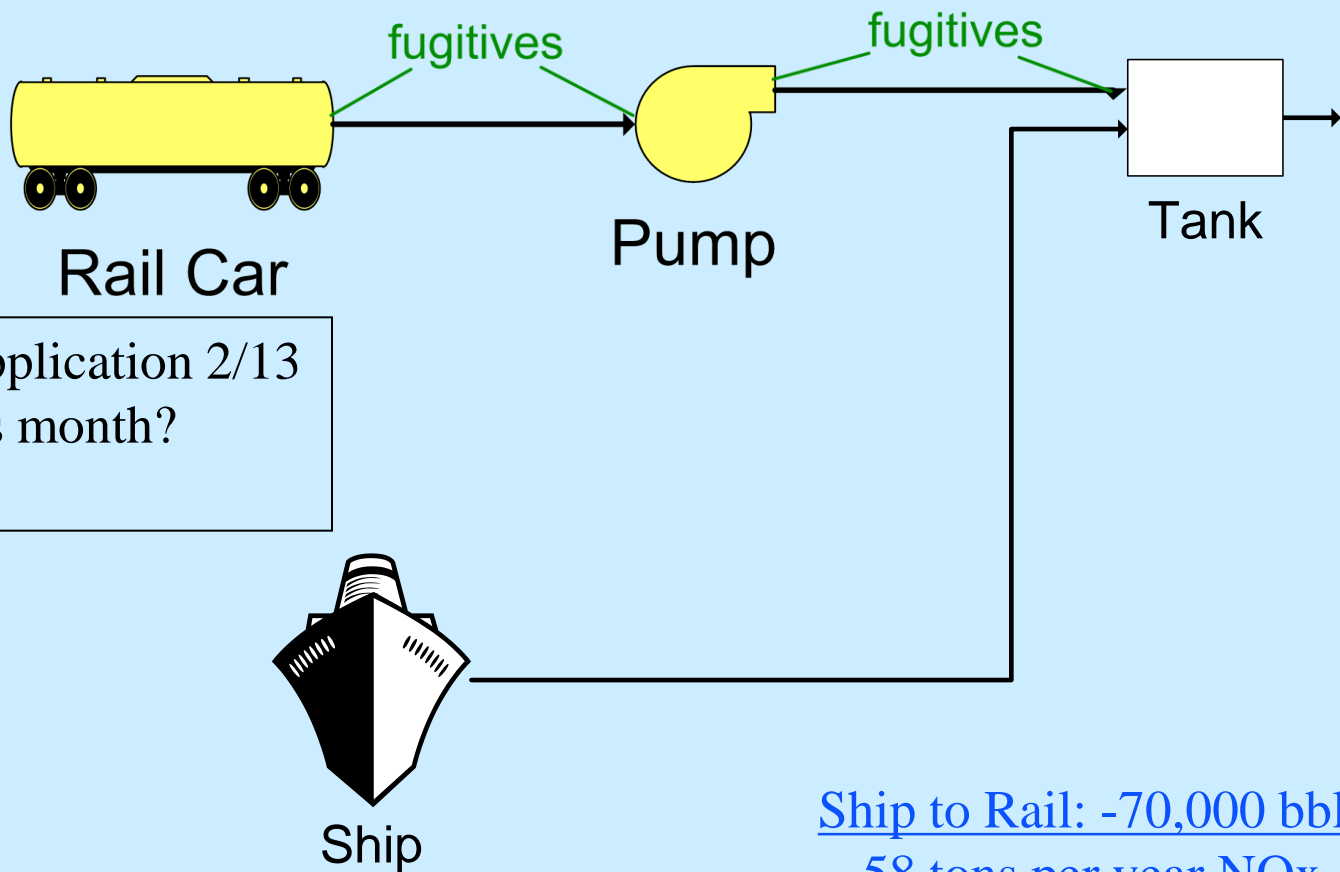
*Typical Marine Terminal tanker transit within Bay Area  
(single terminal)*

	bbl / day	NOx (tpy)	SO2 (tpy)	VOC (tpy)	GHG (tpy)
Marine Terminal	50,000	105	4	4	8,000



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# VALERO



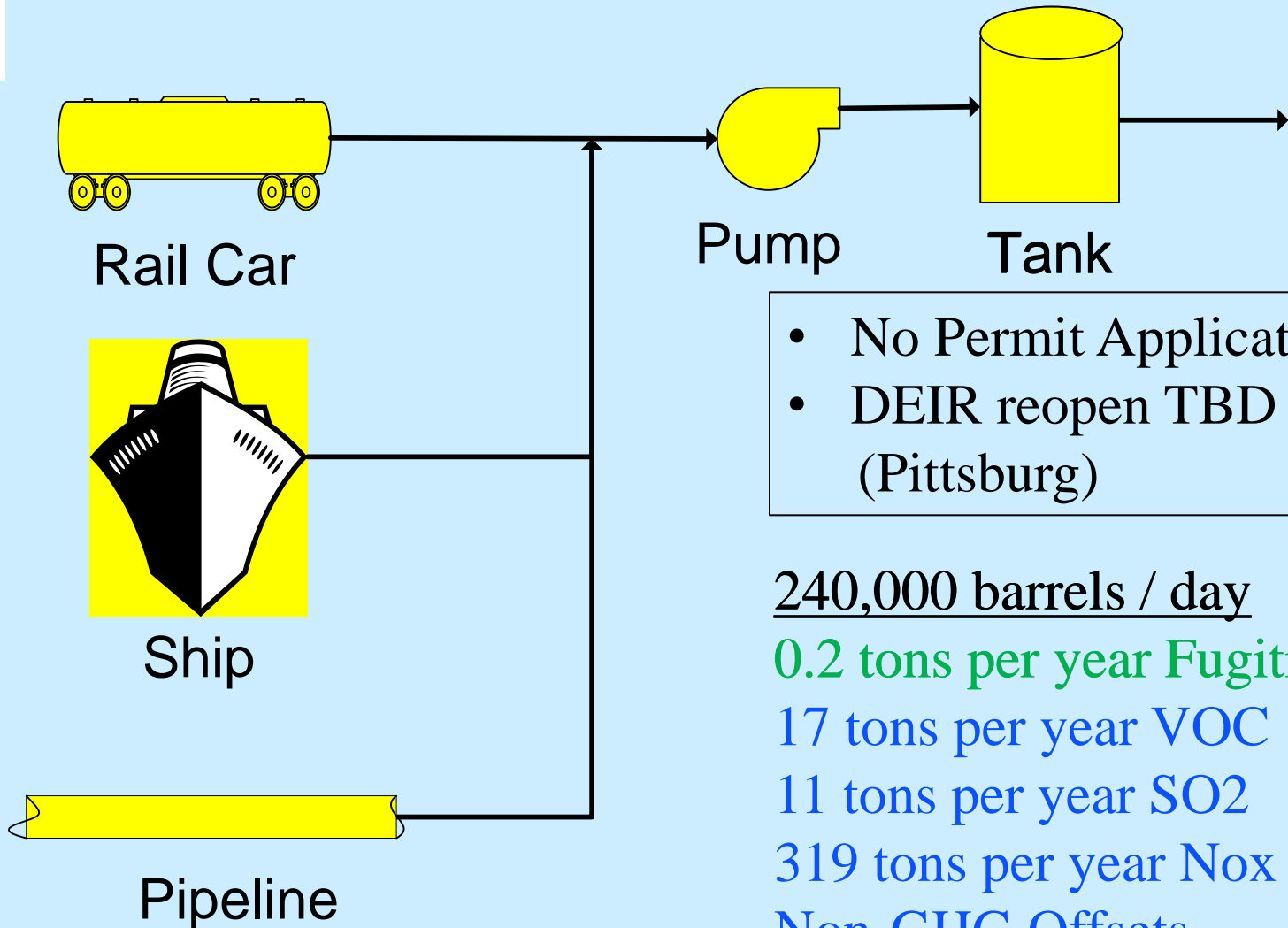
- Permit Application 2/13
- DEIR this month?  
(Benecia)

Project Fugitives  
+ 2 tons/yr VOC to be offset

Ship to Rail: -70,000 bbl/day  
- 58 tons per year NOx  
- 26 tons per year SO2  
- 3.5 tons per year VOC  
- 4000 tons per year GHG



# WESPAC



- No Permit Application
- DEIR reopen TBD (Pittsburg)

240,000 barrels / day

0.2 tons per year Fugitive

17 tons per year VOC

11 tons per year SO<sub>2</sub>

319 tons per year Nox

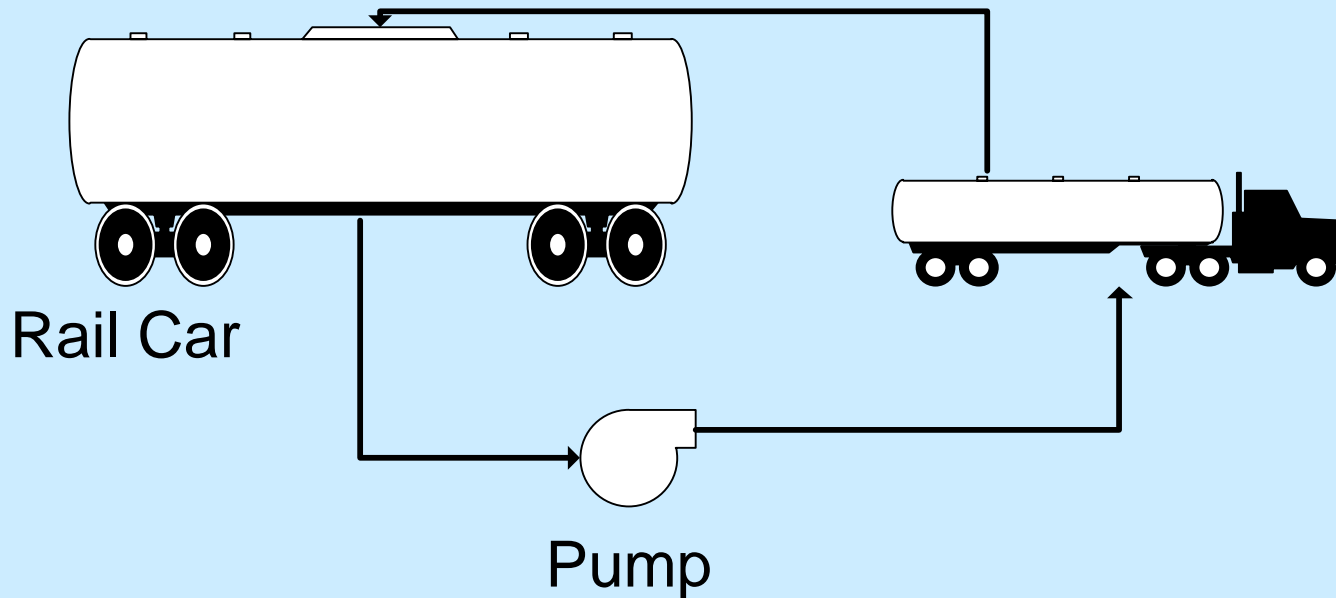
Non-GHG Offsets

33,000 tons per year GHG



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# KINDER MORGAN



## Rail

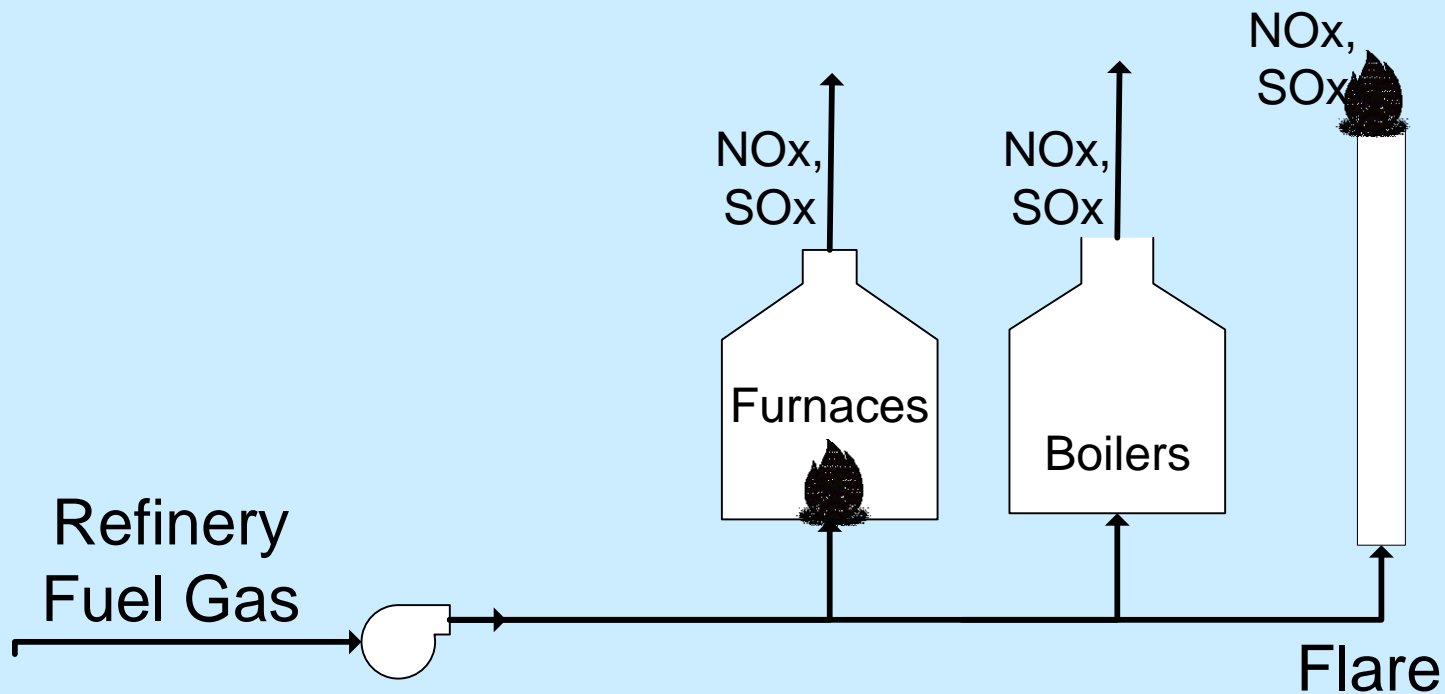
22 tons per year NO<sub>x</sub>  
0.4 tons per year SO<sub>2</sub>  
1.2 tons per year VOC

Permit Limit: 16,000 bbl / day  
4.8 tons / yr Fugitive VOC



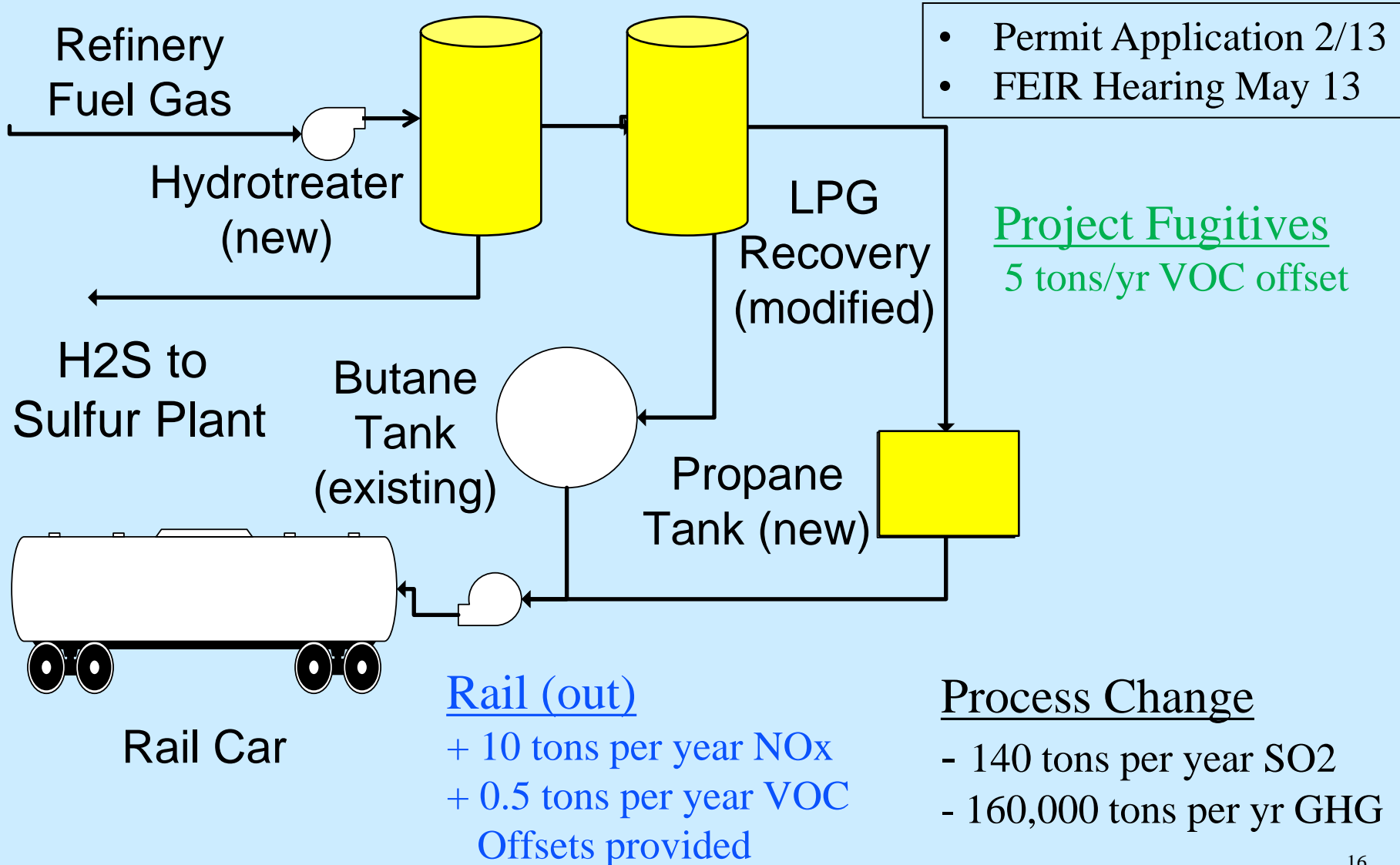
BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# PHILLIPS PROPANE BUTANE

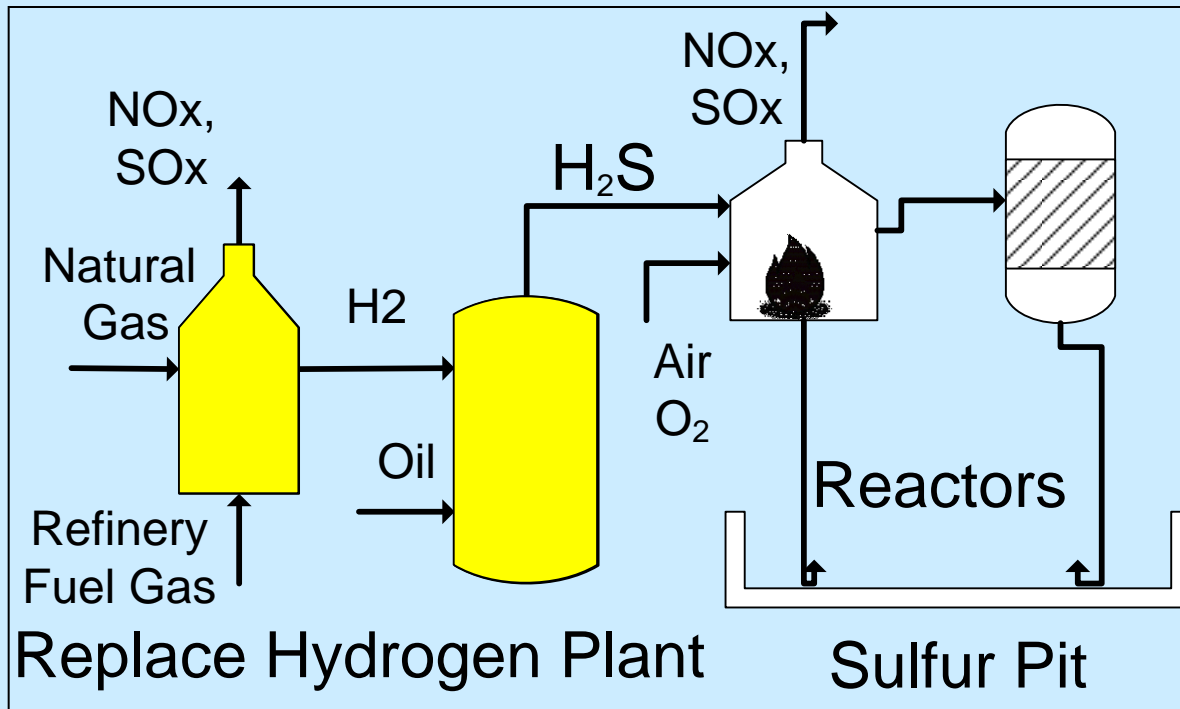


- Methane
- Propane
- Butane
- Trace H<sub>2</sub>S

# PHILLIPS PROPANE BUTANE







- Permit issued 2008
- EIR Comments May 2 (Richmond)

## DEIR Requirements: No Net Increase

- Throughput capacity unchanged
- Fewer and cleaner ships and tugs
- Domed tanks
- Low NO<sub>x</sub> burners retrofit
- Solar energy (2 MW)

## Permit Limits At Capacity

10 tons per year Fugitive

32 tons per year VOC

59 tons per year SO<sub>2</sub>

93 tons per year NO<sub>x</sub>

Non-GHG Offset

1.1 M tons per year GHG

# Regional Emissions from Transportation of Crude Oil and Liquid Fuels - Select Bay Area Energy

Tons per year

	NOX	SOX	VOC	GHG	FUG
<b>Valero</b>	-58	-26	-3.5	-4000	2
<b>Wespac</b>	319	11	17	33000	0.2
<b>KM</b>	22	0.4	1.2		4.8
<b>Phillips</b>	10	-140	5	-160000	5
<b>Chevron</b>	93	58	32	1100000	10
	<b>386</b>	<b>-96.6</b>	<b>51.7</b>	<b>969000</b>	<b>22</b>

	NOX	SOX	VOC	GHG	FUG
<b>Valero</b>	-58	-26	-3.5	-4000	2
<b>Wespac</b>	319	11	17	33000	0.2
<b>KM</b>	22	0.4	1.2		4.8
<b>Phillips</b>	10	-140	5	-160000	5
<b>Chevron</b>					
	<b>293</b>	<b>-154.6</b>	<b>19.7</b>	<b>-131000</b>	<b>12</b>



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Continuing Updates

- Updates to the Air District Board will continue on a regular basis



# CRUDE by RAIL

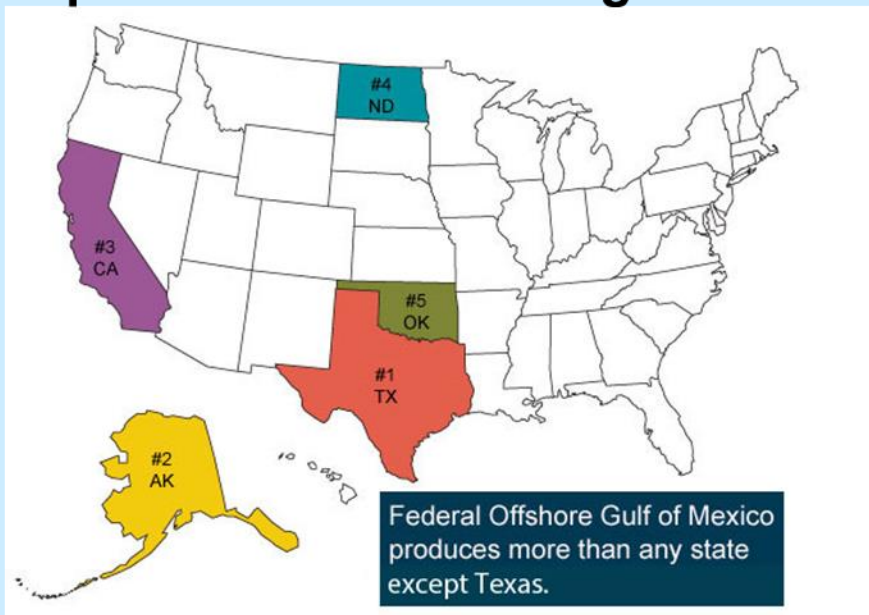
- Generally displaces crude delivered by ship
- Domestic source often less expensive
- Relatively flexible source and destination



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# US CRUDE OIL PRODUCTION

## Top Crude Oil Producing States

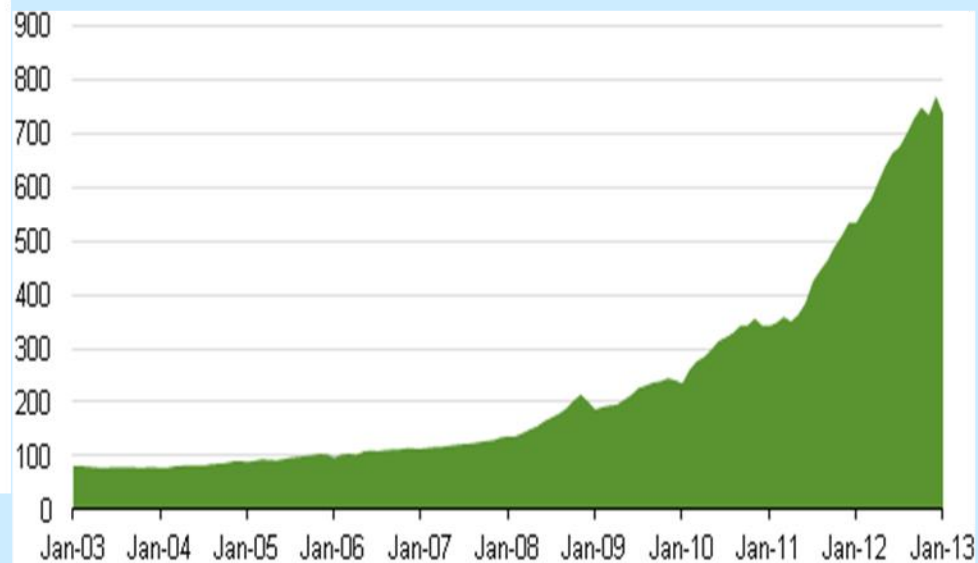


### Top U.S. Crude Oil Producers in 2012:

- |                    |     |
|--------------------|-----|
| 1. Texas:          | 31% |
| 2. Gulf of Mexico: | 20% |
| 3. North Dakota:   | 10% |
| 4. California:     | 8%  |

## North Dakota Monthly Oil Production

Thousand barrels per day



Source: North Dakota Oil Production Reaches New High in 2012, U.S. Energy Information Administration, March 18, 2013.



# FLASH POINT

## Highest to Lowest Flammability

	<b>Gasoline</b>	<b>Baaken Crude</b>	<b>Typical Crude*</b>
<b>Flash Point</b>	<b>- 45 F</b>	<b>- 31 F</b>	<b>20 F</b>

**Crude properties vary by oil field and wells within a field (-40 to 32 F)**

**\* Sweet Crude – Conoco Phillips MSDS**

**Other Canadian Crudes have a flashpoint of – 40 F.**

**North Slope Crude has a flash point of 25 F**

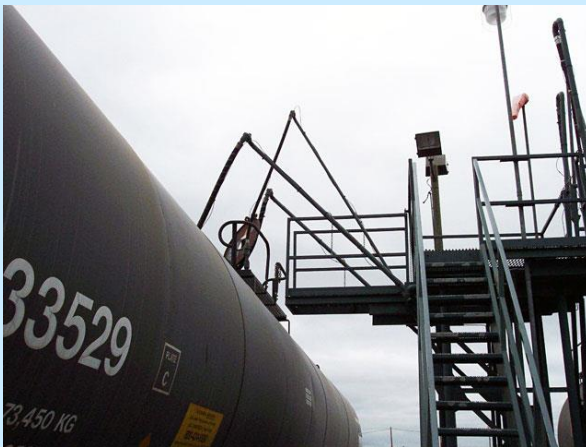
**Note:**

**Gasoline is the most flammable**



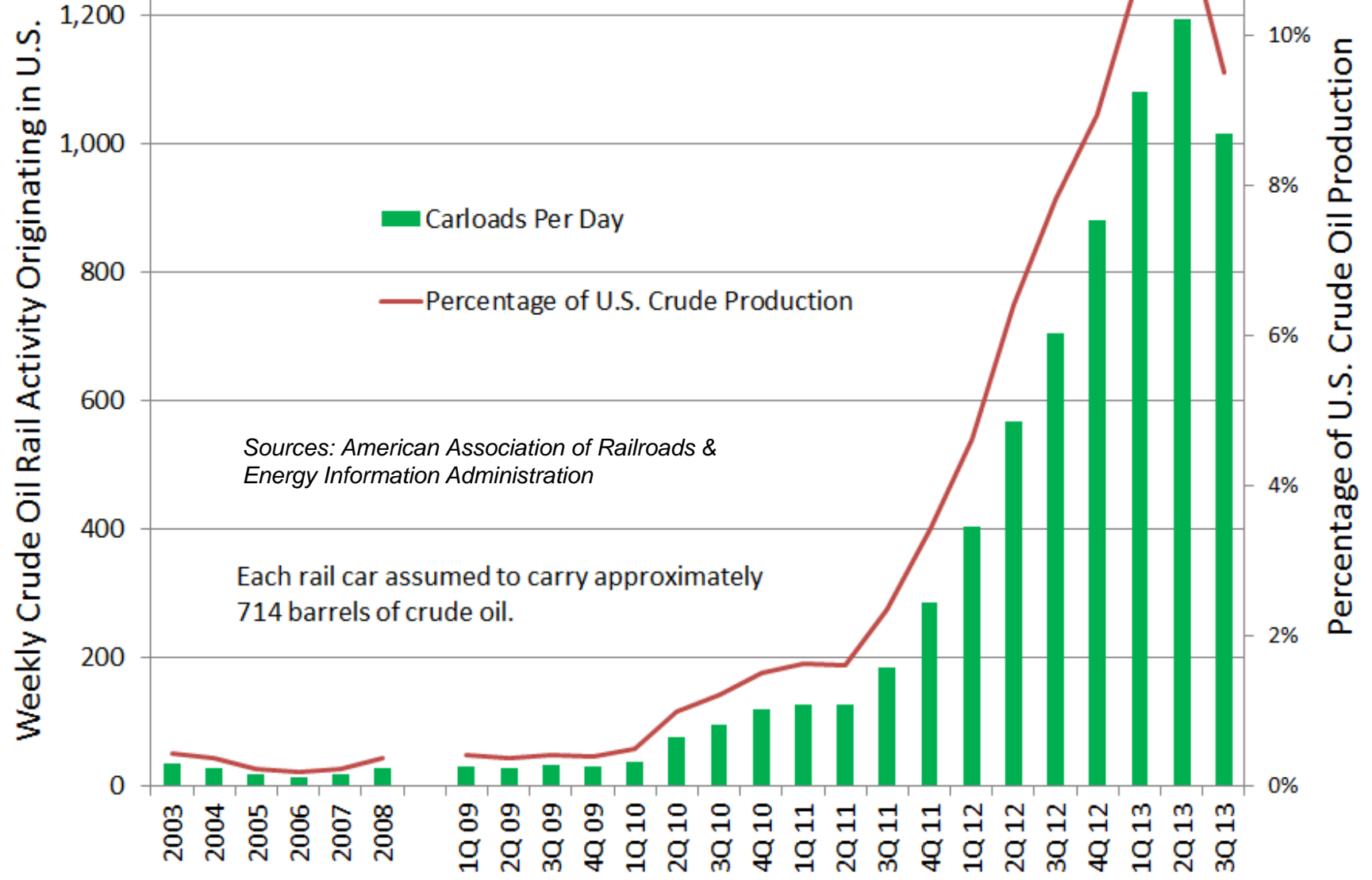
# Rail Logistics – Other Uses

- Refiners use rail cars to routinely ship propane and seasonally send out and receive butane
- Rail cars are also used to deliver refinery feedstock such as gas oils and sulphuric acid for alkylation units
- More recently, California refiners have started using rail cars to import crude oil from Canada and domestic sources outside the state due to changing trends of increasing oil production and discounted prices





# Crude-by-Rail Movements

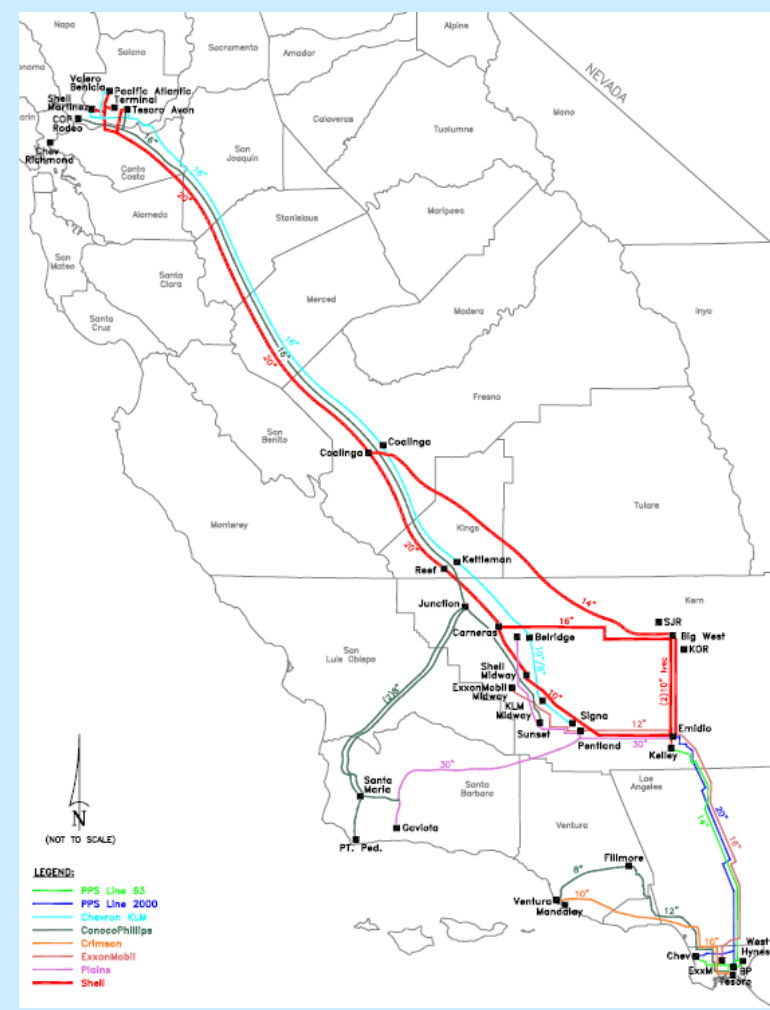






# Crude Oil Sources – Bay Area Refineries

- Northern California refineries processed 642.2 thousand barrels per day of crude oil during 2012
  - 316.0 TBD foreign marine imports
  - 247.8 TBD pipeline shipments
  - 77.8 TBD ANS marine imports
  - 0.6 TBD rail imports
- Bay Area refineries processed 39.5 percent of total crude oil
- Increased rail-by-crude likely to back out marine receipts of similar quality
- Rail capability increases flexibility to enhance supply options & reduces risk of crude oil receipt curtailment

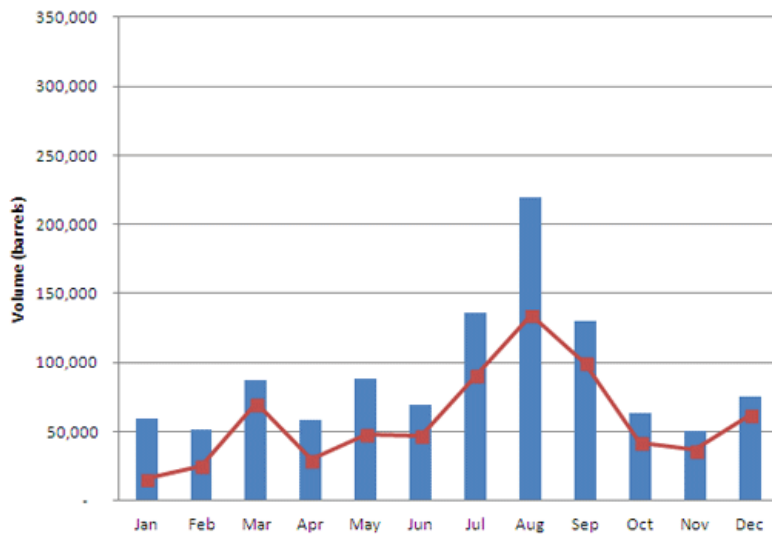


Source: Plains All American



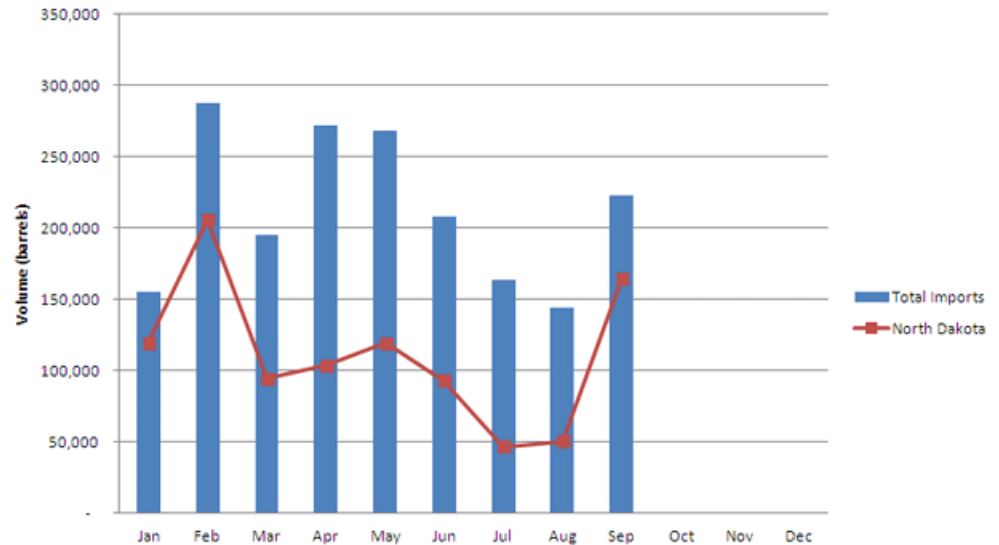
# California Crude-by-Rail Imports Grow

## 2012 Monthly Crude Oil Imports by Rail



Sources: PIIRA data, Energy Commission analysis

## 2013 Monthly Crude Oil Imports by Rail



Sources: PIIRA data, Energy Commission analysis

*Expectation that additional rail import projects will increase deliveries*



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

AGENDA: 5

# Update on Petroleum Refining Emissions Tracking Rule


Board of Directors  
Stationary Source Committee  
April 21, 2014

Brian Bateman  
Health & Science Officer



# Rule Development Process Milestones

- Oct. 2012: “Work Plan for Action Items Related to Accidental Releases from Industrial Facilities” adopted
- Mar. 2013: Workshop report and initial draft rule issued
- Apr. 2013: Public workshops held (Martinez, Richmond, District office – webcast)
- May 2013: Stationary Source Committee briefing
- Jul. 2013: Desert Research Institute (DRI) report on air monitoring finalized
- Jul. 2013: Expert Panel on air monitoring convened – webcast
- Sep. 2013: Draft refinery emissions inventory guidelines issued
- Sep. 2013: Stakeholder Technical Work Group meeting
- Jan. 2014: Revised draft rule and preliminary responses to comments issued
- Jan. 2014: Stakeholder Technical Work Group meeting
- Feb. 2014: Stationary Source Committee briefing
- May 2013 – Apr. 2014: Additional meetings with stakeholders held
- Apr. 2014: Stationary Source Committee briefing
- May. 2014: Stakeholder Technical Work Group meeting scheduled
- Oct. 2014: Anticipated timeframe for Board consideration of adoption

A scenic photograph of a white lighthouse perched on a rocky cliff overlooking the ocean. The sky is clear and blue, and the water is calm. The lighthouse is the central focus of the image, with a few small buildings nearby.

# Summary of Initial Draft Petroleum Refinery Emissions Tracking Rule

- Tracking component
  - Enhanced emissions inventory methodologies
  - Upgraded fence-line air monitoring systems
  - New community air monitoring systems
  - Process for public review and comment
- Control component
  - If annual emissions increase above baseline levels by more than specified trigger-levels, require refinery to develop and implement Emission Reduction Plan that includes feasible air emission reduction measures



# Summary of Public Comments

- Industry comments
  - Setting an emissions baseline imposes an arbitrary cap
  - Emission Reduction Plans
    - Too much uncertainty regarding what specific emission reduction measures may be required
    - Can't adequately evaluate impacts of potential emission reduction measures prior to rule adoption
- Environmental / Labor comments
  - Emissions baseline should reflect current refinery conditions
  - Don't allow use of Emissions Reduction Credits
  - Need more proactive approach
    - Track crude oil quality – any changes should trigger action
      - Up-front demonstration that no increase in emissions would occur



# Potential Revisions Being Considered

- Focus rule on tracking component
  - Establish Total Refinery Emissions Profile based on current refinery conditions and improved emissions inventory methodologies
  - High quality tracking data will inform staff of specific additional regulatory measures that may need to be developed
    - Allows cost effectiveness, and socioeconomic and environmental impacts, of required emission controls to be fully identified and considered prior to rule adoption
  - Add “up-front” tracking of crude oil quality
    - Allows staff to analyze whether any observed emissions increases are associated with changing crude slates



# Next Steps

- Continue discussions with stakeholders
- Finalize emissions inventory and air monitoring guidelines
- Hold another set of Public Workshops
- Complete analysis of socioeconomic and environmental impacts
- Complete staff report
- Hold public hearing for consideration of adoption