



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Petroleum Refining Emission Tracking Rule

AWMA Monitoring Workshop

November 5th and 6th, 2014

Sarnia, Ontario

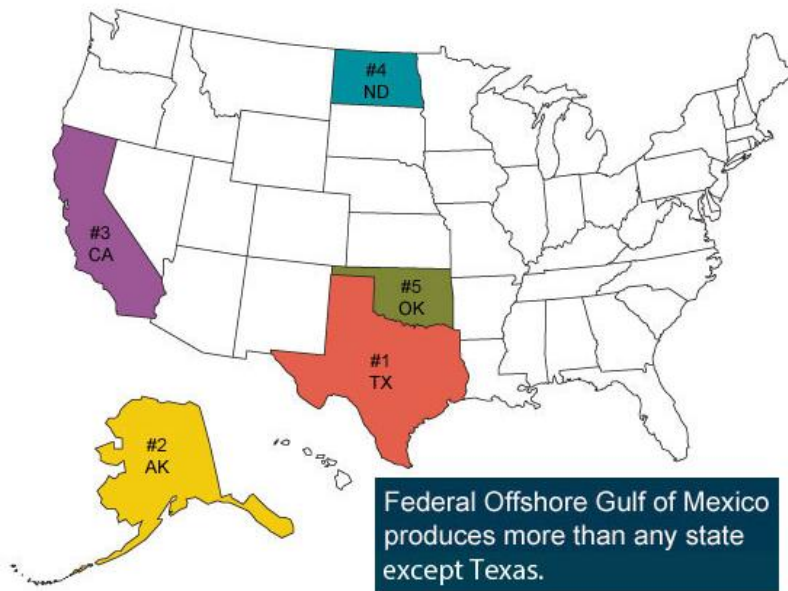
Eric Stevenson

Director of Technical Services

**Bay Area Air Quality Management
District**

U.S. Crude Oil Production

Top Crude Oil Producing States (2011)

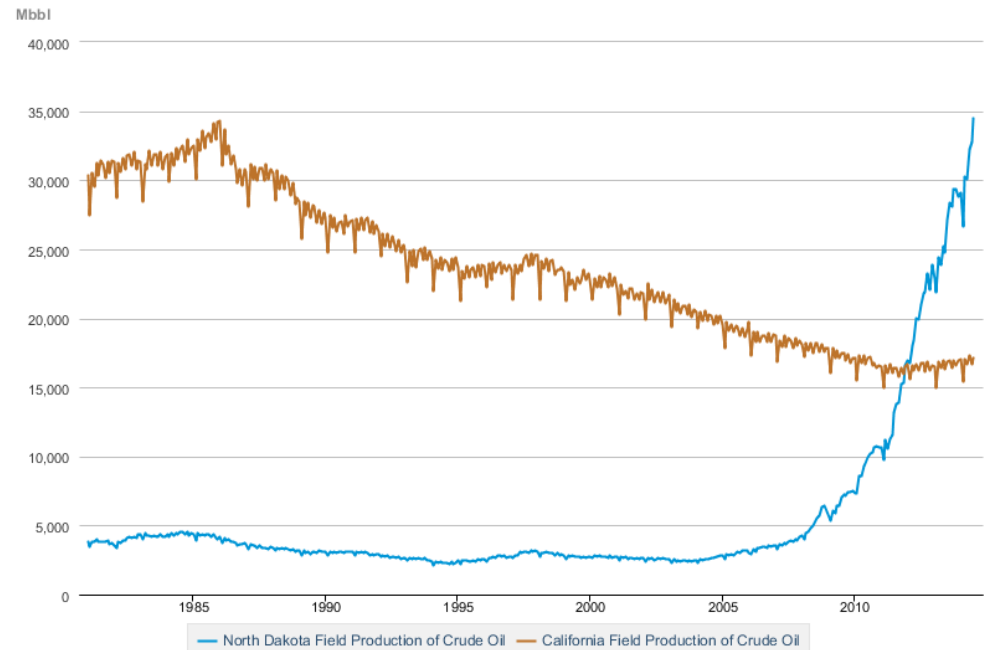


Source: Petroleum Supply Monthly April 2012, U.S. Energy Information Administration.

Top U.S. Crude Oil Producers in 2012:

1. Texas: 31%
2. Gulf of Mexico: 20%
3. North Dakota: 10%
4. California: 8%
5. Alaska: 8%
6. Oklahoma: 4%

Crude Oil Production



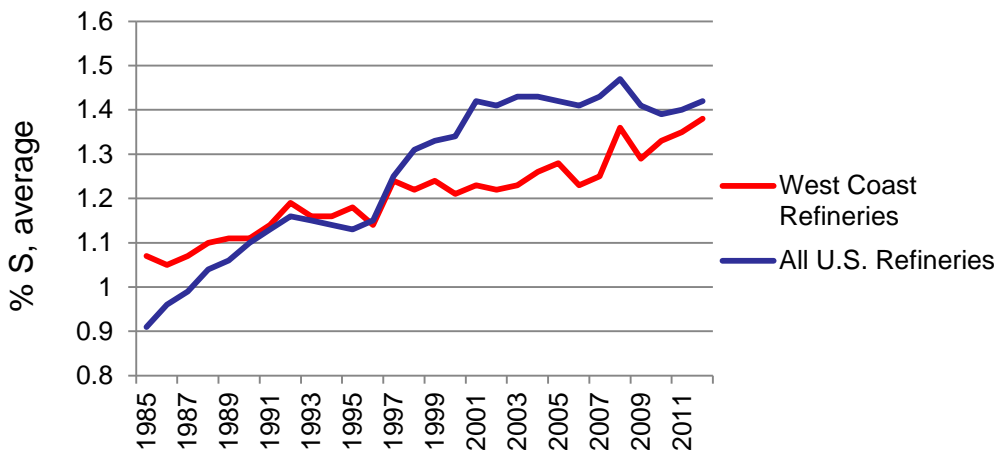
Source: U.S. Energy Information Administration

- North Dakota crude oil production tripled between 2009 and 2012 through the use of horizontal drilling and hydraulic fracturing in shale rock in the Bakken Formation.

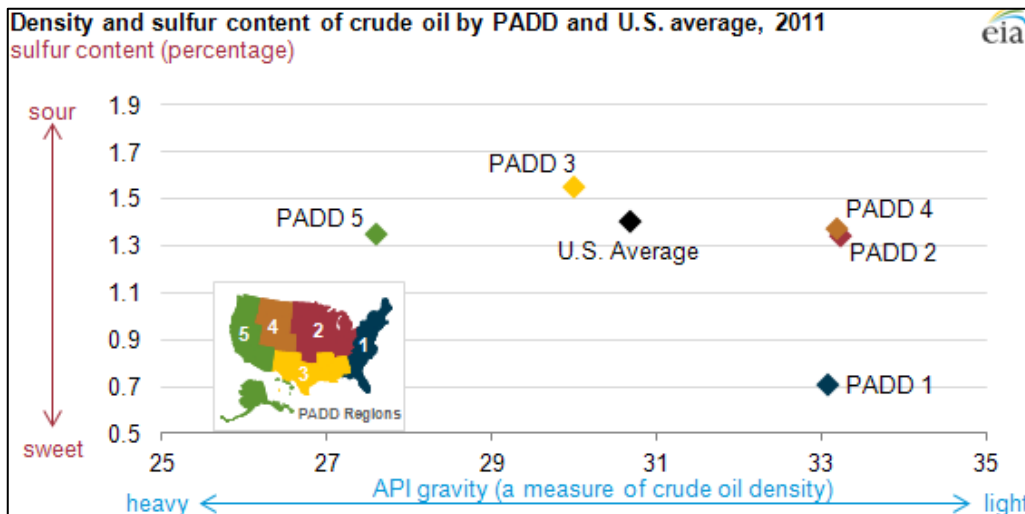
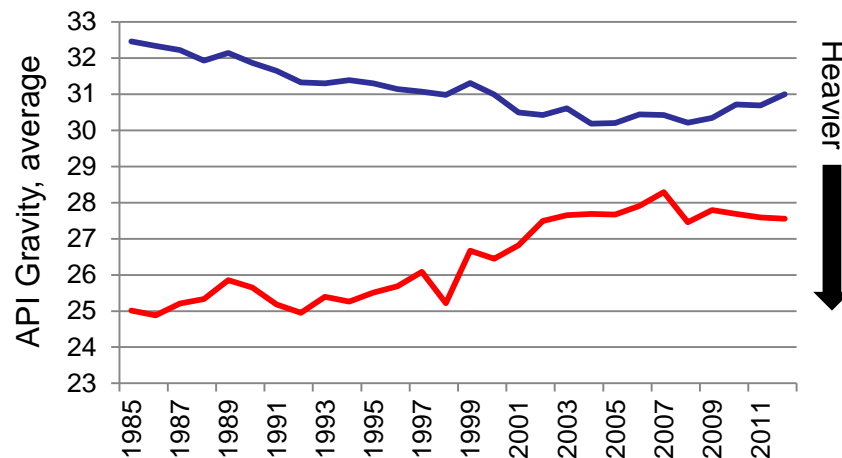


Trends in Crude Oil Quality

Sulfur Content



Density



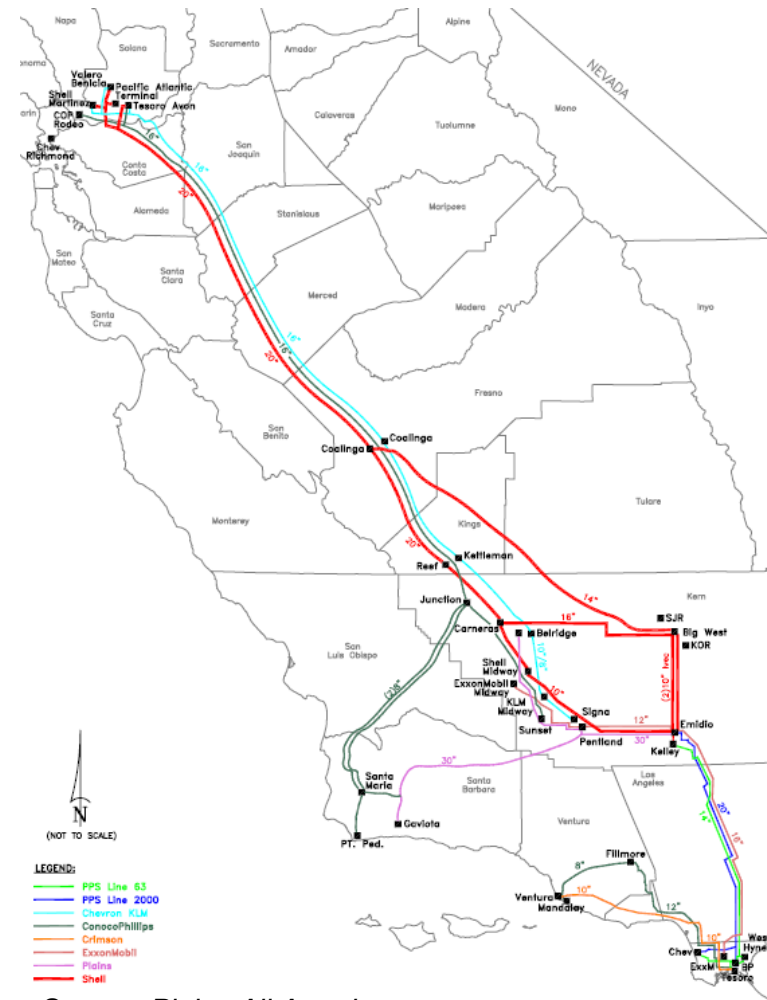
- API gravity is a measure of the density of a liquid. It is expressed in degrees, where a higher number indicates lower density.
- Crude oil with an API gravity greater than about 31 degrees is considered “light”.
- Average crude slate of California refineries (2011):
 - Sulfur content: 1.49%
 - API Gravity: 24.6 degrees

PAD District 5 (West Coast): Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington.

- California currently has 64% of PAD District 5’s refining capacity

Crude Oil Source for SF Bay Area

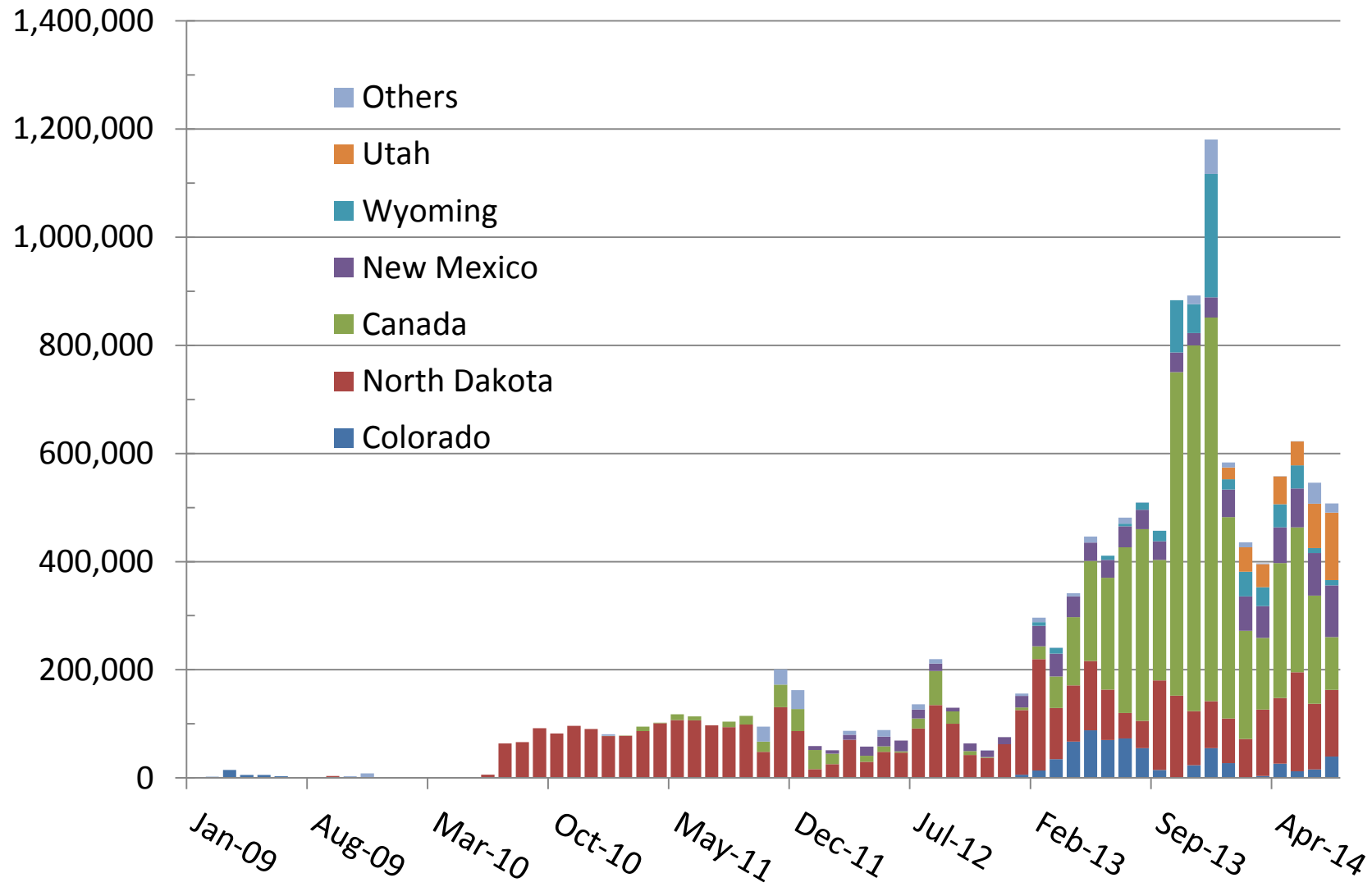
- Northern California refineries processed 642.2 thousand barrels per day of crude oil during 2012
 - 316.0 TBD foreign marine imports
 - 247.8 TBD pipeline shipments
 - 77.8 TBD ANS marine imports
 - 0.6 TBD rail imports
- Bay Area refineries processed 39.5 percent of total crude oil
- Increased crude-by-rail 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



Crude Oil Sources Shipped by Rail



Source: California Energy Commission



Rule Development Process

- Process started in 2012 with a Regulatory Concept paper and the “Work Plan for Action Items Related to Accidental Releases from Industrial Facilities”
- First draft of the rule released in March of 2013
- In April of 2013, public workshops held
- Meeting with interested parties throughout the process
- Monitoring Guidance is currently being reviewed by interested parties and comments being considered



Current 12-15 Elements

- ***Annual emissions inventories*** of all regulated air pollutants based on upgraded methods, including emissions from cargo carriers
- ***Petroleum Refinery Emissions Profile (PREP)***; require that on-going inventories include comparisons with PREP
- ***Crude oil composition characteristics*** with annual emissions inventories (e.g. sulfur, nitrogen content, API gravity, Total Acid Number)
- ***Health Risk Assessments (HRA)*** with enhanced emissions inventories and revised OEHHA HRA guidelines
- ***Enhance fence line monitoring systems and establish community air quality monitoring systems***



Development of Air Monitoring Guidance

- Hired contractor to evaluate current network, available equipment and monitoring options
 - Designed to be a starting point for further evaluation
- Convened panel of monitoring experts from around the nation
 - Experts from government agencies, academia, industry and the community
 - Reviewed contractor findings
 - Responded to a series of charge questions
- Guidance based on input from the contractor and panel



Charge Questions for Monitoring Guidance

- What should the size and spatial orientation of a network of monitors be around refineries?
- What network components should be considered (compounds measured, technology and instrumentation used, methodologies applied, air quality assessment tools utilized, etc.)?
- How should the data be provided to the public?
- What should be considered when developing measurement quality objectives, such as:
 - What type of instrument siting criteria should be used?
 - What should the time resolution of the equipment be?
 - How often should the instrumentation be calibrated?
 - What should the accuracy/precision/completeness requirements of the data be?
 - What other quality control/quality assurance requirements should be put in place?
- What technologies, methodologies and tools could be employed to augment any fixed network to better quantify pollutant variations over space and time, especially during short duration incidents?
- What emerging technologies might be utilized in the future to further enhance community air monitoring capabilities?



Air Monitoring Systems

- Submitted Air Monitoring Plans must be consistent with Air Monitoring Guidelines
- Fence-line and community air monitoring systems must be installed and operated in accordance with approved Air Monitoring Plan
- Fence-line monitoring systems
 - Would cover additional pollutants (e.g., volatile organic compounds) and provide greater spatial coverage than existing District-required monitoring
- Community air monitoring systems
 - Would improve ambient air monitoring during incidents
 - Would provide valuable data for: (1) estimating health risks, (2) making inter-site air quality comparisons, and (3) evaluating air quality trends over time



Fence-line Air Monitoring Requirements

- Location based population and meteorology
- Time resolved to five minutes and provided hourly
 - Displayed on website real-time with context to allow for better understanding of results
- Compounds likely to be emitted by refineries that represent risk at near ambient levels
- Quality Assurance Project Plan (QAPP) to identify QA/QC requirements
- Public input encouraged



Community Air Monitoring Requirements

- Location linked to refinery by gradient studies from the refinery fence-line
- Siting based on EPA requirements
- Compounds likely to be emitted by refineries as well as other urban risk drivers
- Measurement methods that can be compared to other air quality measurements throughout the Bay Area, California and the nation
- Means to access historical data



Opportunities

- Petroleum Refinery Emission Tracking Rule structure provides information for further action
 - Source category controls provide a proven approach
 - Increased transparency of overall emissions and health risk
 - Tracking overall emissions, crude quality and air quality
- Concurrently, developing Bay Area wide controls
 - Fluidized Catalytic Cracking (FCC) Units and other sources of secondary PM
 - New HRA requirements



Enhanced Approach

- Proceed with latest version of Regulation 12, Rule 15 (12-15), Petroleum Refining Emissions Tracking Rule
- Develop a companion rule concurrently to 12-15 to mitigate refinery emissions increases
 - Both rules to the Board for consideration by March of 2015
- Develop a Board of Directors Resolution to guide further rule development efforts to reduce emissions
- Expedite rule development



Companion Rule to 12-15

- Mitigate emissions increases of criteria pollutants, Toxic Air Contaminants (TAC) and greenhouse gases (GHG) based on PREP
 - Require causal analysis of any increase
 - Require mitigation plan to be submitted
 - Require public review of mitigation plan
- This will help ensure that crude oil composition changes do not increase emissions
- This will help identify processes that contribute to emissions increases



Strategy for Tracking and Reducing Refinery Emission

- Present 12-15 for Board consideration
 - Air monitoring, HRA and emissions inventory provide a means to track impacts within the immediate communities and throughout the Bay Area
- Development of companion rule and present to Board for consideration
 - Mitigate increases in refinery emissions
- Develop resolution for Board consideration
 - Guide further rule development to reduce refinery emissions



Additional/Contact Information

- Eric Stevenson
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- Rules Available Here:
 - <http://www.baaqmd.gov/Divisions/Planning-and-Research/Rule-Development/Rule-Workshops.aspx>