Bay Area Alternative Fuels Projects

Stationary Source and Climate Impacts Committee Meeting
March 21, 2022

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Senior Air Quality Engineer, Permitting & Refineries Section
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Presentation Outcome

• Provide a brief overview of the two Bay Area refinery projects that will transition from producing petroleum products to alternative fuels
  
  • Marathon Martinez Refinery Renewable Fuels Project
  • Phillips 66 Rodeo Renewed

• Provide a status update of the two Air District permit applications
Presentation Outline

• Locations of Alternative Fuels Projects
• Origin of Petroleum and Alternative Feedstocks
• Difference between Renewable Diesel and Biodiesel
• Petroleum Refinery and Alternative Fuels Facility Processes
• Proposed Alternative Fuels Projects in the Bay Area
• Emissions Reduction
• Status Update and Estimated Timeline
Requested Action

• None – informational presentation
Locations of Alternative Fuels Projects

- Facility Locations
  - Phillips 66
    - Rodeo, CA
  - Marathon
    - Martinez, CA
    (Bulk Terminal Mode Only since April 2020)

Source: “Marathon Martinez Refinery.” 37°59'42.55"N 122°12'24.20"W.
“Phillips 66 San Francisco Refinery.” 38°00’31.38”N 122°09’17.53”W.
Origin of Petroleum Feedstock

- Fossil Fuels, Crude Oil and Petroleum Products are from decayed organic materials.
Origin of Alternative Feedstock

• Renewable diesel and biodiesel are derived from biomass feedstocks, such as vegetable oil, animal fat or waste oil.
• Biomass is renewable organic material that comes from plants and animals.

Source: U.S. Energy Information Administration (public domain)
Renewable Diesel versus Biodiesel

Feedstock
- Fat & Oil

Processing
- Hydrotreating
  - H₂ and catalyst
- Transesterification
  - OH and catalyst

Fuel
- Renewable Diesel
  - ASTM D975
  - Chemically identical to fossil diesel
  - No Engine Modifications
- Biodiesel
  - ASTM D6751
  - Typically blended with petroleum diesel
  - Modifications to engines if >20% mix
Petroleum Refining Process

- Crude Oil (Ship, Rail, Pipeline)
- Storage Tanks
- Desalter
- Crude Heater
- Atmospheric Distillation
- Vacuum Distillation
  - Hydrocracker
  - Coker
- Hydrotreater
- Sulfur Plant
  - Catalytic Reformer
  - Alkylation
  - Fluidized Catalytic Cracker

Petroleum Products:
- Gasoline
- Diesel
- Jet Fuel
- Propane
- Butane

Stationary Source & Climate Impacts Committee
March 21, 2022
Bay Area Air Quality Management District
Alternative Fuels Process

Alternative Feedstocks (Ship, Rail, Pipeline, Trucks) → Storage Tanks → Pretreatment Unit → Wastewater

Legend
- Red: New Unit
- Yellow: Converted Unit

Fuel Gas

Hydrotreater

Hydrotreater

Hydrotreater

Hydrocracker

Alternative Fuels
- Renewable Diesel
- Jet Fuel
- Propane
- Naphtha

Wastewater

Alternative Fuels Process
### Alternative Fuels Projects

<table>
<thead>
<tr>
<th></th>
<th>Marathon (Martinez, CA)</th>
<th>Phillips 66 (Rodeo, CA)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing Processing Capacity (Crude Oil)</strong></td>
<td>161,000 barrels per day (bpd)</td>
<td>117,000 barrels per day (bpd)</td>
</tr>
<tr>
<td><strong>Future Processing Capacity (Alternative Feedstock)</strong></td>
<td>48,000 bpd (Annual Average)</td>
<td>69,000 bpd (Maximum)</td>
</tr>
<tr>
<td><strong>Alternative Feedstocks</strong></td>
<td>Soybean Oil, Corn Oil, Used Cooking Oil, Other Vegetable Oil, Rendered Fat (Tallow)</td>
<td>Soybean Oil, Inedible Corn Oil, Used Cooking Oil, Other Vegetable-Based Oil, Tallow, Canola Oil, Fats/Oils/Grease</td>
</tr>
<tr>
<td><strong>Alternative Fuels</strong></td>
<td>Renewable Diesel, Naphtha, Propane</td>
<td>Renewable Diesel, Naphtha, Propane, Jet Fuel</td>
</tr>
<tr>
<td>Notable Shutdown Sources</td>
<td>Marathon (Martinez, CA)</td>
<td>Phillips 66 (Rodeo, CA)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Gasoline/Diesel Storage and Distribution</td>
<td>20,000 barrels per day</td>
<td>40,000 barrels per day</td>
</tr>
<tr>
<td>Fluidized Catalytic Cracking Unit</td>
<td></td>
<td>Crude Distillation Unit</td>
</tr>
<tr>
<td>Catalytic Reformer Unit</td>
<td></td>
<td>Carbon Plant</td>
</tr>
<tr>
<td>Delayed Coker Unit</td>
<td></td>
<td>Sulfur Plant</td>
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<tr>
<td>Sulfuric Acid Plant</td>
<td></td>
<td>Various Process Boilers/Heaters</td>
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<tr>
<td>Various Process Boilers/Heaters</td>
<td></td>
<td>Santa Maria Plant:</td>
</tr>
<tr>
<td>Various Cooling Towers/Flares</td>
<td></td>
<td>(Crude Unit, Coking Units, Sulfur</td>
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<tr>
<td></td>
<td></td>
<td>Recovery Units)</td>
</tr>
</tbody>
</table>

### New Units

<table>
<thead>
<tr>
<th>Marathon (Martinez, CA)</th>
<th>Phillips 66 (Rodeo, CA)</th>
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<tbody>
<tr>
<td>Pretreatment Unit</td>
<td>Pretreatment Unit</td>
</tr>
<tr>
<td>Wastewater Equipment</td>
<td>Thermal Oxidizer</td>
</tr>
<tr>
<td>Hydrogen Sulfide Adsorption</td>
<td>Scrubber</td>
</tr>
<tr>
<td>Thermal Oxidizer</td>
<td></td>
</tr>
</tbody>
</table>
Equivalent Refinery Requirements

• Amendments to Refinery Definitions adopted by the Board of Directors on November 3, 2021

• Continue to be subject to 21 Air District Regulations

• Reconsider the need for Rule 9-14 Petroleum Coke Calcining Operations for AB 617 Accelerated BARCT
<table>
<thead>
<tr>
<th>Regulation</th>
<th>Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation 1: General Provisions and Definitions</td>
<td>-</td>
</tr>
<tr>
<td>Regulation 2: Permits</td>
<td>2-1, 2-2, 2-4, 2-5, 2-6</td>
</tr>
<tr>
<td><strong>Regulation 3: Fees</strong></td>
<td>-</td>
</tr>
<tr>
<td>Regulation 6: Particulate Matter</td>
<td>6-1, 6-5</td>
</tr>
<tr>
<td><strong>Regulation 8: Organic Compounds</strong></td>
<td>8-1, 8-2, 8-5, 8-6, 8-7, 8-8, 8-9, 8-10, 8-18, 8-28, 8-33, 8-39, 8-40, 8-44, 8-53</td>
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<tr>
<td><strong>Regulation 9: Inorganic Compounds</strong></td>
<td>9-1, 9-8, 9-9, 9-10</td>
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<tr>
<td>Regulation 10: Standards of Performance for New Stationary Sources</td>
<td>-</td>
</tr>
<tr>
<td><strong>Regulation 11: Hazardous Pollutants</strong></td>
<td>11-10, 11-12, 11-18</td>
</tr>
<tr>
<td><strong>Regulation 12: Misc. Standards of Performance</strong></td>
<td>12-11, 12-12, 12-15</td>
</tr>
</tbody>
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**Bold** - Amendments to Refinery Definitions adopted by the Board of Directors on November 3, 2021.
## Estimated Emissions Reduction

<table>
<thead>
<tr>
<th></th>
<th>Marathon*</th>
<th>Phillips 66*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen Oxides (NO\textsubscript{x})</td>
<td>76%</td>
<td>64%</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO\textsubscript{2})</td>
<td>87%</td>
<td>79%</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>91%</td>
<td>51%</td>
</tr>
<tr>
<td>Precursor Organic Compounds (POC)</td>
<td>40%</td>
<td>7%</td>
</tr>
<tr>
<td>Particulate Matter (PM\textsubscript{10})</td>
<td>88%</td>
<td>24%</td>
</tr>
<tr>
<td>Particulate Matter (PM\textsubscript{2.5})</td>
<td>88%</td>
<td>23%</td>
</tr>
<tr>
<td>Greenhouse Gas (GHG)</td>
<td>59%</td>
<td>20%</td>
</tr>
</tbody>
</table>

*Subject to Final CEQA and Air District Evaluations
(Source: Draft Environmental Impact Reports, October 2021)
### Estimated Timeline

**Marathon**
- Air Permit Application Received: 10/5/2020
- Notice of Preparation: 2/17/2021 (Marathon)
- Draft Environmental Impact Report for Public Comment: 10/14/2021
- Air District Comment Submittal: 12/17/2021
- Planning Commission Meeting: 3/23/2022 (Marathon)
- Authority to Construct Issuance: Pending CEQA approval

**Phillips 66**
- Air Permit Application Received: 5/24/2021
- Notice of Preparation: 12/21/2020 (Phillips 66)
- Draft Environmental Impact Report for Public Comment: 10/14/2021
- Air District Comment Submittal: 12/17/2021
- Planning Commission Meeting: TBD (Phillips 66)
- Authority to Construct Issuance: Pending CEQA approval

*Stationary Source & Climate Impacts Committee*
*March 21, 2022*
Questions or Feedback
Major Stationary Source Community Air Monitoring (Schedule X)

Stationary Source and Climate Impacts Committee
March 21, 2022

Ila Perkins
Manager, Air Monitoring - Operations
iperkins@baaqmd.gov
Presentation Outcome

• Understand background of Schedule X fee and status of monitoring in refinery fenceline communities
Presentation Outline

- Background
- Fee estimates and costs
- Developing stations
- Status update
- Next steps
Presentation Requested Action

• None. Informational only.
2016: During Regulation 12, Rule 15 rulemaking, Air District committed to implementing enhanced air monitoring in refinery communities

- Purpose: establish air monitoring sites near refineries and other large stationary sources to make near-real time air pollution data and information about long-term trends available with context to fenceline communities

2016: Regulation 3 (Fees) Amendment

- Established a new fee schedule (X) to recover the costs associated with the Major Stationary Source Community Air Monitoring Program
2017: State Law Assembly Bill (AB) 1647

- Required Air Districts to design, install, operate, and maintain a refinery-related community air monitoring system
Initial Fee Schedule Included:

- Cost of site construction
- Instrumentation
- Monitor operation, amortized over ten years

Total annualized cost of five stations over 10 years ~ $1.5 million

Initial Cost Estimates Did Not Include

- District staff time for station development and ongoing data validation and analysis
- Community engagement (stipends, language access, rental fees, facilitation services)
- Increased cost of property leases or construction over time
Phased Approach for Site Development

**Siting**
- Community input
- Assessment of preferred locations
- Site identification
- Leasing
- Site design & permitting

**Construction**
- Site construction & station setup
- Equipment procurement
- Equipment installation
- Equipment testing

**Monitoring**
- Begin monitoring
- Ongoing station maintenance
- Data quality assurance
- Data analysis & reporting
# Considerations for Candidate Sites

## Assessment of Preferred Locations
- Community input
- Proximity of the monitor to source(s) of air pollution
- Historical weather patterns and topography
- Existing air quality measurements or modeling data
- Proximity to sensitive populations and other environmental justice considerations

## Site Identification and Lease
- Locate available properties
- Site infrastructure and logistics:
  - Access
  - Power
  - Telecommunications
  - Lease longevity
  - Siting feasibility
  - Presence of obstructions to air flow
  - Location of existing air monitors
  - Site safety
- Lease negotiation and permitting
Current Status – Benicia (Valero)

Siting
- Community input
- Assessment of preferred locations
- Site identification
- Leasing
  - Site design & permitting

Construction
- Site construction & station setup
- Equipment procurement
- Equipment installation
- Equipment testing

Monitoring
- Begin monitoring
- Ongoing station maintenance
- Data quality assurance
- Data analysis & reporting

Update: Air District formalizes approval for candidate location – early September 2021
Developing Stations – Community Engagement

Key Stakeholders
• Community Members & EJ Advocates
• Benicia Community Air Monitoring Program
• Air Watch: Bay Area
• City of Benicia Officials
• Benicia Fire Department
• Benicia Unified School District

Recent Community Engagement
• Co-developed a well-attended virtual workshop with community advocates
• Accessibility survey ensured equitable participation
• Refinery Stakeholder listserve
• Strong support from community partners
• Opportunities for improvement identified with community advocates
## Current Status – Chevron, Marathon, PBF, Phillips 66

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<tr>
<th>Siting</th>
<th>Construction</th>
<th>Monitoring</th>
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<tbody>
<tr>
<td>✓ Community input</td>
<td>✓ Site construction &amp; station setup</td>
<td>✓ Begin monitoring</td>
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<tr>
<td>✓ Assessment of preferred locations</td>
<td>✓ Equipment procurement</td>
<td>✓ Ongoing station maintenance</td>
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<td>✓ Equipment installation</td>
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Questions and comments?