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AGENDA: 5

Proposed Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants

**Stationary Source and Climate Impacts Committee Meeting
February 28, 2022**

**Victor Douglas
Rule Development Manager
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Presentation Outcome



- Provide information and updates on the development of Proposed New Regulation 13: Climate Pollutants, Rule 5: Petroleum Refinery Hydrogen Plants and Proposed Amendments to Regulation 8: Organic Compounds, Rule 2: Miscellaneous Operations.

Presentation Outline



- Background
- Recent Rule Development History
- Summary of Proposed New Rule Provisions
- Emission Impacts of Potential New Flares
- Aesthetic Impacts of Potential New flares
- Next Steps

Presentation Requested Action



- None; informational item

Background



- **Climate Protection Goals:**
 - Reduce GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050.
- **Methane:**
 - Potent and short-lived climate pollutant
 - Global warming potential:
 - 34 times that of carbon dioxide on a 100-year time horizon
 - 86 times that of carbon dioxide on a 20-year time horizon
- **Proposed New Rule 13-5, Industrial Hydrogen Plants:**
 - Limits vented emissions of total organic compounds (including methane)
 - Affects hydrogen production and carrying systems
 - Includes alternative compliance option for equivalent control of GHG emissions
 - Affected sources exempt from Rule 8-2: Miscellaneous Operations

Recent Rule Development History



- June 2021 – Request for Comments on revised draft rule and Notice of Preparation and Initial Study for Draft Environmental Impact Report
- July 2021 – California Environmental Quality Act Scoping Meeting
- July 2021 – Presentation to Stationary Source and Climate Impacts Committee
- September 2021 – Discussion and Review of Alternative Reduction Measures proposed by Refiners
- January 2022 – Published Notice of Completion of Draft Environmental Impact Report and Public Hearing Notice

Hydrogen Production Steps



Step 1: Purification of the feed gas.

Step 2: Steam methane reformation reaction:



Step 3: Temperature shift reaction:



Step 4: Final product purification step.

- Pressure swing adsorption (PSA) system
- Solvent-based CO₂ removal system.

Why Do Hydrogen Vent Emissions Occur?



- Excess hydrogen is required by refineries due to safety reasons.
- Sudden changes in hydrogen supply and demand between the hydrogen plant and the hydrogen consumers can lead to a hydrogen imbalance.
- When a hydrogen imbalance occurs, the excess hydrogen is removed by venting to the atmosphere or control device.
- Vented or controlled hydrogen gas may or may not contain methane depending on the refinery.

Overview of Hydrogen Plant Configurations



Facility	Purification Method	Vent Control Method
Valero	CO ₂ Removal System	None
PBF Energy	CO ₂ Removal/PSA System	None
Marathon	CO ₂ Removal/PSA System	Refinery Flare
Phillips 66	PSA System	None
Chevron	PSA System	Hydrogen Flare
Air Liquide	PSA System	Hydrogen Flare

Proposed New Rule Provisions



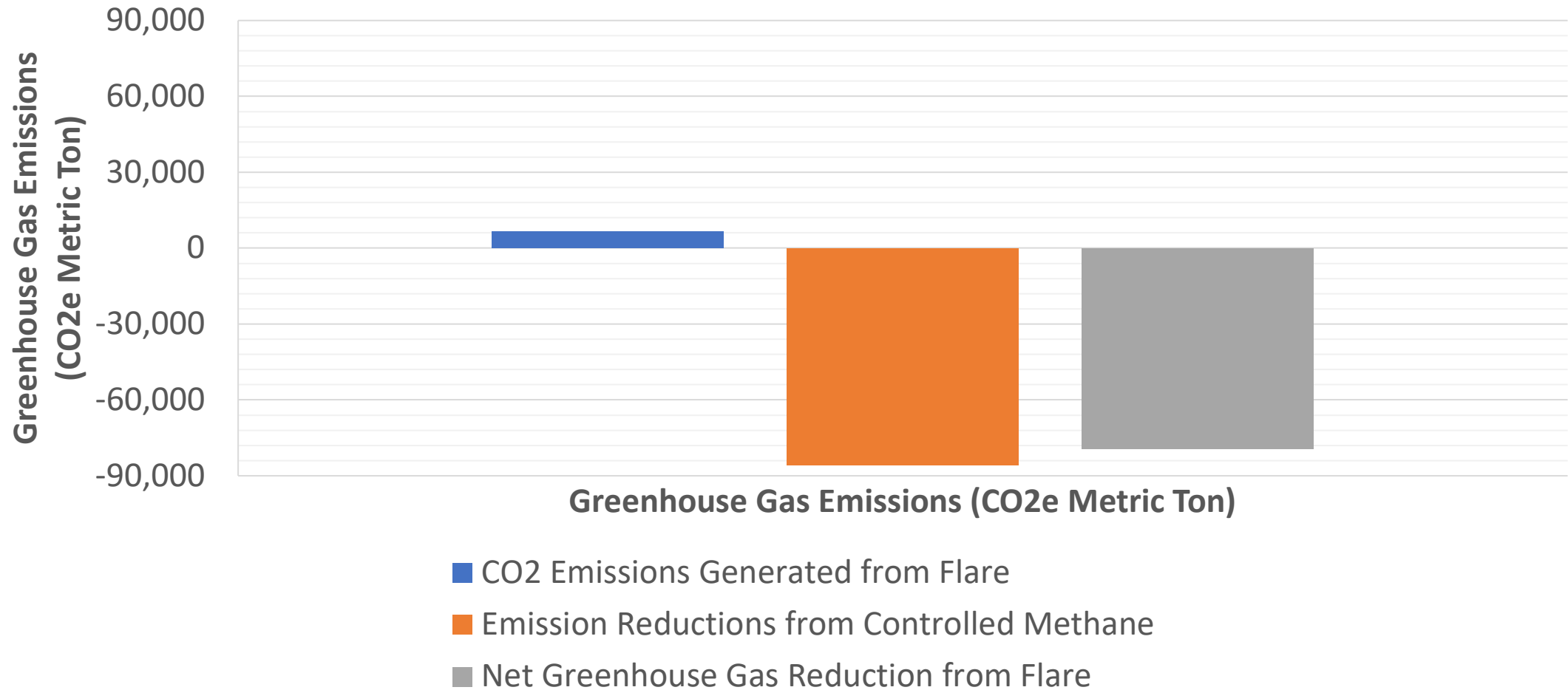
- Limits emissions of Total Organic Compounds (methane and other organics) to 15 pounds per day and 300 parts per million or requires at least 90% control
- Alternative Compliance Plan (ACP) option provided for Overall 90% control of Methane
 - Up to 20% of emissions reductions may be GHGs other than Methane on a CO₂e basis
 - Provides flexibility to meet equivalent GHG emissions reductions without construction of new flares
- Alignment of permitting deadlines for control devices and alternative compliance measures (3 years from rule adoption)

Potential NOx and Greenhouse Gas Emissions Impacts of a Flare



- 32 tons per year potential NOx increase
 - 1.3% of the NOx inventory for both affected facilities
- 79,000 metric tons per year CO₂e net emissions reductions of methane
 - 1% of GHG emissions inventory for both affected facilities
 - Equivalent to 775 passenger vehicles removed

Net Greenhouse Gas Emissions from Potential Operation of a Flare



Cost and Cost Effectiveness Analysis



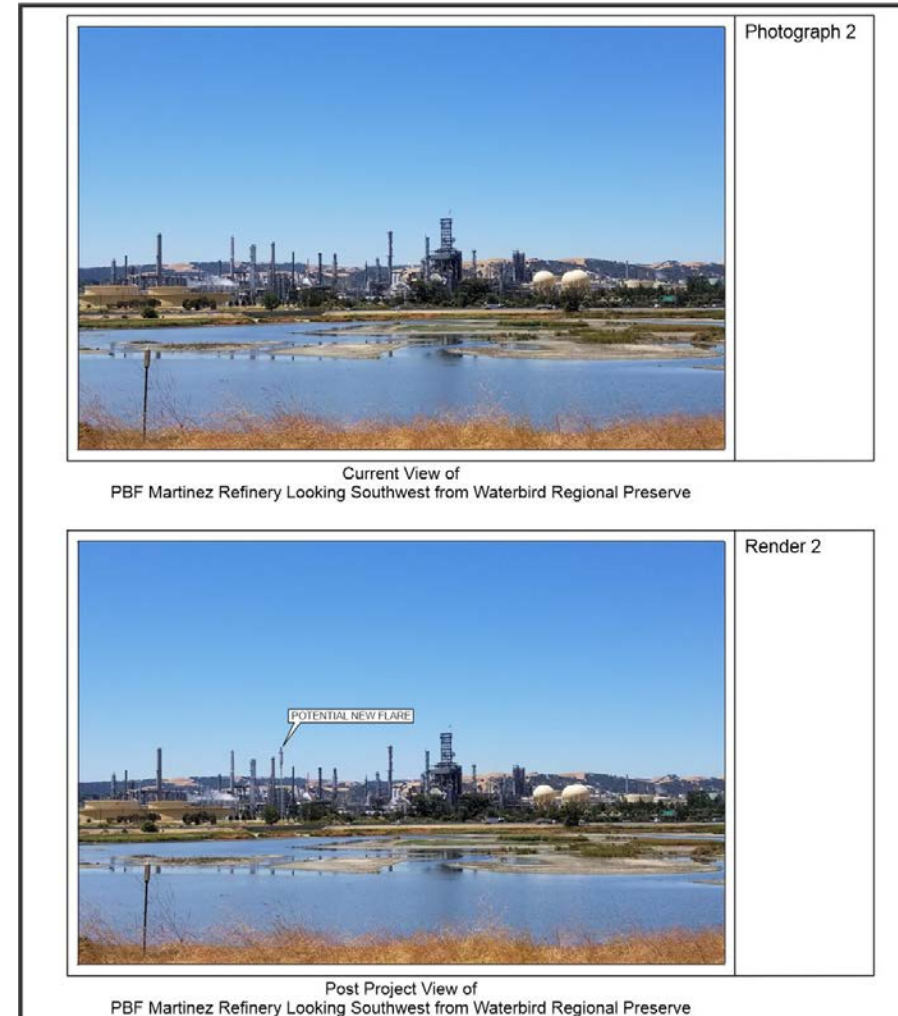
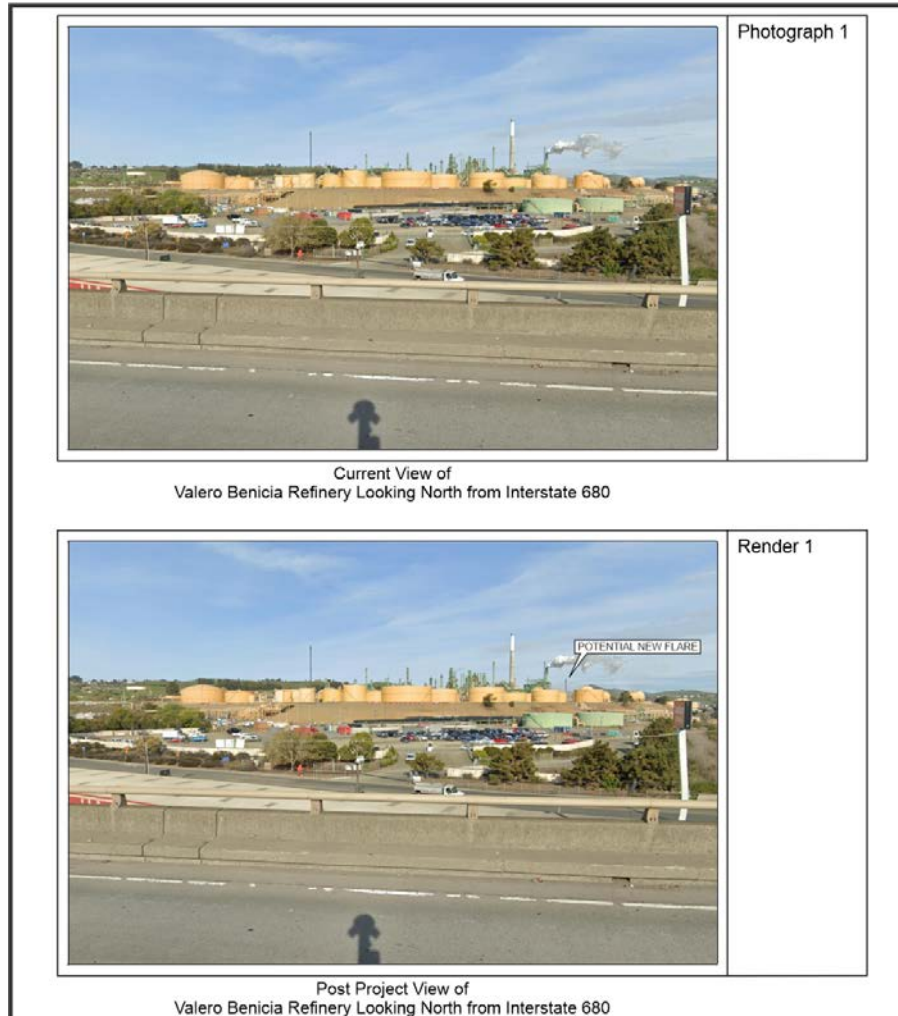
- Total annualized cost associated with flares = \$3.5 M per year
- Total methane reduction = 77,219 metric ton CO₂e per year
- Cost-effectiveness of flares = \$1,541 per metric ton CO₂e
- Total annualized cost associated with pressure swing adsorption (PSA) system = \$15.4 M per year
- Incremental cost-effectiveness between flare and PSA system = \$47,091 per metric ton CO₂e

Socioeconomic Impact Analysis



- Total compliance cost as percent of annual net income = 1.1%
- Carbon Credit Median Price = \$16.89 to \$27.14 per metric ton CO₂e
- Carbon Credit value for methane reduction = \$1.3M to \$2.1M
- Social Cost of Carbon attempts to measure the economic harm caused by climate change.
 - Social cost of carbon = \$1.7M to \$9.8M per year
 - Anticipated cost for compliance = \$7.0M to \$8.7M per year

Aesthetic Impact of Potential New Flares



Source: Draft EIR, Chapter 3.1 Aesthetics. Environmental Audit, Inc.

Visible Emissions from Flares



Source: Hydrogen Tools-H2Tools

Visible Emissions from Flares, cont.



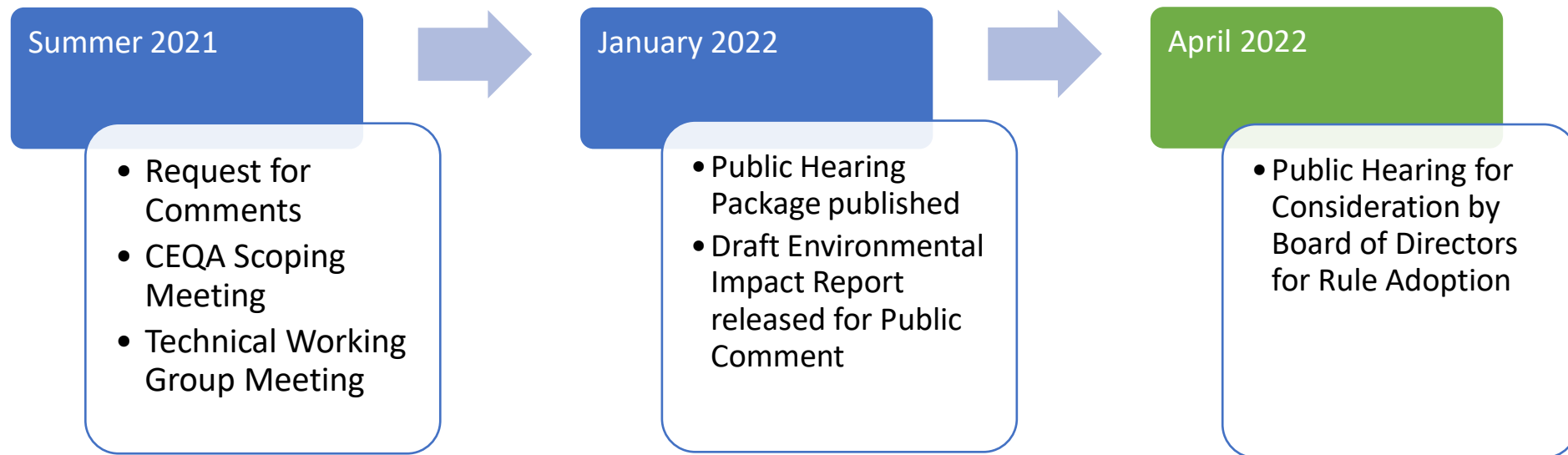
Source: Hydrogen Tools-H2Tools

Visible Emissions from Flares, cont.



- More complex, heavier hydrocarbon gases typically generate more smoke than simpler, lighter hydrocarbon gases
- Hydrogen burns with a dim blue flame that may be invisible in daylight
- A flaring event associated with a hydrogen plant is expected to produce a clean burning flame with little-to-no smoke

Next Steps



Feedback Requested/Prompt



- Questions and comments?



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AGENDA: 6

Strategies for Accelerating Facility Risk Reductions

**Stationary Source and Climate Impacts Committee Meeting
February 28, 2022**

**Carol Allen
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Presentation Outcome



- Respond to public and Committee frustrations regarding the slow pace of implementation of facility risk reductions
- Explain Engineering's revised strategies for accelerating completion of health risk assessments and approval of risk reduction plans, without compromising on quality
- Inform the Committee of the additional staffing needed to implement these strategies

Presentation Outline



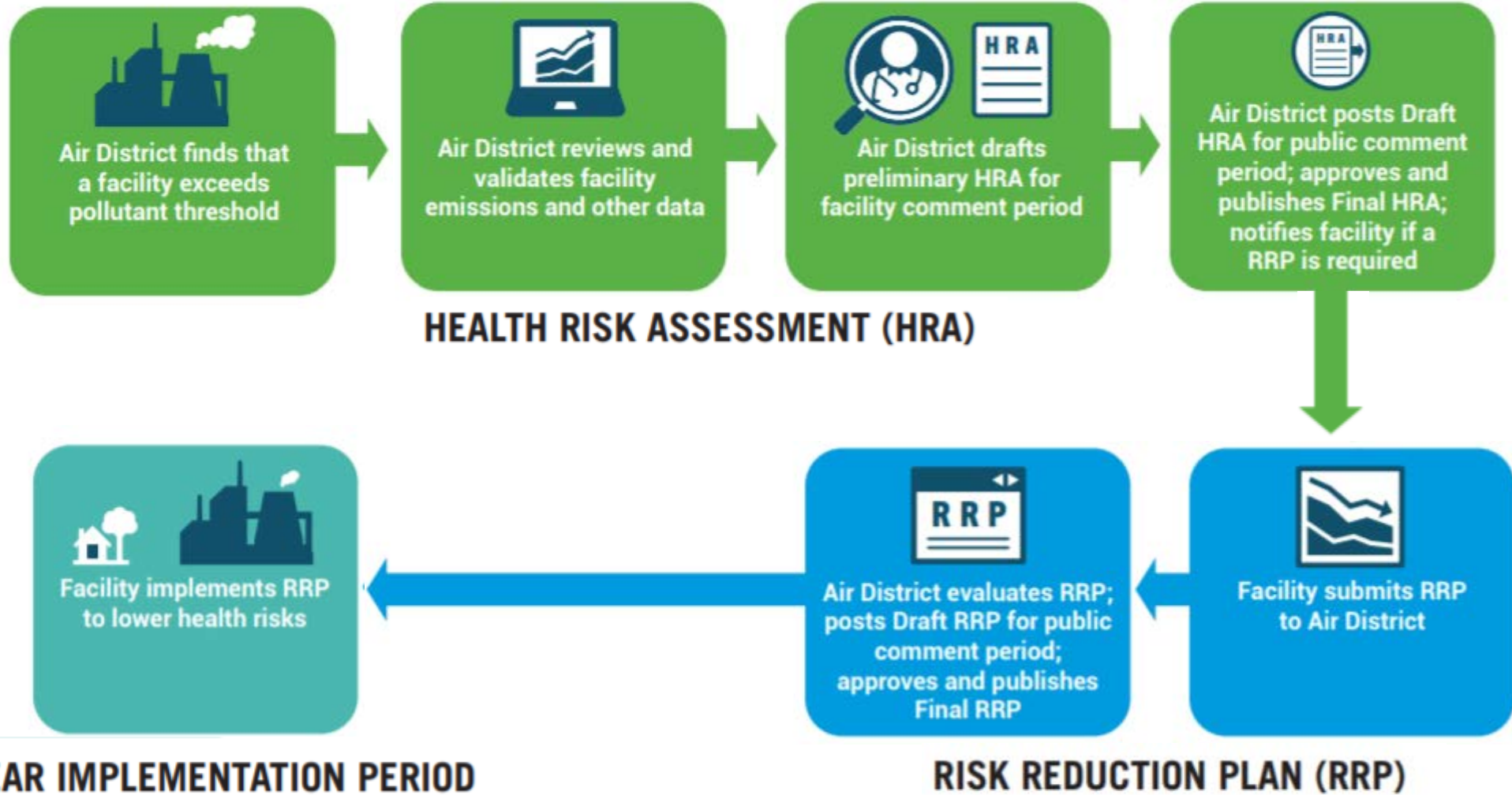
- Background on Regulation 11, Rule 18 (Rule 11-18)
- Discussion of Program Delays
- Program Improvements Presented in November 2021
- Revised Strategies for Accelerating Health Risk Assessments (HRAs) and Risk Reduction Plans (RRPs)
- Staffing Needs and Schedule Impacts
- Next Steps

Presentation Requested Action



- None – informational presentation

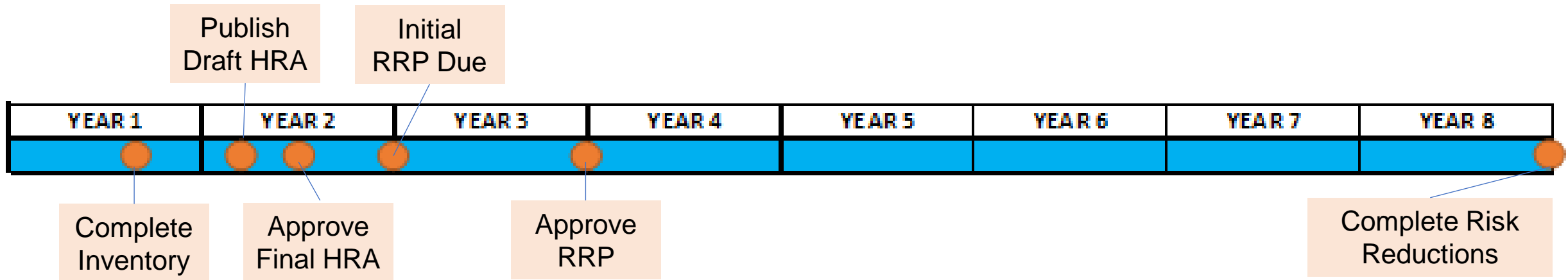
Rule 11-18 Implementation Process





Implementation Estimate

2017 Implementation Time Estimate for a Single Facility



Staff review time concentrated in the first 3 years:

- Based on a best-case scenario requiring few revisions
- Assumed full staffing of program
- Applied to review of a single facility at a time

Under-estimates staff review time based on real-world conditions

Many facility action time periods are set by Rule 11-18:

- Facility review of HRA within 90 days
- Submit risk reduction plan within 6 months
- Complete risk reductions within 5 years

Changes to these time period will require rule amendments

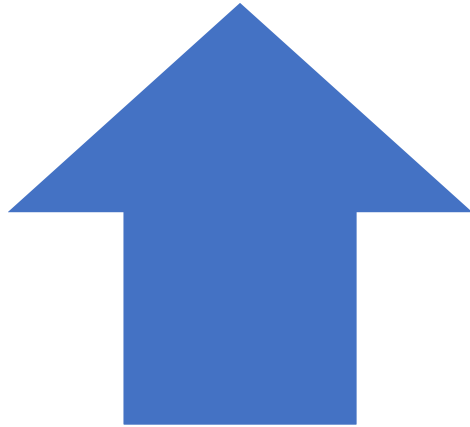
Implementation Delays



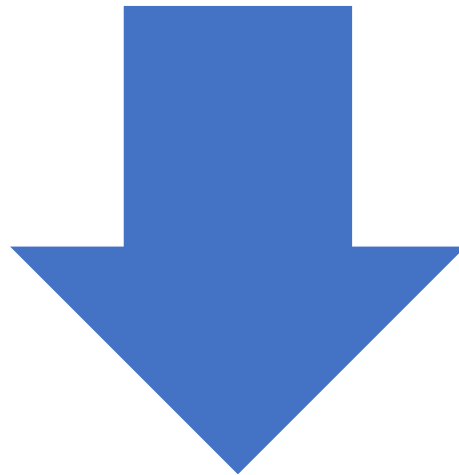
Initial Implementation Time Estimates Did Not Consider:

- Requested staff resources have yet to arrive
- Development of guidelines and procedures
- Standardization and improvement of emission inventories
- Delays related to source testing, review and approval
- Impacts of Legal actions: settlement meetings and Rule 12-15 inventories
- Time for holding public meetings and responding to extensive comments
- Diversion of available modeling staff to high visibility permit applications and enforcement projects (toxics issues and mandated deadlines)
- Impacts due to COVID: crematory applications and unanticipated staff leave
- Increases in engine applications that lead to 25% increase in NSR HRAs
- Staff diversion to development and implementation of Rule 2-1 & 2-5

Pros and Cons of November 2021 Program Improvements



More Rigorous Air District Review
Higher Confidence in HRA Results
Longer Implementation Time



Less Rigorous Air District Review
More Chance for Missing Impacts
Quicker Implementation Time

Accelerating HRA and RRP Approvals



New Strategies:

- Create a group of staff whose primary responsibilities are review and approval of Rule 11-18 emission inventories, health risk assessments, and risk reductions plans
- Eliminate permit application and permit renewal responsibilities for modeling and Rule 11-18 staff
- Minimize this group's time spent on emergency projects, enforcement and CEQA support, Permit Reform implementation, other diversions
- Train additional modeling staff to provide the additional support necessary due to expected increases in the number of NSR and AB2588 (Hot Spots) HRAs

Staffing Needs and Schedule Impacts



- Rule 11-18 Program 4 FTEs (additional staff)
- Permit Reform 1 FTEs (dedicated to modeling)

- Completion of Phase I HRAs with Additional Staff 2 years *
- Completion of Phase I HRAs w/o Additional Staff 5 years *

* Time required to transition permit work away from Rule 11-18 staff and any future diversion of Rule 11-18 staff to other projects will impact these schedules.

Progress on Health Risk Assessments



Phase I 34 Facilities - High Potential for Elevated Health Risks



21 Complete

7 Complete

3 Complete

Facility HRAs Currently Underway

- ChemTrade West
- Lehigh
- WCCC Landfill
- Clover Flat Landfill
- Genentech
- Ameresco Keller Canyon
- WM – Tri-Cities
- PCC Structurals
- Los Medanos
- Eco Services
- Owens Corning IS
- City of Santa Clara
- Irvington Memorial
- AB&I Foundry

Next Steps



- Continuing HRA Work for Phase I Facilities
- Developing Procedures for Reviewing Risk Reduction Plans
- Creating Dispute Resolution Panel
- Awaiting Management Audit Results
- Hiring Additional Staff, as allowed
- Training Existing Staff on Modeling Procedures

Questions or Feedback





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AGENDA: 7

Introduction to the Stationary Source and Climate Impacts Committee and 2022 Work Plan

Stationary Source and Climate Impacts Committee
February 28, 2022

Damian Breen
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Presentation Outcome



- Staff will share a proposed work plan for the meetings of the Stationary Source and Climate Impacts Committee in 2022.

Presentation Outline



- Work plan outlined from months February 2022 – December 2022.

Presentation Requested Action



- None – informational presentation

2022 Stationary Source and Climate Impacts Committee Work Plan



- February
 - Introduction to the Stationary Source and Climate Impacts (SSCI) Committee and 2022 Workplan
 - Regulation 11, Rule 18 (Rule 11-18) Update
 - Regulation 13, Rule 5 (Rule 13-5) Update
- March
 - Nitrous Oxide (NOx) Appliance Rules (9-4 and 9-6) update (if no EIR)
 - Fenceline Community Air Monitoring Program (Schedule X)
 - Update on Bay Area Refinery Conversion Projects
 - Rule 9-14 Petroleum Coke Calcining Operations

2022 SSCI Work Plan Cont'd



- April
 - NOx Appliance Rules (9-4 and 9-6) update (if EIR)
 - South Bay Odor Study
 - Rule 8-8: Refinery Wastewater
 - Wildfire Response Program Update
- May
 - Rule 9-13: Portland Cement Manufacturing
 - Air Filtration Health Benefits (Possible Guest Speaker)

2022 SSCI Work Plan Cont'd



- June
 - Rule 11-18 Update
 - Assembly Bill (AB) 32 Scoping Plan Update
- July
 - Rule 8-5: Tanks
 - Rule 8-18: Equipment Leaks
 - Bay View Hunters Point Cement and Material Handling Facilities
- September
 - Health Impacts of Wood Smoke

2022 SSCI Work Plan Cont'd



- October
 - Source Prioritization
 - Particulate Matter Methodology
- November
 - Green and Healthy Homes Update
- December
 - Source Apportionment in Overburdened Communities Update

Discussion/Questions

