

# PR 1410 Working Group Meeting #10

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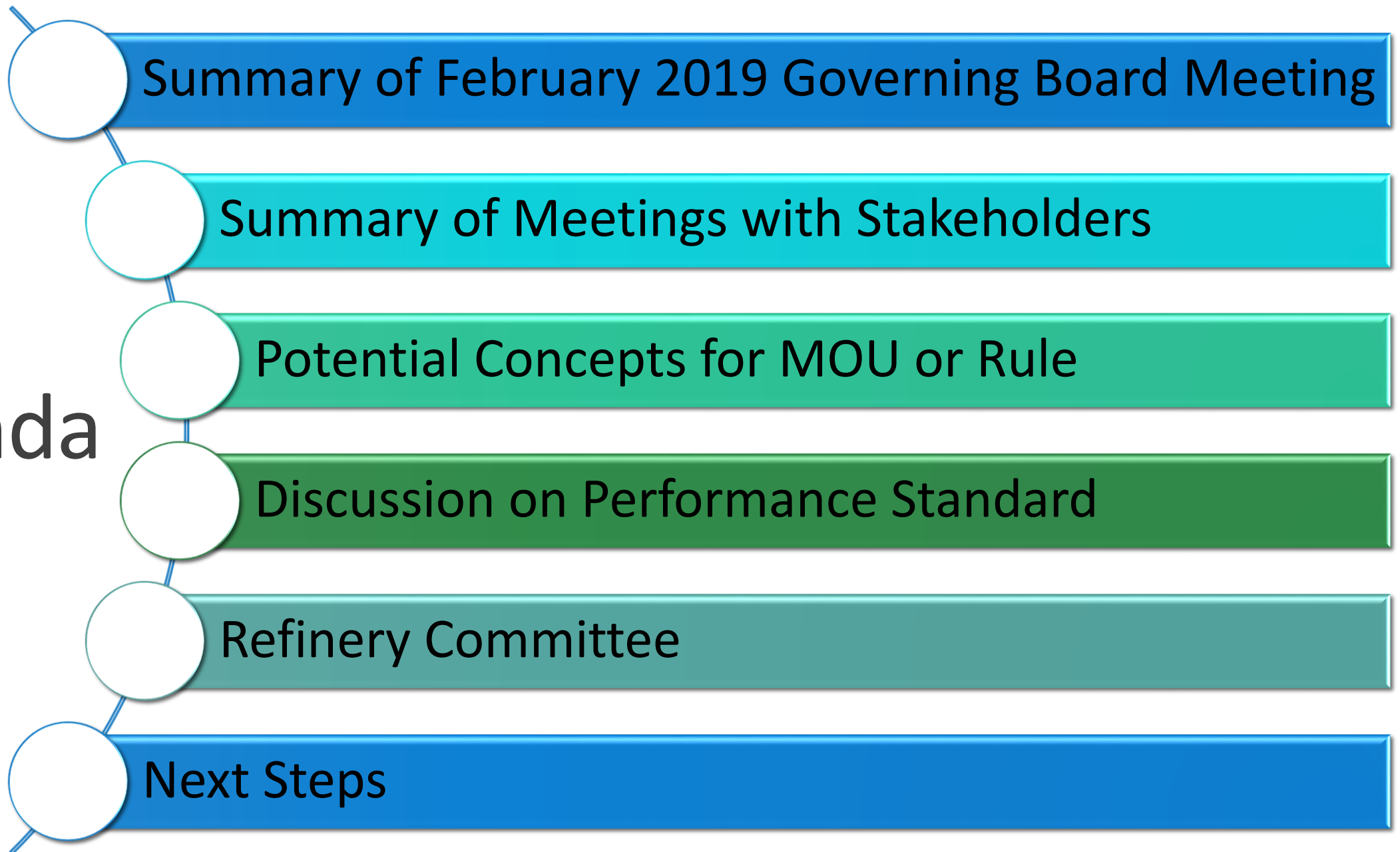
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JUNE 13, 2019

South Coast AQMD Headquarters

Diamond Bar, California

# Agenda



# February 2019 Governing Board Meeting

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- Staff presented:
  - ❑ Hazards of hydrogen fluoride (HF) or modified hydrogen fluoride (MHF)
  - ❑ Concerns for low probability, high consequence release
  - ❑ Effectiveness of enhanced mitigation measures to protect community
  - ❑ Establishment of performance standard
  - ❑ Possible phase-out of HF or MHF in rule or Memorandum of Understanding (MOU)
- Governing Board directed to staff:
  - ❑ Work with both the community and industry over the next 90 days to reach a resolution
  - ❑ Present to the Refinery Committee for review and recommendation to the full Governing Board
  - ❑ Pursue both an MOU approach and proceed with rule development

# Meetings with Stakeholders Since February 2019

## Torrance Refining Company (TORC)

February 13, 2019

March 7, 2019

March 22, 2019

April 10, 2019

May 1, 2019

May 22, 2019

June 4, 2019

## Valero Wilmington Refinery (Valero)

February 20, 2019

March 13, 2019

April 17, 2019

May 30, 2019

June 11, 2019

## Community Organizations (TRAA, CBE, Sierra Club, and Ban Toxic MHF)

February 13, 2019

March 22, 2019

May 2, 2019

June 5, 2019

## Refinery Union Representatives

April 19, 2019

## Los Angeles County Public Health

May 30, 2019

# Key Topics Discussed

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Potential Contents of MOU or Rule

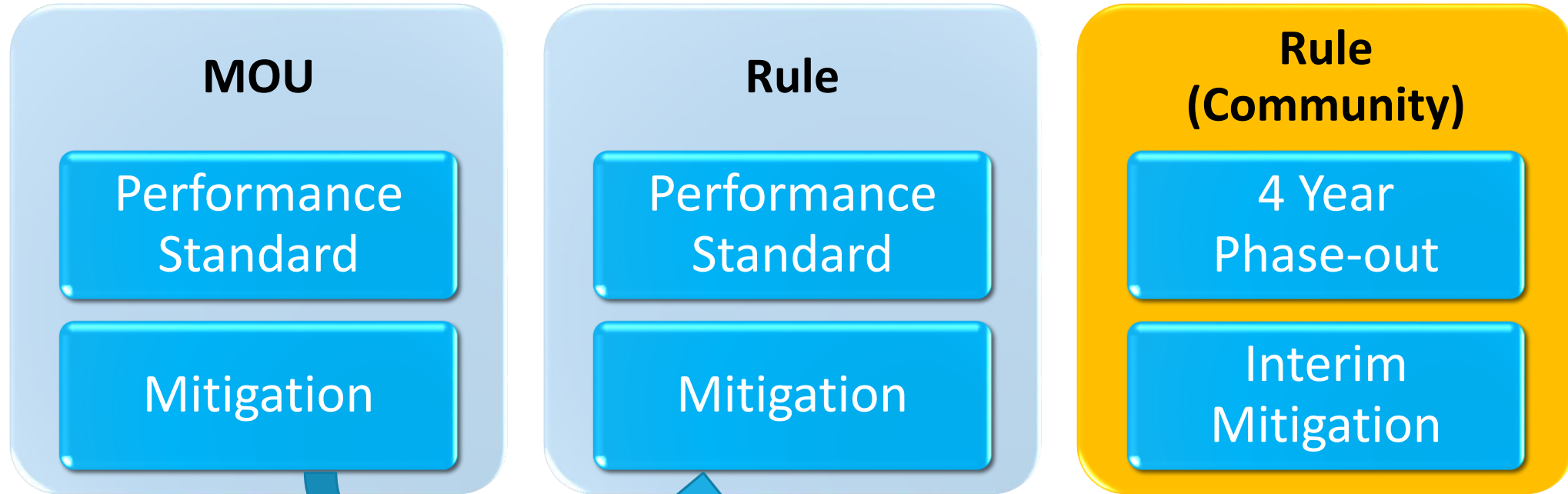


Performance Standard Consideration



Key Considerations for Mitigation Measures

# Key Elements of a Rule or MOU



If agreement cannot be met for an MOU, pivot to a Rule

# Potential Contents of MOU or Rule



- Within 6 months of rule adoption
  - ❑ Implement early action mitigation measures
  - ❑ Demonstrate Performance Standard can be met based on:
    - Established Threshold (HF concentration limit at specific receptor)
    - Specific Release Scenarios (hole size, operating conditions, credit for mitigation measures)
    - Demonstration (computer model and key assumptions)
- If Performance Standard can be met:
  - ❑ Implement all mitigation measures used in the demonstration
- If Performance Standard cannot be met:
  - ❑ Phase-out MHF within 4 to 8 years

# Potential Contents of MOU or Rule (cont'd)



- Other requirements
  - ❑ Monitoring, reporting, and recordkeeping requirements
  - ❑ Annual independent third party audit of MHF alkylation unit and mitigation measures
  - ❑ Periodic technology assessments of emerging technologies
- Other considerations
  - ❑ Coordinate with Public Health Agencies, first responders, and the surrounding communities for emergency preparedness including stockpiling Calcium Gluconate (antidote)

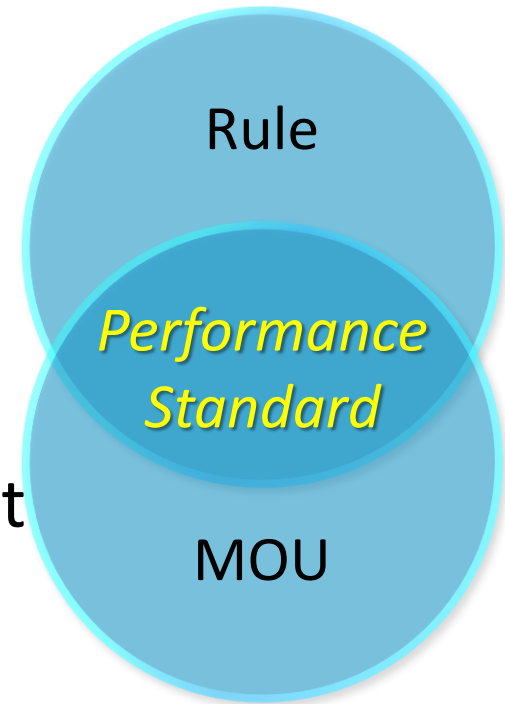


# Performance Standard Considerations

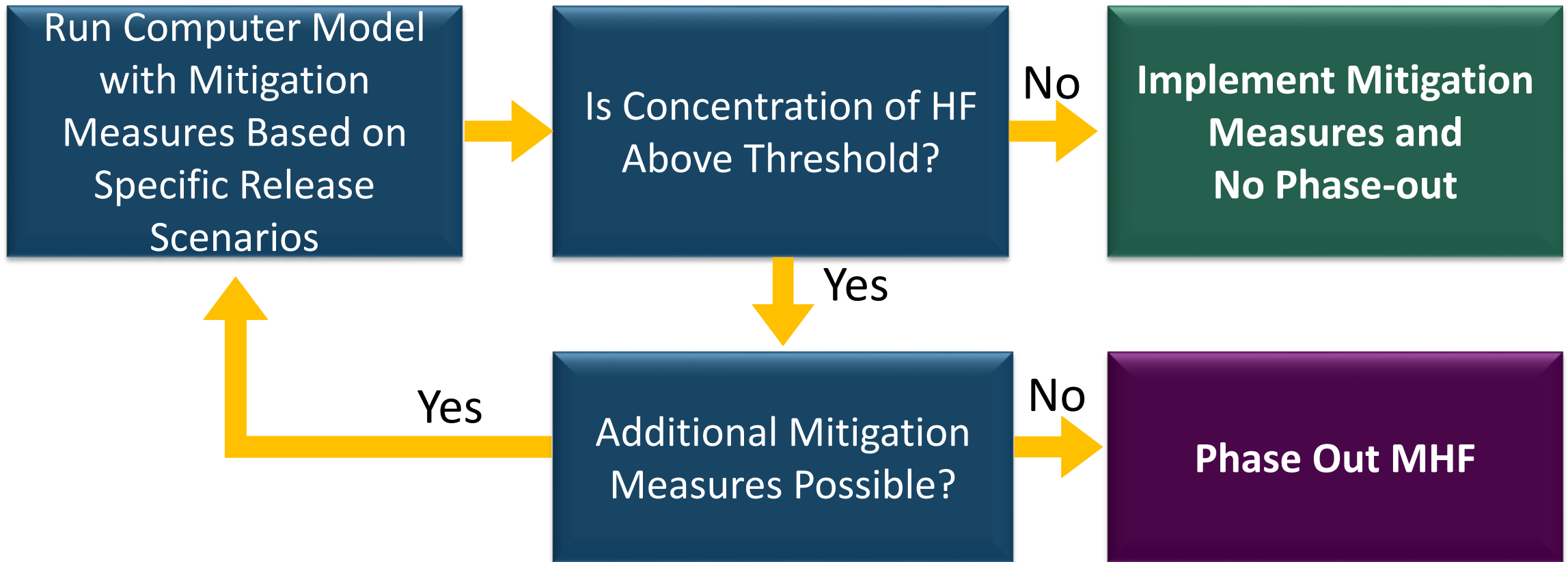
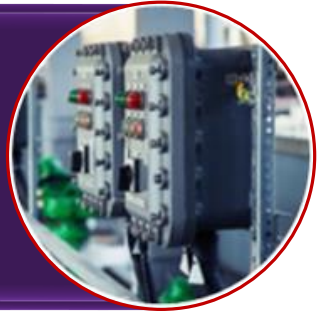
# Establishing Performance Standard



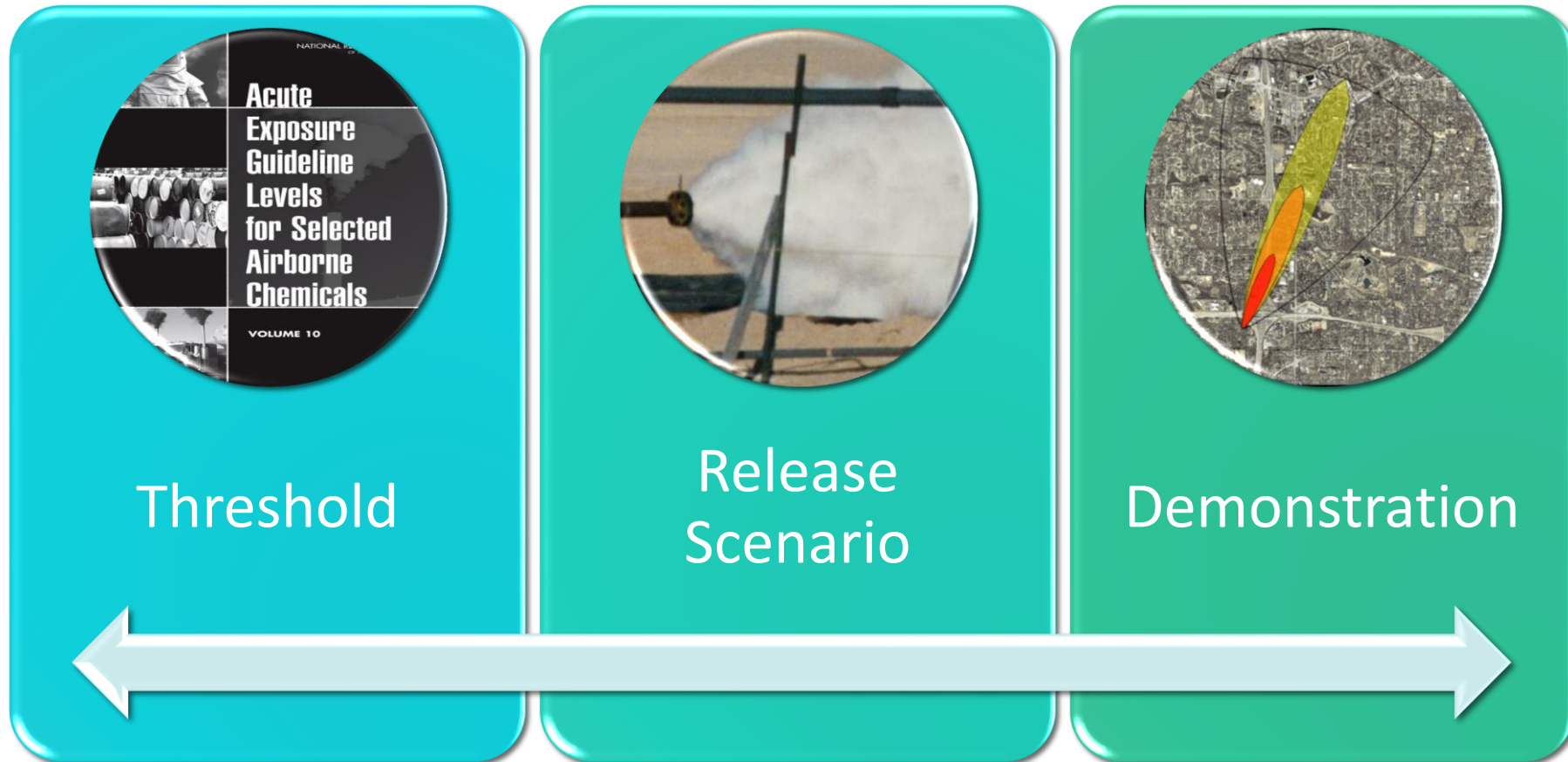
- A core element in rule or MOU
- Benchmark refineries would have to meet to continue using MHF
- Purpose:
  - ❑ Establish a health-protective threshold that must be met
  - ❑ Design mitigation measures to meet health-protective threshold



# Overview of Performance Standard



# Key Elements of Performance Standard



# Threshold

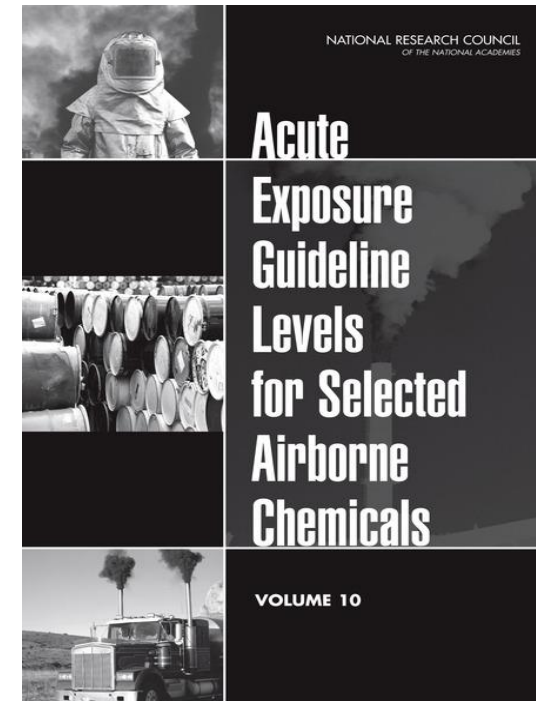
# Objectives of Threshold



- Threshold is the benchmark that must be met if HF or MHF is released
- Health-protective
  - ❑ No irreversible adverse health effects
  - ❑ Protective for all individuals, including susceptible populations
  - ❑ Concentration for short-term exposure duration at receptor location
- Preference is threshold established by other agency
  - ❑ Developed and accepted by scientists and public health agencies
  - ❑ Peer reviewed through academia, scientific review committee, etc.
  - ❑ Developed through a public process

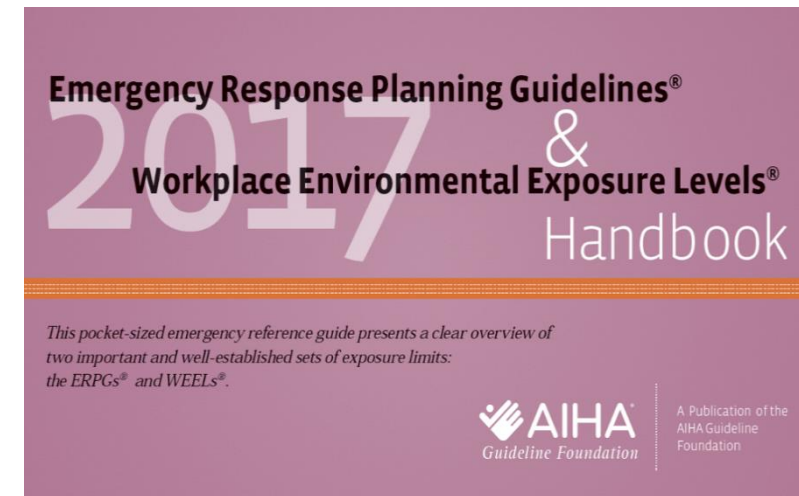
# Acute Exposure Guideline Levels (AEGL) Standards

- Established by U.S. EPA
- Developed in 1996 and periodically updated
- AEGLs developed through a national advisory committee
- Assesses ~ 300 airborne chemicals
- Includes thresholds for five timeframes: 10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours
- Designed to address general population including susceptible individuals
  - Includes susceptible subpopulations such as infants, children, elderly, persons with asthma and those with other illnesses



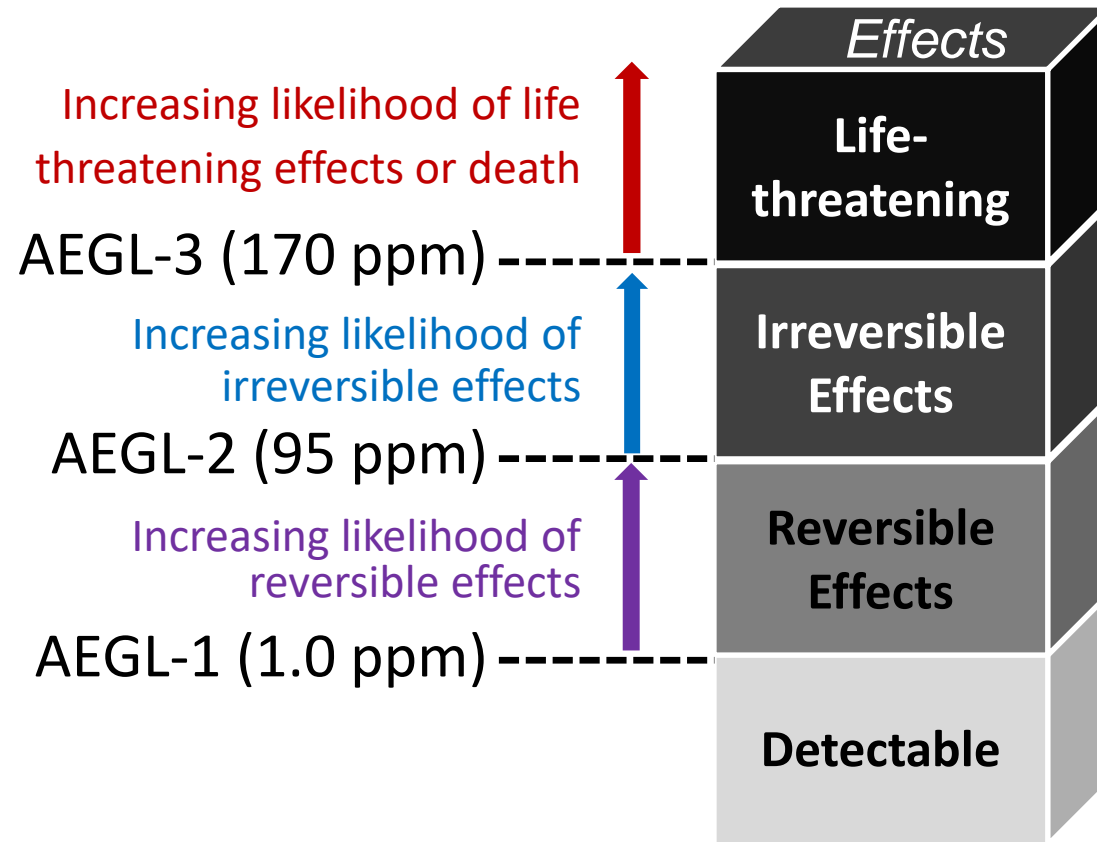
# Emergency Response Planning Guidelines (ERPG) Standards

- Established by American Industrial Hygiene Association
- Developed in 1988 and periodically updated
- Assesses ~ 150 hazardous airborne chemicals
- Includes thresholds for two timeframes:  
10 minutes and 1 hour
- Designed to address “nearly all individuals”
  - ❑ Not designed to sensitive members of public such as old, sick, or very young

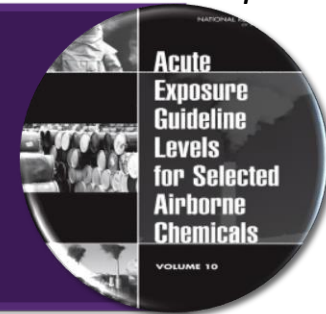




# AEGL Values for 10 Minute Exposures to HF<sup>1</sup>



<sup>1</sup> US EPA 2001, Standing Operating Procedures for Developing Acute Exposure Guideline Levels for Hazardous Chemicals



# Initial Proposal for Threshold

## South Coast AQMD Staff

AEGL-2 95 ppm for 10 minutes  
(No irreversible health effects)

Fenceline or nearest sensitive receptor



## Refineries

AEGL-3 170 ppm for 10 minutes  
(No life threatening health effects)

Nearest permanent residence



## Torrance Refinery Action Alliance (TRAA) Science Advisory Panel

AEGL-2 for 10, 30, 60 minutes and 4 and 8 hours  
(No irreversible health effects)

Fenceline and all points beyond

# Release Scenario

# Establishing Release Scenario



- Release scenario will identify the release parameters for specific areas within the alkylation unit that must be evaluated
- Purpose is to evaluate impacts from *consequential* release
  - ❑ Low risk, high consequence release
  - ❑ Consequential releases are more challenging to mitigate and could result in greater impacts to surrounding community
  - ❑ Small leaks are easier to mitigate
- Consider volume released and hole size
  - ❑ Preference is to use a specific hole size, not just volume released
  - ❑ Volume released will not capture various operating conditions (temperature and pressure) that affect rate of release

# Elements of Defining Release Scenario



- **Hole Size**

- Primary input for release calculation



- **Release Location**

- Can result in different release rate due to unit operating conditions

- **Release Duration**

- Depends on detection, activation time, and mitigation rate
- Determines total amount released



- **Release Rate**

- Depends on hole size and operating unit conditions (temperature and pressure)

# Initial Proposal for Hole Size



## South Coast AQMD Staff: 1 to 2-inch release

Considering different hole sizes for different units

$\frac{3}{4}$ - to 2-inch pipes common throughout alkylation unit

Up to 2 inches represents 95% of equipment failure events<sup>2</sup>



## Refineries: 1-inch release

“Leak before break” principle applies to vessels and piping

Larger pipes designed to flex and not shear

Typical mitigation design standard is for  $\frac{3}{4}$ -inch release



## TRAA Science Advisory Panel: Time and Volume

30 second to 4-hour release scenario that releases maximum amount of MHF

# Considerations for Release Location



- Release locations were selected based on:
  - ❑ Units with the largest volume of HF/MHF
  - ❑ Concentration of HF
  - ❑ Operating conditions (temperature and pressure)

## South Coast AQMD Staff and Refineries Agree on Following Release Locations

- Acid Settler/Cooler
- Acid Boots Return Line
- Fresh Acid Storage
- Acid Rerun Column
- Acid Unloading Hose

# Considerations for Release Rate



- Several variables affect the rate of HF release:
  - Composition
    - HF, additive, hydrocarbon, and acid soluble oil
  - Hole size
  - Location of release
  - Unit parameters
    - Temperature
    - Pressure



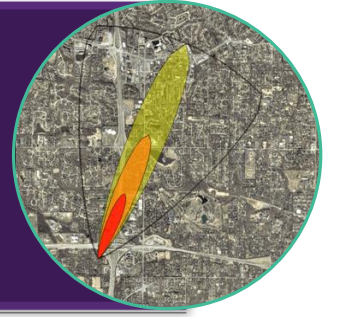
# Considerations for Response Time



- Response time = Detection Time + Activation Time
- Detection Time: Is time to detect an HF/MHF release
  - ❑ Human detection such as visual; or
  - ❑ Automated detection such as sensors or open path monitors
- Activation Time: Reaction time to activate mitigation measure after detection
  - ❑ Manual activation such as operator pressing a button
  - ❑ Automatically activate mitigation measure based on sensor or open path monitors or activation of other mitigation measures

# Demonstration

# Background for Demonstration



- Purpose is to demonstrate if specific measures under the established release scenarios can meet Threshold
- Demonstration should include:
  - ❑ Model(s) deemed acceptable
  - ❑ Percent reduction or “credit” allowed for each specific mitigation measure
  - ❑ Process required if a facility elects to pursue additional mitigation measures
  - ❑ Sensitivity runs and verification process for comparing results with other acceptable model

# Acceptable Dispersion Models



- Both TORC and Valero are proposing to use models that meet our basic criteria
  - TORC - HGSYSTEM
  - Valero - PHAST (Process Hazard Analysis Software Tool)
- Staff seeking third party review of modeling scenario assumptions and results

# Credit for Mitigation

# Credit for Mitigation Measures



- Purpose is to determine appropriate credit (e.g., percent reduction) for each specific mitigation measure (if any)
- The percent reduction will be applied prior to conducting dispersion modeling
- Considering credit for the following mitigation:
  - Additive
  - Physical barrier(s)
  - Water spray curtain
  - Water cannon
  - Acid evacuation
- Would consider revising credit if proven with publicly available testing or other valid information

# Considerations for Mitigation



- Staff proposing to allow credit for automated and some active mitigation systems
  - ❑ Additional mitigation measures will make the community safer
  - ❑ Allowing credit for mitigation provides a mechanism to demonstrate the safety (e.g., performance standard)
  - ❑ Even if MHF is phased out, would want maximum safety protections in place in the interim

## Manual Mitigation

- Detection time
- Reaction time
- Activation time

## Automated Mitigation

- Detection time
- Activation time
  - Eliminates reaction time

# Comments from TRAA Science Advisory Panel



- TRAA has commented that only passive mitigation should be allowed
  - ❑ Passive mitigation is defined by the U.S. EPA as “equipment, devices, or technologies that function without human, mechanical, or other energy input.”
  - ❑ During a catastrophic event, cascading failures can lead to failure of active mitigation measures

## Passive Mitigation

- Examples:
  - Additive
  - Barriers
- Does not require any action
- U.S. EPA Risk Management Plan only allows credit for passive mitigation

## Active Mitigation

- Examples:
  - Water mitigation
  - Acid Evacuation System
- Potential for intentional disengagement
- Could fail during “catastrophic” event



# Water Mitigation

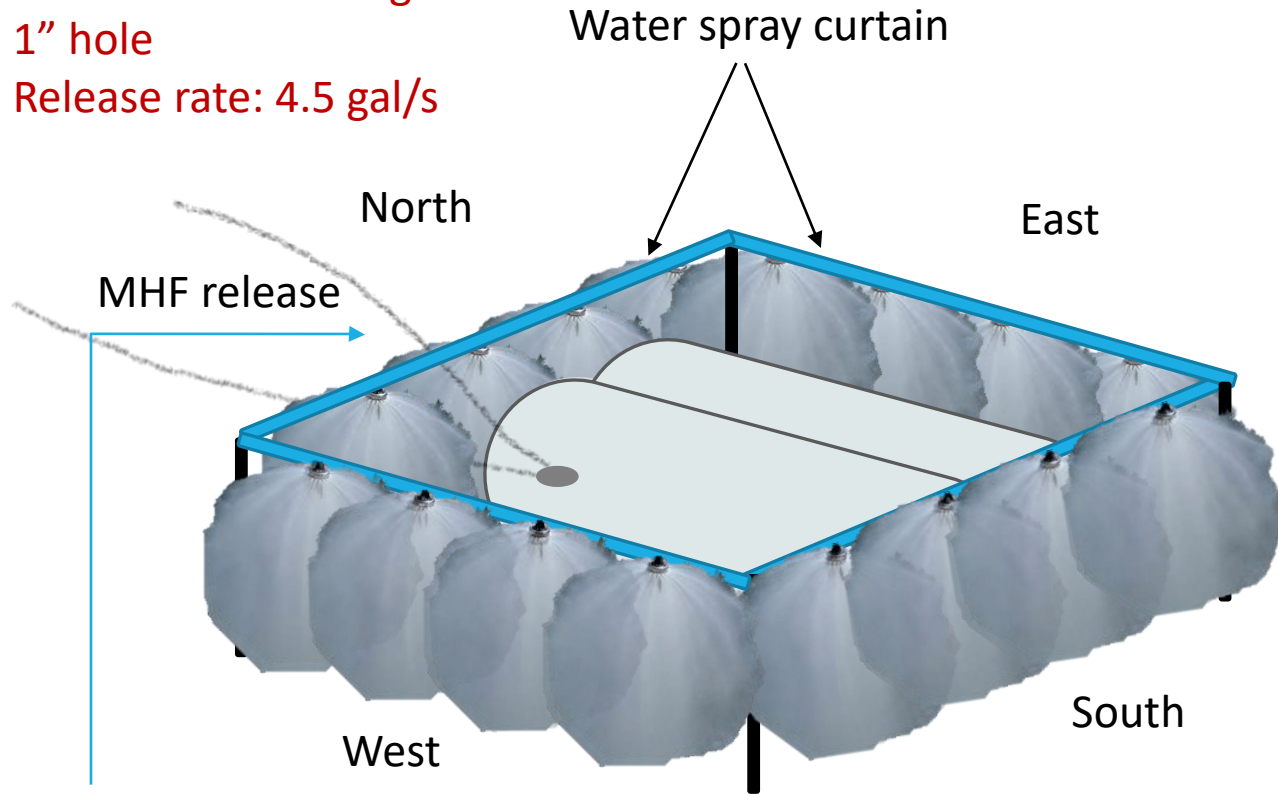


- Must have dedicated pre-pressurized water supply
- Adequate water is necessary for effective mitigation
  - ❑ 60:1 water to HF *contact* ratio delivered **at release path** achieves greater than 95% efficiency<sup>3</sup>
  - ❑ MHF release must contact the water to be effective
    - If MHF release is flowing north, the water curtain on the west, south, and east sides cannot be included in percent reduction calculation
    - If the MHF release is above water curtain level, the water cannot be included in reduction
  - ❑ Multiple layers of water curtain and water cannon can provide additional reductions

<sup>3</sup> Schatz and Koopman 1990, *Water spray mitigation of hydrofluoric acid releases*

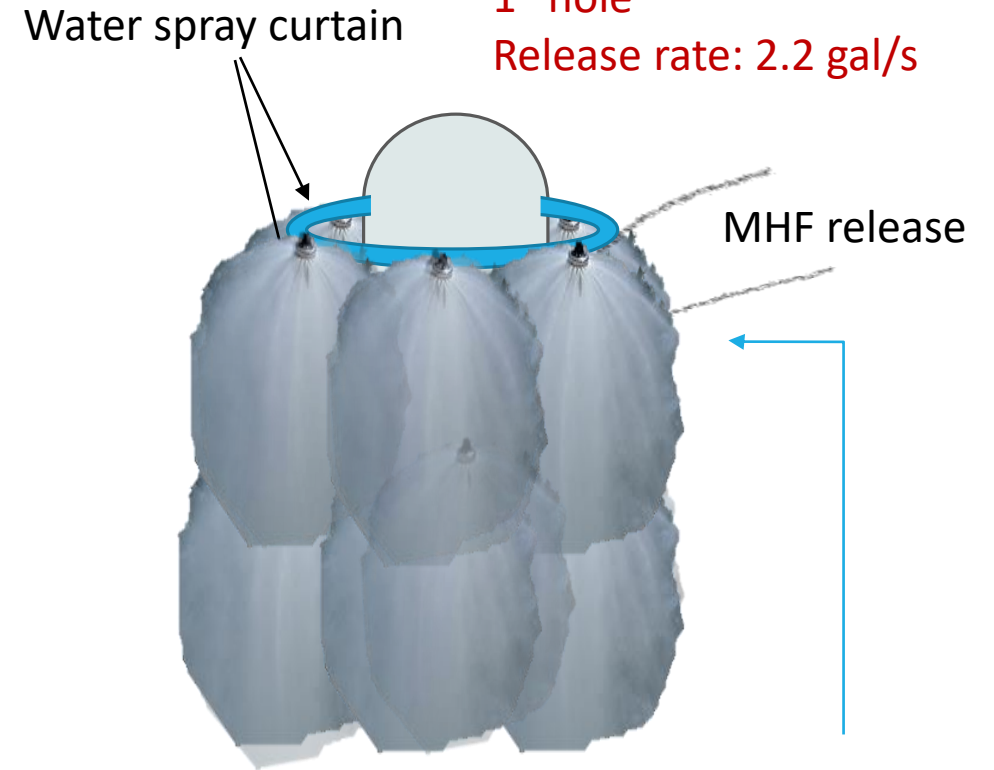
# Water Mitigation

MHF release flowing north  
1" hole  
Release rate: 4.5 gal/s



Water: 270 gal/s (60:1 Water:HF)  
Total Water: 1,080 gal/s

MHF release above lower  
water curtain  
1" hole  
Release rate: 2.2 gal/s



Water: 132 gal/s (60:1 Water:HF)  
Total Water: 1,056 gal/s

# Initial Proposal for Mitigation Credit



## South Coast AQMD Staff

Passive (Additive and barriers)

Automated (Water)

Considering active (Acid Evacuation System)



## Refineries

All applicable mitigation



## TRAA Science Advisory Panel

Only Passive Mitigation (*in accordance with U.S. EPA's RMP definition*)

# Other Considerations



- Other enhancements such as redundancy (e.g., backup power) and improvement of video quality are required
  - ❑ It will not affect the demonstration but is needed to ensure proper operation of mitigation systems in case of emergency situation
- Other elements to be in consideration:
  - ❑ Training of workers
  - ❑ Training of emergency responders
  - ❑ Commitment to work to ensure adequate supply of calcium gluconate
  - ❑ Technology assessment moving forward

Refinery  
Committee  
Members



Mayor Larry  
McCallon,  
Chair



Mayor Judith  
Mitchell,  
Vice Chair



Dr. William A.  
Burke,  
Ad Hoc  
Member



Mayor Pro  
Tem Ben  
Benoit



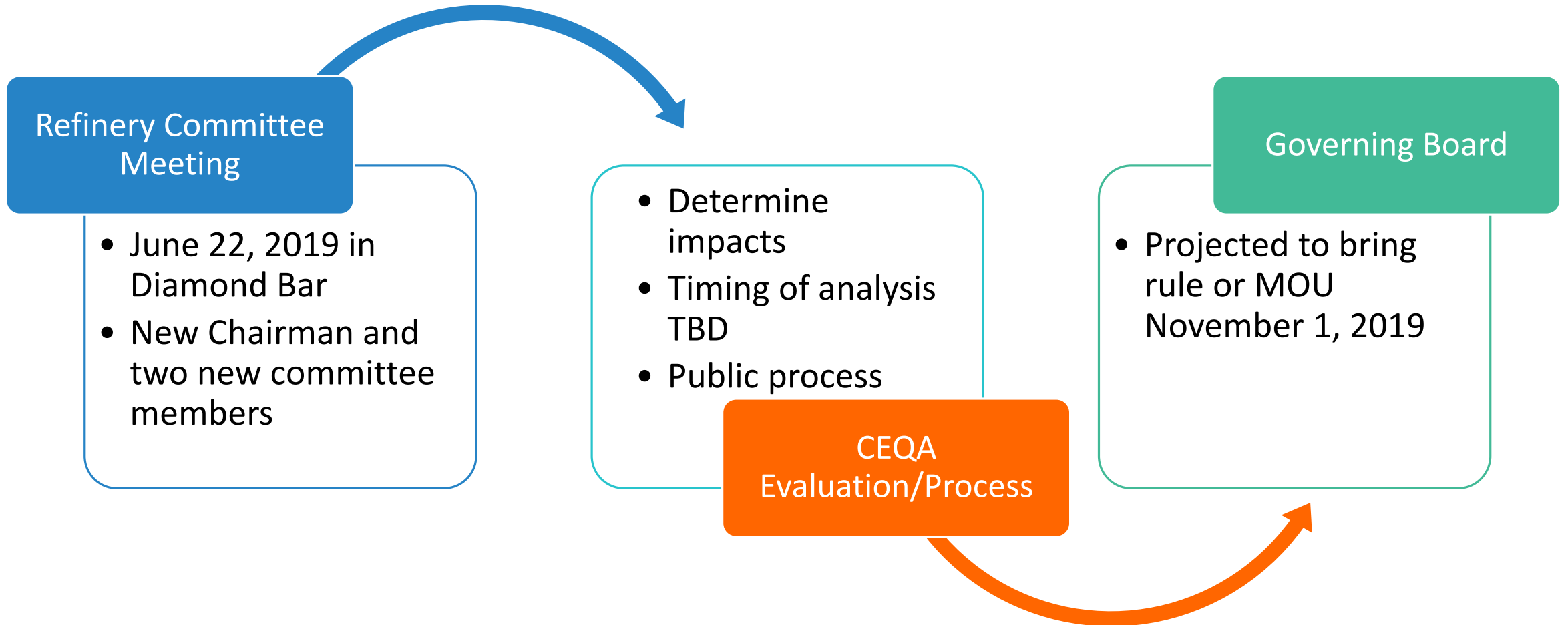
Supervisor  
Janice Hahn



Supervisor Lisa  
Bartlett

# Next Steps

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# Rule Staff Contacts

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- Michael Krause, Planning & Rules Manager  
(909) 396-2706, [mkrause@aqmd.gov](mailto:mkrause@aqmd.gov)
- Heather Farr, Program Supervisor  
(909) 396-3672, [hfarr@aqmd.gov](mailto:hfarr@aqmd.gov)
- Jong Hoon Lee, Ph.D., Air Quality Specialist  
(909) 396-3903, [jhlee@aqmd.gov](mailto:jhlee@aqmd.gov)

# Socioeconomic Analysis and CEQA Staff Contacts

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## **Socioeconomic Analysis**

- Paul Stroik, Ph.D., Air Quality Specialist  
(909) 396-2851, [PStroik@aqmd.gov](mailto:PStroik@aqmd.gov)

## **CEQA**

- Darren Ha, Air Quality Specialist  
(909) 396-2548, [dha@aqmd.gov](mailto:dha@aqmd.gov)