South Coast
Air Quality Management District
South Coast AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

NOTICE OF THE SCAQMD
REFINERY COMMITTEE MEETING

REFINERY COMMITTEE:
Dr. Clark E. Parker, Sr., Chair
Mayor Larry McCallon, Vice Chair
Mayor Ben Benoit
Dr. Joseph K. Lyou
Mayor Pro Tem Judith Mitchell
Dr. William A. Burke, Ad Hoc Member

Saturday, April 28, 2018 – 9:00 a.m.

Torrance City Council Chambers
3031 Torrance Boulevard
Torrance, CA 90503

AGENDA

Items are expected to be completed in the order listed below. However, items may be taken in any order.

1.	**Welcome / Opening Remarks**	*Dr. Clark E. Parker, Sr.* *Committee Chair*
2.	**Introduction**	*Wayne Nastri* *Executive Officer*
3.	**Staff Presentation – Status Update of PR1410**	*Dr. Philip M. Fine* *Deputy Executive Officer* *Planning and Rules*
4.	**Health Effects from Exposure to Sulfuric Acid and Hydrofluoric Acid (HF)**	*Dr. Craig A. Merlic* *Professor* *Department of Chemistry and Biochemistry* *UCLA*

5. **Elected Officials** *(3 minutes each)*

6. **Refineries** *TORC*
Valero
(10 minutes each)

7. **TRAA Presentation** *Dr. Sally Hayati*
President
(10 minutes)

8. **Union Representatives** *(10 minutes)*

9. **Public Comments** *(1 minute each)*
Members of the public may address the Committee concerning any agenda item before or during consideration of that item (Govt. Code Section 54954.3). Speakers may be limited to one (1) minute each. The agenda for this meeting is posted at SCAQMD Headquarters, 21865 Copley Drive, Diamond Bar, CA, and Torrance City Council Chambers at 3031 Torrance Boulevard, Torrance, CA, at least 72 hours in advance of the meeting. At the end of the agenda, an opportunity is provided for public comment on matters within the Committee's authority.

10. **Refinery Committee Discussion** *Committee Members*

11. **Closing Remarks** *Committee Members*

Adjournment

Document Availability

All documents (i) constituting non-exempt public records, (ii) relating to an item on the agenda, and (iii) having been distributed to at least a majority of the Committee after the agenda is posted, are available prior to the meeting for public review at the South Coast Air Quality Management District Public Information Center, 21865 Copley Drive, Diamond Bar, CA 91765, and will also be available at the meeting site on the day of the meeting.

Americans with Disabilities Act

The agenda and documents in the agenda packet will be made available, upon request, in appropriate alternative formats to assist persons with a disability [Govt. Code Section 54954.2(a)]. Disability-related accommodations will also be made available to allow participation in the meeting. Any accommodations must be requested as soon as practicable. Requests will be accommodated to the extent feasible. Please contact Denny Shaw at 909-396-2386 from 7 a.m. to 5:30 p.m. Tuesday through Friday, or send the request to dshaw@aqmd.gov.

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Status Update on PR1410 – Hydrogen Fluoride Storage and Use at Petroleum Refineries

South Coast AQMD

SCAQMD REFINERY COMMITTEE

April 28, 2018
Torrance, California

SUMMARY OF JANUARY 20TH 2018 REFINERY COMMITTEE MEETING

- SCAQMD staff presented initial rule concepts
- Approximately 100 speakers testified with almost an equal number of people supporting or opposing a ban of MHF
- Refinery Committee direction to staff:
  - Return to the Refinery Committee in 90 days
  - Work with key stakeholders to reach consensus
  - 8 year implementation timeframe is too long
  - If consensus cannot be reached, the Refinery Committee will direct staff on how to proceed

SCAQMD MEETINGS SINCE THE LAST REFINERY COMMITTEE

Torrance Refining Company (TORC)

- SCAQMD staff February 7, 2018
- SCAQMD technical staff March 7, 2018
- SCAQMD staff April 5, 2018

Valero

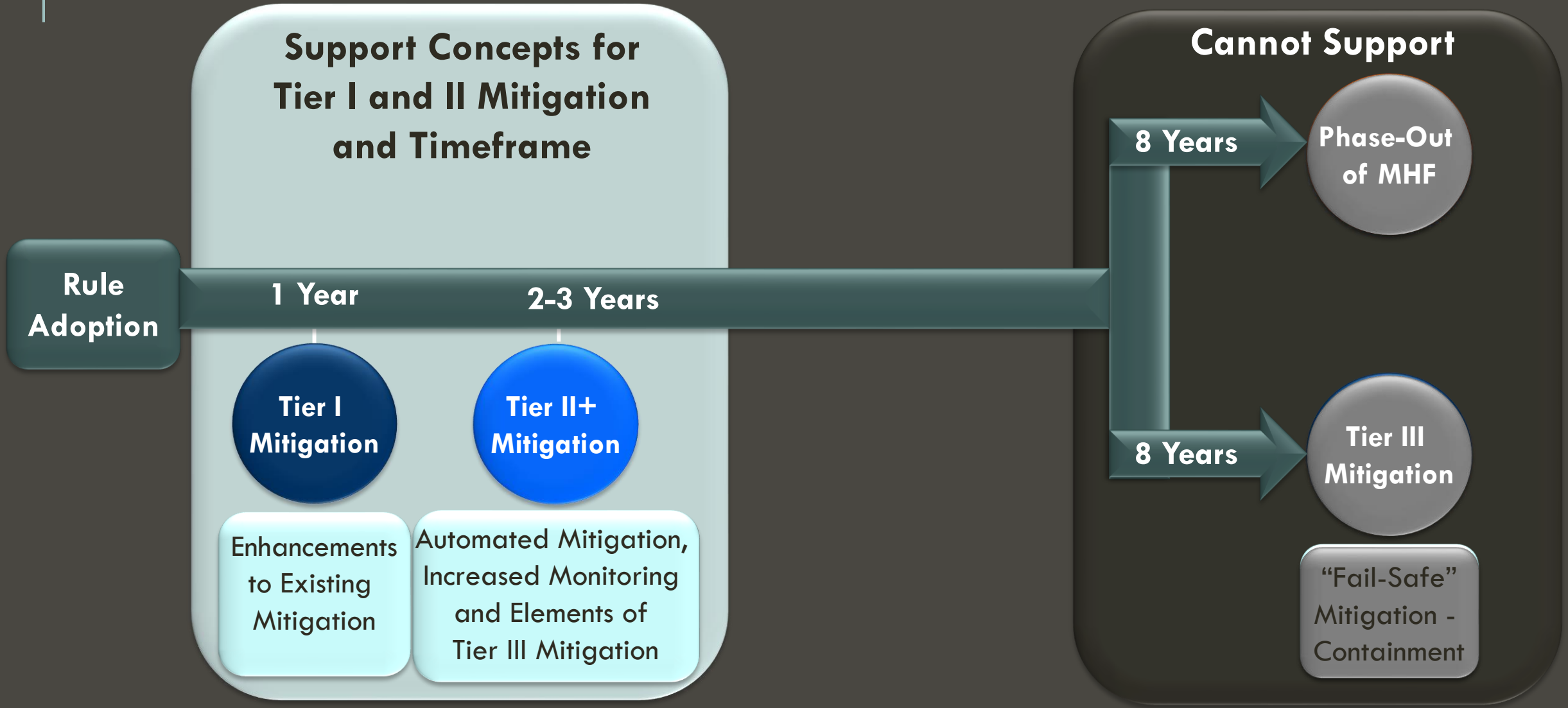
- SCAQMD staff February 1, 2018
- SCAQMD staff March 8, 2018
- Dr. Parker and SCAQMD staff April 4, 2018

Torrance Refinery Action Alliance

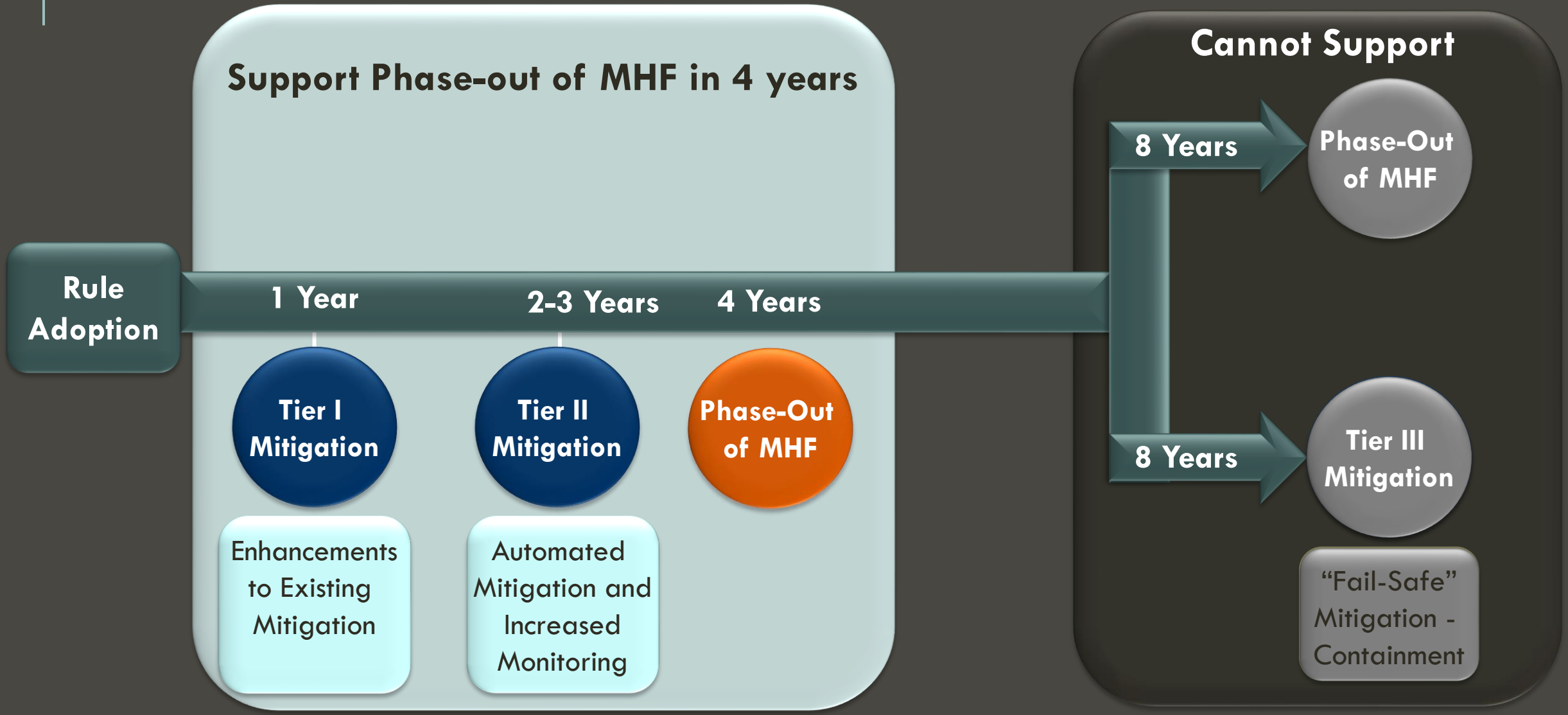
- SCAQMD staff March 23, 2018
- Dr. Parker and SCAQMD staff April 4, 2018

SUMMARY OF STAFF'S INITIAL RULE CONCEPT

REFINERIES' RESPONSE TO INITIAL RULE CONCEPT



TRAA'S RESPONSE TO INITIAL RULE CONCEPT



KEY ISSUE #1
REFINERIES ASSERT THEY CANNOT CONVERT TO EMERGING TECHNOLOGIES BECAUSE THEY ARE NOT COMMERCIALLY AVAILABLE AND PROVEN

RESPONSE:

- Sulfuric acid alkylation is commercially available
- Further demonstration of emerging technologies at scale is desirable
- Proposed Rule 1410 can include phase-out with:
  - Technology assessment
  - Participation of refineries in demonstration projects

STATUS OF TECHNOLOGIES

- Sulfuric acid alkylation currently available
  - Approximately 50 refineries in the nation use sulfuric acid alkylation units
  - With the exception of TORC and Valero, all other California refineries use sulfuric acid
  - Valero's refineries in Louisiana and Texas are completing installation of new sulfuric acid alkylation units
- Emerging technologies
  - Solid acid catalyst alkylation being used at a petrochemical plant in China – Application is 2,700 bpd in 2015
  - Ionic liquid catalyst at Chevron Salt Lake City refinery in Utah – 5,000 bpd HF Alkylation conversion 2017 to 2020

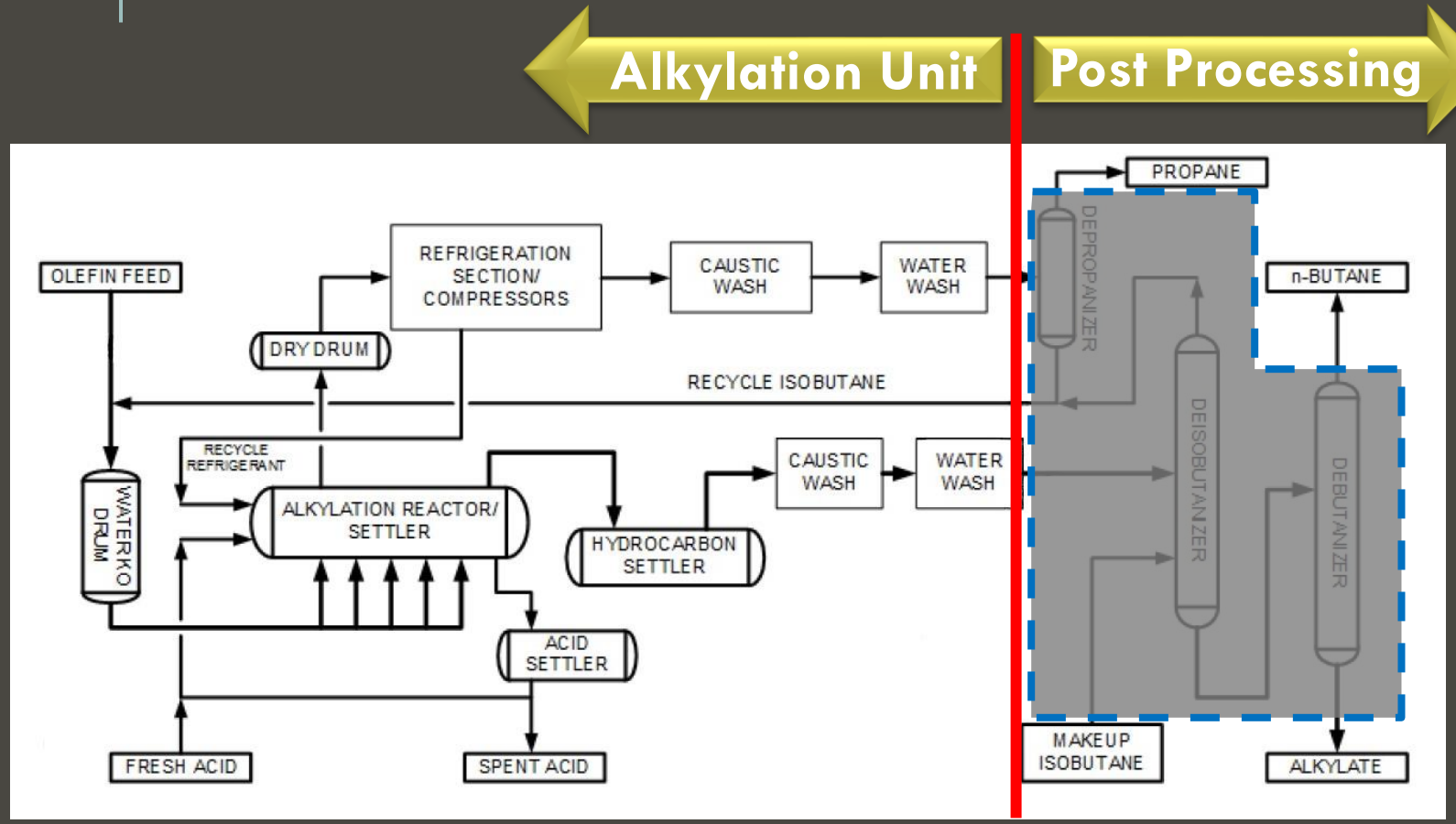
KEY ISSUE #2
REFINERIES CANNOT SUPPORT A PHASE-OUT BECAUSE CONVERSION TO SULFURIC ACID WILL NOT GENERATE ANY RETURN ON INVESTMENT

RESPONSE:

- In addition to capital and operating costs, the decision to phase-out MHF should consider public safety and health effects
- Difficult to quantify the financial impact of the risk associated with an off-site release of MHF
- TORC's Burns and McDonnell study[1] estimated the conversion cost of a sulfuric acid alkylation unit of $600 million with an additional $300 million for acid regeneration

[1] Burns and McDonnell - Alkylation Study & Estimate, 2017

SULFURIC ACID ALKYLATION COST ESTIMATES



- Burns & McDonnell estimate included alkylation unit and post processing equipment
  Estimated Cost: $600 Million

- SCAQMD staff and Norton Engineering agree post processing replacement not needed for conversion
  Estimated Cost: $300 Million

- Installation at Valero more challenging than TORC due to space constraints

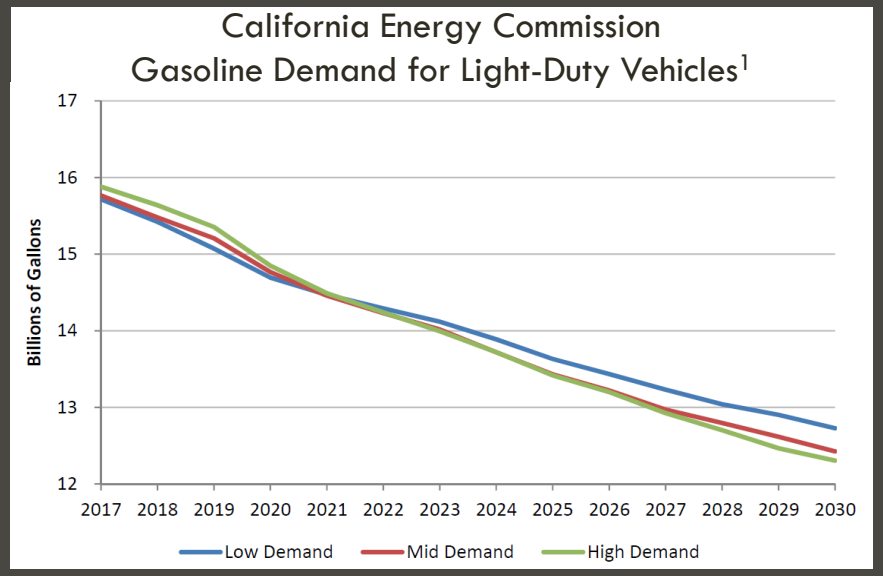
POTENTIAL BENEFIT OF NEW TAX CUT AND JOBS ACT

- New Tax Cut and Jobs Act – "full expensing" provision allows the deduction of 100% cost of investments from taxable income in every year for up to five years
- Estimated cost of sulfuric acid alkylation approximately $300 million dollars – Amortized over 5 years:

	Millions of Dollars	
	Capital Expenses	**Tax Savings**
Annual Average	~$70	~$15
Five-Year Total	~$350	~$75

- TORC's most recent turnaround cost was more than $250 million – Extraordinary turnaround that included the majority of its refinery process units

KEY ISSUE #3
A RULE THAT AFFECTS ONLY 2 REFINERIES GIVES A MARKET ADVANTAGE TO THE OTHER REFINERIES AND WILL INCREASE GASOLINE PRICES



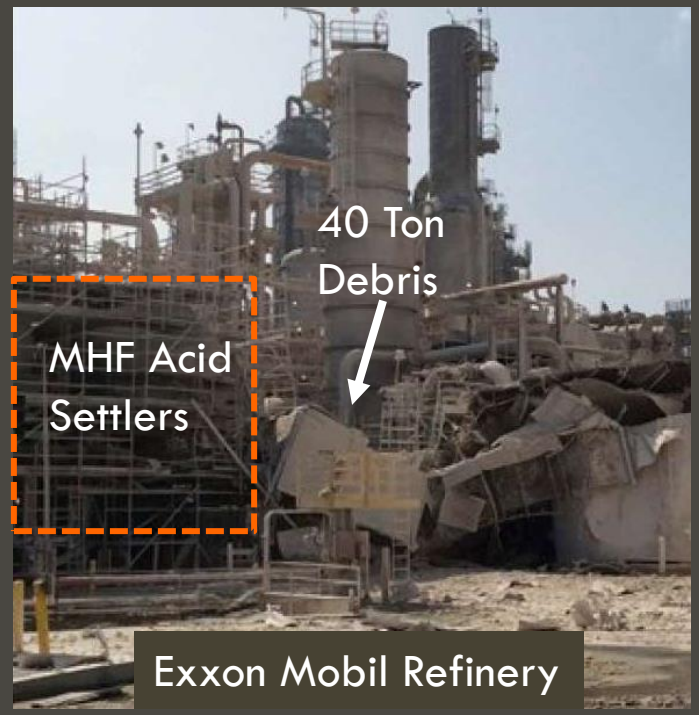
RESPONSE:

- Any impacts would be temporary
- Can incorporate a staggered implementation schedule to reduce supply impacts, if any
- Planned phase-out is different than an unplanned shutdown – less disruptive
  - Refineries can stockpile or purchase alkylate to minimize downtime
- Future California gasoline demand projected to decrease[1] minimizing potential supply impacts, if any

[1] California Energy Commission, Transportation Energy Demand Forecast 2018-2030, November 2017

ACCIDENTS HAPPEN

- "Near-miss" accident at Exxon Mobil in 2015[1]
  - 40 ton piece of electrostatic precipitator landed within 5 feet of the MHF acid settler
- Sulfuric acid alkylation accident at Tesoro Martinez in 2014[2]
  - Released 84,000 pounds of sulfuric acid injured two employees
- HF Release at Marathon Petroleum Corporation, Texas City in 1987[3]
  - Vapors emitted under pressure for over 2 hours
  - More than 1,000 people injured
- Explosion at Valero Texas City April 19, 2018[4]
  - Early reports stated fire erupted in refinery's depropanizer tower
  - Uncertain at this time if HF was released from alkylation unit



Exxon Mobil Refinery

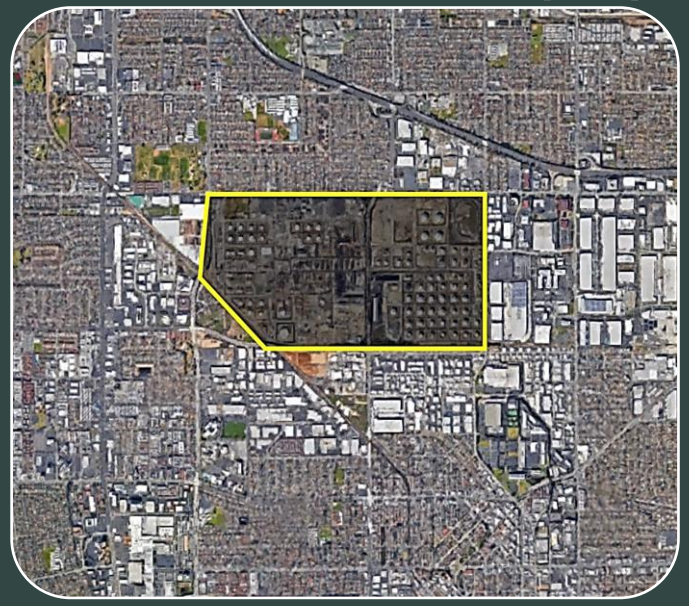
[1] Chemical Safety Board - ExxonMobil Torrance Refinery Investigation Report, 2017
[2] Chemical Safety Board - Tesoro Martinez Refinery Process Safety Culture Case Study, 2016
[3] Texas City Journal; Where a Chemical Leak Seems an Acceptable Risk, 1987
[4] San Antonio Business Journal; Fire at Valero's Texas City Refinery Remains Under Investigation, 2018

TOP THREE U.S. REFINERIES USING HF/MHF ALKYLATION IN DENSELY POPULATED AREAS

#1
Philadelphia Energy Solutions

Alkylate: 26,500 BPD
298,000 People within 3 Miles
Nearest Residence ~3,200 Feet

#2
Torrance Refining Company



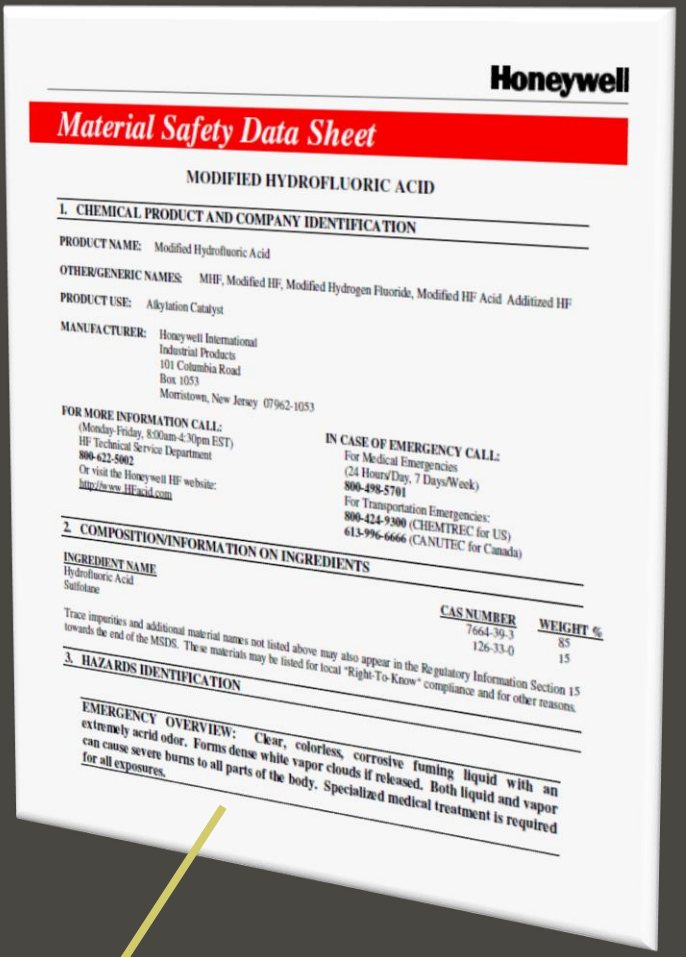
Alkylate: 25,500 BPD
245,000 People within 3 Miles
Nearest Residence 1,500 Feet

#3
Valero Wilmington Refinery

Alkylate: 20,000 BPD
153,000 People within 3 Miles
Nearest Residence ~4,100 Feet

RELATIVE RISK OF HF AND MHF

- MHF modestly increases rainout - HF exposure would still occur
- Material Safety Datasheets for HF and MHF list the same hazards



Honeywell

Material Safety Data Sheet

MODIFIED HYDROFLUORIC ACID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Modified Hydrofluoric Acid

OTHER/GENERIC NAMES: MHF, Modified HF, Modified Hydrogen Fluoride, Modified HF Acid Additized HF

PRODUCT USE: Alkylation Catalyst

MANUFACTURER: Honeywell International
Industrial Products
101 Columbia Road
Box 1053
Morristown, New Jersey 07962-1053

FOR MORE INFORMATION CALL:
(Monday-Friday, 8:00am-4:30pm EST)
HF Technical Service Department
800-622-5002
Or visit the Honeywell HF website:
http://www.HFacid.com

IN CASE OF EMERGENCY CALL:
For Medical Emergencies
(24 Hours/Day, 7 Days/Week)
800-498-5701
For Transportation Emergencies:
800-424-9300 (CHEMTREC for US)
613-996-6666 (CANUTEC for Canada)

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
Hydrofluoric Acid	7664-39-3	85
Sulfolane	126-33-0	15

Trace impurities and additional material names not listed above may also appear in the Regulatory Information Section 15 towards the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Clear, colorless, corrosive fuming liquid with an extremely acrid odor. Forms dense white vapor clouds if released. Both liquid and vapor can cause severe burns to all parts of the body. Specialized medical treatment is required for all exposures.

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CURRENT STAFF RECOMMENDATION FOR TWO POSSIBLE RULE APPROACHES

- Option A: Tier 1+ Mitigation with Phase-out in 5 years
  - "Tier 1+" Mitigation: Enhancements to existing and some automated mitigation implemented within 1 year
  - Phase-out MHF no longer than 5 years
- Option B: Tier 1 and 2 Mitigation with Longer Phase-out
  - Tier 1 Mitigation: Enhancements to existing mitigation implemented within 1 year
  - Tier 2 Mitigation: Automated mitigation implemented within 2-3 years
  - Technology assessment in 2 years
  - Phase-out MHF no longer than 6 years
  - If technology assessment concludes additional time needed, phase-out MHF no longer than 8 years

TWO POSSIBLE RULE CONCEPTS TO CONSIDER

Option A

Option B