Status Update on PR 1410 – Hydrogen Fluoride Storage and Use at Petroleum Refineries

webcast at: http://www.aqmd.gov/home/news-events/webcast
Since April 2017

- 6 Refinery Committee Meetings
- 10 Working Group Meetings
February Board Meeting

• Staff presentation addressed
  - Hazards of hydrogen fluoride (HF) and modified hydrogen fluoride (MHF) and key issues

• Board direction
  - Pursue both an MOU approach and proceed with rule development
  - Work with both the community and industry over the next 90 days to reach resolution
  - Present to the Refinery Committee for review with recommendations to the full Board
Meetings with Stakeholders Following February Board Meeting

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
- June 19, 2019

Valero Wilmington Refinery (Valero)
- February 20, 2019
- March 13, 2019
- April 17, 2019
- May 30, 2019
- June 11, 2019

Community Organizations¹
- February 13, 2019
- March 22, 2019
- April 17, 2019
- May 2, 2019
- June 5, 2019

Union Representatives²
- April 19, 2019

Los Angeles County Public Health
- May 31, 2019

¹ Torrance Refinery Action Alliance (TRAA), Communities for a Better Environment (CBE), Sierra Club, Ban Toxic MHF, and Del Amo Action Committee
² LiUNA Local 1309, USW Local 675, IBEW Local 11, Sheet Metal Workers Local 105, and Los Angeles/Orange Counties Building & Construction Trades Council
Key Elements of a Rule or MOU

MOU
- Meet Performance Standard or Phase-out HF/MHF
- Mitigation

Rule

Rule (Community Organizations)
- 4 Year Phase-out
- Interim Mitigation

Pivot to Rule if no Agreement
Key Elements of Performance Standard

- Acceptable computer model
- Receptor location

Performance Standard

- Locations within alkylation unit where release will occur
- Hole size

Threshold

Health protective HF concentration level for specified time

Mitigation

Mitigation measures allowed for Performance Standard demonstration

Release Scenario

Demonstration

- Locations within alkylation unit where release will occur
- Hole size
### Areas of Agreement for Key Elements of the Performance Standard

<table>
<thead>
<tr>
<th>Area</th>
<th>South Coast AQMD Staff</th>
<th>TORC and Valero</th>
<th>TRAA Science Advisory Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold</td>
<td>AEGL-2</td>
<td>X</td>
<td>Agree&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mitigation Measures</td>
<td>Passive and Active</td>
<td>Agree</td>
<td>X</td>
</tr>
<tr>
<td>Release Locations</td>
<td>High Risk Locations</td>
<td>Agree</td>
<td>X</td>
</tr>
<tr>
<td>Release Hole Size</td>
<td>1 to 2 Inches</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Computer Model</td>
<td>Publicly Available</td>
<td>Agree</td>
<td>Agree</td>
</tr>
<tr>
<td>Receptor Location</td>
<td>Fenceline</td>
<td>X</td>
<td>Agree&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>3</sup> Agrees to Acute Exposure Guideline Level -2 (AEGL-2) standard for all five exposure time periods

<sup>4</sup> Agrees to fenceline and all points beyond
Thresholds
Acute Exposure Guideline Levels (AEGL)

- AEGLs are established by U.S. EPA and scientifically reviewed
- Addresses all receptors including sensitive populations
- AEGL standards includes five specified time periods from 10 minutes to 8 hours

Staff Recommendation

- AEGL-2 threshold (no irreversible health effects)
- Exposure time dictates AEGL time period

<table>
<thead>
<tr>
<th>Exposure Time</th>
<th>AEGL Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Minutes</td>
<td>95 ppm</td>
</tr>
<tr>
<td>30 Minutes</td>
<td>34 ppm</td>
</tr>
<tr>
<td>1 Hour</td>
<td>24 ppm</td>
</tr>
<tr>
<td>4 hours</td>
<td>12 ppm</td>
</tr>
<tr>
<td>8 Hours</td>
<td>12 ppm</td>
</tr>
</tbody>
</table>
HF AEGL Tiers for 10 Minute Exposure

- **Discomfort**
  - Increasing notable discomfort
  - Increasing reversible health effects

- **Detectability**
  - Objectionable odor
  - Sensory irritation

- **AEGL-1**
  - 1 ppm
  - 10 Minutes

- **AEGL-2**
  - 95 ppm
  - 10 Minutes

- **AEGL-3**
  - 170 ppm
  - 10 Minutes

- **Disabling**
  - Impairment ability to escape
  - Irreversible health effects

- **Death**
  - Life-threatening
  - Death

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5 USEPA Acute Exposure Guideline Levels

TORC and Valero

South Coast AQMD Staff
(Time period based on exposure duration)

TRAA Science Advisory Panel
(Assess all 5 time periods)
Release Scenarios
Staff Recommendation for Release Scenarios

Locations based on:
- Highest volume of HF/MHF
- Highest HF concentration
- Highest pressure and/or temperature

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

TORC and Valero generally agree on release locations

TRAAD Science Advisory Panel recommend maximum volume of HF/MHF released over different timeframes
Staff Recommendations for Release or Hole Size

South Coast AQMD Staff
- 1 to 2 inch hole
- Based on piping in and out of equipment for scenarios evaluated
- Assuming a 1 to 2 inch pipe can sheer or develop a leak

TORC and Valero
- 1 inch hole
- Based on concept that larger pipes will bend before breaking

TRAA Science Advisory Panel
- Volume released
- Large volume released quickly and smaller volume released slowly
Mitigation Measures
Purpose of the Performance Standard...

Is to assess if mitigation measures can protect the public from a consequential release of HF or MHF.
Overview of Performance Standard

Computer Model Calculates HF Released with Specific Mitigation Measures

Below Threshold?

No

Yes

Additional or Enhance Mitigation Measures Possible?

No

Yes

Phase-Out MHF

No Phase-Out - Must Implement Mitigation Measures Used to Meet Threshold
Passive and Active Mitigation

• Passive mitigation
  • Requires no human, mechanical, or energy input to function

• Active mitigation
  • Requires human, mechanical, or energy input to function
Objectives of Mitigation Measures

• Reduce the amount of HF released
• Ensure measures can mitigate HF/MHF released
• Minimize exposure to HF/MHF
• Design and include measures to meet health protective threshold

• Acid evacuation system to reduce the amount of HF/MHF released
• Assess efficacy to ensure measures can mitigate release of HF/MHF

• Additional monitors for earlier detection
• Automation for quicker response
• Barriers to slow momentum to reduce exposure
Recommendations for Mitigation Used in Demonstration

<table>
<thead>
<tr>
<th>Mitigation Features</th>
<th>Passive Mitigation</th>
<th>Active Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce Exposure</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Improve Response Time</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Reduce Volume of HF/MHF Released</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

South Coast AQMD Staff
All Mitigation

TORC and Valero
All Mitigation

TRAA
Science Advisory Panel
Only Passive Mitigation
Receptor Location
Possible Receptor Locations and Recommendations

<table>
<thead>
<tr>
<th>Location</th>
<th>Nearest Residential/Sensitive or Worker Receptor</th>
<th>Nearest Residential/Sensitive Receptor</th>
<th>Nearest Permanent Residential/Sensitive Receptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Coast AQMD Staff</td>
<td>Fenceline</td>
<td>TORC</td>
<td>Valero</td>
</tr>
<tr>
<td>TRAA Science Advisory Panel</td>
<td>470 Feet</td>
<td>1,500 Feet</td>
<td>1,500 Feet</td>
</tr>
<tr>
<td></td>
<td>1,500 Feet</td>
<td>1,500 Feet</td>
<td>1,500 Feet</td>
</tr>
<tr>
<td></td>
<td>1,250 Feet</td>
<td>2,400 Feet</td>
<td>4,100 Feet</td>
</tr>
</tbody>
</table>

6 Estimated distance from acid settler to receptor location based on Google maps.
7 Agrees to fenceline and all points beyond.
Can TORC and Valero Meet a Threshold of AEGL-2?

• Both refineries are proposing additional enhancements to existing mitigation measures

• Refineries have conducted initial iterations of modeling
  □ Additional enhancements needed to achieve AEGL-2

• Staff is working on details such as
  □ Amount of credit for each mitigation measure
  □ Details regarding the modeling demonstration
  □ Implementation timeframe
Next Steps

Performance standard is the core of an MOU or rule

Staff is seeking direction on key elements of performance standard

Staff is seeking direction on path forward

- Dual path (MOU and rule)
- Pivot to rule with a performance standard
- Rule with 4-year phase-out of HF/MHF