A Dramatic Shift: Future and Current Challenges of Chemical Sector Air Quality Requirements

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Agenda

- Chemicals of Interest
- Fenceline Monitoring
- SSM Exemptions
- Flare Provisions
- PRDs
- Maintenance Vents
- Heat Exchange/Cooling Tower Monitoring
- Implementation

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Consent Decrees, RTRs, and More

- Substantial EPA chemical sector activity over past few years and into future
- Consent decrees were leading indicator for the sector
- OLD, EMACT, and MON RTRs (final rules in 2020, compliance dates in Summer 2023)
- HON Section 114 Requests in 2022
- Chemical sector MACT RTR-related (and NSPS?) rule changes will continue to consume extensive resources

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RSR → EMACT → MON → HON…..Interesting Points

- HON is more relatable to refineries than EMACT/MON
- MON and HON are organized nearly the same
- EtO bubbled up as a precedent setting issue starting with EtO sterilization facilities.
- MON was first effort to include rulemaking for sources "In Ethylene Oxide Service"
- Commercial sterilizers proposal good indication of direction for HON risk review
- Loss of SSM exemption not limited to MACT
- Loss of Force Majeure

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HON/NSPS

- 112(d)(6) technology review, 112(f)(2) risk review (ample margin of safety), or combination thereof?
- Starting with 2017 NEI
- EtO expanding to all HON affected sources
- Section 114 ICR: Facility uses, produces, or stores benzene, 1,3-butadiene, ethylene oxide, ethylene dichloride, and/or vinyl chloride
- December 16, 2022, deadline for determinations
- Final rule deadline ~15 months later (3/29/2024)

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Fenceline Monitoring (FLM) Current Status

- Started with Refinery Sector Rule (RSR)
- Methods 325A/B part of RSR regulatory package
- FLM has been a staple of chemical sector CDs
- FLM was not in OLD/EMACT/MON revisions after RSR
- However, HON is expected to have FLM provisions
- Potential challenges for EPA in developing HON FLM

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Chemicals of Interest Expanding

- Benzene
- Ethylene Oxide
- 1,3-Butadiene
- Ethylene Dichloride
- Vinyl Chloride
- Chloroprene
- Formaldehyde
- Site-Specific Compounds of Interest?

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FLM Data Now Very Public

- Consent Decrees are requiring Public Facing Websites (14 day posting versus CEDRI less frequently) Managed by Regulated Entity
- This month EPA rolled out a new website to make refinery FLM data very easily accessible

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FLM Site-Specific Monitoring Plans

- SSMP – OK for RSR; Not OK for CD
  - Co-Located Sources will be remedied for benzene
  - Offsite impacts (e.g., barges) will still be an issue
- Areas of Focus
  - Product Loading And Unloading Operations Including Releases From Incoming Barges And Ships
  - Nearby Wastewater Collection And Treatment Systems
  - Benzene containing tank leaking components
  - Consider Additional or More Frequent Monitoring To Identify Problem Areas

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Loss of Startup/Shutdown/Malfunction (SSM) Exemption

- Focus Areas are large volume vents that cannot be safely sent to flares in lieu of TO/RTO
  - High oxygen content
  - Halogenated
- Reliability of Existing Control Devices is the Primary Focus
  - Single Trip Points converted to double or triple
  - Addition of instrumentation
  - Enhanced alarms strategies
  - Identified root causes of trips that can be mitigated through MOCs

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Flare Provisions

- Covered Flares under Consent Decrees will not be greatly impacted
- MON flare requirements are only applicable to MCPUs that produces olefins or polyolefins and manufacture ethylene, propylene, polyethylene, and/or polypropylene as a product
- Many NSR permits have special conditions already included that align with typical flare monitoring provisions for NHV limits, flowrate, visible emissions, and tip velocity
- Nuanced differences between flare CD requirements and MACT flare requirements (FMP, Flare Protocol, WGMP, smokeless design capacity, RFI)

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Flare Provisions (continued)

- Flare combustion efficiency
  - Single net heating value operating limit in combustion zone NHVcz > 270 Btu/scf (> 800 Btu/scf for multipoint ground flares)
  - Install flow rate monitors on flare vent gas, air/steam assist, supplemental gas
    - 15-minute average period
    - Monitor the composition of the flare vent gas or directly monitor the NHVvg
    - Allowed to use higher adjusted hydrogen heating value (1,212 Btu/scf)
- Operate with pilot flame at all times regulated material is sent to flare
- Specify smokeless design capacity and operate with no visible emissions
  - Allowed 5 minutes in any 2-hour period when regulated material sent to flare and below smokeless design capacity
  - Use video monitoring in lieu of the daily visible emissions (Method 22) observations; 3-year retention required

Flare Provisions (continued)

- Flare Emergency Flaring Provisions
  - Operating above the smokeless capacity
  - RCA and Corrective Action requirements when flow rate exceeds the smokeless capacity
    - Visible emissions are present for more than 5 minutes in 2-hour period
- Develop a Flare Management Plan (FMP)
- Develop a Continuous Parameter Monitoring System (CPMS) Plan

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PRDs

- Straightforward if
  - Fully instrumented and DCS connected site; or
  - Most PRDs vented to control; or
  - Distinct areas of HAPs; or
  - Mostly < 5% in organic service PRDs
- Very complicated if you don’t meet any of the criteria above.
  - Requires a detailed P&ID review, field walk verification, process knowledge verifications, and potential sampling
  - Followed by capital projects to install instrumentation, monitoring systems, and/or route to control device header

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PRDs (continued)

- Minimize the duration of atmospheric PRD releases by installing systems that detect, record time/date and immediate notify operators that a pressure release is occurring.
- Eliminate atmospheric releases by routing PRDs to control devices or employing three redundant prevention measures.
- Eliminate recurrence of atmospheric PRD releases by requiring identification of root causes and implementation of corrective actions.
  - Root cause reported and corrective actions completed or plan developed within 45 days of the release.
- There will also be an enforcement component, these release events will be a violation of the work practice:
    - Any release event determined to be caused by operator error or poor maintenance.
    - A second release event in a 3-calendar year period for the same root cause for the same equipment.
    - A third release event from a single pressure relief device in a 3-calendar year period for any reason.

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Maintenance Vents

- Differences between MACT CC (72 lbs total VOC) and EMACT/MON (50 lbs total VOC)
- Approaches
  - Sitewide Approach 1 – all maintenance venting follows safety procedure proven to meet requirements
  - Sitewide Approach 2 - all maintenance vents will follow procedure for degassing before opening for maintenance
  - Sitewide Approach 3 – all maintenance venting scenarios are below the 10% LEL, < 5 psig, < 50/72 lbs VOC, etc. based on worst case
  - Sitewide Approach 4 - Case by Case for each affected equipment based on size, design, contents, etc.
- Implementation will be greatly facilitated by integrating this process with your equipment access safety procedures; align equipment access threshold with the maintenance vent 10% LEL point.

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Maintenance Vents

<table>
<tr><td colspan="3">1) Operator depressure/drain/purge equipment to controlled system</td></tr>
<tr><td colspan="3">2) Safety Department/Operator measures LEL inside equipment from a bleeder/vent</td></tr>
<tr><td colspan="2">If LEL >10%</td><td>If LEL <10%</td></tr>
<tr><td colspan="2">3) Suspend work</td><td rowspan="8">3) Proceed with opening</td></tr>
<tr><td colspan="2">4) Safety Department notifies Environmental</td></tr>
<tr><td colspan="2">5) Environmental estimates VOC content; documents</td></tr>
<tr><td>If VOC content <50/72 lbs</td><td>If VOC content >50/72 lbs</td></tr>
<tr><td>6) Conduct risk meeting
a) Identify actions to be taken to mitigate hazards
b) Env validates VOC <50/72 lbs
c) Document meeting</td><td>6) Operations resumes purge to controlled system</td></tr>
<tr><td>7) Obtain management approval</td><td>7) Recycle back to step #2: Safety Department/Operator rechecks LEL</td></tr>
<tr><td>8) Proceed with opening</td><td></td></tr>
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Heat Exchanger/Cooling Tower Monitoring

- El Paso method will be required to monitor for HES leaks at cooling tower return line or representative riser, or at select heat exchanger lines
- Existing sources
  - Initially 6 months of monthly monitoring, then quarterly
- New sources
  - Initially 6 months of weekly monitoring, then monthly
- Leak definition: > 6.2 ppmv (as methane in stripping gas)
- Repair requirements
  - Leaks less than 62 ppmv – repairs required within 45 days or less
    - Can be delayed if unit shutdowns are required
    - If greater than 62 ppmv during subsequent monitoring, repair required in 30 days
  - Leaks greater than 62 ppmv require repair within 45 days or less
    - No delay of repair available

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Wrap Up

- Get started as early as possible AND get personnel outside of the environmental department involved early.
  - Evaluation of existing flare instrumentation – not by environmental
  - Determine adequacy of supplemental fuel gas supply
  - Turnaround schedule for flare work?
  - Long delivery for new equipment/instrumentation
- Improve/refresh applicability determinations and documentation
- Environmental needs to stay engaged, set milestones, then measure and report against those milestones

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Questions?

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Work Practices - Decoking Ethylene Cracking Furnace

- Conduct Daily Inspections For Flame Impingement During Normal Operations.
- Conduct At Least Two Of The Following Other Work Practices.;
  - Monitor CO_2 concentration at the radiant tube outlet during decoking,
  - Monitor temperature at the radiant tube outlet during decoking,
  - Purge the radiant tubes with steam after decoking,
  - Apply a coating material to radiant tube interior after decoking.

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