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Strategies for the Earliest New HON Requirements

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Overview

- Background
- Ethylene Oxide
- Fenceline Monitoring
- Loss of Startup/Shutdown/Malfunction Exemption
- Flares
- Pressure Relief Devices
- Path Forward

How Did We Get Here?

- Per Clean Air Act requirements, EPA required to do periodic review of MACT and NSPS
  - CAA Section 112(d)(6) and (f) Risk and Technology Review (RTR) for each MACT every 8 years
  - CAA Sec. 111(b)(1)(B), review and, if appropriate, revise each NSPS every 8 years
- Several organizations, including Louisiana Environmental Action Network and Texas Environmental Justice Advocacy Services, sued EPA alleging reviews were overdue for HON and SOCMI NSPS
- EPA entered consent decree with signature deadline of December 2022 (later extended to March 2023) for draft rule and March 2024 for final rule

HON

- Sweeping changes similar to Refinery MACT, Ethylene MACT, and MON revisions
- EPA had special focus on ethylene oxide (EtO) and chloroprene based on risk assessments
- Startup, shutdown, and malfunction exemptions eliminated
- TRE eliminated from Group 1 vs. Group 2 process vent determinations
- Continuing conversion of regulations to electronic reporting

"In EtO Service" thresholds

- Equipment Leaks (LDAR components) 0.1% by wt
- Heat Exchange Systems, process fluid 0.1% by wt
- Process Vents that when uncontrolled, contain a concentration of greater than or equal to 1 ppmv undiluted ethylene oxide, and when combined, the sum of all these process vents would emit uncontrolled, ethylene oxide emissions greater than or equal to 5 lb/yr (2.27 kg/yr)
- Storage Vessels 0.1% by wt
- Wastewater Streams 1 ppmw any flow rate

"Do not assume anything, Obiwan."

- If information exists that suggests ethylene oxide could be present in [equipment], the [equipment] is considered to be "in ethylene oxide service" unless sampling and analysis is performed as specified in §63.109 to demonstrate that the [equipment] does not meet the definition of being "in ethylene oxide service". Examples of information that could suggest ethylene oxide could be present in [equipment], include
  - calculations based on safety data sheets,
  - material balances,
  - process stoichiometry, or
  - previous test results provided the results are still relevant to the current operating conditions.
- Has your facility quantified emissions of EtO for TRI, state emissions inventory, or permitting?

EtO's stringent requirements

- No delay of repair
- Lower, more stringent, leak thresholds
- More frequent monitoring
- "Wastewater" containing any level of EtO cannot be used for cooling water in HON heat exchange system
- EtO requirements stem from risk assessment so existing sources have only 2 years to implement

Fenceline Monitoring (FLM)

- Many concerns, including "site" use, produce, store, or emit criteria
  - No de minimis quantities in proposed rule
  - EPA emission factors
- Proposed deadline to start HON FLM is one year from March 2024 promulgation date (i.e., March 2025)

"Life moves pretty fast"

Life is "like a box of chocolates"

- FLM brings additional scrutiny
- Elevated concentration - emissions
  - Unpermitted source(s)?
  - Underestimated emissions?
- Comparison to standards
  - Ambient standards
  - Worker exposure standards
- In-depth audits

Potential FLM Outcomes

- Enforcement actions
- Consent decree
- Capital expenditures
- Ongoing operational expenditures
- Additional public scrutiny

FLM compounds and action levels

- Method 325A/B every 14 days
  - Benzene 9 µg/m^3 (~2.8 ppbv)
  - 1,3-Butadiene 3 µg/m^3 (~1.3 ppbv)
  - Chloroprene 0.3 µg/m^3 (~0.1 ppbv)
  - Ethylene Dichloride 4 µg/m^3 (~1.0 ppbv)
- New Method 327 – 24-hr summa canisters every 5 days
  - Ethylene Oxide 0.2 µg/m^3 (~0.1 ppbv)
  - Vinyl Chloride 3 µg/m^3 (~1.2 ppbv)

FLM Site-Specific Monitoring Plan

- Could be critical if near another facility that emits one of your site's FLM compounds
- Pilot study can help identify whether SSMP needed

"Houston, we have a problem."

- ID locations of high concentrations and review associated wind data
- Identify unknown and/or underestimated emission sources.
- Differentiate competing emission sources between facility sources and/or third-party contributing sources.
- Additional technology/methods
  - IR camera
  - Handheld PIDs
  - Method 21 LDAR monitoring
  - Periodic GMAP surveys

Loss of SSM Exemption

- Loss of startup/shutdown/malfunction exemption has been coming since 2008 federal court decision
- 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

Control Device Bypasses

- May not bypass an air pollution control device (APCD) at any time
- Any APCD bypass is a violation, and
- If bypass occurs, must estimate and report the quantity of organic HAP released

Flare Provisions

- Covered Flares under Consent Decrees will not be greatly impacted
- 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)

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

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 HAP 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

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.

Lagniappe

- Storage Vessels - If use a sweep, purge, or inert blanket between the internal floating roof and fixed roof must route emissions through a closed vent system and control device
- Heat Exchangers – El Paso Method
- New prohibition on injecting wastewater into or disposing of water through any heat exchange system in a chemical manufacturing process unit (CMPU) meeting the conditions of 40 CFR 63.100(b)(1) through (3) if the water contains any amount of EtO, has been in contact with any process stream containing EtO, or the water is considered wastewater as defined in 40 CFR 63.101

Maintenance Vents

- 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 (with outlet concentration less than or equal to 20 ppmv hydrogen halide and halogen HAP), < 5 psig, < 50 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.

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 bleed/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="5">3) Proceed with opening (if has an outlet concentration less than or equal to 20 ppmv hydrogen halide and halogen HAP)</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 lbs</td><td>If VOC content >50 lbs</td></tr>
<tr><td>6) Conduct risk meeting
a) Identify actions to be taken to mitigate hazards
b) Env validates VOC <50 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><td></td></tr>
<tr><td colspan="2">8) Proceed with opening</td><td></td></tr>
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New NSPS

- New NSPS
  - IIIa – air oxidation unit processes
  - NNNa – distillation operations
  - RRRa – reactor processes
  - VVb – LDAR
- Key applicability date – date proposed rule published in Federal Register: April 25, 2023
- New NSPS requirements only apply when a change occurs - Constructed, Reconstructed, or Modified after the applicable date

Affected MACTs other than HON

- Group I Polymer and Resins (P&R I), particularly chloroprene from Neoprene Production – MACT U
- Group II Polymer and Resins (P&R II) – MACT W
- P&R I and P&R II changes are similar to some of the HON changes
- Unlike NSPS, MACT rule changes can affect "existing" sources that have not had a "modification" or "reconstruction"

"Start the engine! Start the engine!"

- FLM Pilot Study
  - Be ready to initiate as soon as final rule is signed in March 2024, if not before, because draft rule has FLM beginning 1 year after promulgation
  - Laboratories were resource constrained during 2022 HON ICR, so factor that into decisions and timing
  - Site-specific Monitoring Plan?

Additional Steps over Next 12 Months

- Long lead time compliance items for flares and PRDs in particular
- 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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