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**CEMTEK KVB-ENERTEC
2018 REFINERY EMISSIONS SEMINAR & TRAINING**

The Refinery Sector Rule and Recent Amendments/Updates

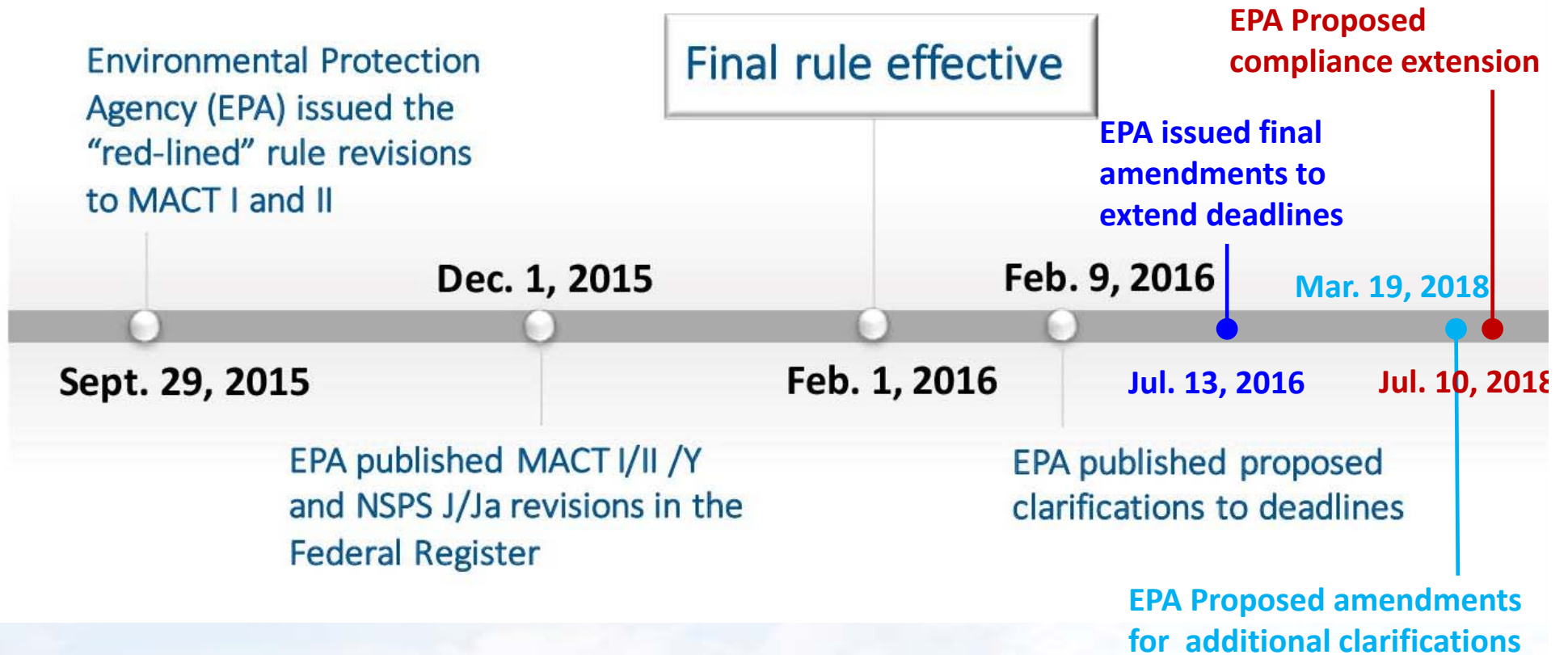
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Agenda

- > Overview of Refinery Sector Rule
 - ❖ Background and Applicability
 - ❖ Affected Sources
 - ❖ “Big Picture” Changes
 - ❖ General Requirements
- > Amendments and Updates

Refinery Sector Rule Amendment Changes



Background & Applicability (1)

- > On June 30, 2014
 - ❖ EPA proposed revisions to both of the petroleum refinery NESHAP based on its residual risk and technology review (RTR)
 - ◆ Refinery MACT 1(40 CFR 63 Subpart CC) - August 18, 1995
 - ◆ Refinery MACT 2 (40 CFR 63 Subpart UUU) - April 11, 2002
- > On September 29, 2015
 - ❖ EPA issued its final RTR (aka Refinery Sector Rule) for the Petroleum Refinery Sector
 - ❖ “Red-lined” rule revisions to MACT 1 and 2
- > On December 1, 2015
 - ❖ The final rule was published in the Federal Register.
 - ❖ Effective date of February 1, 2016

Background & Applicability (2)

- > The final rule requires:
 - ❖ Continuous fence-line monitoring for Benzene
 - ❖ Calls for a comprehensive program of process changes and pollution prevention
 - ◆ Targeted at reductions in visible flare emissions and releases by pressure release devices (PRDs).
 - ❖ Additional reductions from storage tanks and delayed coker operations
 - ◆ Some had no controls required previously
 - ❖ New control requirements for maintenance activities and episodic releases that were previously unregulated.

Background & Applicability (3)

- > The RTR rule applies only to major sources of hazardous air pollutants (HAPs) and not to area sources.
 - ❖ A major source is defined as 10 tpy of any one HAP and/or 25 tpy of combined HAPs.
- > This final rule is based on the risk and technology review of two refinery emissions standards:
 - ❖ National Emission Standards for Hazardous Air Pollutants (NESHAP) From Petroleum Refineries
 - ◆ 40 CFR Part 63 Subpart CC, “Refinery MACT 1”
 - ◆ Focuses on evaporative emissions
 - ❖ NESHAP for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units
 - ◆ 40 CFR Part 63 Subpart UUU, “Refinery MACT 2”
 - ◆ Focuses on combustion sources/process vents

RSR-Affected Emission Sources (1)

- > MACT CC (Refinery MACT I) Affected Emission Sources
 - ❖ Delayed Coking Units (DCUs)
 - ❖ Miscellaneous Process Vents (MPVs), including maintenance vents
 - ❖ Flares as control devices
 - ❖ Storage tanks
 - ❖ Fugitive equipment leaks (through fence line monitoring)
 - ❖ Marine loading

RSR-Affected Emission Sources (2)

- > MACT UUU (Refinery MACT II) Affected Emission Sources
 - ❖ Catalytic Reformer Units (CRUs)
 - ❖ Fluid Catalytic Cracking Units (FCCUs)
 - ❖ Sulfur Recovery Units (SRUs)

“BIG PICTURE” Changes to RSR



New emission controls for refinery storage tanks, Catalytic Reforming Units (CRUs), and Delayed Coking Units (DCUs)



Work practice standards to reduce emissions from atmospheric Pressure Relief Devices (PRDs) and flares



Continuous benzene monitoring at the refinery fenceline “to improve the management of fugitive emissions” per the rule preamble



Elimination of exemptions to emission limits during periods of Startup, Shutdown, and Malfunction (SSM)



Technical corrections and clarifications to the Petroleum Refinery New Source Performance Standards (NSPS) in 40 CFR 60 Subparts J and Ja

Reductions from Storage Tanks, CRUs, and Delayed Coking Units (1)

- > Storage vessels with smaller capacities and lower vapor pressure content must implement certain requirements to control emissions
- > Group 1 storage vessels:
 - ❖ Must comply with the requirements of Generic MACT [40 CFR Part 63, Subpart WW]
 - ❖ Potentially subject to additional fittings, guide-pole controls, etc.

Reductions from Storage Tanks, CRUs, and Delayed Coking Units (2)

- > For DCUs at existing refineries, the new rule establishes the following options for maximum venting pressure or temperature:
 - ❖ Coke drum cannot vent until the pressure is at < 2 psig averaged over 60 decoking events; OR
 - ❖ Temperature < 220 °F averaged over 60 decoking events.
- > Removed the control exemption for CRUs during active purging when the reactor pressure is ≤ 5 psig
 - ❖ EPA believes that active purge systems can direct the gas to a control system regardless of system pressure

Reductions in Releases from Pressure Relief Devices (1)

- > Establishes the work practice standards for releases from PRDs to the atmosphere:
 - ❖ Must be equipped with a monitoring device (such as a rupture disk indicator, magnetic sensor, motion detector on the PRD valve stem, flow monitor, or pressure monitor)
 - ◆ Identifies a pressure release, records the time and duration, and notifies operators that a release is occurring.
 - ❖ Must apply a minimum of three prevention measures to each PRD
 - ◆ Such as flow, temperature, level and/or pressure indicator meters; documented routine inspection and maintenance programs; or safety instrumentation systems.

Reductions in Releases from Pressure Relief Devices (2)

- > In the event of a release, facilities are required to perform a root cause analysis
 - ❖ To determine the cause of the PRD release event and
 - ❖ To quantify and report the amount of the release.
- > Following a release, facilities must implement corrective action.
 - ❖ Releases caused by operator error or negligence and repeat release events are considered deviations and must be reported in semiannual compliance reports.

Reductions in Flare Emissions

- > New flare provisions have been implemented to further assure 98% combustion efficiency and to supersede the flare General Provision requirements.
- > Like PRDs, repeat events outside the work practice requirements are considered deviations.
- > Flares must now meet the following operating conditions:
 - ❖ Continuously lit pilot flame at all times
 - ❖ No visible emissions when flare vent gas is below the smokeless capacity of the flare
 - ❖ Net heating value for the combustion zone gas (NHVcz), ≥ 270 BTU/ft³ on a 15-minute average, estimated using flare vent gas composition monitoring
 - ❖ Compliance with one of two options for flare tip velocity

Continuous Fenceline Monitoring

- > Establishes a work practice standard of continuous, *but not necessarily real-time*, monitoring:
 - ❖ To improve the management of fugitive emissions from sources such as leaking equipment and wastewater treatment
 - ❖ All refineries must utilize a network of passive diffusive tube samplers at the refinery fenceline, collecting a sample at least once every 14 days
 - ❖ The monitors must encircle the refinery fenceline
 - ❖ If fenceline concentrations exceed the $0.9 \mu\text{g}/\text{m}^3$ threshold, corrective action is required

Removal of Exemption for Releases during SSMs (1)

- > Eliminates the exemption to emission limits for uncontrolled releases during startup, shutdown, and malfunction (SSM) events
- > In its place, EPA has finalized alternate work practices to be performed during startup, shutdown, and hot standby, including:
 - ❖ Requirements for PRDs
 - ❖ Classifying as a violation
 - ◆ Control device bypass of a Group 1 miscellaneous process vent

Removal of Exemption for Releases during SSMs (2)

- > Other alternative work practices include the following:
 - ❖ Perform a root-cause analysis and implement corrective action following certain emergency flaring events during SSM periods,
 - ❖ Limit the number of events allowed to occur over a three-year period before it is considered a deviation, and
 - ❖ Develop prevention measures, such as a flare management plan.
 - ❖ MPVs can now be classified as Maintenance Vents and, if these vent meet specified criteria, emissions can be released to the atmosphere.

Removal of Exemption for Releases during SSMs (3)

- > Established standards for FCCUs during SSM events
 - ❖ During startup, shutdown, and hot standby of FCCUs, refineries can choose to comply with:
 - ◆ One of two emissions standards for metal HAPs and
 - ◆ One of two emissions standards for organic HAPs
 - ❖ For metal HAP emissions:
 - ◆ Comply with either NSPS requirements, PM limits, and nickel limits; OR
 - ◆ Maintain inlet velocity to the primary internal cyclones of the catalyst regenerator at or above 20 ft/sec.
 - ❖ For organic HAP emissions:
 - ◆ Comply with either specified operating limits, NSPS requirements, or CO emission limits; OR
 - ◆ Maintain the O₂ concentration in the exhaust gas from the catalyst regenerator at or above 1% volume.

Removal of Exemption for Releases during SSMs (4)

- > Established standards for SRUs
 - ❖ During startup and shutdown, they must:
 - ◆ Send any startup or shutdown gases to a flare, thermal oxidizer, or incinerator, OR
 - ◆ Comply with NSPS requirements or the total reduced sulfur emission limits in the rule.

Amendments and Updates (1)

- > On February 9, 2016
 - ❖ EPA published proposed clarification to deadlines
 - ◆ For maintenance activities associated with process vents regulated under Refinery MACT 1 (40 CFR part 63, subpart CC) and
 - ◆ For periods of startup and shutdown associated with fluidized catalytic cracking units and sulfur recovery units regulated under Refinery MACT 2 (40 CFR part 63, subpart UUU)
- > On July 13, 2016
 - ❖ EPA issued a final rule that provides more time to comply with some of the new requirements of the final refinery rule
 - ◆ Require owners and operators of sources that were constructed or reconstructed on or before June 30, 2014, to comply with the requirements for:
 - Maintenance vents during startup, shutdown, maintenance and inspection;
 - FCCU during startup, shutdown and hot standby;
 - SRU during startup and shutdown
 - ◆ No later than 18 months after the effective date of the December 1, 2015, rule (i.e., no later than August 1, 2017)
 - As opposed to the original effective date (i.e., no later than February 1, 2016)
 - ◆ Following the compliance extension procedure in 40 CFR 63.6(i), 12-month extension to August 1, 2018 is also possible.

Amendments and Updates (2)

> On October 18, 2016

- ❖ EPA proposed two minor clarifying amendments and provided opportunity for public comment on several issues including:
 - ◆ Work practice standards for PRDs;
 - ◆ Work practice standards for emergency flaring events;
 - ◆ Assessment of risk as modified based on implementation of these PRD and emergency flaring work practice standards;
 - ◆ Alternative work practice standards for DCUs employing the water overflow design; and
 - ◆ Provision allowing refineries to reduce the frequency of fenceline monitoring at sampling locations that consistently record benzene concentrations below 0.9 micrograms per cubic meter

Amendments and Updates (3)

> On March 19, 2018

- ❖ EPA proposed amendments pertain to:
 - ◆ Maintenance venting requirements and associated recordkeeping and reporting;
 - ◆ Operating requirements for steam-assisted flares;
 - ◆ Fenceline monitor placement;
 - ◆ Types of pressure relief devices (PRDs) subject to the PRD atmospheric release work practice standards
 - ◆ Other amendments to make the rule requirements more clear and consistent

Amendments and Updates (4)

> On July 3, 2018

- ❖ EPA proposed amendments on NESHAP Refinery MACT I regulations pertain to:
 - ◆ Maintenance vent standards that apply during periods of startup, shutdown, maintenance or inspection for sources constructed or reconstructed on or before June 30, 2014.
 - ◆ Change the compliance date from August 1, 2017, to January 30, 2019
 - consistent with CAA section 112(i)(3)(A), which specifies that the EPA provide a compliance date no more than 3 years after the effective date of the standard.

RSR Compliance Deadlines

Source Category	Compliance Deadline	Citation
Flares (as a control device for CC and UUU)	January 30, 2019	Multiple references including 63.670
DCUs PRDs	January 30, 2019 (see note)	Table 11 of Subpart CC
Include in-situ sampling systems as MPV	January 30, 2019	63.641 Definitions
Fenceline monitoring	January 30, 2018 (see note)	Table 11 of Subpart CC
Group 1 storage vessels comply with Generic MACT controls	April 29, 2016 (see note)	Table 11 of Subpart CC
Upgrades for any storage vessels to meet revised requirements	Storage vessel is emptied and degassed, or January 30, 2026 (whichever occurs first)	63.660(d)
Remove control exemption for CRU active purging ≤ 5 psig	January 30, 2019	July 13, 2016 Federal Register
FCC SU/SD/ hot standby standards and SRU SU/SD standards Subpart CC Maintenance vents	August 1, 2017 (see note) January 30, 2019	July 10, 2018 Federal Register Proposal (not final)

Note: Deadlines apply to refinery sources constructed or reconstructed pre-June 30, 2014.

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Questions?

