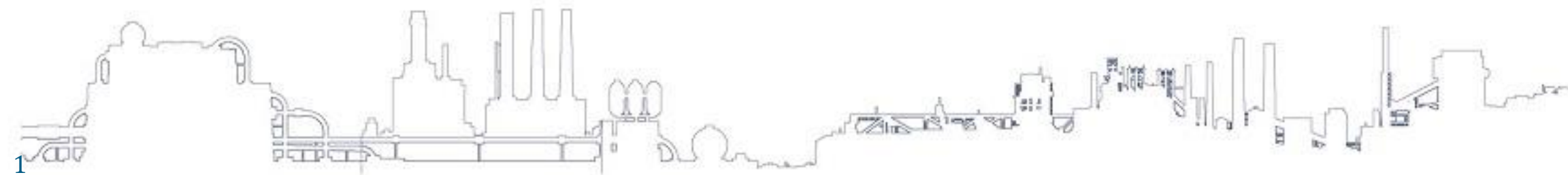


Organic Liquids Distribution (OLD) and Ethylene MACT Updates

Kristin Gordon, Amy Marshall, Philip Crawford, and Eric Swisher

May 12, 2020



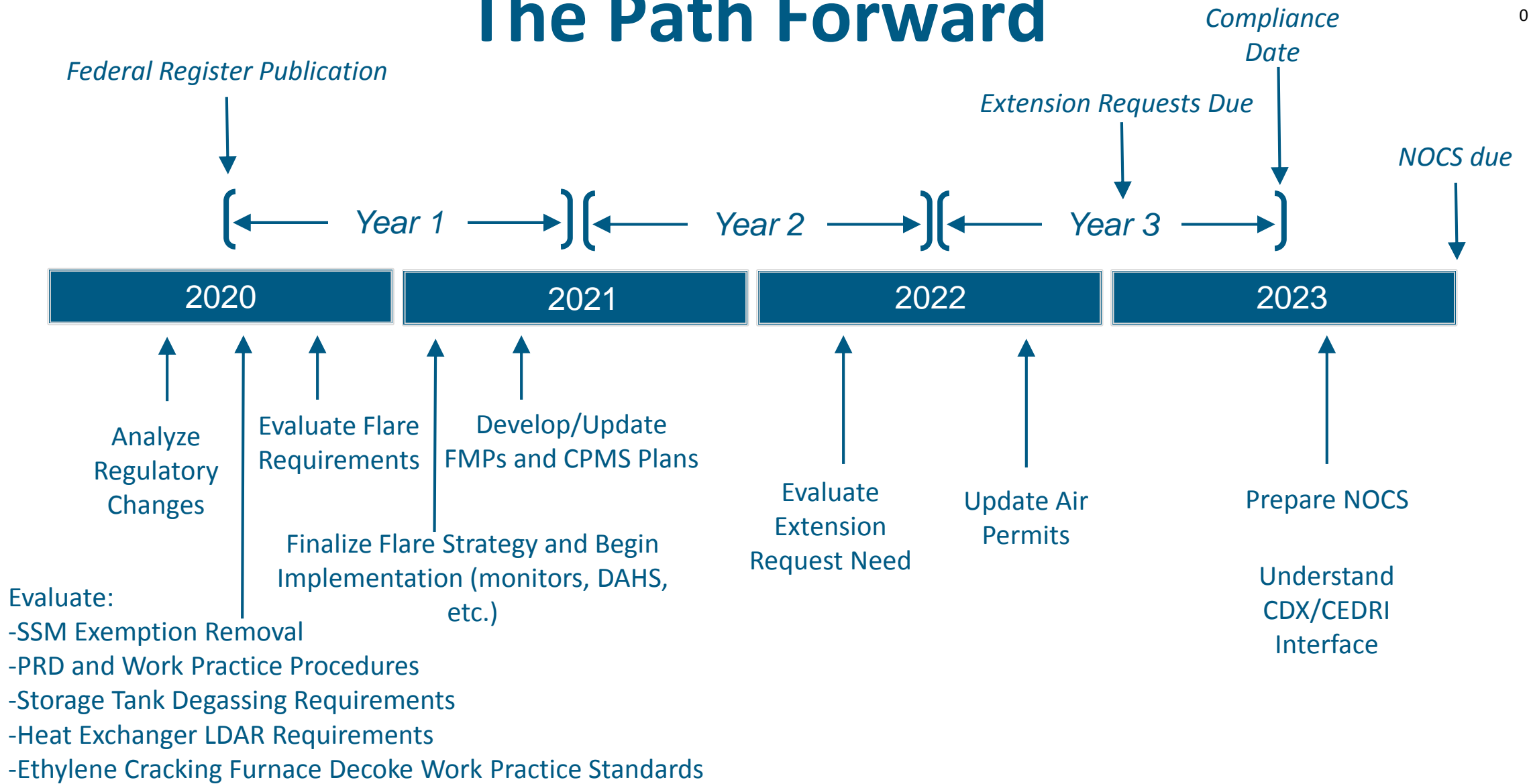
Agenda

05/20

- What will we cover today?
 - Outcome of EPA's review of the OLD and Ethylene MACT rules
 - Rule updates that were finalized
 - Changes from proposal
 - Some detail on the new flare requirements
 - What actions to take now



The Path Forward



Develop Compliance Approach. Consider Capital Expenditures (e.g., control equipment, DAHS), Turnarounds, and Air Permitting Requirements. Develop Calendar and Key Milestones.



Housekeeping

- ❑ How to ask questions?
 - Please enter your questions in the *Questions* box.
 - Q&A at the end.
- ❑ Can I get a certificate of completion?
 - Yes, webinar attendees will receive a certificate upon request.
 - Continuing Education for Certifications/Licenses.

Why did EPA Update these Rules?

- EPA is obligated to perform a risk and technology review (RTR) of each promulgated Part 63 MACT standard.
 - Risk Review – once.
 - Technology Review – every 8 years.
 - Risk – additional standards needed to provide an ample margin of safety to protect public health?
 - Technology – have there been cost-effective developments in practices, processes, or controls?

Who is Subject to These Rules?

- ❑ OLD MACT – major sources that have either organic liquid terminals or a few storage tanks or transfer racks not subject to another MACT.
 - Storage tanks, transfer operations, loading of transport vehicles, and equipment leaks requirements.
- ❑ EMACT – ethylene production units located at major sources.
 - Storage vessels, process vents, transfer racks, equipment leaks, wastewater streams, heat exchange systems, and decoking operations requirements.

40 CFR 63, SUBPART EEEE ORGANIC LIQUIDS DISTRIBUTION (OLD) (NON- GASOLINE) MACT UPDATE

Amy Marshall



Results of the OLD MACT RTR

05/20

- EPA modeled 157 facilities and determined that risks are acceptable for the source category and the current standards provide an ample margin of safety.
- Chronic cancer inhalation risk from the OLD source category could be as high as 20-in-1 million, with 1,3-butadiene from equipment leaks as a major contributor to the risk.
- EPA finalized one change based on the results of the technology review – revising existing storage tank control thresholds to align with Refinery RTR and HON.



Final Rule Revisions

- EPA added Table 2b, which includes lower vapor pressure thresholds requiring controls for existing storage tanks.
- EPA revised the monitoring requirements for flares because they determined that the current requirements were not adequate to ensure compliance with the 98% destruction efficiency standard.
- EPA clarified that PRDs on vapor return lines of a vapor balancing system are also subject to the vapor balancing system requirements of §63.2346(a)(4)(iv). No additional PRD work practice or monitoring provisions were added, but a PRD definition was added.

Final Rule Revisions (cont.)

05/20

- EPA eliminated the SSM exemptions, standards apply at all times.
 - Added general duty text
 - Modified the reporting requirements for failures to meet a standard
 - Safety device opening allowance removed 3 years after promulgation
 - 240-hr control device maintenance allowance removed except for tank breathing losses
 - Added standard for tank degassing – route to control device or back to process or fuel gas system until VOC in vapor is <10% of LEL
- Added electronic reporting via CEDRI
- Technical clarifications



Proposed Changes that were not Finalized

05/20

- EPA did not finalize its proposal to add testing and recordkeeping to confirm the annual average true vapor pressure of tank contents every 5 years or with a change of commodity in the tank's contents.
- EPA is not finalizing its proposal to add HAP testing of tanks claimed to not be subject to the OLD MACT.
- EPA did not finalize the proposed requirement to perform LDAR for fixed roof tanks that do not require control and did not add connectors to the LDAR requirements. As a result, the final rule does not include fenceline monitoring as an alternative compliance option.



40 CFR 63, Subparts XX & YY Ethylene Production (EMACT) Update

Philip
Crawford



<https://www.refiningandpetrochemicalsme.com/petrochemicals/24246-wison-engineering-successfully-ships-the-worlds-largest-single-modular-ethylene-cracking-furnace-for-zhejiang>



Results of the Ethylene MACT RTR

05/20

- ❑ EPA: Acceptable risk and ample margin of safety.
- ❑ Max individual lifetime cancer risk from the source category:
 - 100-in-1 million driven by naphthalene and benzene emissions.
- ❑ Facility-wide risk:
 - 2,000-in-1 million attributable to ethylene oxide.
- ❑ Technology Review: Heat exchange system (HES) monitoring.
- ❑ Other changes to address SSM and CAA section 112(d)(2) and (d)(3).



Final Rule Revisions

05/20

- ❑ Other changes:
 - Standards apply at all times (SSM exemption removed)
 - Electronic Reporting Requirements
 - Overlap provisions
 - Additional and revised definitions
- ❑ Existing Sources - 3 years to comply
 - Commenced construction after 10/9/2019, must comply on startup or publication in FR (whichever is later).



Final Rule Revisions (Cont.)

05/20

□ Heat Exchange Systems:

- Modified El Paso Method

- Leak definition: 6.2 ppmv of total strippable hydrocarbon in the stripping gas (as methane).
- Monitoring location < 165,000 gpm
- Small systems ($\leq 10,000$ gpm): Alternative mass-based leak definition of 0.18 kg/hr.

- Repair leaks and re-monitor in 45 days.

- DOR available, unless the leak is greater than 62 ppmv (or 1.8 kg/hr for small systems).

- Removed monitoring exemptions for once-through systems subject to NPDES permits.



Final Rule Revisions (Cont.)

05/20

- Storage Vessels Degassing (Fixed and Floating Roof)
 - Control until the vapor space is less than 10% of the LEL.
 - Performance demonstrations are required:
 - Subpart SS testing/design evaluation, MR&R.
 - Subpart CC requirements also apply for flares.
- Bypass Lines
 - No bypass of a control device is allowed.
 - HAP emissions from bypass must be reported.



Final Rule Revisions (Cont.)

05/20

□ Pressure Relief Devices

- Post Release Monitoring

- Below 500 ppm within 5 days, or replace the rupture disk, if equipped

- Rupture disk only:

- Must replace within 5 days
- Cannot restart until replaced

- Work practices

- PRD management program
- Release monitoring
- RCA/CAA analysis for releases



Final Rule Revisions (Cont.)

05/20

□ Process Vents

- No longer just those that are “continuously discharged”
 - Includes “periodically discharged” > 20 ppmv total organic HAP and 50 lbs/day or more of VOC
 - Also includes:
 - Episodic and nonroutine releases
 - In situ sampling systems
 - Coke combustion emissions
 - Fuel gas streams going to flares where at least 50% of the fuel gas comes from ethylene production



Final Rule Revisions (Cont.)

05/20

□ Maintenance Vents

- Prior to venting, liquids must be removed as much as practical and equipment depressurized to a flare or control device until one of the following criteria are met:
 - Vapor in equipment has an LEL < 10%;
 - If LEL cannot be measured, the pressure in the equipment is reduced to 5 psig or less, and upon opening, active purging cannot be used until the LEL is < 10%;
 - Equipment contains less than 50 pounds of VOC;
 - If none of the above can be met prior to installation/removal of a blind, then pressure must be reduced to 2 psig or less before installation/removal of blind. Active purging can be used during blind installation/removal provided pressure at purge gas introduction location is 2 psig or less.



Final Rule Revisions (Cont.)

05/20

- Decoking Operations Work Practices
 - Daily firebox burner inspections
 - Repair burners with radiant tube flame impingement within 1 calendar day
 - Control measure during decoke (pick at least 2)
 - CO₂
 - Temperature
 - Air Out Verification
 - Inject materials into steam or feed to reduce coke formation
 - Isolation Valve Inspections



Final Rule Revisions (Cont.)

05/20

□ Flares

- Revised MR&R requirements (Subpart CC)
- Visible emissions work practices for emergency flaring
- Standards for pressure-assisted multi-point flares



Final Rule Revisions (Cont.)

05/20

□ Flare Monitoring

- Flame Presence
- No visible emissions (except 5 minutes during any 2 consecutive hours)
- $V_{tip} < 60$ fps, or less than:

$$\log_{10}(V_{max}) = \frac{NHV_{vg} + 1,212}{850}, \text{ where } V_{max} \text{ is limited to 400 fps}$$

- $NHV_{cz} \geq 270$ Btu/scf
- Net heating value dilution parameter (NHV_{dil}) ≥ 22 Btu/ft² for flares with perimeter assist air



Final Rule Revisions (Cont.)

05/20

□ Pressure-Assisted Multi-Point Flares

- Tip velocity standards do not apply
- $NHV_{cz} \geq \underline{800}$ Btu/scf
- Monitor stages for flame presence
- Cross-lighting burners
 - 6 ft. on center or less
 - Cross-lighting demonstration can be performed for burner spacing > 6 ft
- Monitor flare header pressure and valve positions to ensure proper operation
- Can operate under approved alternative means of emission limitations



Final Rule Revisions (Cont.)

□ Emergency Flaring Work Practice – Visible Emissions

- Flare management plan
- Conduct RCA/CAA and implement corrective actions
- Violations:
 - Events due to operator error or poor maintenance;
 - And, except for force majeure events:
 - Two events in 3-calendar years from a single flare for the same root cause and same equipment;
 - Three events in 3-calendar years from a single flare for any reason.



Proposed Changes that were not Finalized

05/20

□ Storage Vessels

- EPA did not finalize proposed revisions to tighten the control applicability thresholds (vapor pressure and storage capacity) for storage vessels.

□ Flares

- Not finalizing the work practice standard for velocity exceedances for flares operating above smokeless capacity (velocity limit must be met at all times).



COMPLYING WITH THE NEW FLARE REQUIREMENTS


Eric Swisher





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Flare Performance Indicators

□ Indicators of “Good” Flare Combustion

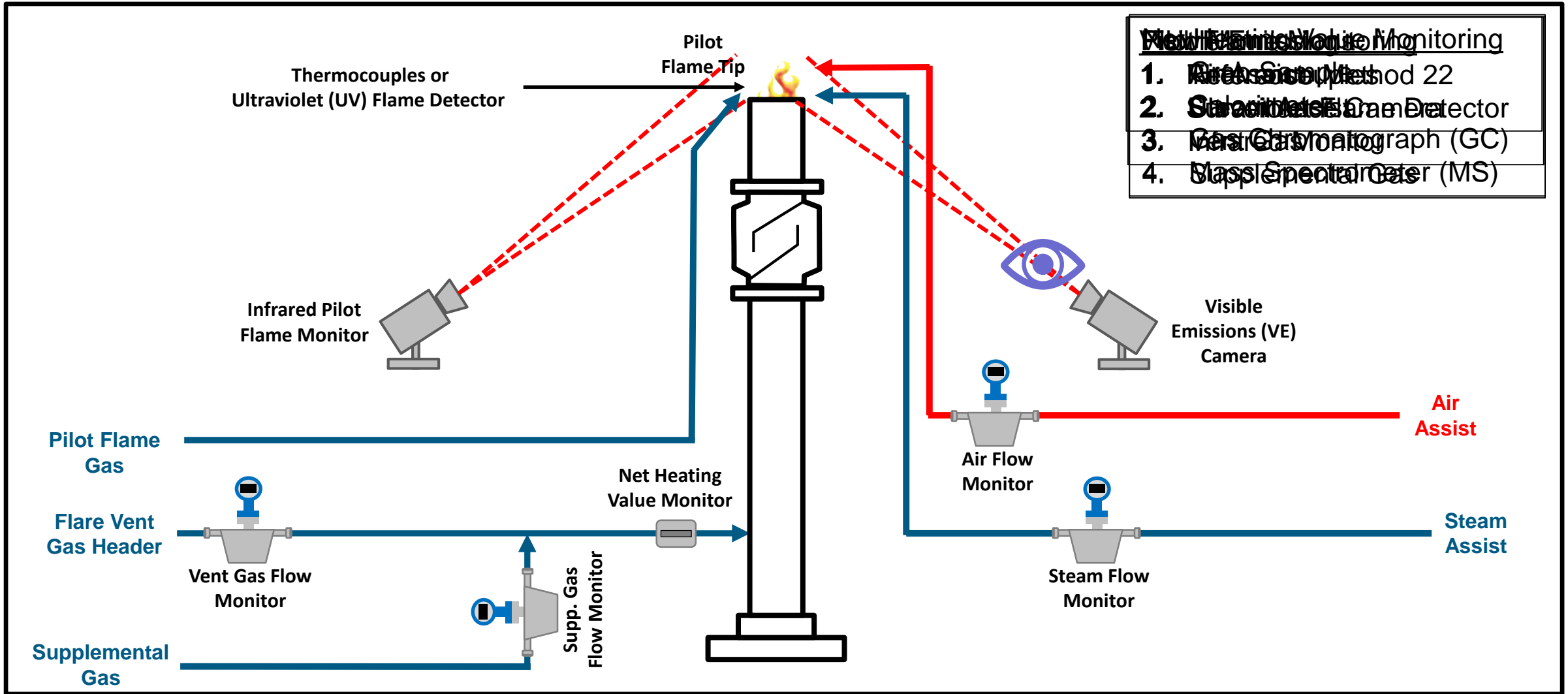
- No Visible Emissions (i.e., No Smoking) 
- Combustion Efficiency (CE)
- Destruction Removal Efficiency (DRE)

Flare Monitoring Summary

- ❑ Existing Monitored or Calculated Parameters
 - Tip Velocity
 - Vent Gas Net Heating Value (NHVvg)
 - Pilot Monitoring
 - Visible Emission Monitoring (Reference Method 22 )
- ❑ New Monitored or Calculated Parameters
 - Vent Gas Flow and Composition
 - Combustion Zone Net Heating Value (NHVcz)
 - Steam Flow and Control
 - Supplemental Gas Flow and Control
 - Optional Visible Emission Monitoring with Video Camera ()



Flare Monitoring



Flare CPMS Monitoring Plan

05/20

- Description of the Monitoring Equipment
 - Type
 - Justification
- Routine QA/QC Procedures
 - Initial
 - Ongoing
- Description of the Data Collection and Reduction System
 - “Black Box”
 - Process Controls

Monitoring Plan Description

□ Flare Vent Gas Flow Rate Monitoring

<i>Parameter</i>	<i>Minimum Accuracy Requirement</i>
Flare Vent Gas Flow Rate	$\pm 20\%$ of flow rate at velocities from 0.03 to 0.3 meters per second $\pm 5\%$ of flow rate at velocities greater than 0.3 meters per second (1 foot per second)

□ Flare Vent Gas Composition Monitoring

- Calorimeter (optional Hydrogen Analyzer)
- Gas Chromatograph (GC)
- Mass Spectrometer (MS)

Routine QA/QC Procedures

05/20

- ❑ Flare Vent Gas Flow Rate Monitoring
- ❑ Calibration and Verification
 - Tolerances
- ❑ System Response Check
- ❑ Preventive and Corrective Maintenance Programs

Performance Specification 9 (PS-9)

□ GC and MS

Calibration/Validation	Frequency	Cylinder Gas	Concentrations	Place of Injection
Multi-Point Calibration/Validation	Initial & Quarterly	Certified Standard	Low, Mid, High	Analyzer
7-Day Drift Test	Initial	Certified Standard	Low, Mid, High	Analyzer
Performance Audit Test	Initial & Quarterly	U.S. EPA Audit U.S. EPA Protocol Certified Standard	Mid	Probe
Mid-Level Validation	Daily	Certified Standard	Mid	Analyzer



Data Collection and Reduction System

05/20

- ❑ 15-minute Block Averages
- ❑ “Regulated Material” or “Intermittent Flaring”
- ❑ Good vs. Bad Data
- ❑ Process Integration
- ❑ Compliance Demonstration
- ❑ Reporting



Data Acquisition System Process

05/20

- ❑ Infrastructure
- ❑ Integration
- ❑ Configuration
- ❑ Verification
- ❑ Implementation



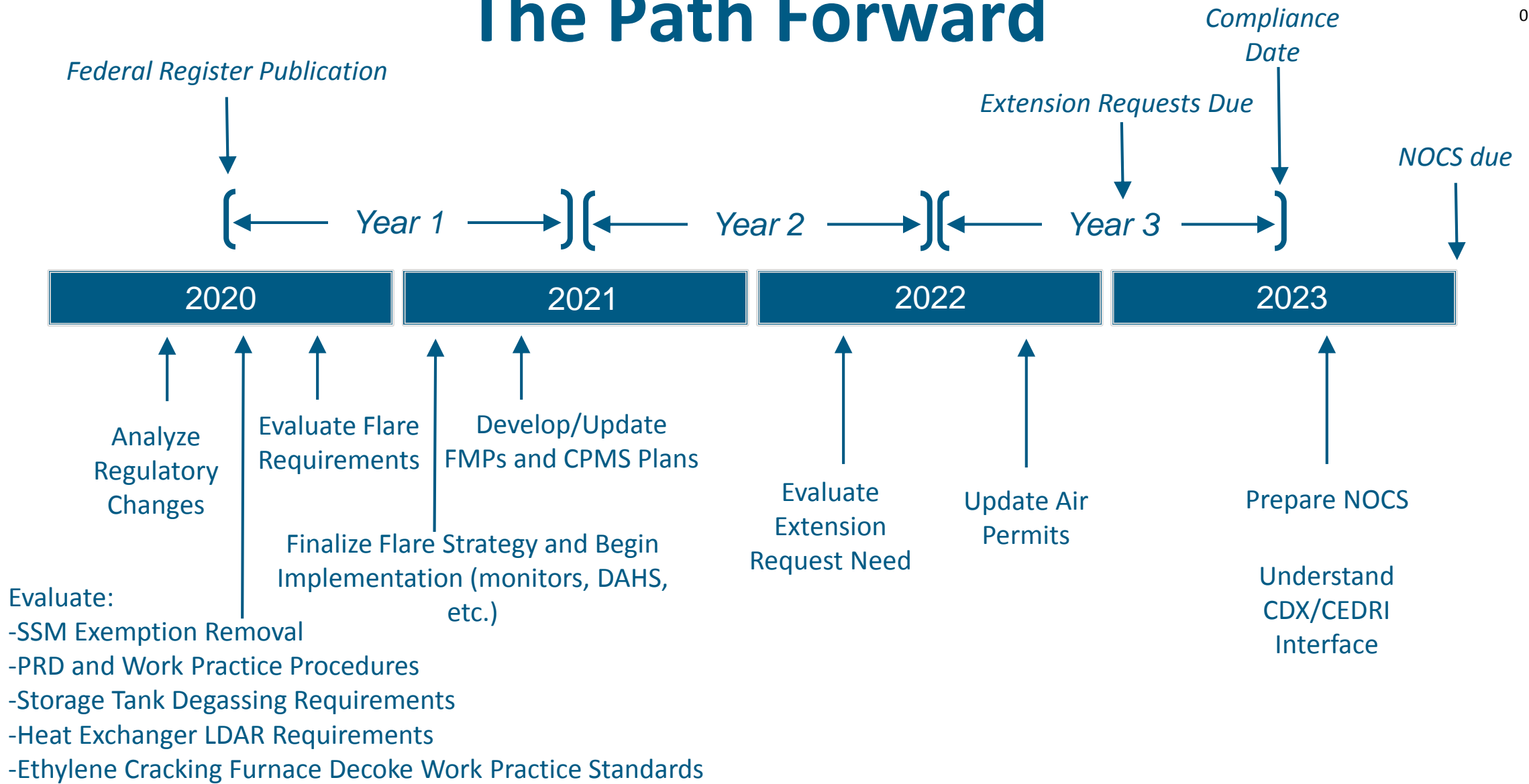
THE PATH FORWARD

Kristin Gordon



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Questions?

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