



trinityconsultants.com

PC MACT Updates

Cemtek Environmental Emissions Monitoring Seminar
Costa Mesa, CA September 28, 2016

Vineet Masuraha
Trinity Consultants
Irvine, CA



Agenda

1. Introduction
2. Overview of the applicable AQ requirements
3. Overview of emissions and emission sources
4. Normal vs. S/S vs. malfunction operations
5. PC MACT regulations - limits and monitoring options
6. PC MACT updates
7. Discussions and questions

Trinity Consultants, Inc.



- > Environmental consulting services providing firm headquartered in Dallas, TX
- > 40 years of experience in North America with significant cement industry experience
- > Serving >2,500 industrial clients and >4,000 projects per year
- > 550+ employees
- > ~40% owned by employees and ~60% by PE
- > 40+ offices with 5 international offices
- > Most of the senior PMs have been with the firm >15 years
- > Known as a leader in Air Quality

Trinity's Cement Expertise

- > Trinity is actively involved in trade associations and conferences for cement/aggregate industries
- > Serves most of the cement companies
- > Deep experience from permitting greenfield to modifications, alternate fuels, enforcement matters, waste, water, and all other issues impacting cement companies
- > Have served ~60 cement plants on various projects

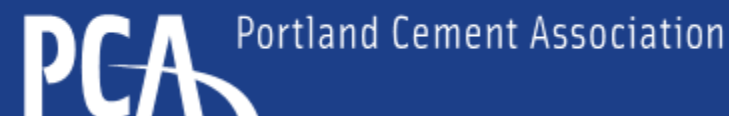
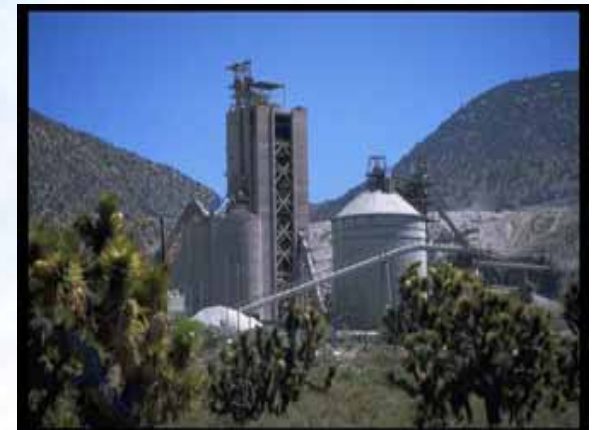
Associate Member of:

Portland Cement Association

AWMA – Cement Lime & Non Metallic Mineral Processing Committee

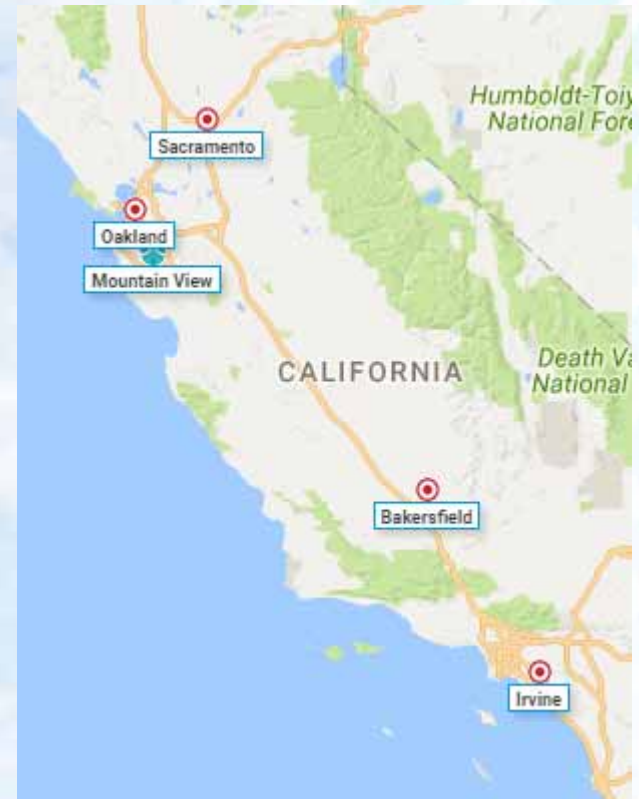
National Lime Association

Cement Kiln Recycling Coalition



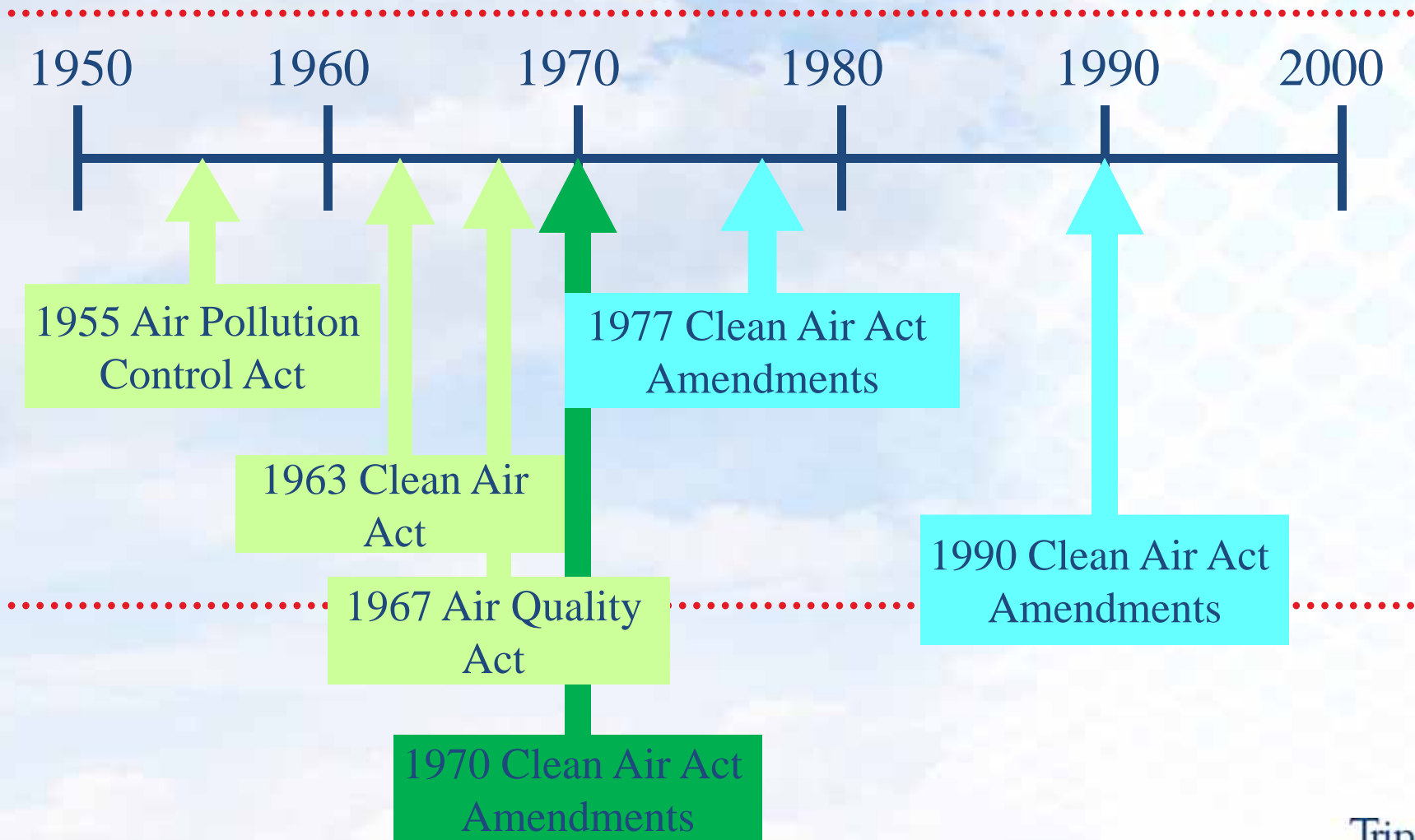
About Trinity California

- > Core competency is Environmental Regulatory Permitting and Compliance Services to Industry for more than 40+ years
- > CA staff size is approximately 60 - primarily engineers and scientists located throughout CA
 - ❖ Offices in Irvine, Bakersfield, Oakland, and Sacramento
- > Most of the staff is very familiar with cement operations
- > Staff is very experienced with CA Air Districts/All other agencies reporting, permitting, compliance, and other related services

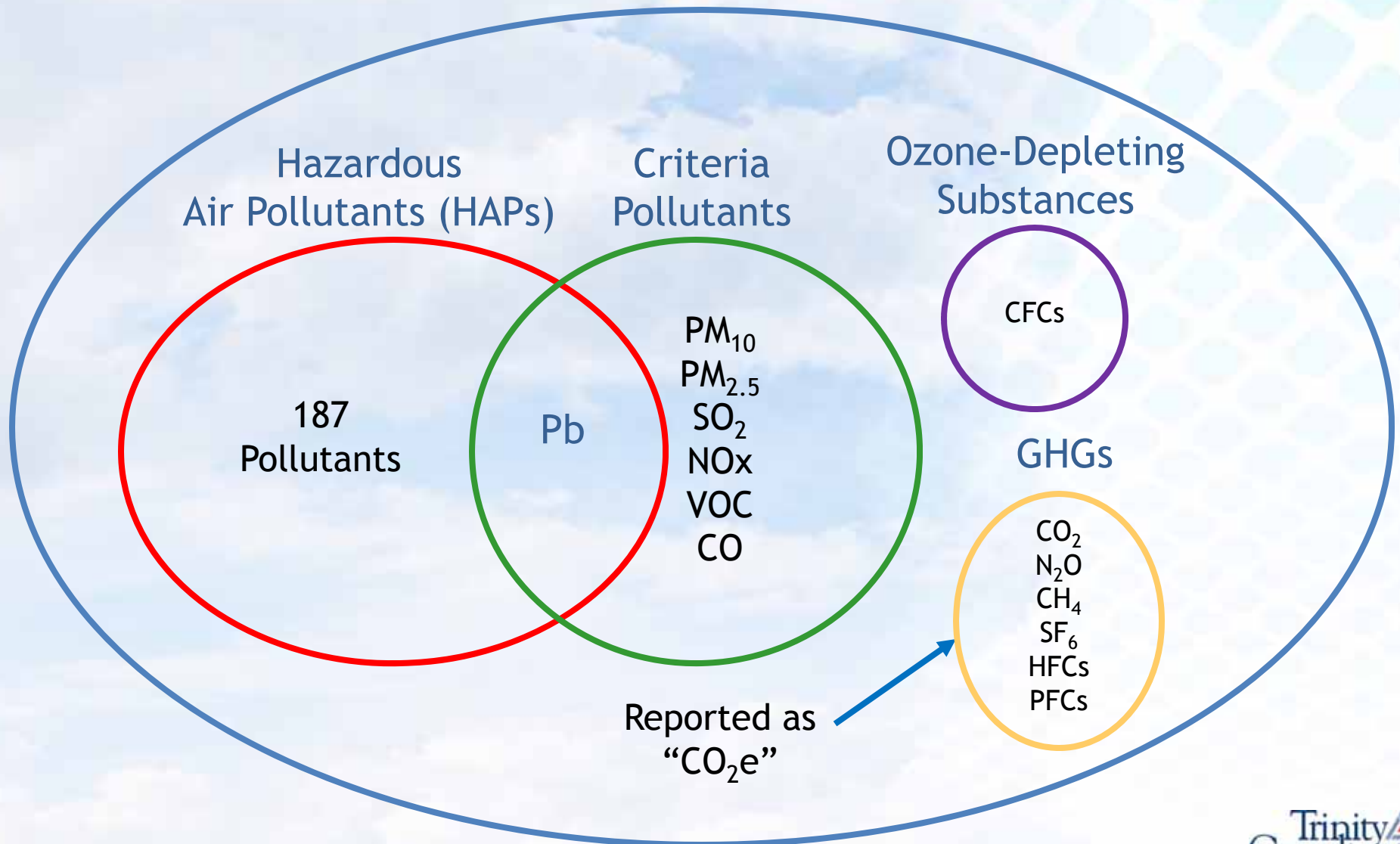


CEMS Regulatory Background

History of Federal Air Quality Laws



Regulated Air Emissions



Current NAAQS

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
CO	9 ppm	8-Hour	None	
	35 ppm	1-Hour		
Pb	0.15 µg/m ³	3-Month (2008 std.)	Same as Primary Standard	
	1.5 µg/m ³	Quarterly (1978 std.)	Same as Primary Standard	
NO ₂	0.053 ppm	Annual	0.053 ppm	Annual
	0.100 ppm	1-Hour (2010 std.)		
PM ₁₀	50 µg/m ³	Annual	Same as Primary Standard	
	150 µg/m ³	24-Hour	Same as Primary Standard	
PM _{2.5}	12.0 µg/m ³	Annual	Same as Primary Standard	
	35 µg/m ³	24-Hour (2006 std.)	Same as Primary Standard	
Ozone	0.075 ppm	8-Hour (2008 std.)	Same as Primary Standard	
	0.08 ppm	8-Hour (1997 std.)	Same as Primary Standard	
SO ₂	0.03 ppm	Annual (1971 std.)	0.5 ppm	3-hour
	0.14 ppm	24-Hour (1971 std.)		
	0.075 ppm	1-hr (2010 std.)		

Four Categories of Emissions

- > Normal - Production operation emissions
- > Planned SS - Startup and shutdown emissions during normal operations that are predictable and planned
- > Unplanned SS - Unexpected emissions that are quantifiable, unscheduled, and not anticipated
- > Malfunction/Emission Events - Other emissions that not authorized such as acts of God, accidents, malfunctions, unexpected emissions during SS, and non-compliant operations



Normal Operation = Steady State or Batch Production + Planned SS
What is NOT Planned SS = EE + Unplanned SS

SSM – Startup, Shutdown, and Malfunction and MSS – Maintenance, Startup, and Shutdown

Regulations Vs. Permits

- > Regulations generate requirements that the facility must follow
 - ❖ Emission Standards
 - ❖ Testing, Monitoring, Record Keeping and Reporting
- > Permits codify all the requirements that apply to equipment and facilities
 - ❖ Pre-Construction Permits (NSR/PTC)
 - ❖ Operating Permits (PTO/Title V)

Emissions Reporting

- > CEMS are used to gather emissions data to demonstrate compliance with regulatory limits
- > The CEMS emissions data is used to generate reports which are submitted to applicable regulatory bodies
 - ❖ US EPA
 - ❖ State
 - ❖ Local Air Pollution Control Districts

Why is a CEMS needed?

- > Compliance demonstration for applicable emission limits and standards such as:
 - ❖ New Source Performance Standards (NSPS)
 - ❖ Maximum Achievable Control Technology Standards (MACT)
 - ❖ Best Available Retrofit Technology (BART)
 - ❖ New Source Review (NSR) Permit
 - ◆ Prevention of Significant Deterioration (PSD) Permit
 - ❖ Operating (Title V) Permit
 - ❖ Greenhouse Mandatory Reporting Rule (MRR)
 - ❖ Acid Rain Program (Part 75)
 - ❖ NO_x Budget Program/Clean Air Interstate Rule (CAIR)
 - ❖ State-Specific permits and programs
 - ◆ State NSR and Operating permits
 - ◆ RECLAIM

Key CEMS Requirements

- > Emission Limits and Standards - Specify sources to be monitored (pollutant, averaging period, mass/concentration, etc.)
- > Performance - Specify monitoring system design, installation, testing, operation, and maintenance requirements
- > QA/QC Requirements - Specify QA plan, QC procedures, and QA audit procedures
- > Reporting Requirements - Specify frequency, type of report, format, content, and other details

NSPS (40 CFR 60)

- > Applies to *Criteria Pollutants*
- > Developed and listed by industry and equipment
 - ❖ Subpart F: Portland Cement Manufacturing
 - ❖ Subpart Y: Coal Preparation Plants
 - ❖ Subpart OOO: Non-metallic Mineral Processing
 - ❖ Subpart III, JJJJ: Diesel/Gas Engines
- > Applicability must be evaluated for *new, modified, and reconstructed sources*

NSPS Subpart F Key Dates – 08/17/1971 and 06/16/2008

NSPS Subpart OOO Key Dates – 08/31/1983 and 04/22/2008

Subpart F Pollutants Regulated

Pollutants	Date
PM (0.3 lb/ton) Opacity	08/17/1971
PM (0.02*/0.07** lb/ton) SO ₂ (0.4*** lb/ton) NO _x (1.5*** lb/ton) Opacity	06/16/2008

- > * New or Reconstructed
- > ** Modified
- > *** New, Reconstructed, or Modified

PM Emissions Monitoring

- > Demonstrate initial compliance through an initial performance test using Method 5 or Method 5I.
- > Monitor continuous performance through a PM CPMS (Continuous Parametric Monitoring System)
 - ❖ Based on annual three run stack test
 - ❖ Annual compliance test determines source operating limit

NO_x and SO₂ Monitoring

- > Continuously monitoring and recording concentration by volume of NO_x and SO₂ emissions
 - ❖ Using Continuous Emissions Monitoring System (CEMS)
 - ❖ 30-Day Rolling Average



Subpart Y - Coal Processing

Thermal Dryer

- ❖ If all thermal input is from an affected facility covered by another NSPS (such as a lime or cement kiln), not subject to this Subpart.
- ❖ SO₂, NO_x and/or CO standards not applicable if
 - ◆ heat input from source other than coal or residual oil,
 - ◆ source subject to limit from another subpart
 - ◆ use waste heat or residual from coal or residual oil

NESHAP (40 CFR Part 63)

- > National Emission Standard for Hazardous Air Pollutants (NESHAP) - 40 CFR Part 63
 - ❖ Hazardous Air Pollutants (HAPs) sources
 - ❖ Major and area sources
 - ❖ Existing and new
 - ❖ Maximum Achievable Control Technology (MACT)

Kilns (including Alkali Bypass, In-line Coal Mills)	Raw Mills and Raw Material Dryers	Clinker Coolers	Finish Mills
Storage Bins	Conveying System Transfer Points	Bulk Loading/ Unloading/Bagging	Open Clinker Piles

PC NESHAP (40 CFR 63 Subpart LLL)

- > Final Rule 9/12/2013 (upgrade from 1999 rule)
- > Technical Amendments
 - ❖ Proposed 11/2014
 - ❖ Finalized 7/2015
- > Corrections 9/11/2015
- > EPA Guidance
 - ❖ Spring 2013
 - ❖ Spring 2016
 - ❖ Docket memos 2015
 - ❖ PCA Span Memo Summer 2016

Subpart LLL Requirements

- > Emission limits and operating parameters
- > Continuous monitoring with CEMS/CMS
- > Work practices for kiln startup/shutdown
- > Operating plans and procedures
- > Recordkeeping and reporting through data acquisition system (DAS)

Standards: Kilns, Cooler, and Dryers

SOURCE	POLLUTANT	LIMIT	UNITS
Existing Kiln	PM	0.07	lb/ton clinker
	D/F	0.2 (or 0.4)	ng/dscm (TEQ)
	Mercury	55	lb/MM ton clinker
	THC or OHAP	24 or 12	ppmvd
	HCl	3	ppmvd
New Kiln	PM	0.02	lb/ton clinker
	D/F	0.2 (or 0.4)	ng/dscm (TEQ)
	Mercury	21	lb/MM ton clinker
	THC or OHAP	24 or 12	ppmvd
	HCl	3	ppmvd
Existing Cooler	PM	0.07	lb/ton clinker
New Cooler	PM	0.02	lb/ton clinker
Any RM Dryer	THC	24	ppmvd

Note: Table applies to major and area sources in normal operation unless specified

Startup/Shutdown Mode

- > EPA regulatory definition
 - ❖ Startup *begins* when a kiln ID fan is on and begins firing fuel in the main burner
 - ❖ Startup *ends* when kiln feed is continuously introduced into the kiln for ≥ 120 minutes or when the kiln feed rate exceeds 60% of the kiln design limitation rate (whichever occurs first)
 - ❖ Shutdown begins when continuous kiln feed to the kiln is halted and ends when continuous kiln rotation ceases

S/S - Work Practices

- > Kiln startup fuel (one or combination) until kiln reaches 1200°F:
 - ❖ natural gas, synthetic natural gas, propane, distillate oil, synthesis gas, and ultralow sulfur diesel
- > Dry sorbent and activated carbon systems used for HAP control must be turned on and operating when gas stream to APCD reaches 300°F
- > PM and other HAP control devices must be operational during startup/shutdown

Compliance Demonstration

- > Initial
 - ❖ Performance testing
 - ❖ Setting operating parameter limits
- > Continuous monitoring
 - ❖ CEMS
 - ❖ Parametric
 - ❖ Visible emissions
- > Routine stack tests
- > Operation and maintenance procedures

Performance Testing

- > Stack testing
 - ❖ Annually - PM, Hg*
 - ❖ 30-month - OHAP, HCl/SO₂, D/F
- > CEMS
 - ❖ HCl, Hg, THC
 - ❖ Initial, first 30-operating days
- > Visible emissions
 - ❖ Initial Method 9 for 10-minute observation
 - ❖ Reduced frequency
- > Performance evaluations prior to testing

*If less than detection limits for two annual test can reduce frequency to 30 months

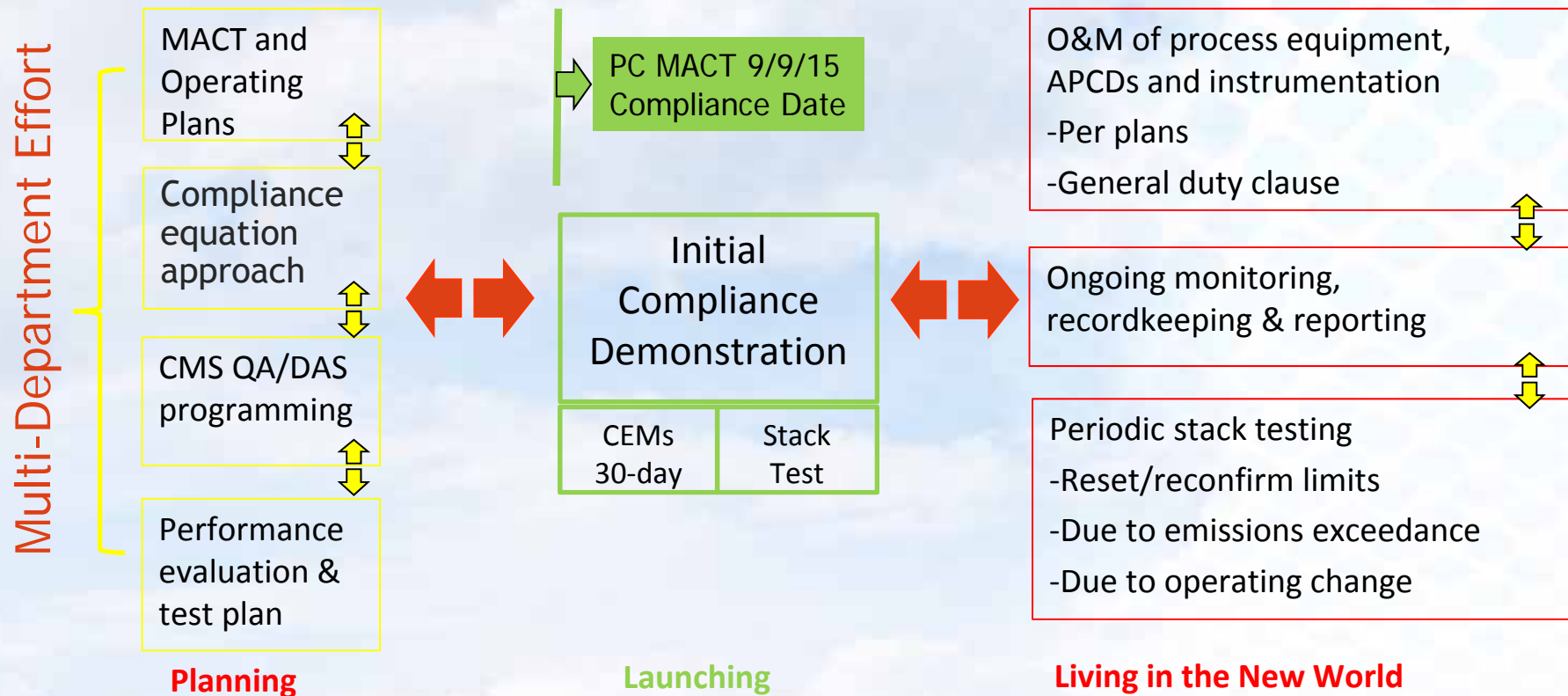
Operating Limits

- > Demonstration of Compliance with Emission Standards
 - ❖ RM On, RM Off, and separate stacks
- > Parametric Monitoring
 - ❖ PM CPMS
 - ❖ ACI injection rate
 - ❖ Scrubber parameter
- > Using CEMS for Alternative Monitoring
 - ❖ THC for OHAPs
 - ❖ SO₂ for HCl

Periodic QA Activities

CMS	Daily	Quarterly	Annual
PM CPMS	CD	Per Mfr's Specs	
THC CEMS	CD	CE – PS 8A	RATA – PS 8
HCl CEMS	CD	CGA – PS 15	RATA – PS 15
Hg CEMS	CD	CGA – PS 12A	RATA – PS 12A
Hg Sorbent Trap	Per PS 12B	Per PS 12B	RATA – PS 12B
O ₂ CEMS	CD	CGA – PS 3	RATA – PS 3
Flow Monitor	CD	RAA – PS 6	RATA – PS 6

How Do Revised MACT Compliance Actions Work Together?



PCMACT Plans

- > O&M plan
- > Site-specific performance test plan
- > Site-specific emissions monitoring plan
 - ❖ Each CPMS/CEMS
 - ❖ Quality Assurance/Quality Control
- > Opacity monitoring plan (VEs)
- > BLDS monitoring plan

O&M Plan

> O&M (40 CFR 63.1347)

- ❖ Procedures for proper operation and maintenance of the affected source and air pollution control devices
 - ◆ Grouped by plant system
- ❖ Procedures for inspection of combustion system components of each kiln/in-line kiln raw mill at least once per year
- ❖ Fugitive dust emissions control measures for open clinker storage piles per 63.1343(c)
- ❖ Address periods of startup and shutdown
- ❖ Corrective action process
- ❖ Certification of compliance at all times in summary reporting

Recordkeeping Requirements

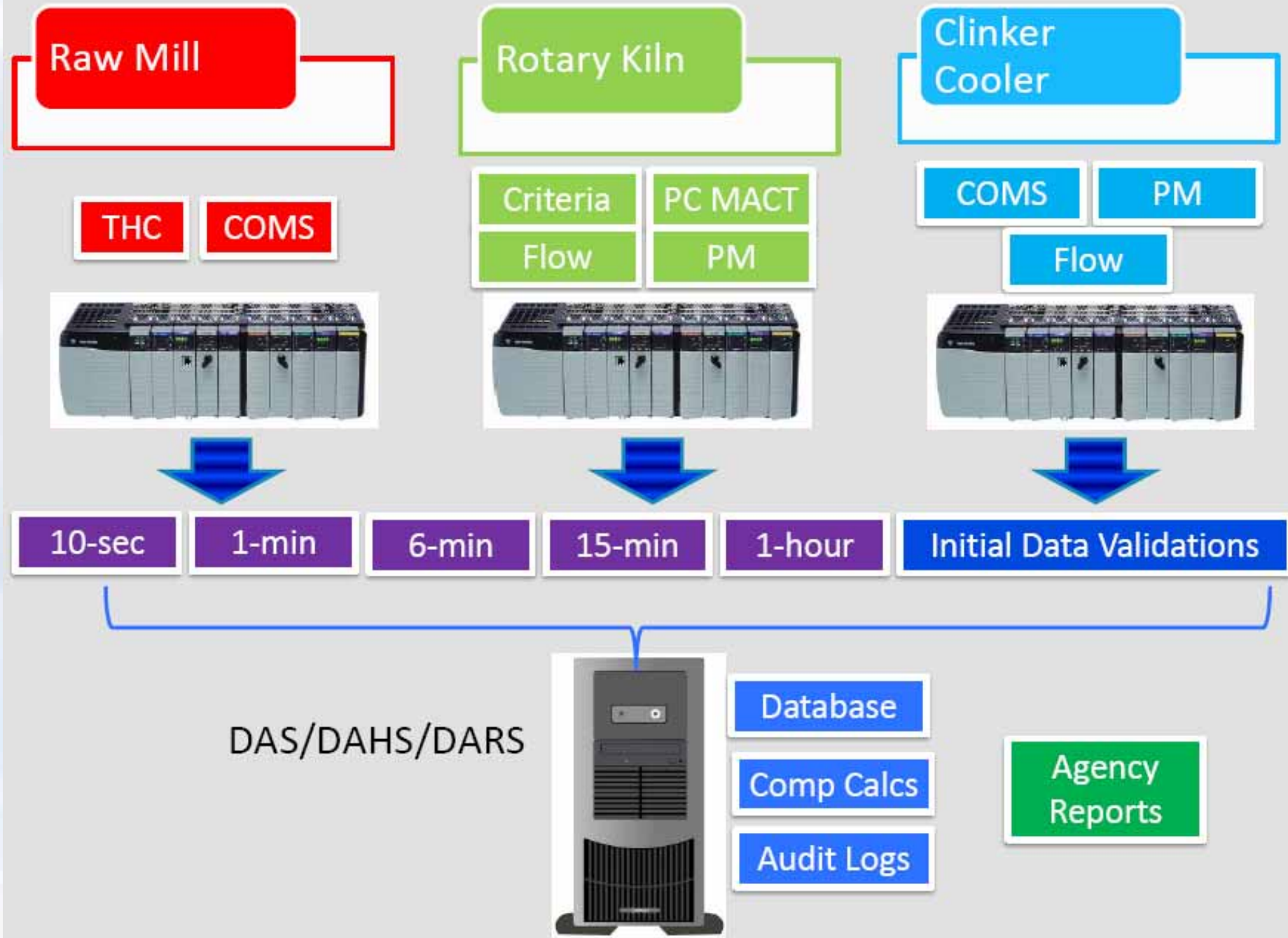
- > Readily available and retained for 5 years
 - ❖ Most recent 2 years must be on-site
- > Daily clinker production rates and kiln feed rates
- > 30-day rolling averages
 - ❖ HCl, THC, Hg
 - ❖ PM CPMS,
 - ❖ Alternative THC for OHAPs, SO₂, for HCl
- > 3-hour rolling averages
 - ❖ D/F

Recordkeeping Requirements

- > Date, time and duration of each startup and shutdown
 - ❖ Include quantity of feed and fuel for each S&S
- > Date, time and duration of each malfunction event (if causes failure to meet a standard)
 - ❖ Includes monitoring malfunctions
 - ❖ Must list source affected, volume of pollutant emitted in excess of standard, and the method used to make that determination
 - ❖ Actions taken to minimize emissions
- > Other exceedances of emissions standards or parametric limits
 - ❖ Date and duration
 - ❖ Specific actions taken for each including inspections, corrective action and repeat performance tests
 - ❖ Results of those actions

Reporting Requirements

- > Reporting requirements outlined in §63.1354(b), §63.10(d),(e)
 - ❖ Performance & opacity test results; notification of compliance status
 - ❖ Performance evaluation results
 - ❖ Excess emissions and continuous monitoring system performance report
 - Noncompliance with emission limit or operating parameter limit
 - CMS downtime > 10% of operating time
 - ❖ Semiannual summary report
- > Compliance and Emissions Data Reporting Interface (CEDRI)



PC MACT - Lingerin Topics

- > June 2016: suspension of Hg above-span
- > Overall plants have evolved to learn and implement the changes
 - ❖ Enhanced communications between departments - more coordination (“not just the way it used to be”)
 - ❖ Tracking compliance to prevent operating limit issues
 - ❖ Learning curve and system adjustments for new APCDs
 - ❖ Some companies have launched PC MACT audits

Instrumentation and DAS Topics

- > Ongoing plant learning curve; costs for on-call assistance
- > Compliance calculations and commingled stacks: follow up clarifications
- > DAS handling of negative opacity readings, startup/shutdown or downtime - used correctly in daily averages?
- > Ongoing reporting questions on 30/60 day timing and CEDRI input options
- > New guidance for dioxin and furan temperature block determinations

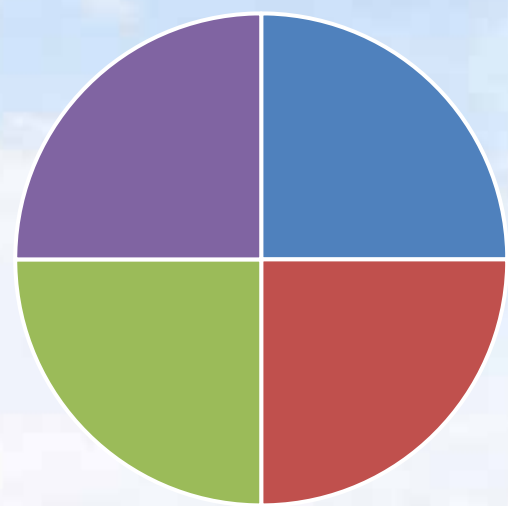
Common CEMS Performance Issues and Causes

- > Failed Calibrations
- > System malfunctions
 - ❖ Sample system leak
 - ❖ Sample flow issue
 - ❖ Moisture in sample system
 - ❖ Excessive heat
- > Analyzer malfunctions
 - ❖ Operating out of specification
 - ❖ Maintenance required
 - ❖ Adjustment required

Common CEMS Data Audit Findings

- > CEMS data hourly averages not calculated in compliance with requirements (No fifteen minutes segments)
- > Retention of CEMS data (5 years for Title V facilities)

1 Hour Data



■ 1st Qtr (15 Min.) ■ 2nd Qtr (15 Min.) ■ 3rd Qtr (15 Min.) ■ 4th Qtr (15 Min.)

Questions/Discussions