CKRC Technical/Regulatory Workshop

Exploring the Regulatory Building Blocks of Energy Recovery:

HOW and WHY we do what we do! #PasstheTorch

April 18, 2018: 9am-3pm

Workshop Agenda

I) Overview Of U.S. Cement Industry Hazardous Waste Fuel Use & Regulatory Development

a) Hazardous waste combustion regulatory overview
- BIF rule development, Combustion strategy & BIF enforcement actions
- Permitting & risk assessment evolution
- MACT rule evolution
- Current CAA/RCRA authority – permitting and compliance

b) EPA Learning Curve and historical interactions, motivations and methods

c) Industry learning curve and CKRC historical actions

Q&A – wrap up

II) Hazardous Waste Combustor MACT Implementation & Lessons Learned

a) HWC MACT regulatory overview

b) HWC MACT implementing the standards

c) HWC MACT discussion topics:
1. Subpart EEE at all times
2. EEE/LLL overlap – where does the line meet
3. Combustion system leaks
4. Stack testing considerations
5. Title V and NOC updates

Q&A – wrap up

III) RCRA – Permitting, Key Historical Topics & Lessons Learned

a) RCRA overview, TSDF permit process, and day-to-day implementation

b) RCRA longer-term requirements

c) RCRA discussion topics:
1. Managing site generated wastes
2. CKD and 266.112 implementation
3. Alphabet soup (TSDF fugitive emissions control)
4. Training – MSHA-OSHA-RCRA-HWC MACT coordination
5. WAP vs. FAP and max-max
6. Treatment and blending in Tanks
7. Energy recovery, Btu, and impermissible dilution
8. Railcar management

Q&A – wrap up

IV) Program Implementation Discussion

a) Guidance & historical industry studies

b) Resource availability for the future

c) Question and answer period/wrap up

Listing of Hazardous Waste Management Acronyms/Symbols
Compiled December 2016 – Trinity/SYA

Acronym or Symbol	Description
acfm	Actual cubic feet per minute
ACGIH	American Conference of Governmental Industrial Hygienists
AEC	Alternate Emergency Coordinator
AOC	Area of Concern
AP-42	Compilation of Air Pollutant Emission Factors (U.S. EPA)
APCD	Air Pollution Control Device
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
BACT	Best available control technology
BIF	Boiler and Industrial Furnace
BLDS	Bag leak detection system
Btu	British Thermal Unit
CAA	Clean Air Act
CAS	Chemical Abstracts Service
CBI	Confidential Business Information
CCR	Coal combustion residues (fly ash, bottom ash, synthetic gypsum)
CDR	Chemical Data Report
CFATS	Chemical Facility Anti-Terrorism Standards
CEM/CEMS	Continuous emissions monitor/Continuous emissions monitoring system
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cfm	Cubic feet per minute
CFR	Code of Federal Regulations
CISWI	Commercial and Industrial Solid Waste Incinerator (CAA Section 129 rule)
CKD	Cement Kiln Dust (long-kiln term)
CKRC	Cement Kiln Recycling Coalition
CMS	Continuous monitoring system (regulatory instrumentation term)
CMS	Corrective Measures Study
CO, and CO_2	Carbon monoxide, and Carbon dioxide
COMS	Continuous opacity monitoring system
CPMS	Continuous parameter monitoring system
CPT	Comprehensive performance test
CWA	Clean Water Act
D/F	Dioxins and furans
CRO	Control Room Operator

Acronym or Symbol	Description
DOC	Documentation of Compliance (HWC MACT early compliance plan)
DQO	Data quality objective
DRE	Destruction and Removal Efficiency
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
EC	Emergency Coordinator
EG	Emission guideline
EHS	Extremely hazardous substance
EPA	Environmental Protection Agency (or U.S. EPA)
EPCRA	Emergency Planning and Community Right-to-Know Act
ERT	Emergency Response Team
EU	Emission unit
FAP	Feedstream Analysis Plan (HWC NESHAP plan)
FR	Federal Register
FRP	Facility Response Plan
g/kg	Gram/kilogram
GC/MS	Gas Chromatography / Mass Spectroscopy
GHG	Greenhouse Gases
gph	Gallons per hour
gpm	Gallons per minute
gr	Grain (1/7000 lb avoirdupois)
HAP	Hazardous air pollutant
HazCom	OSHA or MSHA hazard communication
HazMat ER	Hazardous Materials Emergency Response
HAZWOPER	Hazardous Waste Operations and Emergency Response (training)
HC	Hydrocarbon
HCl	Hydrogen chloride
Hg	Mercury
HHRAP	Human Health Risk Assessment Protocol (HW combustion facility risk assessment guidance)
HHV	High Heat Value
HHW	Household Hazardous Waste
HMIWI	Hospital/medical/Infectious Waste Incineration (CAA Section 129 rule)
HON	Hazardous organic NESHAP
HRA	Hourly rolling average
HSM	Hazardous Secondary Materials (RCRA term)
HWC MACT or HWC NESHAPs Rule	National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors (40 CFR Part 63, Subpart EEE) (CAA rule)
HWDF	Hazardous Waste-Derived Fuel

Acronym or Symbol	Description
ICR	Information Collection Request (by EPA for regulatory information collection)
ICS	Incident Command System
LAER	Lowest achievable emission rate
LDR	Land Disposal Restrictions
LEL	Lower Explosive Limit
LEPC	Local Emergency Planning Committee
LHV	Low Heat Value
LQG	Large Quantity Generator (RCRA term)
LVM	Low-volatile metals (As, Be and Cr in HWC MACT)
LWDF	Liquid Waste-Derived Fuel
MACT	Maximum Achievable Control Technology
MBtu and MMBtu	Thousand Btu and Million Btu
mg, and Mg	Milligrams, and megagram ($l0^6$ grains, also 1 metric ton)
MON	Miscellaneous organic NESHAP
MPHRA	Multi-pathway human risk assessment
MSDS	Material Safety Data Sheet
MSW	Municipal solid waste
MWC	Municipal waste combustor (CAA Section 129 rule)
NAAQS	National Ambient Air Quality Standards (CAA rule)
NACE	National Association of Corrosion Engineers
NAICS	North American Industry Classification System
NESHAP	National Emission Standard(s) for Hazardous Air Pollutants (CAA rule)
ng	Nanograms (10^{-9} grams)
NHSM	Non-hazardous secondary materials (for solid wastes used as fuels or ingredients in combustion units as defined in 40 CFR Part 241)
NIC	Notice of Intent to Comply (HWC MACT Initial Notification)
NIOSH	National Institute of Occupational Safety and Health
NOC	Notification of compliance
NODA	Notice of Data Availability
NO_x, NOx, NOX	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	National Response Center
NSPS	New source performance standard (CAA rule)
NSR	New source review
O_2	Oxygen
OAQPS	Office of Air Quality Planning and Standards (U.S. EPA)
OJT	On the Job Training
O & M Plan	Operations and Maintenance Plan
OPL	Operating parameter limit (HWC MACT term)

Acronym or Symbol	Description
OSHA	Occupational Safety and Health Administration (U.S. Dept. of Labor)
OTCP	Operator training and certification program (HWC NESHAP plan)
P2	Pollution prevention
PAC	Polycyclic aromatic compounds
PAL	Plant-wide applicability limit
PBT	Persistent, bioaccumulative, toxic
PCA	Portland Cement Association
PCB	Polychlorinated biphenyl
PC NESHAPS aka PC MACT	National Emission Standards for Hazardous Air Pollutants from Portland Cement Kilns (40 CFR Part 63, Subpart LLL) (CAA rule)
PE	Professional Engineer
PM	Particulate matter
PM_{10}, PM10	PM with an aerodynamic diameter of less than or equal to l0 μm
$PM_{2.5}$, PM2.5	PM with an aerodynamic diameter of less than or equal to 2.5 μm
POTW	Publicly owned treatment works
PPE	Personal Protective Equipment
ppmvd	Parts per million by volume, dry
ppmw	Parts per million, weight basis
PS	Performance Specification
PSD	Prevention of significant deterioration (CAA rule)
psia	Pounds per square inch, absolute
psig	Pounds per square inch, gauge
PSM	Process Safety Management
PTE	Potential to emit, potential-to-emit
QA/QC	Quality assurance / quality control (plan)
RA	Risk Assessment
RACT	Reasonable available control technology
RAP	Relative Area Percent
RATA	Relative accuracy test audit
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RICE	Reciprocating internal combustion engine
RI/FS	Remedial Investigation / Feasibility Study
RMP	Risk management plan
RQ	Reportable Quantity
RTR	Risk and Technology Review (periodic EPA review of CAA MACT standards)
RVP	Reid vapor pressure (psia at 100° Fahrenheit)

Acronym or Symbol	Description
SARA	Superfund Amendments and Reauthorization Act
scfm	Standard cubic feet per minute
SDS	Safety data sheet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SOCMI	Synthetic organic chemical manufacturing industry
SOx SOx, SOX	Sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SQG	Small Quantity Generator
SRE	System Removal Efficiency (of metals in combustion system)
SSMP	Startup, Shutdown, and Malfunction Plan
SVM	Semi-volatile metals (Pb and Cd in HWC MACT)
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit
SW-846	Test Methods for Solid Waste: Physical/Chemical Methods
SWPPP	Stormwater Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Potential
TDF	Tire Derived Fuel
TEQ	Toxicity equivalent quotient
THC	Total Hydrocarbon
TOC	Total organic carbon
tpy	Tons per year
TPQ	Threshold Planning Quantity
TRI	Toxic Release Inventory
TSCA	Toxic Substance Control Act
TSD	Treatment, Storage and Disposal
TSDF	(Hazardous waste) Treatment, Storage, and Disposal Facility
TSP	Total suspended particulate(s)
µCi	Micro Curie
µg	Micrograms (10-6grams)
µm	micrometer (or micron, 10^{-6} meter)
U.S. EPA, USEPA	United States Environmental Protection Agency
USC	United States Code
UST	Underground Storage Tank
UTL	Upper Tolerance Limit
VE	Visible Emissions
VOCs	Volatile organic compound
VSQG	Very Small Quantity Generator (RCRA term)
WAP	Waste Analysis Plan (RCRA plan)
WDF	Waste Derived Fuel

Section I

Overview of U.S. Cement Industry Hazardous Waste Fuel Use and Regulatory Development

CKRC Workshop
April 18, 2018

I(a): Hazardous Waste Combustion Regulatory Overview

Hazardous Waste as Alternative Fuel

- How U.S. operations and rules surrounding energy recovery and recycling evolved
- Historical perspective on combustion rule evolution

Understanding history to evaluate best practices and regulatory approaches for future

Cement Kilns & Hazardous Waste Fuel

- Why use wastes as a fuel?
  - Opportunity for Resource Recovery
  - Partially or completely replace costly fossil fuels
  - Proven technology for ‘recycling’ by liquid and solid alternative fuels beneficial reuse
  - Benefits are:
    - Energy recovery
    - Material recovery
    - Economics
    - Environmental
- In return - more scrutiny

Cement Process Attributes

- Waste fuels are destroyed, releasing energy as heat, water and carbon dioxide
  - 3,500°F + flame temperature; long residence time
- Solid materials physically and chemically combined in clinker product
  - Most metals introduced with raw materials and fuels are bound within clinker matrix
- Many inherent safeguards assuring good combustion in cement kiln
  - Heat required to sustain process is large
  - Large thermal sink (material and refractory)
  - Stability is necessary to assure quality is maintained
  - Reducing conditions (operating with no oxygen) negatively impacts clinker quality
  - Organic constituents are destroyed following "malfunctions" because required combustion energy (as heat) does not diminish instantaneously

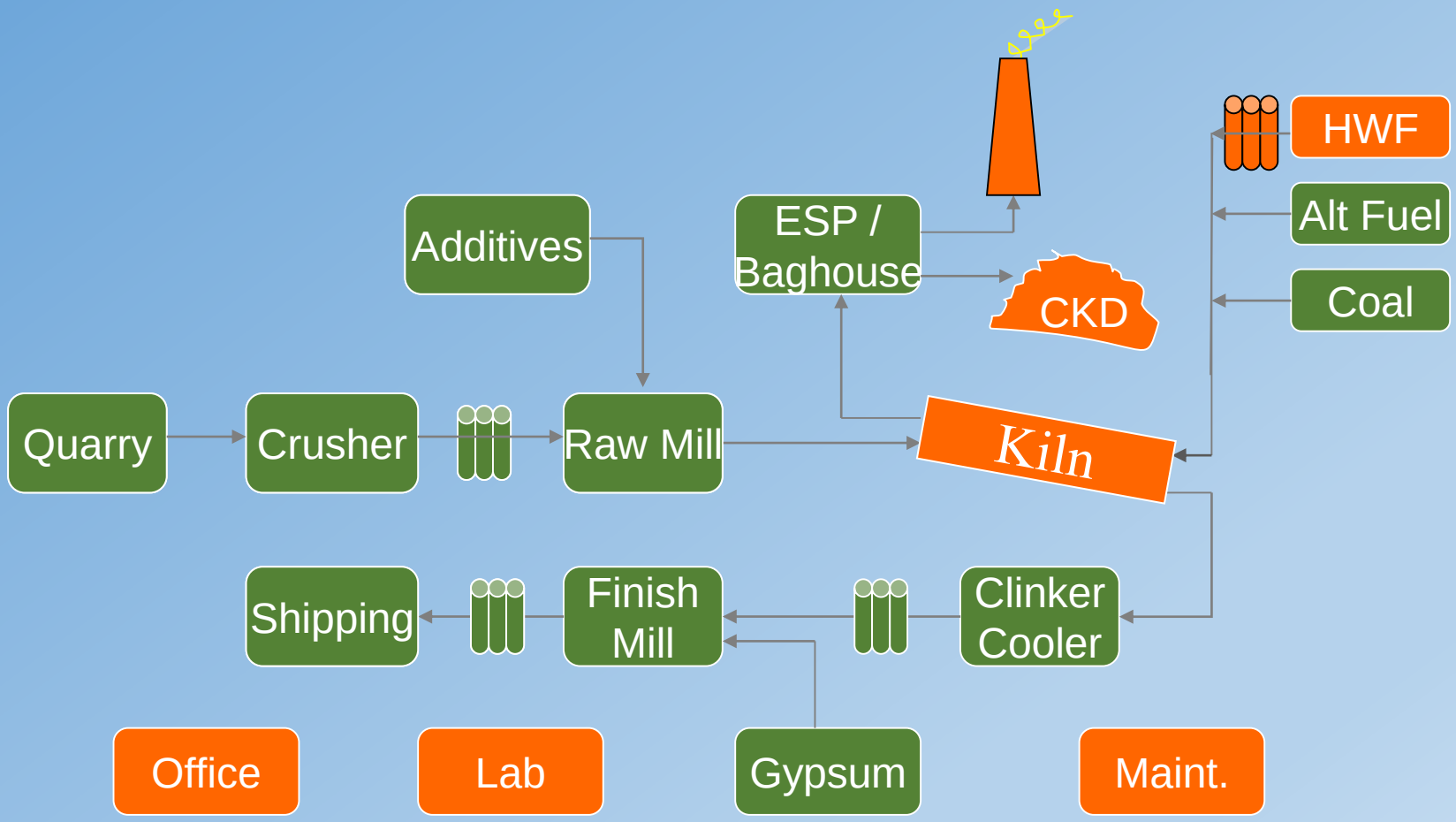
Cement & HW Fuel History

- HW-derived fuel use began about 1974 in some kilns
- 1976: RCRA regulations – recycling exempt; HSWA 1984
- Generation of large quantities of hazardous wastes with significant energy content existed
- 1986: HW storage & transport regulated; fuel use in kilns remains exempt
- 1989: Proposed Boilers & Industrial Furnaces (BIF) rule
- Market for waste fuels grows ~ 20 cement plants burning waste fuel by end of ‘80’s

Cement & HW Fuel History (con't)

- 1990: Land-bans codified
- 1991: Final BIF rule regulating kilns' use of HW fuel
  - Self implementing under "interim status" for existing HW kilns
  - Stringent air emissions standards, operating limits and testing
  - Notification, recordkeeping and reporting
  - RCRA permitting not a priority for EPA due to stringency
- Escalation of public opposition and turf wars ensued
  - WTI Incinerator
  - Incinerators (ARTT) vs. kilns

RCRA Impacts – post 1991 BIF rule



Historical Timeline – RCRA Evolves

- Combustion Enforcement Initiative – EPA Inspections 1993
- National Combustion Strategy:
  - 1993 Draft/1994 Final
  - Focus on RCRA Permitting, New Regulations (MACT) and Risk Assessment
- CKRC members generally agreed to conduct SSRAs
- Years of RCRA permitting and associated risk assessment work plans and studies ensued
- 2001 Risk Burn Guidance

Historical Timeline – MACT Evolves

- 1996 – 2005 HWC MACT rule development concurrent with RCRA permitting and risk assessment
  - HWC MACT Issued in 1999 – Litigation Followed
  - Interim MACT Standards
  - Replacement Rule in 2005, effective 2008
- Combined CAA/RCRA authority approach for combustors
- Same time period, cement industry had significant kiln replacements, and major changes (e.g. adding fuel to calciner)

BIF Rule Recap

BIF Regulatory Historical Framework

- Mainly included emission standards and detailed compliance requirements
  - Emission limits
  - Operating limits
  - Testing
  - AWFCOs and Monitoring requirements
  - Recordkeeping/Reporting
- Details became part of the Part B permit application, and thus permit

BIF: Emission Limits - Historical

- Metals
  - As, Ba, Be, Cd, Cr, Pb, Hg, Se, Ag, Tl
  - Tier I, IA, II and III
- Organics (CO/THC)
  - Tier I and II
- Destruction/Removal Efficiency (DRE)
- Particulate Matter (PM)
- Hydrogen Chloride/Chlorine Gas (HCl/Cl_2)

RCRA Permitting Process

- Part B Permitting
- Trial Burn
  - Trial Burn Conducted over Several Days
  - Simulates Worst-case Operating Conditions
  - Used to Establish Permit Limits
  - Used to Collect Information for Risk Assessment Study
- Multi-pathway Risk Assessment
- Ongoing Monitoring & Recordkeeping

RCRA to CAA (permitting) Transition

- HWC MACT
  - Permitting under Title V
  - Emission standards, operating limits and more move from RCRA/BIF permit to MACT framework
- RCRA permits retain:
  - General facility standards
  - Materials handling
  - Direct burn standards, where applicable
  - CKD management
  - Corrective action, closure and financial assurance
  - Risk-based emission limits, where found warranted

RCRA to MACT Changes

- Revised (Lower) Emission Standards
- Metals - Individual to Group (SVM, LVM, VM)
- Averaging Times Different
- WAP to FAP
- RCRA Personnel Training to Operator Training
- MACT Operations & Maintenance (O&M) and Startup, Shutdown & Malfunction (SSM) Plans
- PCOC to DOC (Documentation of Compliance)
- Trial Burn (TB) to Comprehensive Performance Test (CPT)
- COC/RCOC to NOC (Notification of Compliance)

RCRA to CAA Transition

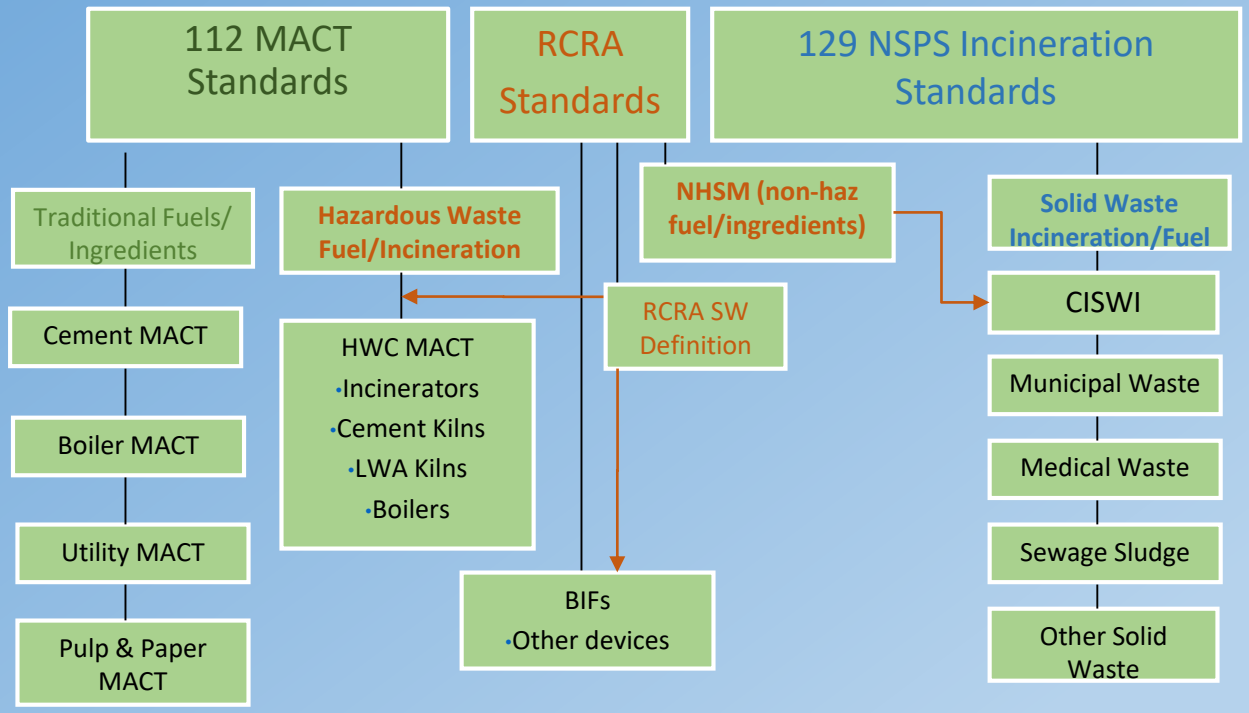
- All kilns subject to HWC MACT rule have both RCRA and Title V permits
  - Each permit in place to address different aspects
  - Pre-MACT RCRA permits included sunset provisions for BIF emission standards to allow transition to HWC MACT standards
  - Duplicative requirements between permits not intended by EPA
  - RCRA Retains Omnibus Authority & Risk Assessments

Current Regulatory Process for Cement Facility using HW Fuel

Regulations Applicable to Cement Industry

- Clean Air Act (CAA)
- Resource Conservation and Recovery Act (RCRA)
- Clean Water Act (CWA)
- Emergency Planning and Community Right-to-Know Act (EPCRA) Title III
- Mining Safety Health Administration (MSHA)
- Other regulations

Current Structure of Federal Combustion Air Standards



Fuels Drive Decision on which CAA Rule Facility Follows Applicability And Requirements Addressed In Title V Permit

CAA Regulatory Requirement Comparison

Manufacturing MACT

- Emission standards
- Operating limits
- Performance Testing
- Initial compliance requirements
- Continuous compliance
  - Requirements
- Monitoring
- Recordkeeping and reporting
- Workplace standards

Add for HWC:

- Feedstream analysis plan
- Operator training plan

Combustion NSPS

- Emission limits
- Operating limits
- Performance testing
- Initial compliance requirements
- Continuous compliance
  - Requirements
- Monitoring
- Recordkeeping and reporting

- Preconstruction siting analysis
- Waste management plan
- Operator training and
  - Qualification

Definition of new/modified source is significantly different

RCRA Permit and Operations

- RCRA regulations are extensive and in place to prevent harm to human health and environment
- Permit and permit applications address specific details of design, construction and operating procedures
- Actions are prescribed from pre-qualification of fuels to acceptance procedures, unloading, storage, in-plant management, and use in kiln
- Operations changes generally invoke permit modifications

RCRA Permit Components

- Significant learning curve in 90s derived operating procedures and methods still mostly used today:
  - Approach to “know” process inputs to know outputs will be in compliance (now MACT)
    - Max-max approach as example
    - Emissions knowledge/derivation
  - CKD management approach
  - Railcar management approach
  - Instrumentation (like-for-like definition)
  - Risk assessment conduct

Combined CAA-RCRA Authority

CAA

Construction/Title V Permits
- Preconstruction authorization

Emissions Standards/stack testing
Operating limits-monitoring
Operating plans
Recordkeeping/reporting/notifications

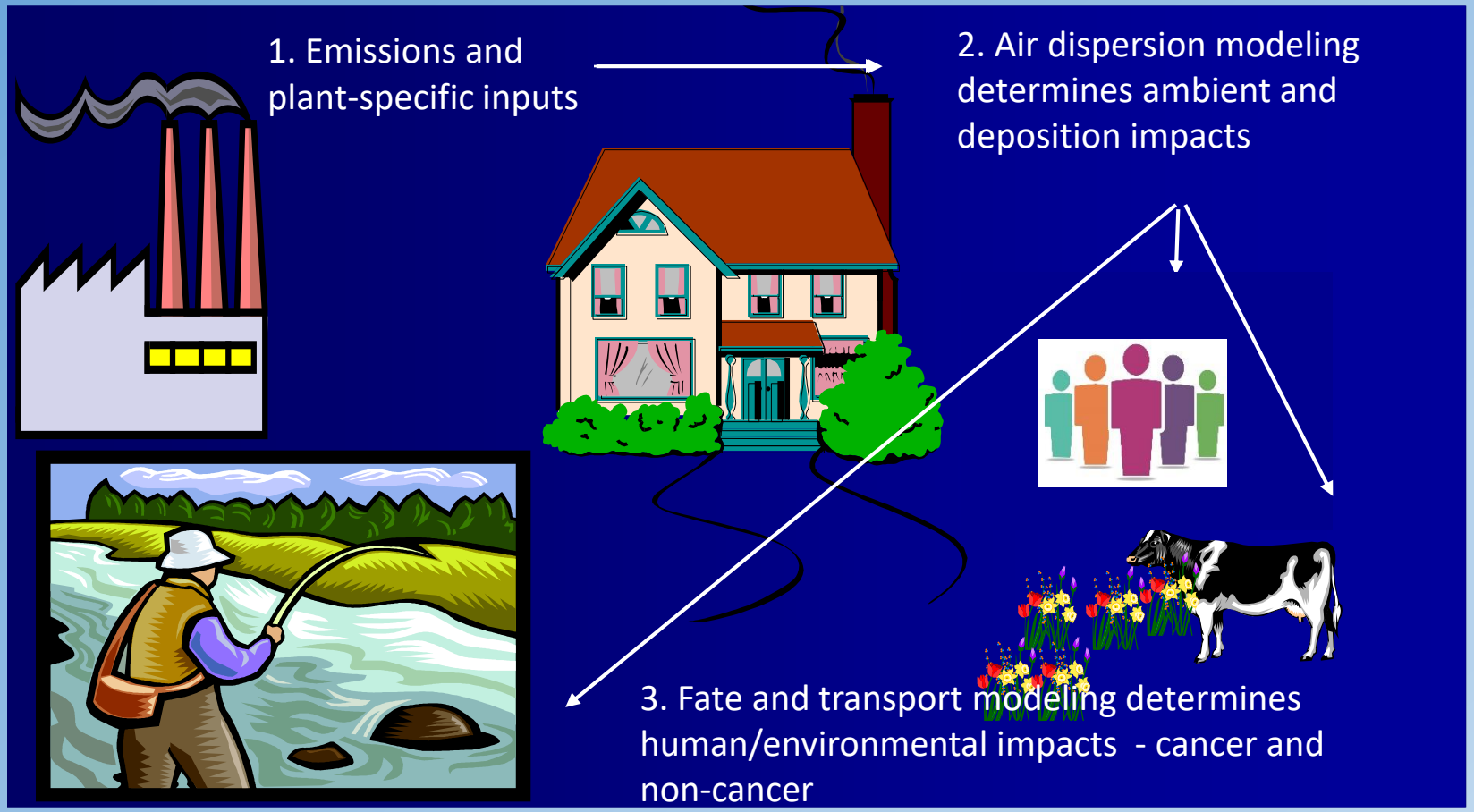
Omnibus Provisions-Risk Assessment
Documents protectiveness of Permits

RCRA

Part A/Part B permit
- Preconstruction authorization

Application includes details
Recordkeeping/reporting/notifications
Public participation (beyond CAA, thus retained in RCRA)

Risk Assessment Process



Risk Assessment Process

- Typically multi-year process
- Protocol submittal and agreement
  - Overall approach (guidance, assumptions)
  - Selection of receptors and exposure scenarios
  - Selection of constituents of concern and emissions data source(s)
- Air dispersion modeling
- Risk modeling & results evaluation
- Risk report submittal
- For RCRA permit, risk assessment results used to verify HWC MACT emissions limits are protective

Risk Assessments

- Risk assessments - cement facilities mostly performed risk assessments when first permitted
- HWC MACT/National Risk Assessment showed general protectiveness for cement industry
- EPA agreed no ongoing need to redo risk assessment unless significant change at facility
- 40 CFR 270.10(l)(1) provides criteria by which director can conclude risk should be evaluated
- Some states currently requesting re-evaluation due to changes in tox factors

Combustion Risk Assessment Thresholds

- Cancer results <1:100,000
- Non-cancer results
  - Hazard Quotient (HQ)/Hazard Index (HI)
  - < 0.25 (unitless)
  - <1.0 is considered “normal”
  - 0.25 allows for other sources/non-related background risk
- Ecological
  - Regulatory screening criteria
  - Thresholds for no adverse affects to the ecological receptors

Agency Learning Curve

- In the mid-1980s EPA faced with an array of tough environmental problems
  - Weak air standards for toxics and irritants
  - Highly contaminated streams, lakes, bays and surface water sediments
  - Highly contaminated land/groundwater from industrial activity both in urban and rural US
- Due to public outcry, EPA was given broad new powers to act with revisions to the Clean Water Act, Clean Air Act, Superfund (CERCLA), HSWA revisions to RCRA , and LUST legislation (Resourcing all this new work was an issue!)
- Congress had recognized the difficulty in establishing risk-based regulation, and had moved to technology-based mandates as the centerpiece of each statute
- EPA moved out first with toxic pollutant controls in effluent guidelines (generating even more toxic sludges)

Agency Learning Curve

- CERCLA clean-up costs quickly spawned 1984 HSWA to prevent new Superfund sites
- HSWA contained broad authority with very specific Congressional instructions on how regulations were to done and tough deadlines for how fast they were to be done…leading initially to "codification" rule that just codified as regulations all the statutory instructions
- HSWA featured technology-based standards in some areas, and standards based on protection of human health and the environment everywhere else (including combustion emission standards)
- Industry resistance to HSWA high, both politically and in the courts
- Clean Air Act Amendments did not arrive until 1990, so technology-based MACT standards for hazardous waste combustors not an option for many years
- Land Ban regulations (Solvents and Dioxins and First Third) started pushing large volumes of hazardous waste toward combustion in early 1990s

Agency Learning Curve

- Large volumes of hazardous waste to combustion considered problematic, given the poor quality of combustion in some commercial incinerators at that time
- Some were fixed/moving grate units
- Dioxin problems discovered many places, especially near municipal combustion facilities; mercury/toxic metal contamination problems also discovered
- CKD issues (direct health/property impact of alkaline dust on neighborhoods, and fears about toxics contained) being raised by many communities
- Combustion facility performance data on control technology effectiveness was skimpy to nonexistent for many toxic emissions
- EPA acquired access to pilot scale incinerator (John Zink in OK) to generate residuals/ash/emissions performance data; EPA sampled operating combustion facilities; and, eventually, permit data available as litigation of the regulation stretched out the timeline

Agency Learning Curve

- From 1985 to 1996, Marine Shale Processors in Louisiana operated without a permit, claiming to be an industrial furnace exempt from definition of solid waste and combustion regulation under HSWA
- Through 1991, it accepted drums of hazardous waste for $300/drum and sold its "proprietary aggregate," mostly as road base material, for $1/ton
- It grossed $22 million in 1990 and served 2500 customers
- Health hazards and mishandling of hazardous waste were well documented
- EPA had no choice but to step in and regulate all waste combustion (including boilers and industrial furnaces that had been initially deferred) under RCRA
- EPA was immediately caught in the competitive cross-fire between commercial incinerators and the cement/aggregate (not Marine Shale) industry; a battle that continued in the courts and politically for years

Agency Learning Curve

- Unusual situation: extra set of stakeholders beyond the normal industry vs. environmental activists (incinerators vs. energy recovery that existed in the space in-between)
- When the CAA Amendments became available, technology-based (MACT) standards became much easier basis for EPA to defend decisions
- Appropriate methodology for calculating MACT remains contentious today, for combustors and other industry sectors…litigation continues
- Until recently, most EPA/State veterans of process held view that risk from combustion facilities had been addressed by the rules/implementing permits
- However, as regulatory veterans have retired, new generation of skeptical permit writers and risk assessors have appeared

Agency Learning Curve

- Incumbent on industry to show what has been done, and impress new folks that industry stepped up, installed state-of-the-art controls, and eliminated the risks
- Industry also must show that it is not cutting corners on operation of those controls
- Obviously, the first step is to invite them into your facility, show them how you do things, fully answer their questions, and explain why you are proud of how you conduct your business

Industry Learning Curve and CKRC Historical Actions

Michelle Lusk, CKRC

Workshop April 18, 2018

#passthetorch

Why Energy Recovery in Cement Kilns?

- Industrial wastes have been used in cement kilns since the mid-1970's.
- The initial impetus that led to development of this technology was related to both the energy crisis of 1973 and to emerging environmental issues.
- By the early 1980's, there was a sharp increase in public awareness of the environmental problems caused by improper land disposal of hazardous and other wastes and a corresponding increase in governmental regulation.
- By the end of the 1980's, 23 U.S. cement plants operating 37 kilns were burning waste-derived fuels or poised to do so.

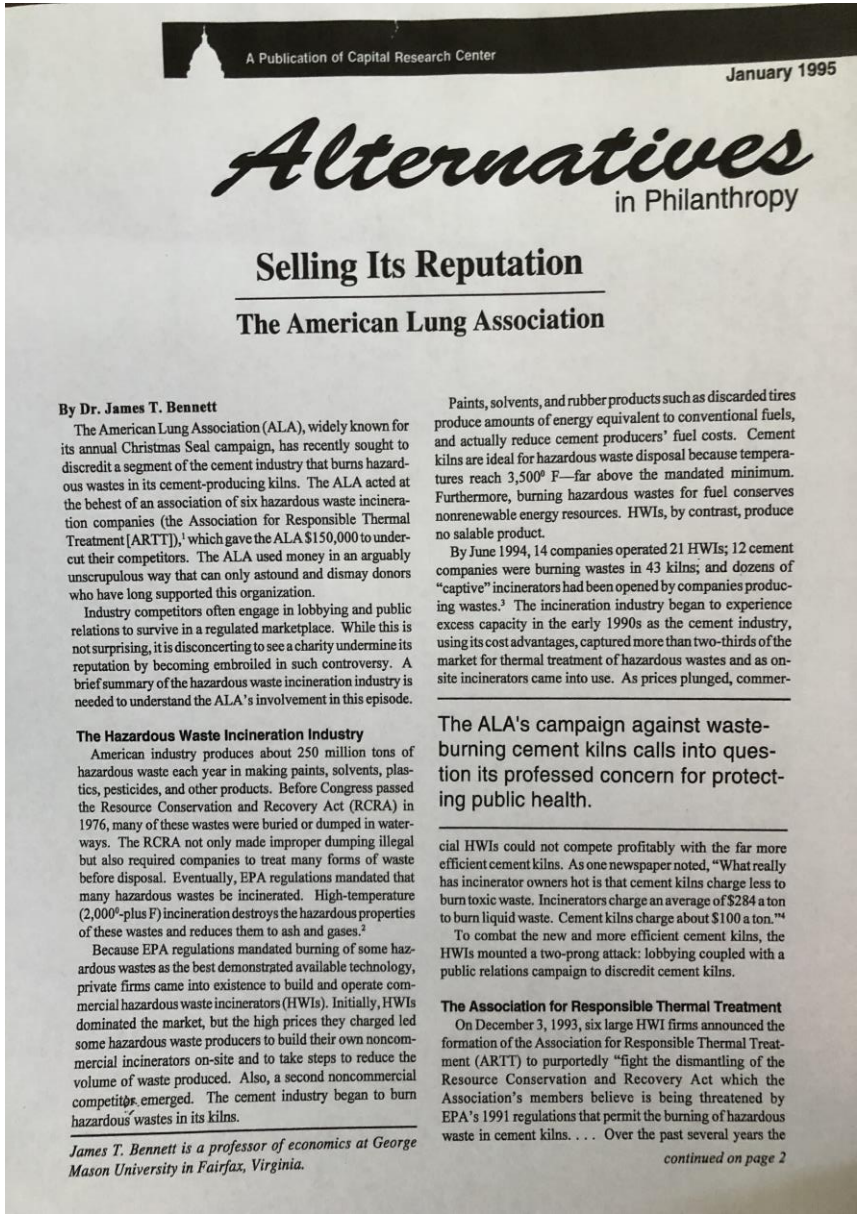
Why CKRC?

- As the technology expanded, government increased its regulation of waste disposal and combustion.
- Simultaneously, significant research and testing programs began to yield a large body of data about the nature of waste materials, their behavior in these industrial processes, and the environmental impact of using them as supplemental energy sources.
- The industry realized they needed a voice and representation at the federal level and “banded” together to form CKRC in the late 80s.

Industry Found Itself Having to Fend Off Attacks from All Sides

- Regulators: EPA Administrator Carol Browner's May 1993 Combustion Strategy and various other initiatives (OSWER, TSCA, OSHA)
- Competitors: HWTC and ARTT "Level the Playing Field" Campaign
- Enviros: ALA, Green Peace, Earth Justice, local citizens groups, community medical doctors, actors (Public, Product, Regulation, Legislation)
- Within Industry: HWC vs Non-HWC

ARTT and ALA



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January 1995

Alternatives in Philanthropy

Selling Its Reputation

The American Lung Association

By Dr. James T. Bennett

The American Lung Association (ALA), widely known for its annual Christmas Seal campaign, has recently sought to discredit a segment of the cement industry that burns hazardous wastes in its cement-producing kilns. The ALA acted at the behest of an association of six hazardous waste incineration companies (the Association for Responsible Thermal Treatment [ARTT]),[1] which gave the ALA $150,000 to undercut their competitors. The ALA used money in an arguably unscrupulous way that can only astound and dismay donors who have long supported this organization.

Industry competitors often engage in lobbying and public relations to survive in a regulated marketplace. While this is not surprising, it is disconcerting to see a charity undermine its reputation by becoming embroiled in such controversy. A brief summary of the hazardous waste incineration industry is needed to understand the ALA's involvement in this episode.

The Hazardous Waste Incineration Industry

American industry produces about 250 million tons of hazardous waste each year in making paints, solvents, plastics, pesticides, and other products. Before Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976, many of these wastes were buried or dumped in waterways. The RCRA not only made improper dumping illegal but also required companies to treat many forms of waste before disposal. Eventually, EPA regulations mandated that many hazardous wastes be incinerated. High-temperature (2,000°-plus F) incineration destroys the hazardous properties of these wastes and reduces them to ash and gases.[2]

Because EPA regulations mandated burning of some hazardous wastes as the best demonstrated available technology, private firms came into existence to build and operate commercial hazardous waste incinerators (HWIs). Initially, HWIs dominated the market, but the high prices they charged led some hazardous waste producers to build their own noncommercial incinerators on-site and to take steps to reduce the volume of waste produced. Also, a second noncommercial competitor emerged. The cement industry began to burn hazardous wastes in its kilns.

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Paints, solvents, and rubber products such as discarded tires produce amounts of energy equivalent to conventional fuels, and actually reduce cement producers' fuel costs. Cement kilns are ideal for hazardous waste disposal because temperatures reach 3,500° F—far above the mandated minimum. Furthermore, burning hazardous wastes for fuel conserves nonrenewable energy resources. HWIs, by contrast, produce no salable product.

By June 1994, 14 companies operated 21 HWIs; 12 cement companies were burning wastes in 43 kilns; and dozens of "captive" incinerators had been opened by companies producing wastes.[3] The incineration industry began to experience excess capacity in the early 1990s as the cement industry, using its cost advantages, captured more than two-thirds of the market for thermal treatment of hazardous wastes and as on-site incinerators came into use. As prices plunged, commercial HWIs could not compete profitably with the far more efficient cement kilns. As one newspaper noted, "What really has incinerator owners hot is that cement kilns charge less to burn toxic waste. Incinerators charge an average of $284 a ton to burn liquid waste. Cement kilns charge about $100 a ton."[4]

The ALA's campaign against waste-burning cement kilns calls into question its professed concern for protecting public health.

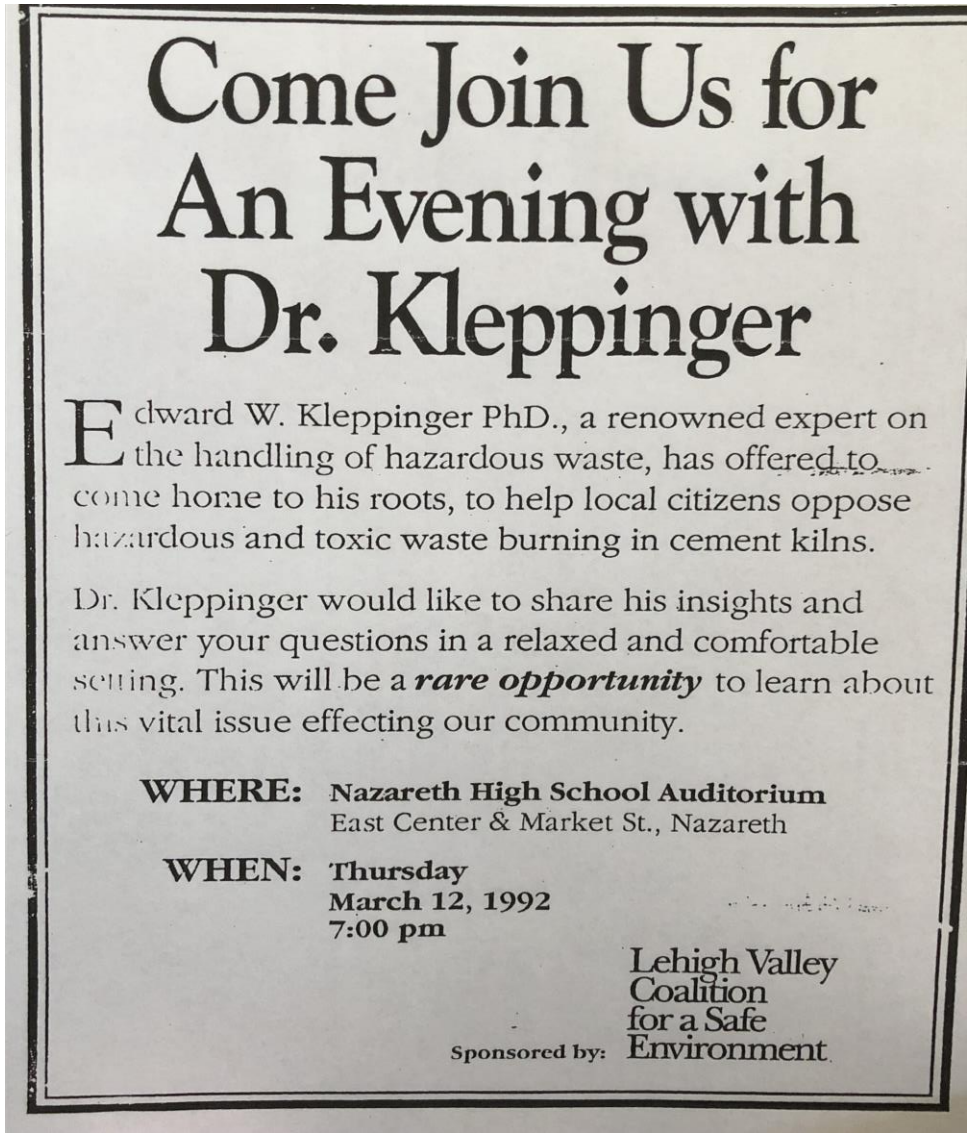
To combat the new and more efficient cement kilns, the HWIs mounted a two-prong attack: lobbying coupled with a public relations campaign to discredit cement kilns.

The Association for Responsible Thermal Treatment

On December 3, 1993, six large HWI firms announced the formation of the Association for Responsible Thermal Treatment (ARTT) to purportedly "fight the dismantling of the Resource Conservation and Recovery Act which the Association's members believe is being threatened by EPA's 1991 regulations that permit the burning of hazardous waste in cement kilns. . . . Over the past several years the

continued on page 2

“Experts” and Local Communities



Come Join Us for An Evening with Dr. Kleppinger

Edward W. Kleppinger PhD., a renowned expert on the handling of hazardous waste, has offered to come home to his roots, to help local citizens oppose hazardous and toxic waste burning in cement kilns.

Dr. Kleppinger would like to share his insights and answer your questions in a relaxed and comfortable setting. This will be a ***rare opportunity*** to learn about this vital issue effecting our community.

WHERE: **Nazareth High School Auditorium**
East Center & Market St., Nazareth

WHEN: **Thursday**
March 12, 1992
7:00 pm

Sponsored by: Lehigh Valley Coalition for a Safe Environment

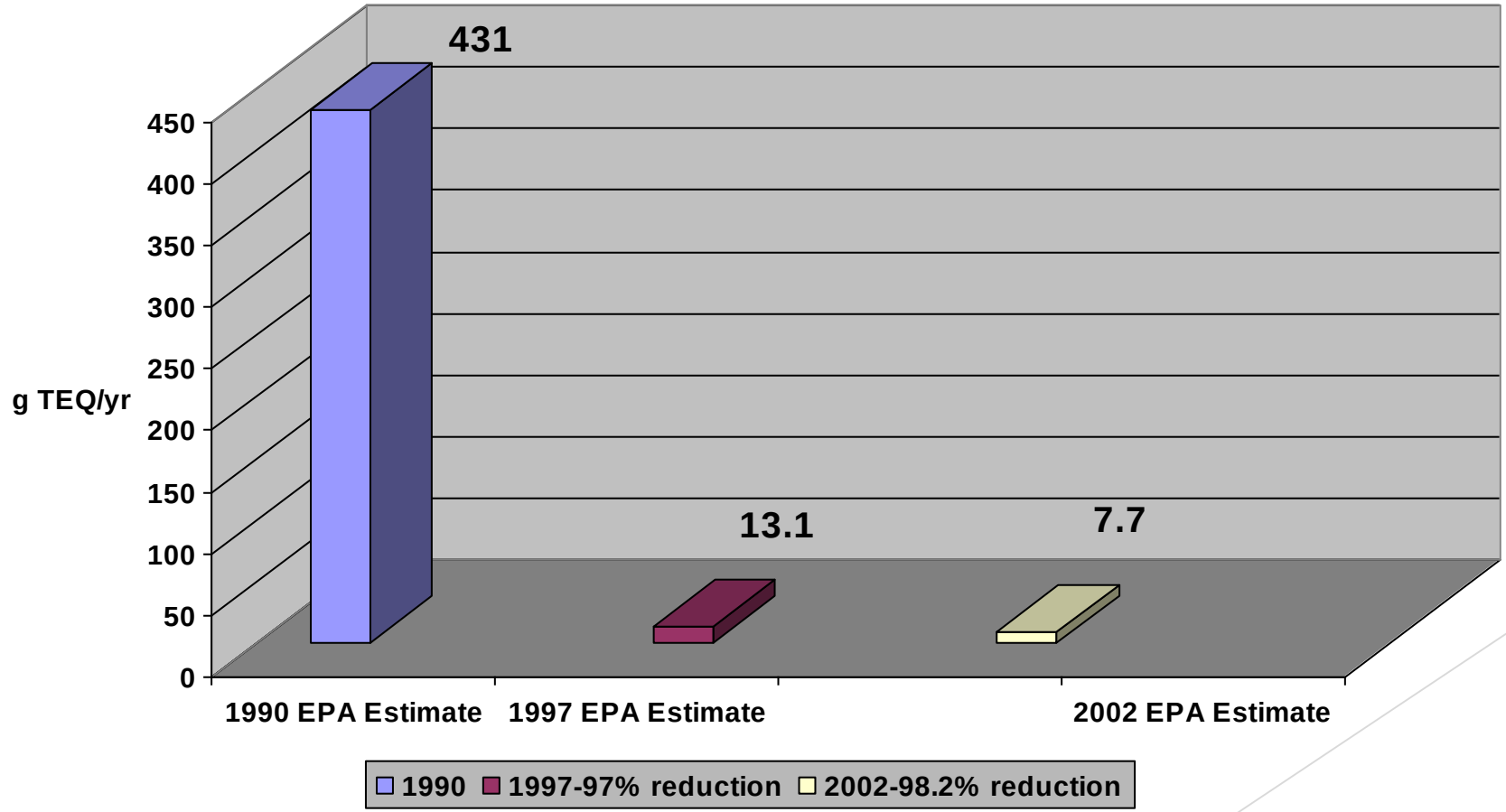
…And From Many Angles

- Technical
- Regulatory
- Public Relations
- Local, Regional, National

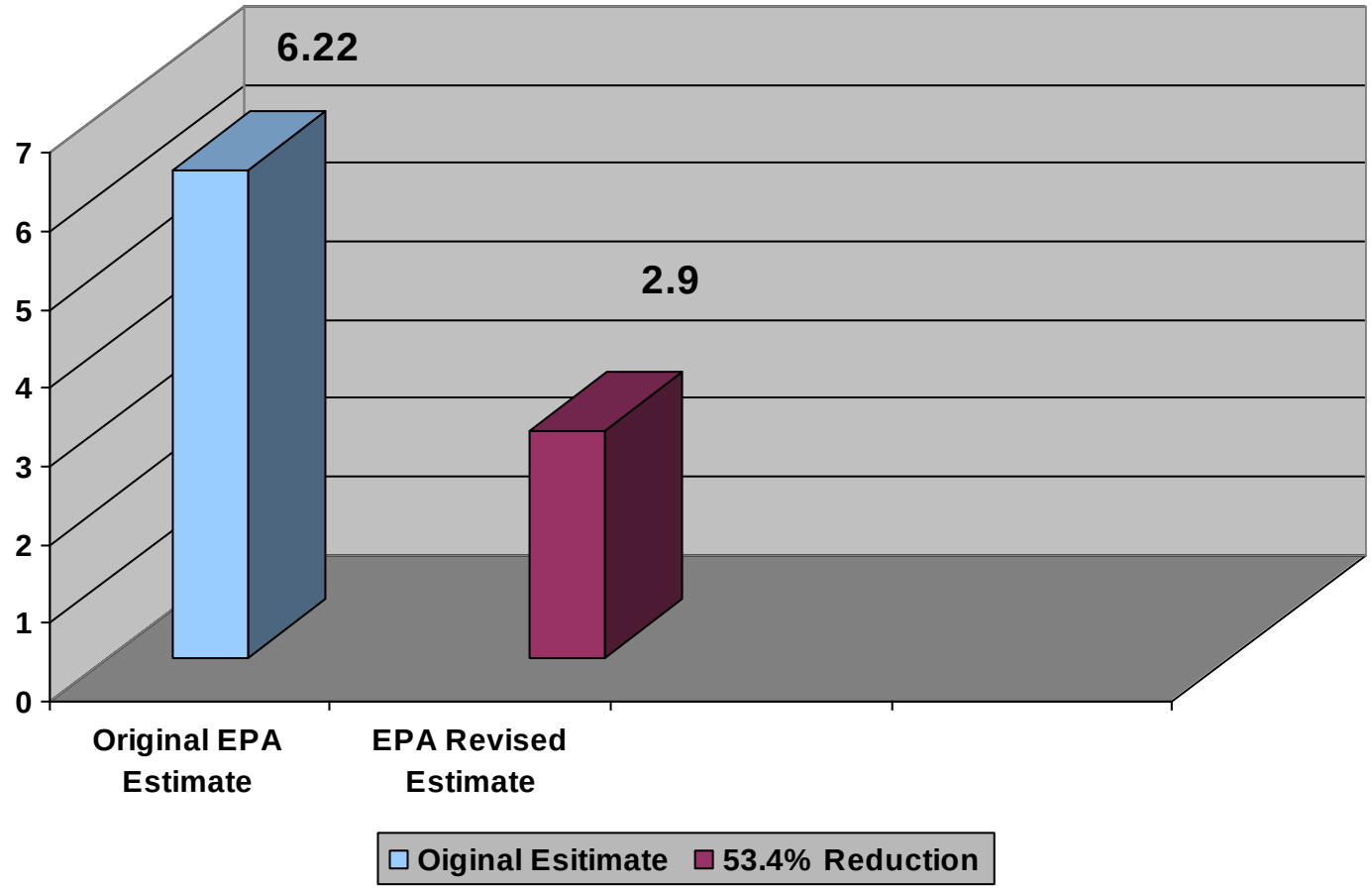
CKRC Made a Concerted Effort to Take the High Road

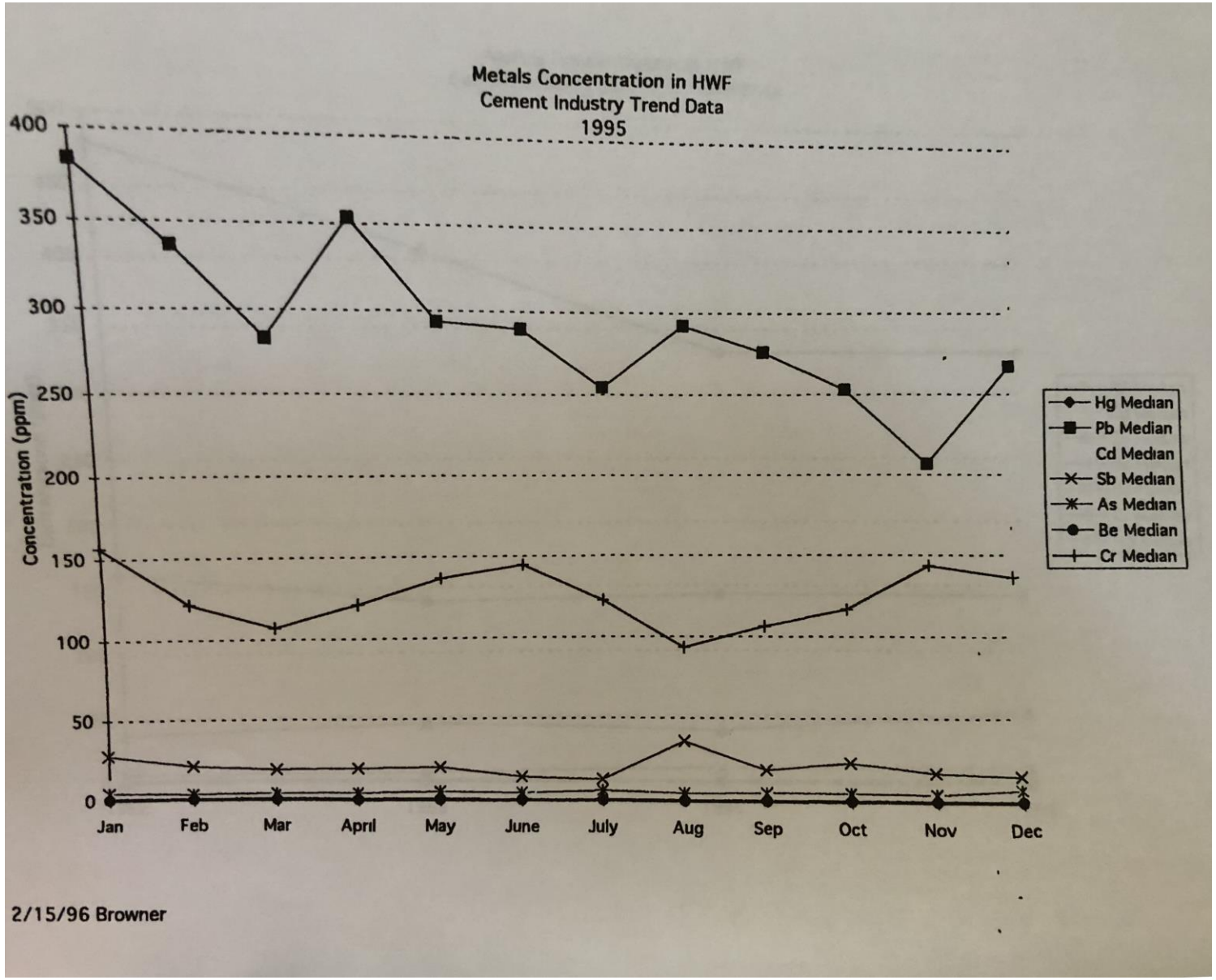
- Massive Data Collection Effort (BIF topics, CKD, CETRED, HWC MACT)
- Demonstration of Emission Reductions (D/F, HG--see next two slides)
- Extensive Risk Assessments (no unacceptable risks due to HWF use)
- Develop Relationships, Educate, Build Trust
- Public Outreach, Fact over Emotion
- Cooperative Industry Coalitions
- Problem Solving/Demonstration
- Solutions and Support (Focus of Today's Workshop)

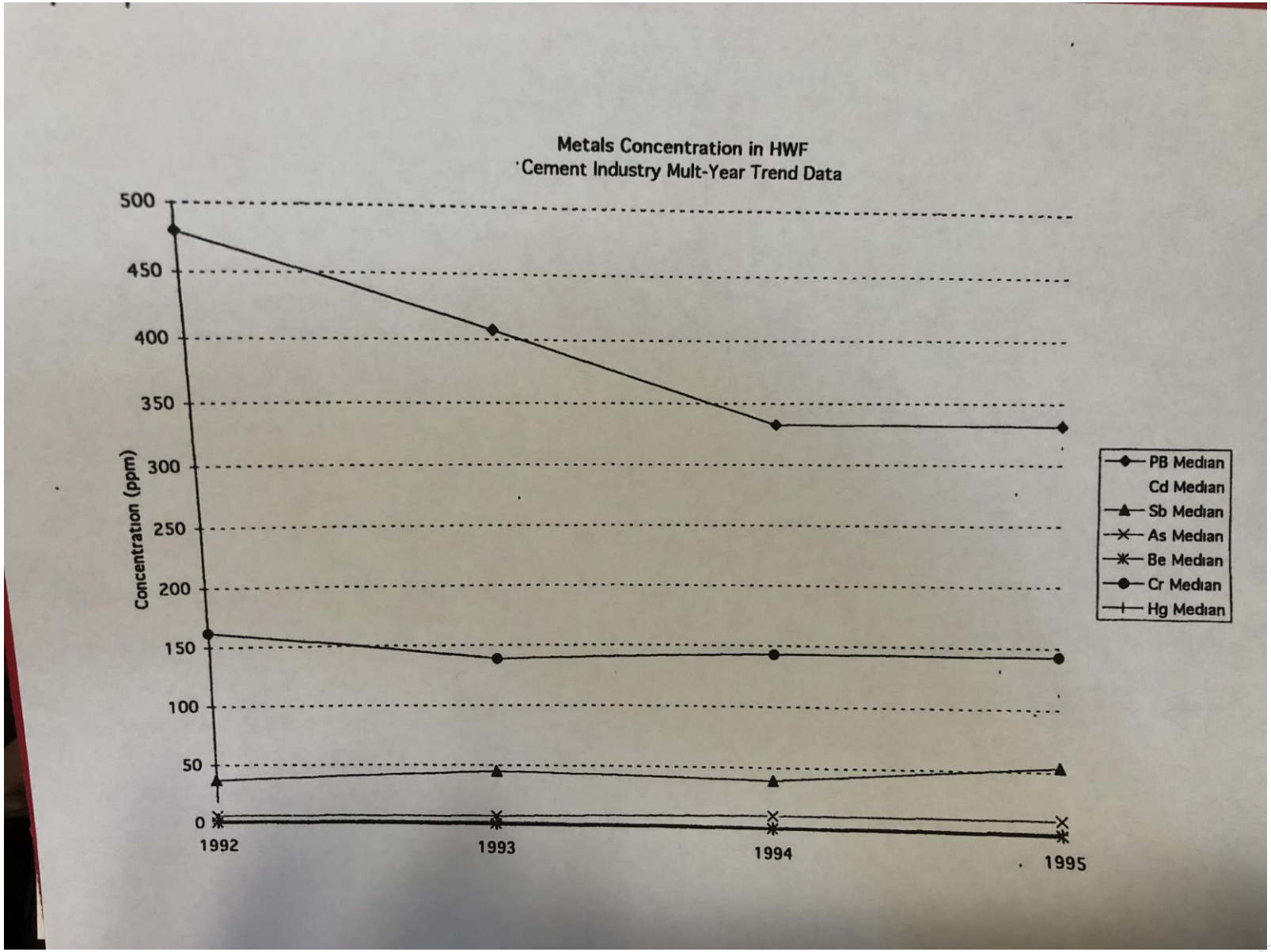
HWC Cement Kilns Dioxin/Furan Emissions Reductions



HWC Cement Kiln Mercury Emissions Reductions




Metals Concentration in HWF
Cement Industry Trend Data
1995
Concentration (ppm)
400
350
300
250
200
150
100
50
0
Jan
Feb
Mar
April
May
June
July
Aug
Sep
Oct
Nov
Dec
Hg Median
Pb Median
Cd Median
Sb Median
As Median
Be Median
Cr Median
2/15/96 Browner


Metals Concentration in HWF
Cement Industry Mult-Year Trend Data
Concentration (ppm)
500
450
400
350
300
250
200
150
100
50
0
1992
1993
1994
1995
PB Median
Cd Median
Sb Median
As Median
Be Median
Cr Median
Hg Median

Section II

Hazardous Waste Combustor MACT Implementation & Lessons Learned

CKRC Workshop
April 18, 2018

II(a): HWC MACT Regulatory Review

CKRC Workshop
April 18, 2018

HWC MACT Regulatory Components

Emissions Standards

Operating Limits

Performance Testing/NOC

O&M Plan

APCDs

Instrumentation (CMS and CEMs) and AWFCO's

DAS System

OTCP

SSM Plan

QA/QC Plan

Combustion System "leaks"

FAP

63 Subpart A

- Preconstruction review and notification
- Operation and Maintenance Plan (O&M)
- Startup, Shutdown & Malfunction Plan (SSMP)
  (still valid for HW MACT)
- Performance test
- CMS/CEMS/COMS
- Notifications
- Recordkeeping and reporting (SSM, CMS, excess emissions)

HWC MACT Emissions Standards

- Emissions standards and operating requirements apply at all times, unless under an alternative mode ("otherwise applicable standards")
  - Current NOC outlines emissions and operating limits
  - AWFCO system in place to cut off waste fuel if operating limit exceeded
    - Excess Exceedance report for any 10 exceedances in 60-day period
  - Residence time calculations for when waste is in the system
- Plans in place for operating specifics

HWC MACT Emissions Standards

- Dioxins and furans (D/F)
- Mercury (Hg)
- Semi-volatile metals (lead (Pb) & cadmium (Cd))
- Low-volatile metals (arsenic (As), beryllium (Be), & chromium (Cr))
- Particulate matter (PM) (surrogate for non-enumerated HAP metals)
- Total chlorine (hydrogen chloride (HCl) + chlorine gas (Cl_2)
- Destruction Removal Efficiency (DRE) (control of organic HAPs)
- CO or HC (surrogate for non-dioxin PICs & “good combustion”)

HWC MACT Monitoring Requirements

- Continuous emission monitoring systems (CEMS)
  - CO or HC (and oxygen)
  - Must meet PS 4B (CO/O_2) and 8A (HC)
- Continuous opacity monitors (COMS)
  - For cement kilns that do not have a baghouse
  - Must meet PS 1

HWC MACT Compliance Documentation

- Initial Notification of HWC MACT (Subpart EEE) Applicability
- Notification of Intent to Comply (NIC)
- Comprehensive performance test (CPT) plan & CMS performance evaluation plan submittal
- Operations and Maintenance Procedures
- Startup, Shutdown and Malfunction Procedures
- Continuous Emissions Monitoring Plans
- Feedstream Analysis Plan
- Operator Training Plan

HWC MACT: Operations & Maintenance Plan

- Goal is to minimize emissions, AWFCOs, and malfunctions, with plan including:
  - Parameters that affect emissions
  - Equipment to maintain listed parameters
  - Operations procedures
  - Corrective actions
  - BLDS (or PMDS) information, including corrective measure plan
- Plan must be maintained in operating record only
- Must be in compliance with plan details at all times
- Inherently part of Title V permit/certification

HWC MACT Plans & Reporting (1/3)

- Startup, shutdown & malfunction plan (SSMP)
  - Outlines operations during startup, shutdown and malfunctions
  - SSM no longer valid in Subpart A, but is in HWC MACT/EEE
  - Choice of CAA or RCRA options
    - Must be submitted for review & approval (CAA option)
    - RCRA option does not require submittal
    - Approving authority has 90 days to notify of approval or intent to deny
- Operator training & certification program (OTCP)
  - All personnel reasonably expected to directly affect emissions (e.g., control room operators, CMS & FAP personnel, etc.)
  - Specific requirements for control room operators, including annual refresher training

HWC MACT Plans & Reporting (2/3)

- Feedstream analysis plan (FAP)
  - Parameters for analysis of feedstreams
  - Sampling and analysis methods
  - How document compliance with feedrate limits
  - Frequency of analysis
- Must be in place and active to support OPLs in DOC or NOC
- Plan not submitted to Agency unless requested
- Receiving wastes analyzed per requirements of RCRA

HWC MACT Plans & Reporting (3/3)

- Subpart A Reporting Requirements
  - Startup, Shutdown and Malfunction Reports
  - Excessive Emissions and Continuous Monitoring System Performance and Summary Report
- Subpart EEE Reporting Requirements
  - Excessive Exceedance Reports
  - Excessive Exceedance Notifications for BLDS

HWC MACT Emissions Testing

- Initial comprehensive performance testing (CPT) within 1-year of initial compliance date
- Notification of Performance Test and CMS Performance Evaluation Test Plan – 60 days before conducting test
- Notification of Compliance (NOC) – 90 days after conducting CPT
- Confirmatory performance testing – within 31 months of prior CPT – for D/F only
- Repeat comprehensive performance test required no later than 61 months from previous comprehensive test

HWC MACT Future Regulatory Actions

- Will EPA perform RTR process to re-evaluate HWC MACT – no current action or driver reported
- If RTR performed, how will emissions data be updated?
  - Existing EPA database - few current kilns
  - Data request may add 1 – 2 years for re-proposal
- What will CEM requirements be – how will that play into setting standards?
- Will EPA try to reconcile PC/HWC MACT kiln differences?
- More stringent standards using new test data – MACT on MACT

II(b): HWC MACT Implementing the Standards

CKRC Workshop
April 18, 2018

Air Emissions and Pollution Control (1/6)

- Types of emissions from kiln systems studied
  - Criteria pollutants – Nox, SO2, CO, ozone (Hydrocarbons), PM (TSP & PM10)
  - Organic emissions, dioxin/furans and non/dioxin/furans
  - Metals,
  - HCl/Cl2
- Emissions function of kiln type, raw materials, and fuels
  - Raw materials can contain trace organic compounds resulting in CO and THC emissions
  - Raw materials may have sulfur bearing compounds resulting in SO2 emissions (e.g., pyrites)
  - Raw materials may also contain trace metals
  - Fuels have sulfur and trace metals
  - Newer PH/PC kilns have lower NOx emissions

Air Emissions and Pollution Control (2/6)

- Trace amounts of metals in raw material may have modest impact on metal input due to larger mass of input to kiln compared to fuel
- Waste fuels typically have contained higher levels of some metals and chlorine
  - Historical metals concentration in waste fuels have been declining
- System removal efficiency (SRE) for metals in kiln system is quite high - 99.9% and higher for low and semi-volatile metals (LVM and SVMs)

Air Emissions and Pollution Control (3/6)

- Metals emissions from kilns are generally low
  - Metals emissions are predictable
  - Metal compounds of different volatility vaporize and condense along different section of kiln, exiting kiln in different streams
- Mercury emissions are variable; lower SRE for mercury since volatile metal
- Acid gas emissions (HCl/Cl2) generally low due to inherent scrubbing of raw materials due to significant lime content in system

Air Emissions and Pollution Control (4/6)

- Metal behavior in system is subject to cycles; inputs and outputs over long term yield analysis of environmental performance
  - Mercury cycles in system based on raw mill on and off operation
  - Longer averaging periods necessary versus short-term feed rate limits currently in place

Air Emissions and Pollution Control (5/6)

- Most organic emissions are raw material driven
- Compare THC from bypass or after calciner vs. kiln stack
  - By-pass or after calciner measurement is from combustion (typically much less than 10 ppm)
  - Kiln stack - raw materials
  - Kiln stack usually higher; thus, source is raw materials

Air Emissions and Pollution Control (6/6)

- Organic emissions not from fuels
  - Destruction and removal (DRE) tests have consistently proven greater than 99.99% efficiencies
  - Trace organic emissions also likely from raw materials, but is quarry dependent
  - Products of incomplete combustion generally extremely low
- Dioxin/furan emissions
  - EPA has confirmed there is no difference in D/F emissions for hazardous waste burning versus non-burning kilns

HWC MACT Emission Standards (1/2)

Pollutant	Units	Existing Source	New Source
D/F	ng TEQ/dscm[1]	0.2/0.4[2]	0.2/0.4[2]
PM	gr/dscf[1]	0.028	0.0069
Hg	µg/dscm[1] ppm[3]	120 3.0	120 1.9
THC	ppmvd[1]	20	20
CO	ppmvd[1]	100	100
HCl/Cl_2	ppmvd[1]	120	86
SVM	µg/dscm[1] lb SVM/MMBtu	330 7.6×10^{-4}	180 6.2×10^{-5}
LVM	µg/dscm[1] lb LVM/MMBtu	56 2.1×10^{-5}	54 1.5×10^{-5}
DRE	%	99.99	99.99

[1] Corrected to 7% O_2

[2] 0.4 for air pollution control device inlet temperatures ≤400 °F

[3] Average as-fired concentration in waste fuel

HWC MACT Emission Standards (2/2)

Kilns without by-pass or mid-kiln gas sampling system[1]	20 ppmv THC or 100 ppmv CO in main stack[2]
Kilns with bypass or mid-kiln gas sampling system[1]	10 ppmv THC or 100 ppmv CO in bypass or mid-kiln gas sampling system[2]

[1] CO and/or THC measured on an hourly rolling average basis. THC are reported as propane.
[2] If complying with CO standard, must also demonstrate compliance with THC standard during CPT when DRE testing is being conducted.

Destruction and Removal Efficiency OPLs

Operating Parameter	Operating Limits Set By
Maximum hazardous waste feedrates for pumpable & total wastes for each feed location	CPT - average of max hourly rolling averages for each run
Minimum combustion temperature for each combustion chamber measured at location best representing bulk gas temperature in combustion zone	CPT - average of test run averages
Maximum gas flowrate or production rate (or raw material feed rate) to demonstrate adequate residence time	CPT - average of maximum hourly rolling averages for each run

All limits 1-hour rolling averages, except site-specific parameter(s)

Dioxin/Furan OPLs

Operating Parameter	Operating Limits Set By
Maximum temperature at inlet to APCD (ESP, fabric filter, other dry device)	CPT - average of test run averages
Maximum hazardous waste feedrates for pumpable & total wastes for each feed location	CPT - average of maximum hourly rolling averages for each run
Maximum gas flowrate or production rate (or raw material feed rate) to demonstrate adequate residence time	CPT - average of maximum hourly rolling averages for each run

All limits 1-hour rolling averages, except site-specific parameter(s)

Mercury OPLs

Operating Parameter	Compliance Approach (all 12-HRA limits)
Limit on mercury hazardous waste feed concentration	Sampling and analysis of hazardous waste mercury concentration and continuous monitoring system for hazardous waste feedrate
Limit on mercury feedrate in all HW feedstreams (MTEC standard)	Sampling and analysis of HW feedstreams for mercury concentration, continuous monitoring system for HW feedstream flowrate & stack gas flowrate, [1] or identify minimum stack gas flowrate & maximum HW feedrate of mercury
OR Limit on maximum total mercury feedrate in all feedstreams	Sampling & analysis of feedstreams[2] for mercury concentration, continuous monitoring system for feedstream flowrate, & stack gas flow rate

[1] Limit applies to all HW feedstreams. MTEC must be continuously calculated & recorded in operating record.

[2] Limit applies to all feedstreams (i.e., hazardous waste, raw materials, other fuels and additives), except natural gas, process air, & feedstreams from vapor recovery systems.

Particulate Matter Control OPLs

Operating Parameter	Limits Set By	Compliance Averaging Period
Maximum flue gas flowrate or production rate (or raw materials feed rate)	CPT – average of maximum hourly rolling averages for each run	1-HRA
Site-specific operating parameters indicative of ESP performance	CPT (no guidance on averaging methodology); requires setting of AWFCOs	As appropriate

Semi-volatile and Low-volatile Metal OPLs

Operating Parameters	**Limits Set By**	**Compliance Averaging Period**
Maximum inlet temperature to APCD	CPT - average of test run averages	1-HRA
Maximum total chlorine and chloride feedrate	CPT - average of test run averages	12-HRA
Maximum flue gas flowrate or production rate (or raw materials feed rate)	CPT – average of maximum hourly rolling averages for each run	1-HRA

SVM and LVM OPLs (cont'd)

Control Technique	Compliance Using	Limits Set By	Avg. Period
Maximum SVM & LVM feedrate from all feedstreams	Sampling & analysis of feedstreams [1] for metals concentrations & CMS for feedstream flowrate	CPT - average of test run averages	12-HRA
Maximum total SVM & LVM thermal feedrate concentration from hazardous waste feedstreams	Sampling & analysis of hazardous waste feedstreams [1] for metals concentrations heat content & CMS for hazardous waste feedstream flowrate	CPT - average of test run averages	12-HRA
Maximum pumpable LVM feedrate from hazardous waste feedstreams	Sampling & analysis of feedstreams [2] for metals concentrations and heat content & CMS for feedstream flowrate	CPT - average of test run averages	12-HRA

[1] This limit applies to all hazardous waste feedstreams

[2] This limit applies to all feedstreams, (i.e., hazardous waste, raw materials, other fuels & additives) except natural gas, process air, & feedstreams from vapor recovery systems)

Hydrogen Chloride/Chlorine Gas OPLs

Control Technique	Compliance Using	Limits Set By	Compliance Averaging Period
Limit on maximum chlorine & chloride feedrate from all feedstreams	Sampling and analysis of feedstreams [1] for chlorine (organic & inorganic) & CMS for feedstream flowrate	CPT – average of test run averages	12-HRA
Maximum flue gas flowrate or production rate (or raw materials feed rate)	CMS	CPT – average of maximum hourly rolling averages for each run	1-HRA

[1] Limit applies to all feedstreams, (i.e., hazardous waste, raw materials, other fuels & additives) except natural gas, process air, & feedstreams from vapor recovery systems

Operating Parameter Limit Summary

- Many OPLs overlap multiple emission standards
  - If not performing simultaneous testing -> most restrictive limit applies without prior agency approval
- OPLs are in direct conflict
  - Minimum combustion temperature vs. maximum production/waste fuels

CPT Topics (1/2)

- CPT timing
  - Initial CPT at startup of waste fuels
  - Every 5 year CPT for all MACT constituents
  - Every 2.5 year CfPT for D/F
  - Periodic re-CPT for planned changes that impact emissions
- Setting OPLs
  - Major difference between average of min. or max. hourly rolling average vs. average of test run averages
  - Facility must try to operate at “extreme range of normal”
  - Must maintain product quality while conducting test - difficulty in “pushing envelope” to set limits
  - If limits not set properly, OPLs will result excessive waste fuel cutoffs

CPT Topics (2/2)

- Extrapolation of metals feedrates allowed as part of CPT plan approval
- Spiking may be necessary to achieve satisfactory metals/chlorine OPLs
- In lieu of testing for dioxin/furan standard for mode when raw mill is on-line, may specify in CPT and NOC same OPL as established during CPT for mode when raw mill is off-line for both modes

Lessons Learned at HWC Facilities

- Planning in advance of CPT is necessary to prepare for successful OPL setting approach
- Facilities have 720 hours to prepare for subsequent CPTs
  - Imperative that operating scenarios anticipated during CPT are simulated to formulate a plan to meet target OPLs
- Engineering tests for PM and D/F are highly recommended, despite prior knowledge of unit
  - Can highlight unknown issues with APCD (broken bags), unanticipated impacts from raw material changes and/or other process issues

HWC MACT Topic: Subpart EEE at All Times

HWC MACT states that the emission standards and operating requirements apply at all times except (1) during periods of startup, shutdown, and malfunction and (2) when hazardous waste is not in the combustion chamber and you comply with all otherwise applicable standards (i.e. PC MACT).

Current Implementation Approaches:

- Since the September 2015 PC MACT compliance date, many facilities have transitioned to comply with Subpart EEE at all times versus complying with the otherwise applicable provisions.
- Some facilities have retained an alternate mode of operation under 40 CFR §63.1209(q), where the only operating parameter limits (OPLs) maintained are those related to cement manufacturing when not utilizing hazardous waste.
- Implementation is coordinated through the Title V permit/agency.

Background:

Prior to the (2015) revised PC MACT rules, cement kilns historically complied with otherwise applicable option at 40 CFR 63.1206(b)(1)(ii) and 63.1209(q)(1) when hazardous waste was not in the combustion chamber. The following provides an overview of how kilns can maintain compliance with EEE at all times when fuels are not in the system considering the origin of emission standards and OPLs:

- The DRE and THC/CO emission standards are in place to ensure complete combustion of hazardous waste organic constituents. Continuous monitoring for standards and associated OPLs is still required when no hazardous waste is in the combustion chamber (however, facilities implement this differently). This also includes combustion chamber pressure which is in place to monitor fugitive combustion system leaks of hazardous waste constituents. The DRE and THC/CO standards, and associated OPLs provide no meaningful data or calculate to be zero when hazardous waste is not in the system, ensuring that compliance with Subpart EEE can be demonstrated at all times.
- In theory, total feedrate limits from all feedstreams ensure direct compliance with respective emission standards including SVM, LVM, HCl/Cl_2, and Hg (not applicable when complying with Hg MTEC standard). While total feedrate limits were established as a result of hazardous waste fuel utilization, a concession can be made that total feedrate limits can be maintained at all times given the procedures used to establish feedrate limits.
- APCD specific parameters, if established, ensure performance and function of the APCD at CPT demonstrated levels (example - ESP Power). APCD specific parameters should be maintained at all times when complying with Subpart EEE at all times. No specific control parameters are required for baghouses as performance is continuously monitored with BLDS/PMDS.
- Maintaining APCD inlet temperature is key to D/F control for all types of cement kilns, regardless of fuel type in use. APCD inlet temperature should be maintained at all times regardless of compliance option (EEE at all times or otherwise applicable).
- The stack gas flowrate / production rate OPL is related both to residence time of hazardous waste and to control device efficiency. This OPL should be maintained at all times when complying with Subpart EEE at all times.

Since this area of the HWC MACT rules can cause confusion, it is important to define your facility's site-specific approach clearly, and document it in the facility operating record. The facility's DOC (new facilities only), current NOC, Title V permit, and possibly other HWC MACT plans (O&M, SSMP, Operator training, FAP) should all be aligned to clearly document how the facility complies with this provision. Note that in order to have an exceedance of an OPL under Subpart EEE, hazardous waste must be present in the combustion chamber at the time of the exceedance. Additional considerations are warranted if the exceedance was related to an SSM event and SSM plan provisions were followed. Failing to maintain OPLs at all times does not necessarily constitute an exceedance.

Note the HWC MACT rules rely on an SSM plan, which can be a CAA plan (reviewed and approved by the agency), or RCRA plan (retaining some requirements in the RCRA permit), as outlined in 40 CFR 270.235.

Related Topics:

Automatic waste-feed cutoffs, exceedance reporting, operating modes, hazardous waste residence time

Key References:

HWC MACT Rulemaking Preambles (multiple)

Federal Register Vol. 64, No. 189 / Thursday, September 30, 1999 – 64 FR 52828

Federal Register Vol. 70, No. 196 / Wednesday, October 12, 2005 – 70 FR 59402

Federal Register Vol. 73, No. 209 / Tuesday, October 28, 2008 – 73 FR 64068

EPA HWC MACT Technical Support Document – Volume IV: Compliance with the HWC MACT Standards; September 2005

CKRC "Transitioning Between the HWC and PC MACT Rules"; 10-2000 CKRC Implementation Workshop – Summary of Discussion and EPA Comments (11/15/00)

HWC MACT Topic: EEE / LLL Overlap – Where to draw the boxes

PC MACT and HWC MACT apply to portland cement plants that utilize hazardous waste for fuel. The starting point and ending point for MACT standards can be a source of confusion. Further, the NSPSs for Non-metallic mineral processing (NSPS OOO), coal preparation plants (NSPS Y), and Portland cement plants (NSPS F) have the potential to overlap with MACT. This summary addresses the most common interpretations of how applicability is allocated for these MACT/NSPS.

Current Implementation Approaches:

- Limestone/sand/clay – Mining, processing, and storage.
  NSPS OOO applies to plants with onsite or attached quarries starting with the first piece of stationary equipment. This is usually a hopper that either feeds a belt conveyor headed towards the primary crusher or a hopper that feeds the primary crusher directly. NSPS OOO applicability then applies to all of the conveying, screening, and crushing equipment up to the raw material storage building/bins/silos that feed the raw mill. The specific end point is where NSPS F or PC MACT begins. NSPS F and PC MACT no longer specify where this point is, but they do specify that they are applicable to raw material storage bins and the raw mill. Consequently, the most frequent interpretation is that NSPS OOO applies to the conveyor transferring limestone, or other raw materials, into the first raw material storage bin and NSPS F/PC MACT then apply to the transfer from the bottom of the bin. Another interpretation is that the raw material storage building/hall is the endpoint for NSPS OOO and the transfer point from the storage pile to the conveyor transferring material from the building is the start of F/LLL.
- Raw Materials and Products – Storage and Handling Equipment.
  NSPS F and PC MACT have similar applicability. NSPS F generally applies to all material and product storage and handling equipment past the raw mill storage bin (and down the line to the point where cement is loaded into a truck or rail car) that was built new, reconstructed, or modified since August 1971. This would include raw materials brought onsite (gypsum, alumina sources, etc.). In contrast, PC MACT applicability is dependent on if the plant is a major or minor (area) source for HAPs. If the plant is an area source, only NSPS F applies to the material storage and handling equipment (although NSPS F refers to the PC MACT compliance demonstration methods) If the plant is a major source, NSPS F and PC MACT both apply to the material storage and handling equipment. If equipment are subject to both PC MACT and NSPS F, permits typically only address the PC MACT requirements as it is considered to have the more rigorous recordkeeping, reporting, and monitoring requirements (the emission standards are the same).
- Raw Mills, Clinker Coolers, and Finish Mills
  NSPS F and PC MACT have the same standards for these equipment. NSPS F applies if the equipment was built new, reconstructed, or modified since August 1971. PC MACT is applicable regardless of the dates above and applies to both major and minor (area) sources of HAPs. If the equipment is subject to both PC MACT and NSPS F, permits typically only address the PC MACT requirements as they are considered to have the more rigorous recordkeeping, reporting, and monitoring requirements (the emission standards are the same).
- Raw Material Dryers
  NSPS F and PC MACT have the same opacity standard for dryers, but LLL adds a THC standard. NSPS F applies if the equipment was built new, reconstructed, or modified since August 1971. PC MACT is applicable regardless of the dates above and applies to both major and area sources of

HAPs. If the equipment is subject to both PC MACT and NSPS F, permits typically only address the PC MACT requirements as they are considered to have the more rigorous recordkeeping, reporting, and monitoring requirements (the emission standards are the same).

- Kiln Systems
  HWC MACT applies to the portion of the plant that is considered to be a hazardous waste combustor. More specifically, this includes any equipment that would come in contact with combustion gases resulting from the combustion of hazardous waste. This includes the burner pipe, kiln system, preheater and/or precalciner, alkali-bypasses, in-line raw mills, and in-line coal mills. The emissions from this grouping of equipment are typically vented to a single stack. If HWC MACT is applicable to the equipment, PC MACT is not considered to be applicable (see 63.1340(b)(1)). If a facility stops combusting hazardous waste, such as after a waste feed cut off, facilities are not considered to immediately become subject to PC MACT. (See the "EEE at all times" memo for additional details).

  NSPS F has specific emission standards for PM, SO2 and NOX from new, reconstructed, or modified kiln systems (after 6/16/2008). As PC MACT and EEE do not regulate NOX or SO2, an impacted kiln system could also be subject to NSPS F. NSPS F standards for PM are the same as PC MACT and both are more stringent than the PM standards in HWC MACT. Consequently, if a kiln system otherwise subject to NEHSAP EEE is new, reconstructed, or modified after 6/16/2008, the NSPS F PM, SO2 and NOX standards would apply. See 40 CFR 60.62(e) for clarification.

- Coal Handling
  NSPS Y applies to coal handling and storage equipment starting at the first hopper where coal is received by truck, rail, or barge, and continuing to the transfer into the coal mill. At major sources, PC MACT then applies to conveying of coal from the coal mill to the Kiln system. At area sources, PC MACT does not apply to these conveying systems and NSPS F does not address the conveying of coal, so NSPY Y would continue to apply to the conveying systems after the coal mill and up to the point where the coal is fed to the burner.
- In-Line Coal Mills
  If kiln gas is used to heat the coal in the coal mill, the coal mill is considered to be an in-line coal mill and is subject to either NEHSAP LLL or EEE (if the kiln is a hazardous waste combustor). NSPS Y would not apply in this situation (See 40 CFR 60.251).
- Open Clinker Piles
  PC MACT is applicable regardless of the date the pile originated and applies to both major and area sources of HAPs. NSPS F does not apply to storage piles.
- Mobile sources, trucks, loaders, and open storage piles (other than coal or clinker piles)
  NSPSs and NESHAPs do not apply to these source types. See Dec 19, 2001 EPA Settlement Agreement.

Background:

- In developing the NESHAPs for the portland cement category (PC MACT) and for hazardous waste combustors (HWC MACT), EPA made it clear that the LLL standards do not apply to HWC cement kilns at 63.1340(b)(1) "The affected source subject to this subpart are: Each kiln including alkali bypasses and inline coal mills, except for kilns that burn hazardous waste and are subject to and regulated under subpart EEE".

- However, other affected sources at portland cement plants where hazardous waste is burned in the kiln are potentially subject to PC MACT. See 64 Fed. Reg. 31898, 31900, cols. 1-2 (June 14, 1999).
- EPA also made clear that the PC MACT standards would apply to waste-burning kilns only under very limited and defined circumstances: "HW kilns and HW in-line kiln/raw mills that temporarily or permanently stop burning hazardous waste may be subject to the emission standards, notification, testing, and monitoring requirements of today's rule, as provided by subpart EEE of this part." 64 Fed. Reg. at 31900, col. 2.
- In the preamble, EPA explained that (and why) it had created two completely separate source categories for HWC cement kilns and kilns that do not burn waste. "Indeed, this existing RCRA regulatory regime has created a different data base, and system of existing controls, which can result in different analyses, different floor controls and standards under the section 112 MACT process, again indicating that these sources can reasonably be classified as a distinct class. To summarize, this NESHAP for portland cement manufacturing covers NHW kilns and NHW in-line kiln raw mills; it does not apply to HW cement kilns which are subject to subpart EEE of this part." 64 Fed. Reg. at 31909, col. 3.
- Regarding the applicability of NSPS and NESHAPs at the same time. There is no provision in the CAA that forbids the applicability of an NSPS and NESHAP to the same source. Consequently, where both are applicable, the NSPS and NESHAP ideally provide clarification that either one or the other is applicable, or that the more stringent standard applies. An EPA response to Argos Cement in 2014 provides a number of good examples of how EPA interprets the overlapping of NSPS/NESHAP regulations including situations where gas are mixed / comingled that are subject to different NSPS/NESHAPS

Related Terms/Topics:

- CISWI was not addressed as this memo is focused on HWC MACT facilities.

Key References:

- 40 CFR 60 Subpart F - Standards of Performance for Portland Cement Plants
- 40 CFR 60 Subpart Y - Standards of Performance for Coal Preparation Plants
- 40 CFR 60 Subpart OOO - Standards of Performance for Nonmetallic Mineral Processing Plants
- 40 CFR 63 Subpart LLL - National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry
- 40 CFR 63 Subpart EEE - National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors
- Dec 19, 2001 APCA and EPA Settlement agreement clarifying applicability of NESHAPs to mobile and fugitive sources and to coal handling after the coal mill.
- Nov. 13, 2014 EPA response to Argos regarding applicability of 40 CFR 63 Subpart LLL, 40 60 Subpart Y, and 40 CFR 60 Subpart DDDD.

HWC MACT Topic: Combustion System Leaks

HWC MACT requires that combustion system leaks of HAPs must be controlled by either keeping the combustion zone sealed to prevent combustion system leaks, by maintaining the maximum combustion zone pressure lower than ambient pressure using an instantaneous monitor, or under an approved alternative.

Current Implementation Approaches:

- The site-specific compliance approach is specified in the facility's CPT Plan and Notification of Compliance (NOC).
- Maintaining a negative differential pressure across the combustion zone(s) is fairly typical across the industry.
- Keeping the combustion zone sealed is an impractical approach for cement kilns.

Background:

- The 40 CFR §63.1206(c)(5) language is almost identical to original BIF language for maintaining the combustion zone pressure lower than ambient pressure, except for the language addition of "using an instantaneous monitor". The instantaneous monitoring frequency makes maintaining negative differential pressure across the combustion zone(s) difficult to manage for control room operators. The requirement to monitor on an instantaneous basis was challenged by several commenters but ultimately survived through various iterations of rulemaking.
- EPA acknowledged in draft preamble dialogue that a reasonable instantaneous monitoring frequency is once every second with a recording frequency of once per minute provided the recorded pressure is the highest one second observation during the previous minute. When EPA published the July 3, 2001 66 35126 FR, the preamble was updated stating that EPA does not specify the monitoring and recording frequencies in the regulations because sources differ in design and operation. Due to the different design and operation of sources, different monitoring and recording frequencies may be needed to ensure that fugitive emissions do not occur. Monitoring and recording frequencies should be determined on a site-specific basis.
- Kiln systems are maintained under constant negative pressure from the airflow created by the induced draft (ID) fan. The ID fan creates a vacuum effect that results in a continuous airflow into the kiln from the firing hood. This flow configuration ensures that a negative pressure condition is maintained along the entire length of the kiln, including the hazardous waste combustion zone.
- It has been widely demonstrated that due to the location of hazardous waste fuel injection in the combustion zone in the kiln, coupled with the direction of gas flow, fugitive emissions of hazardous waste combustion gases are not physically possible while the kiln and ID fan are in operation.
- As long as a negative pressure drop across the kiln exists [kiln back end pressure minus kiln outlet pressure (kiln hood)], combustion gas will be flowing through the kiln from the kiln outlet (kiln hood) to the kiln inlet (back end).
- Occasionally a brief, localized positive pressure will be encountered at the kiln hood. This trait is inherent to cement kiln operations and is referred to as "puffing." Puffing occurs when a large

piece of the internal kiln coating or clinker drops into the clinker cooler and causes a temporary imbalance of air. This displaced air may escape from the kiln hood. Since the air is being displaced directly from the clinker cooler, no combustion or process gases (or hazardous waste constituents) escape from the kiln. Puffing is a common occurrence. AWFCOs from having positive pressure events at the hood are minimized by measuring the differential pressure across the kiln but still occur from time to time. Another key criteria to mitigate positive pressure events is to install pressure monitors in appropriate locations.

Related Topics:

Instantaneous monitoring, automatic waste-feed cutoffs (AWFCOs)

Key References:

Discussion on Fugitive Emissions at the Hot End of Cement Kilns – Region 4 BIF Work Group, November 1997 (discussion was surrounding risk assessment conduct and intended to document that cement kiln fugitive emissions of hazardous waste constituents were occurring)

HWC MACT Rulemaking Preambles (multiple)

Federal Register Vol. 64, No. 189 / Thursday, September 30, 1999 – 64 FR 52828

Federal Register Volume 66, No. 128 / Tuesday, July 3, 2001 -66 FR 35126

HWC MACT Topic: Stack Testing Considerations

HWC MACT requires performance testing to demonstrate compliance with the emission standards and establish operating parameter limits (OPLs). Many issues surrounding this area have been worked through within and between industry and EPA since BIF rule and subsequently HWC MACT rule implementation.

Current Implementation Approaches:

Destruction and Removal Efficiency

- DRE is a function of POHC feedrate and analytical detection limit. Test programs are designed to demonstrate a DRE in excess of 99.99% for increased assurance of demonstrating compliance. The maximum stack gas flowrate and total detection limit for the sampling train can be used to back-calculate the target POHC spiking rate at a target DRE. There will be three or more fractions analyzed for any DRE test run depending on the test method, each with an associated detection limit, which will contribute to the total POHC emission rate. Alternate analytical methods with lower detection limits are available (Selective Ion Monitoring) but have been shown to provide inconclusive results for cement kilns thus far.
- Tetrachloroethylene (commonly referred to as Perc) has been a frequently used POHC to demonstrate DRE. Other POHCs that have been used include trichloroethylene, orthodichlorobenzene, and 1,2,4-trichlorobenzene. The POHC(s) are specified in the CPT Plan and approved by the authorized agency.
- Care must be taken not to use a POHC that has been demonstrated to be a product of incomplete combustion (PIC) or present in raw materials (benzene, monochlorobenzene, naphthalene).

Feedrate Extrapolation

- Metals feedrate limits are typically extrapolated as allowed by regulation. Extrapolation is approved on a case-by-case basis through the CPT Plan. The historical position is to measure metals system removal efficiency (SRE) and use the respective emission standard to extrapolate feedrate limits. Region 5 and other states have more recently only been allowing extrapolation of feedrate limits that are equal to three times the amount input during the CPT.
- EPA has adopted the concept of using a tracer metal/compound with each tracer representing all metals within a volatility class. For example, chromium is spiked as the LVM metal, and also represents arsenic, beryllium and chromium.

Conflicting Parameters

- One key design criteria of CPTs has been the ability to establish certain OPLs under different sets of operating conditions. Trying to establish a minimum combustion zone temperature while establishing the maximum kiln feedrate and waste fuel feedrate is in direct conflict. Establishing limits for these conflicting parameters has been performed using two separate test conditions. EPA has acknowledged this issue of conflicting parameters in a 2000 memorandum. Region 5

and certain states have recently challenged establishing OPLs under a conflicting parameters scenario.

Background:

- OPLs are established for two reasons, (1) to define automatic waste feed cutoffs and hazardous waste utilization permissibles, and (2) to ensure ongoing compliance with emission standards.
- The concept of establishing operating parameter limits is a holdover from when hazardous waste combustion in cement kilns was regulated under the Boilers and Industrial Furnaces (BIF) rule. EPA's Office of Solid Waste was responsible for writing and developing the current HWC MACT rules. Thus, there are many unique concepts not typically seen in other air rules. With agency air staff now typically over the HWC MACT rules, there are disagreements, at times, on older RCRA/BIF implementation approaches.
- By the time the HWC MACT rules were published, DRE in cement kilns had been recognized by EPA to be sufficiently technically demonstrated; thus there is preamble language by EPA noting why they expect sufficient DRE in kilns (for the main burning zone), and the reduced the requirement to demonstrate DRE one time providing no change in operations. The regulatory language allows the one-time demonstration in the main burning zone, with a 3-time demonstration for calciner burning since DRE in calciners had not been fully demonstrated to the extent that burning in the main burning zone had been prior to more new PH/PC kilns being built.
- Spiking programs under BIF were more burdensome as feedrate extrapolation was not allowed and metals were not grouped by volatility class. BIF regulated emission limits and feedrates were in place for 10 metals which included antimony, barium, silver and thallium in addition to those currently regulated by HWC MACT.

Related Topics:
Stack testing, selecting POHCs, feedrate extrapolation, establishing OPLs, conflicting paramaters, Trial Burn failures.

Key References:

- EPA "Clean Air Act National Stack Testing Guidance", April 27, 2009
- EPA "U.S. EPA Checklist for Review of Phase 1 HWC MACT Comprehensive Performance Test Plans", May 28, 2002
- EPA "Handling Requests for Approval of Minor/Major Modifications/Alternatives to Testing and Monitoring Methods or Procedures", November 22, 2002
- EPA Memo to CKRC on Conflicting Parameters, Late 2000 (not dated)
- EPA R6 RCRA HW Combustion Unit Permitting Manual – Testing components, 1996
- EPA "Guidance on Trial Burn Failures", July 5, 1994
- University of Dayton Research Institute Thermal Stability Index Ranking, April 30, 1991
- EPA "Guidance on Setting Permit Conditions and Reporting Trial Burn Results", January 1989

- EPA "EPA Requirements for Quality Assurance Project Plans", March 2001
- EPA R5 "RCRA QAPP Instructions", Revisions: April 1998
- EPA "Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration", January 1990

MACT Topic: Title V and NOC updates

When the CAA-RCRA combined authority developed, transitioning the air emissions and operating limits from BIF to MACT in the early 2000s, many previous RCRA permitting items moved into MACT operating documents or the Title V permit. Since the new stack testing (CPT) regime included documenting the test results and operating parameter limits (OPLs) in the NOC, the rule laid out that the newly established CPT limits become effective upon postmark of the NOC. Meanwhile, air permitting agencies wanted the NOCs to be included in the Title V permit, which would take modifying the Title V each time a test is performed and NOC is submitted. The self-implementing MACT NOC language vs. incorporation in the Title V approach were at odds with each other and had to be worked through, in addition to other Title V incorporation topics.

Current Implementation Approaches:

- Many facilities worked out approaches with their state to incorporate the current NOC by reference into the Title V permit vs. modifying the permit after each CPT to update any changes to OPLs. However, there are some states that continue to include existing OPLs in the Title V permit and do not incorporate the current NOC by reference.
- Receiving, reviewing and incorporating CPT test results into a NOC typically took most if not all of the 90-day window for postmark, such that extra time was not available to also modify the Title V permit with the new results.
- Some states reference the regulatory compliance requirements without specifying the method for compliance.
- Startup, Shutdown, Malfunction Plans are required to be referenced only, but do need approved by the agency initially (when using the CAA option only).

Background:

- The NOC documents compliance with the HWC MACT emission standards and CMS requirements while identifying the operating parameter limits established during the CPT. Submittal of a NOC is required within 90 days following completion of each CPT.
- The Administrator is to make a Finding of Compliance with emission standards and established OPLs upon obtaining all the compliance information required by relevant standard. However, there is no regulatory deadline for the Finding of Compliance to be issued.
- EPA expected that the initial NOC would be incorporated into an initial or existing Title V through a significant revision requiring public participation. Subsequent NOC submittals would be incorporated through the minor revision procedures.
- EPA guidance on the NOC/Title V Interface, August 2002, indicated the permitting agency must approve changes in new NOC which is in conflict with self-implementing language of HWC MACT.
- The NOC specifies operating limits and monitoring that are considered applicable requirements which the Title V permit is required to list.

Related Topics:

Finding of Compliance, Startup, Shutdown, Malfunction Plan

Key References:

EPA Fact Sheet: NOC/Title 5 Interface, August 2002

Virginia Example, Federal Operating Permit, December 2006.

EPA - Design of Flexible Air Permits, August 7, 2000

EPA Fact Sheet: Title V Operating Permits, July, 2000

Response to STAPPA/ALAPCO Recommendations on MACT/Title V Interface Issues, 1998

Section III

RCRA – Permitting, Key Historical Topics & Lessons Learned

CKRC Workshop
April 18, 2018

III(a-b): RCRA Overview, Permit Process & Requirements

CKRC Workshop
April 18, 2018

RCRA Regulations

- Control hazardous waste from “cradle-to-grave”
- 40 CFR Part:

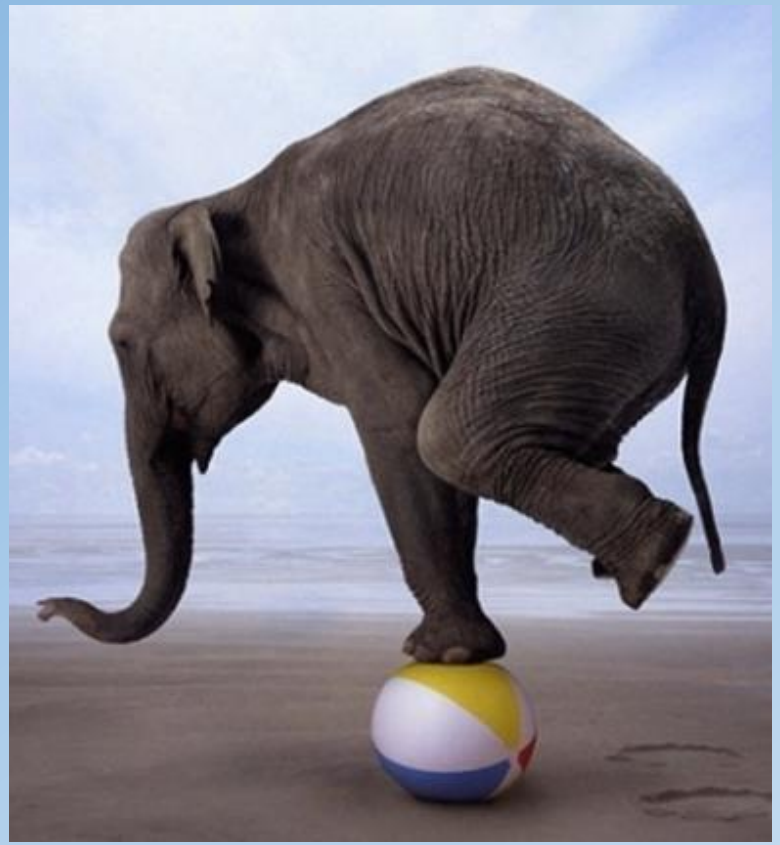
124 – Public Participation
241 - NHSM
260 – Petitions and Delisting
261 – Identify hazardous waste
262 – Generator standards
263 - Transporter standards
264 – Permitted TSDF standards
265 – Interim Status (and some LQG) standards
266 – BIF
268 – Land Disposal Regulations
270 – Permitting
273 – Universal wastes
279 – Used Oil
280 - Underground storage tanks

Federal vs. State Control

- Federal rules generally written first
- States can be authorized to implement the RCRA rules, but don't have to
  - State rule must be at least as stringent as the federal
  - Can go beyond stringency of the federal rule
  - State adopts rule, then applies for authorization
  - Rules adopted individually; not all or none
  - State Status: https://www.epa.gov/rcra/state-authorization-under-resource-conservation-and-recovery-act-rcra
  - Federal can override state decision even in authorized state, but generally does not
  - NHSM cannot be delegated to states, but states should confer with USEPA Regions regarding questions on self-implementing alternative fuel approvals

Day to day operations under a RCRA permit

- Know RCRA permit conditions
- Know RCRA permit application commitments
- Provide operating flexibility
- Maintain product quality
- Maintain profitability
- Other permit requirements
- Ensure employee health and safety
- Ensure community protections



RCRA Permitting Process

- In the beginning, Interim Status, N/A to new sites
- Submit Part A Form and Part B Application
- Notice of Deficiencies (NODs) from state/(Fed)
- Draft Hazardous Waste Management Permit(s) with potential Public Hearing
- Public Comments
- Final Permit (could be state only, or federal only, or federal and state permits)
- Generally 10-year permits

RCRA Application Contents

- Part A Form
- Facility Description
- Waste Analysis Plan
  - Inbound and self-generated waste
- Process Description
  - Unloading, Tanks, containers, kiln, buildings, etc.
  - Air Emission Controls
- Procedures to Prevent Hazards (Inspections)
- Contingency Plan
- Training
- Closure and Financial Assurance
- Corrective Action/SWMUs
- Other

Permit Management

- Application sections generally incorporated by reference or included in permit
- Review sections frequently to ensure reflects current activities
- Keep a “live” application and permit tracking all changes
- Changes to application and permit language generally require permit modifications

Permit Management

- Permit Modifications – see 40 CFR 270.42
  - Class 1 – Minor administrative changes
  - Class 1 with prior approval
  - Class 2 – Moderate changes
  - Class 3 – Significant changes
- Public participation
  - 40 CFR 124 Pre-application meeting – new permits and renewals equivalent to Class 3 mods
  - Class 1 – notice to facility mailing list within 90 days
  - Class 2 & 3 – Notice to facility mailing list and public meeting with 60-day comment period

Managing Longer Term RCRA Permit Components

Closure Process

- RCRA permit requires closure of RCRA Regulated Units in accordance with approved Closure Plan
- Notification - notify agency of intent to conduct closure
  - 60 days – Final closure of land based units
  - 45 days – Final closure on tanks, containers, incinerators, industrial furnaces
  - 45 days – Partial Closure of industrial furnaces
- Implementation - 180 days to complete closure activities
  - Can request extension
- Certification - within 60 days of final closure activity completion
  - Independent P.E. stamp
- Keep Partial Closure documents to submit with Final Closure

Two Types of Closure

- Clean Closure
  - No detections above laboratory PQL's or established background levels
  - Allows for unrestricted use of the unit or area the unit was located
- Risk-based Closure
  - Allows for detected constituent concentrations to remain if concentrations are below established levels
  - Requires a deed notice

Units Requiring Closure

- Kilns
- Tank Systems
- Container Storage Areas
- Truck Unloading Areas
- Railcar Unloading Areas
- Process Storage Buildings
- Ancillary Equipment (piping, valves, grinders, pumps)

Key Closure Considerations

- COC analysis basis limited to accepted waste codes
- Kiln Sampling
  - CKD during burn out
  - CKD, brick residual, brick
- Storage Tanks – decision to re-use or scrap
- Background Sampling for soil and rinse water
- Waste Disposal
  - Waste codes - sometimes an issue

RCRA Corrective Action

- Requires TSDFs to identify all SWMUs and AOCs, including RCRA permitted units, which manage hazardous waste or hazardous waste constituents, and determine whether there has been a release to the environment

Definitions

"SWMU …any discernable existing or historical unit at which solid wastes have been placed at any time, irrespective of whether the unit was included for the management of solid or hazardous waste. Such units include any area of a facility where hazardous constituents may have been routinely and systematically released."

"AOC …means a unit or area that does not meet the definition of a SWMU but merits further investigation to determine the presence or absence of releases. This includes any area having a probable release of hazardous waste or hazardous waste constituents not from a SWMU and is determined to pose a current or potential threat to human health or the environment."

Ongoing Corrective Action Notification Requirements

- Newly identified SWMUs and AOCs
  - Notification within 15 days of discovery
  - Potential development of Assessment Work Plan
  - Potential RFI, CWS, corrective action
  - Newly constructed RCRA units
- Newly identified releases from previously identified SWMUs and AOCs
  - 15 days of discovery
  - Potential development of Assessment Work Plan
  - Potential RFI, CMS, corrective action

SWMU and AOC Examples

- Settling Ponds
- Industrial Landfills
- Satellite Accumulation Areas
- Parts Washers
- Oil/Water Separator
- RCRA Permitted Units
- Used Oil Storage Areas
- Drainage Ditches/Channels
- Contaminated soils from USTs
- Wastewater Treatment Units
- Tank Farm Unloading Areas
- Sewer System
- Laboratory Sumps
- Baghouses
- CKD Tanks
- CKD Landfills
- Waste Oil Tanks
- Tanker/railcar staging or unloading areas

RCRA Topic: Managing Site-Generated Wastes

The hazardous waste operations at a cement plant and its fuel blending facility (and off-site fuel blending operations) may generate several different types of waste streams from routine operations, including, for example: tank farm dike water, solids/sludges from basket strainers, contaminated PPE, laboratory wastes, used oil, spill residue and absorbents, kiln brick, and spent activated carbon. Some waste streams may be able to be incorporated into the fuel, others may not. The RCRA WAP typically describes the on-site generated wastes and their disposition/management.

Current Implementation Approaches:

Rainwater

- Rainwater collected in secondary containment systems may be managed as hazardous waste and blended into the hazardous waste fuels if contaminated with hazardous waste as contaminated environmental media, or is not subject to RCRA if not contaminated.
- Facilities have made the contaminated rainwater determination either analytically (run a GC scan), visually, determine the presence of a sheen, and/or review of spill history in the containment area. If the waste will be managed on-site (e.g., blended into the fuel), the method to determine how it will be managed is discussed in either the WAP or the containment area sections of the permit application.

Spent Carbon

- Spent activated carbon may need to be managed as a characteristic hazardous waste if it exhibits any of the characteristics when shipped off-site, or blended into the hazardous waste fuel. It generally is not managed with listed hazardous waste codes because the vapors that it controls are not considered “contained gases”.

Kiln Brick

- Kiln brick/refractory may need to be tested when removed from the kiln during maintenance, or as part of kiln closure, may need to be tested to document that it is not a characteristic hazardous waste. Chrome-containing refractory is generally no longer used in order to avoid the hazardous waste TCLP characteristic. Until the brick has been tested, it may not be able to be placed on the ground. If the brick is considered not to be a hazardous waste, it is typically disposed of in a landfill, or ground and recycled with the raw feed as beneficial reuse.

Lab Wastes

- Laboratory wastes from the fuels laboratory may need to be managed as listed hazardous waste due to the derived from rule. The cement lab free lime test residue may need to be managed with the hazardous waste due to the possible presence of ethanol.

Used Oil

- Used oil, if blended into the hazardous waste fuel, may need to be managed as off-specification used oil fuel unless the oil has been tested and shown to meet the on-specification used oil fuel requirements. Testing of the used oil is not needed to prove that it meets one of the used oil fuel specifications, but does need to be documented that it has not been mixed with hazardous waste if it is to be managed under 40 CFR 279.

Background:

Agencies have required documenting the disposition of site-generated waste in a HW burning cement kiln RCRA permit application starting with the initial permits. Streams like kiln brick and contaminated rainwater were worked through in detail in some states/regions which set the stage for current implementation/permitting approaches.

Related Terms/Topics:

Contained-in policy, contaminated media, on-spec used oil, off-spec used oil

Key References:

- EPA Containment Rainwater letter, 10/14/2004, RCRA Online 14726
- LDR Treatment Options for Spent Refractory Brick, 10/1/2000, RCRA Online 14515
- Region 5 BIF Workgroup, "Kiln Brick Management Issue," May 30, 1995

RCRA Topic: Cement Kiln Dust (CKD) and 266.112 Implementation

Cement plants historically generate CKD from the process that exit the APCD. The CKD is either recycled back into the process by mixing with the raw feed or insufflation in the hot end of the kiln. Most hazardous waste burning cement kilns also waste some of the CKD for process control reasons by landfilling it, or find a beneficial reuse for it.

CKD is a "Bevill waste" under RCRA, which categorizes CKD as a high-volume, low-toxicity waste that is not subject to federal regulatory control. However, for hazardous waste burning cement plants, EPA addressed the issue of combustion "residue" by adding requirements at 40 CFR 266.112, and the corresponding Part 266-Appendix VII (of the BIF rules) as a mechanism to verify that the CKD still falls under Bevill. Therefore, CKD is excluded from the definition of hazardous waste if it meets the criteria listed at 40 CFR 266.112. The regulations provide two potential mechanisms for demonstrating that the hazardous waste does not significantly affect CKD (the residue) by either:

- Comparison to normal residues, or
- Comparison to health based limits

Current Implementation Approaches:

- Most facilities include both comparison methodologies in the Waste Analysis Plans, preferring to use the comparison to health-based limits (2nd option) primarily with the comparison to normal residues as a back-up option, only if and when needed.
- For either method, the CKD sample is meant to be representative of a day's production. Facilities have taken this sample from either the gathering screw on the APCD, from the silo as the CKD is loaded onto trucks, or as it is being placed in the landfill. Note: the CKD sampling location has generally not been specified in the WAP, but it has come to the attention of a few permit writers. CKRC members have taken their CKD samples on varying frequency bases:

# Sites	CKD Sampling
6	3-shift daily composite
3	Daily
1	Weekly

- The CKD comparison to health based limit testing is in place to document that TCLP analyses of the 12 BIF metals and total non-metals (VOCs, SVOCs, and D/F) meet the F039 disposal restriction limits of 40 CFR 268.43/268.40. Statistical analyses of the results can be used to justify a less than daily analysis frequency. Based on a review of available Waste Analysis Plans, the following shows the variations in testing frequency across CKRC member sites.

Sites	CKD Analysis Frequency
4	Monthly TCLP Metals / Quarterly Organics
2	Quarterly TCLP Metals / Annual Organics
2	Weekly TCLP Metals / Quarterly Organics
1	Weekly TCLP Metals / Annual Organics
1	Weekly TCLP Metals / Weekly Organics
2	Daily Total Metals in addition to above

- Comparison to normal residues requires that the CKD results be compared to a minimum of 10 samples resulting from at least 10 days of operation. This data has been either previously gathered from normal (non-hazardous waste fuel burning) cement production days, or the kiln

will be required to stop burning hazardous waste fuels to generate the 10-days of samples in order to do the comparison using the back-up comparison to normal residue data.

- The specified test methods each have specific maximum sample hold times before the sample is prepped at the laboratory. This can be an issue for the non-metals tests (D/F 7 days; VOC/SVOC 14 days) to be tested monthly or longer. Some sites randomly pick a sample from the daily retains, some randomly pick the day to sample the CKD, while others use a random number generator to pre-identify the day to sample and then ship to the lab immediately.

Background:

- CKRC members have conducted CKD 266.112 sampling/analyses since the 1992 BIF implementation date, thus there are vast quantities of data documenting that the character of CKD generally is not impacted by the use of hazardous waste-derived fuel. As this regulatory component was a subject of the 1993 EPA enforcement actions ("Combustion Strategy"), there was also significant deliberations between industry and EPA/states to determine what implementation methods were agreed to satisfy the regulatory requirements, with the site-specific procedures having been subsequently approved through RCRA permitting.
- The CKD must be periodically tested to demonstrate that the burning of hazardous waste as a fuel does not impact the CKD. The rule assumes daily testing but background guidance (USEPA 1995) allows demonstrating less frequently.
- Most facilities analyze the BIF metals more frequently than the non-metals (VOC, SVOC, D/F).
- Sample location, sample handling, sample hold times, and analysis of the data is important to the compliance process.

Related Terms/Topics:

Bevill exemption; Comparison to normal residue; Comparison to health-based limits;

Key References:

- Pleus, R.C., Kelly, K.E., "Questions and Answers Regarding Recent U.S. EPA Testing of Dioxins and Furans in Cement Kiln Dust," 1993
- USEPA, "Report to Congress on Cement Kiln Dust", 1993
- Region VII BIF Workgroup, "A Discussion on Cement Kiln Dust Compliance Issues Relating to the Boiler and Industrial Furnace Regulations," January 6, 1994.
- USEPA, "CMA/EPA Workshop, Edited Transcript," page 34, January 1995 (see WAP Guidance)

RCRA Topic: "Alphabet Soup" – TSDF Fugitive Emissions Control

Under RCRA, a hazardous waste facility must address air emissions from process vents (Subpart AA), equipment leaks (Subpart BB), and tanks and containers (Subpart CC) as part of a Leak Detection and Repair (LDAR) program. Plus, depending on what wastes from certain industries the facility may elect to receive, the facility may also need to manage that waste consistent with the generator's management requirements (e.g., 61FF, 63G, 63XX, 63GGG, 63PPP, 63FFFF, 63 GGGG, 63 HHHHH, or 63 VVVVVV) in addition to Subparts 61V and 63OO, 63PP, 63TT, 63UU, 63WW which may be referenced by the various air emission control rules. The facility must coordinate all of these overlapping requirements.

Current Implementation Approaches:

- Subpart CC (tanks and containers) allows a TSDF to be exempt from Subpart CC if the equipment is subject to a similar level of control under a rule from 40 CFR Parts 60, 61, or 63, as long as the facility certifies that they are in compliance with that/those rule(s).
- A certification must be submitted to USEPA and/or state agency of using the Subpart CC exemption by being in compliance with a comparable CAA rule.
- Subpart BB (equipment leaks) allows a facility to document compliance (not be exempt) with BB by being in compliance with the comparable requirements of one of the corollary air rules.
- 40 CFR 270.25 requires the RCRA permit application to list information about each piece of equipment to which subpart BB applies. Some applications may list only an example subset of subject equipment.
- Many facilities physically tag each piece of equipment (either hanging a tag on each item or marking a unique identification number on each item). Regulations allow "marking in such a manner that it can be distinguished readily from other pieces of equipment." Some facilities keep a detailed P&ID identifying each piece of subject equipment. Some hang a small subset of the drawing(s) in the area of the equipment (e.g., all subject equipment on the burn floor).
- Some facilities consider a flanged valve to be only one Subpart BB piece of equipment, while others will mark/identify both the valve stem and the 2 flanges.
- All facilities are expected to be subject to 63 DD if they are a major source of HAPs and this should be addressed in the Title V permit. Since the Subpart CC tank and container requirements are essentially the same as those for 63 DD, the tanks and containers can be exempted from the RCRA permitting.
- Many facilities vapor balance the working losses from pumping fuels from trucks into tanks as part of the overall emission control strategy. While vapor balancing truck loading emissions back to the tank is addressed in the rules, vapor balancing the other direction is not clearly addressed.
- Subpart BB allows facilities to reduce the frequency of monitoring for leaks from valves from monthly to quarterly after two no-leak months. Elsewhere in the rules, an alternative monitoring option is provided to all valves to be monitored semi-annually after 2 quarters with less than 2% leaking, or reducing toe annually after 5 quarters with less than 2% leaking.

Background:

- The subpart BB and CC rules are in place to limit fugitive emissions from hazardous waste equipment.

- LDAR is one of EPA's National Enforcement Initiatives and some sites have received detailed audits of their LDAR program.

Related Terms/Topics:

- Organic air emissions, fugitive emissions, sniffing, Leak Detection and Repair (LDAR), alphabet soup,
- 40 CFR Part 61 Subpart FF – Benzene Waste Operations NESHAP
- 40 CFR Part 63 Subpart G – Hazardous Organics NESHAP
- 40 CFR Part 63 Subpart XX – Ethylene Manufacturing Process Units NESHAP
- 40 CFR Part 63 Subpart GGG – Pharmaceuticals Production NESHAP
- 40 CFR Part 63 Subpart PPP – Polyethers / Polyols Production NESHAP
- 40 CFR Part 63 Subpart FFFF – Miscellaneous Chemical Manufacturing NESHAP
- 40 CFR Part 63 Subpart GGGG – Solvent Extraction for Vegetable Oil Production NESHAP
- 40 CFR Part 63 Subpart HHHHH – Miscellaneous Coating Manufacturing NESHAP
- 40 CFR Part 63 Subpart VVVVVV – Chemical Manufacturing Area Sources
- 40 CFR Part 61 Subpart V – National Emission Standards for Equipment Leaks
- 40 CFR Part 63 Subpart OO – National Emission Standards for Tanks – Level 1
- 40 CFR Part 63 Subpart PP – National Emission Standards for Containers
- 40 CFR Part 63 Subpart TT – National Emission Standards for Equipment Leaks – Control Level 1
- 40 CFR Part 63 Subpart UU – National Emission Standards for Equipment Leaks – Control Level 2
- 40 CFR Part 63 Subpart WW – National Emission Standards for Tanks – Control Level 2

Key References:

- USEPA, "Hazardous Waste TSDF – Technical Guidance Document for RCRA Air Emissions Standards for Process Vents and Equipment Leaks," July 1990.
- USEPA, Applicability Determination Index NR89, "Alternative Equipment Tagging Requirements" January 3, 1991
- USEPA, "Organic Air Emissions from Waste Management Facilities," August 1992.
- USEPA, "RCRA Organic Air Emission Standards for TSDFs and Generators," July 1998.
- USEPA Region 4, "CAA and RCRA Overlap Provisions in Subpart AA, BB, and CC of 40 CFR Parts 264 and 265," October 2000,
- USEPA, RCRA Call Center Training Module, "Introduction to: Air Emission Standards," October 2001.
- USEPA, "Leak Detection and Repair, A Best Practices Guide," 2013.

RCRA Topic: Training Coordination – MSHA-OSHA-RCRA-HWC MACT

Training of employees on specific topics is considered a key component of most environmental and safety regulations. Multiple rules drive a facility's training requirements and each has its focus and has to be coordinated by facility.

Current Implementation Approaches:

RCRA Training

- Under RCRA, employees must be trained on the hazards of the wastes to be managed, how to do their job responsibilities, how to safely manage the wastes and equipment, and how to respond to spills and emergencies.
- RCRA Contingency Plan requires employees to be trained to respond to emergencies. Many facilities use the OSHA Hazwoper standards as a basis for this training. OSHA has designated three potential levels of training: 8-hours for general familiarity with hazardous waste operations hazards and annual refresher, 24-hour training for employees responding to releases of known composition and hazards, and 40-hours for employees responding to releases of unknown composition or hazard. Facilities have used both the Hazwoper 24-hour and 40-hour training as a basis for training on the RCRA Contingency Plan.
- Many facilities spell out specific amounts of time on each topic covered in their initial and annual refresher training, but RCRA does not require specifying time, only content coverage.
- Some RCRA training plans incorporate components of other regulatory training plans in this document, even though not specifically required.

HWC MACT Training

- Under the HWC MACT, employees must be trained on how to perform their duties that may reasonably be expected to directly affect emissions from the source.
- Control Room Operators must be trained to either a site-specific, source-developed and implemented program, or a state program.
- All other employees whose activities may reasonable affect emissions of HAPs are to be trained to a technical level commensurate with the person's job duties specified in the training plan.

MSHA/OSHA Training

- Under MSHA (and OSHA if applicable), employees must be trained on specific activities in addition to a hazard communication program (HazCom) about the hazards associated with chemicals a miner may be exposed to and appropriate protective measures. Under OSHA (if considered to be applicable) Hazardous Waste Operations (Hazwoper) requirements apply to spill response.

SPCC Training

- Under the CWA Spill Prevention Countermeasure and Control requirements, employees are required to be trained to prevent oil discharges.

Background:

Training is required by most environmental rules, and certain rules generally apply to almost all employees at a site. Significant overlap may exist between the various programs, but care should be

taken to ensure that each training program meets its requirements without significantly repeating or incorporating non-applicable components of other rules.

Related Terms/Topics:

HazCom, Hazwoper, HWC MACT Operator Training and Certification Program (OTCP), RCRA Contingency Plan, SPCC.

Key References:

- Interagency Agreement Between MSHA and OSHA (https://arlweb.msha.gov/MOU/1979mshaoshammu.HTM), March 1979
- USEPA RCRA Training Modules – "Introduction to Treatment, Storage and Disposal Facilities, Sept. 2005, pg 9,14 https://www.epa.gov/sites/production/files/2015-07/documents/tsdf05.pdf

RCRA Topic: WAP vs FAP and Max-Max

Under RCRA, each facility must have a **WASTE ANALYSIS PLAN (WAP)** describing procedures to ensure wastes are managed at the site to **treat, store or dispose** of the waste. Under HWC MACT, each site must also have a **FEEDSTREAM ANALYSIS PLAN (FAP)** to document obtaining information for each feed stream that is sufficient to document compliance with the applicable feedrate limits. The two Plans work together, but should not overlap.

Current Implementation Approaches:

- The WAP is required to be approved by the state agency as part of the site's hazardous waste management permit. The FAP is generally not required to be approved by the state agency, but they may request that it be approved.
- Some WAPs discuss all testing conducted by the lab, not just those specific to RCRA compliance; such as including FAP testing (e.g., metals and chlorine) and process knowledge (e.g., ash, and metals other than FAP metals.)
- FAPs generally address testing the burn tank(s) but may also include testing to assist with mixing the blend tanks to create the burn tank.
- FAPs generally describe the Max-Max approach (BIF era approach) to burn tank approvals. This approach compares the BIF operating limits to the mass feedrate for each metal and chlorine for all feed streams.
- FAPs also include basis for other feedstream composition information; coal/coke and raw feed (periodic testing) and natural gas (based on generic composition). The coal and raw feed composition generally uses an Upper Predictive Limit statistical analysis.
- Some WAPs and FAPs generically describe test methods, while others identify specific pieces of equipment (e.g., manufacturer's name).

Background:

- The WAP is intended to describe procedures to ensure wastes are safely treated, stored or disposed of, e.g., pH, compatibility, ignitability, free liquids, and maybe radioactivity and PCBs.
- The FAP identifies information needed for each feedstream that is sufficient to document compliance with the applicable feedrate limits provided by the HWC MACT, e.g., HWC MACT metals, chlorine, Btu.

Related Terms/Topics:

Test Methods, Statistical analysis, Knowledge basis of RCRA

Key References:

- Waste Analysis Plans, A Guidance Manual (October 1984)
- Waste Analysis Guidance for Facilities that Burn Hazardous Wastes, Draft (October 1994)
- Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Waste: A Guidance Manual, Final (April 2015)
- SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
- Region VII Workgroup, Letter to John Smith, USEPA Region VII, "BIF Compliance Metals & Chlorine Tracking, Max-Max Procedures," May 24, 1994.

RCRA Topic: Treatment and Blending in Tanks

Blending of hazardous waste-derived fuel streams in a tank/tank system at a TSDF is considered a RCRA treatment type for RCRA permitting and compliance. However, questions arose many years ago as to whether blending is considered *bona fide* treatment when fuel blending for a facility that produces a product placed on the land. The question of whether the fuel is newly generated when blended (e.g. at a fuel blender) has also been part of the discussion. This topic should only be a potential issue if the blending includes incorporating otherwise non-fuel capable streams into the blended fuel (e.g. insufficient Btu for energy recovery or impermissible metals content).

Current Implementation Approaches:

- RCRA Storage tanks (/tank systems) where two or more streams are blended together are also considered RCRA treatment tanks. They are fully permitted under RCRA at a TSDF or the kiln.
  - If the tank does not include blending of multiple streams, the question of agitation to maintain the fuel in suspension may or may not come up as RCRA treatment.
  - For permitting, the tank storage standards of 40 CFR 264 Subpart J are in place and generally provide the relevant environmental protection requirements for storage and blending in the tank. Typically, no additional requirements beyond the Subpart J standards are put in place when blending for treatment in a tank.
  - The Part A would notate T01 in addition to the S02 code.
  - The process section of the RCRA application describes the blending that is performed in tanks.
  - Shredders, grinders, filters, are permitted as part of tank system – ancillary equipment, or potentially Subpart X units.
- A TSDF can consider blending as treatment, but it doesn't accomplish changing the fuel specification such that a new point of generation occurs since it is not legitimate/bona fide treatment when fuel is sent to a cement facility.
  - As a historical example, the bona fide treatment definition for purposes of the comparable fuels specifically "does not include blending to meet the comparable fuels specification at the point of generation".
- As noted in the 10-1994 EPA letter, fuel blending at the generator site within the 90-day generator permit exemption qualifies like any other treatment or storage activity, while fuel blending at a transfer facility would require a RCRA permit. The blending of waste that does not meet fuel criteria is still not sufficient to render the material usable as fuel
- Due to this being a regulatory area full of historic interpretations, it can be important to talk to the approving agency for any long-term RCRA state-specific nuances, especially should newer staff re-evaluate historic RCRA energy recovery regulatory components.

Background:

Hazardous waste-derived fuel blending and storage were not RCRA-regulated activities when many of the RCRA regulatory concepts were formulated (nor was use of the fuel in a kiln pre-90s), which helps explain some of the background and regulatory language surrounding energy recover operations. While the regulations, thus environmental controls have been significantly enhanced over the decades, the deep rooted RCRA concepts still linger even where one would wonder where their purpose lies today. With the onset of the RCRA-BIF rules in the '90s, followed by the transition to HWC MACT kiln emissions

standards and controls in the millennium, kilns using hazardous-waste derived fuel are fully verified to be protective of human health and the environment.

The RCRA treatment definition is as follows from 40 CFR 260.10: ”Treatment means any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any hazardous waste so as to neutralize such waste, or so as to recover energy or material resources from the waste, or so as to render such waste non-hazardous, or less hazardous; safer to transport, store, or dispose of; or amenable for recovery, amenable for storage, or reduced in volume.” Therefore blending and even just simple agitation in a tank makes the fuel “amenable for storage.”

Related Terms/Topics:

Bona fide treatment, Low Btu, legitimate recycling, Land Ban restrictions

Key References:

- RCRA 260-270 regulations (or the state-specific corollary)
- 10-1994 EPA Shapiro letter
- 11-1994 EPA Shapiro letter to Clean Harbors
- 11-1994 EPA letter to Laidlaw

RCRA Topic: Energy Recovery, Btu, and Impermissible Dilution

Fuel used in a BIF/cement kiln must be documented to be used for energy recovery (have usable heat content) to avoid the legacy waste-derived product issue in RCRA*. Some agencies still get confused on whether regulations require bright line Btu acceptance criteria. The 5,000 Btu/lb original RCRA value was only intended to denote where sufficient energy recovery is automatically presumed, and definitely was not intended to be a bright line minimum criteria.

Current Implementation Approaches:

- Facility WAPs typically specify a minimum Btu/# value to document that the fuel has adequate fuel value to be used for energy recovery (to avoid disposal or waste-derived product issues). There are two ways to look at the Btu/# value: as-generated vs. as-burned. Historically RCRA focused on as-generated, which was in place such that facilities didn't meet the requirements through dilution. This value is differentiated from the separate as-burned Btu/# to meet an as-fired operational need and air permit provisions. The topic of Btu acceptance being on an as-generated basis vs. as-burned basis has continued over time, and has different interpretations possible today.
- A 2,500 Btu/# value has become more typical for cement facilities since the 90s, with some facilities still using 5,000 Btu/lb or as negotiated with the permit authority.
- Separately, the 40 CFR 268.3(c) (Impermissible Dilution under Land Ban) criteria is used by some facilities with, or to replace, a Btu bright line value. (e.g. 5000 Btu, 1% TOC, or containing organic constituents at levels exceeding the constituent-specific treatment standard found in 268.48)
- Facilities should have some background documentation supporting fuel value exists wherever Btu/# values below a permitted bright line are taken (and/or background documentation supporting a <5,000 Btu/# bright line value in case it comes up in the future).
- The waste-derived (use constituting disposal) nuances of RCRA rules (261.2 (c)(1) and 266.20) are problematic for cement manufacturers, thus clearly avoiding that gray area of the regs is critical to avoid any potential product implications.

Background:

- Prior to the onset of regulations for energy recovery in cement kilns (pre-BIF and HWC MACT rules), EPA published the Sham Recycling Policy guidance that indicated enforcement personnel should focus on low Btu fuels in non-industrial boilers as an indicator of environmental priorities. The 5,000 Btu/# minimum historical value applied to industrial boilers/furnaces came from that guidance (as an example of the low end of the range of wood Btu values, and the automatically "OK" Btu value), and has carried forward in various regulations despite the onset of significant environmental regulations and emissions controls now in place, and despite the policy being rescinded upon promulgation of the 1991 BIF rules.
- EPA was also originally putting rules in place to prevent facilities like Marine Shale from using "waste" in non-environmentally conscious manners (which impacted the RCRA rule language)

**EPA's 10-94 Fuel Blending Memo clarifies that LDR is not applicable to CKD as long as the 40 CFR 266.112 rules are met. It goes on to say "if the Bevill device produces a product that is used in a manner constituting disposal (e.g., a cement or light-weight aggregate kiln), and the hazardous waste is burned for energy recovery rather than for destruction or as an ingredient, then the product is not required to meet LDR*

treatment standards. In these situations where neither residues nor products are subject to the LDR treatment standards, the original generator's waste would not be considered prohibited from land disposal.

- Although the issue was never totally resolved, regardless of the onset of the BIF, and later HWC MACT, rules fully regulating emissions and protecting the environment, many facilities have negotiated <5,000 Btu/# bright line values and/or criteria by which to document useful energy in fuels during RCRA permitting efforts.
- At least one state agency, newly authorized for the BIF rules, is taking a new look at their take on Btu/# for fuels as part of RCRA permit renewals (in 2018). Thus having documentation in place on energy value is still considered important.
- If energy recovery is documented as the purpose for the HW fuel used at the facility (and agreed to by the permitting agency), then 266.20 (Recyclable materials used in a manner constituting disposal) would not be invoked, and CKD meeting the 266.112 criteria is not hazardous waste.

Related Terms/Topics:

Low Btu, Sham recycling, legitimate recycling, bonafide treatment, cement energy balance, Land Ban impermissible dilution, waste-derived product (use-constituting disposal), Marine Shale (facility in '80s that were determined to be doing "use constituting disposal" that the subsequent regulations were patterned to stop since that activity was not regulated in the 1980s).

Key References:

- 3-16-83 Federal Register – Sham Recycling Guidance
- BIF Rule development and final rule preambles (1987, 1989, 1991)
- RCRA 40 CFR 261.2(c)(1) and 266.20 (Use constituting disposal language)
- Land Ban rule development and final preambles (1990 to 1996)
    - 1996 – EPA addressed Impermissible Dilution and Fuel Substitution
- CKRC Btu work (Stoll memos – EPA meetings – Btu rulemaking petition 1992-1994)
- EPA multiple memos on Fuel Blending (related to Btu) – 1994
- HWC MACT rule development 1996
- TRI regulatory topic on Btu 1998
- CKRC/Stoll Btu topic and white paper 2003-2004

RCRA Topic: Railcar Management

Management of hazardous waste shipments in rail cars to TSDFs at cement kilns was a discussion topic by the early to mid-1990s. Questions arose regarding regulatory requirements, such as rail car acceptance, on-site staging, and unloading. Rail car management regulatory options today vary by state and typically reflect the historical approach previously agreed on by the facility and agency.

Current Implementation Approaches:

The following are types of approaches in place today:

- Management of hazardous waste rail cars as RCRA-permitted units where the staging and/or unloading area is a RCRA container storage unit, with applicable requirements of 40 CFR 264 subpart I – Use and Management of Containers (or applicable state regulation). This avenue can provide facilities with the most flexibility when it comes to the time allowed to stage/store hazardous wastes rail cars on-site. The rail car staging and/or unloading area would be subject to all applicable RCRA requirements including, e.g. Inspections, containment, closure, air emission standards, and special requirements for ignitable and reactive waste.

- Management of hazardous waste rail cars in accordance with general federal, or state-specific requirements where the activity is not as a permitted RCRA container storage unit. States like Missouri (MDNR) allow for the development of a Rail Car Management Plan to be submitted with the facility's RCRA permit application. The Rail Car Management Plan identifies procedures for the following:
    - Shipping of hazardous waste (within 72 hours after loading is initiated, with emergency extension provisions available)
    - Unloading of hazardous waste (within 10 days following receipt, with emergency provisions available)
    - Requirements for ignitable waste
    - Security and Inspections
    - Incorporation into facility SPCC Plan

  As a second example, Indiana (IDEM) allows hazardous waste rail cars to be staged in unpermitted areas for up to 10 days as long as the facility commits to a maximum number of containers to be staged on-site at any one time, and that the cost to dispose of the rail car contents at a third party disposal facility is included in the facility's RCRA Closure cost estimate in addition to the permitted storage capacity.

- It is possible to manage hazardous waste rail cars under both scenarios; one rail car area that is permitted under RCRA and another rail car area that is part of a state unpermitted management requirement.

Background:

Due to industry and inspector/agency staff discussions in "the early days" CKRC, along with the BIF regional workgroups worked together to address questions that were arising by developing a conceptual Rail Car Management Procedure that represented the cement industry combined views. Topics addressed in the industry plan included:

- Security (staged in secured and fenced locations)
- Inspections (documented daily inspections)
- Ignitable waste procedures (40 CFR 264.17)
- SPCC plans addressing rail car areas
- On-site Staging (14 days) for 10 rail cars
- Contingency Plan including volume of rail car contents

The agreed on concepts were used as a tool to further rail car management discussions with EPA and state agencies. Site and state-specific approaches were put in place over the years that resulted in today's practices.

Related Terms/Topics:

Rail car staging, SPCC, Contingency Plan, 40 CFR 264 Subpart I, Container Storage, 10-day transfer

Key References:

- RCRA 40 CFR 264 Subpart I
- CKRC Rail Car Management Procedure – April 1, 1994
- Missouri Railcar Management Regulation: 10CSR 25-7.264(3)
- IDEM Staging Policy WASTE-0011-NPD (December 8, 1998)