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Office of Air Quality Planning and Standards

Rulemaking for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units

Tribal Consultation
December, 2010
POC: Eric Ginsburg

Purpose of the Consultation

- Hear from you, your concerns and comments
- Provide background information on EGU's and the history of the rule
- Provide summary of issues we are exploring for the proposal
- Discuss your input and comments

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Definition of EGU

- The “electric utility steam generating unit” source category includes those units that combust coal or oil for the purpose of generating electricity for sale and distribution through the national electric grid to the public.

- Section 112(a)(8) defines an “electric utility steam generating unit” as:
  - Any fossil fuel-fired combustion unit of more than 25 megawatts electric (Mwe) that serves a generator that produces electricity for sale. A unit that cogenerates steam and electricity and supplies more than one-third of its potential electric output capacity and more than 25 Mwe output to any utility power distribution system for sale is also considered ann electric utility steam generating unit.

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Overview of Section 112

- Section 112 of CAA mandates that EPA develop standards for hazardous air pollutants (HAP) for both major and area sources listed under section 112(c).
  - The section 112 definition of EGU does not distinguish between area and major sources.
  - Major sources of HAP are those that have the potential to emit 10 tons per year (tpy) or more of any one HAP or 25 tpy or more of any combination of HAP.
- Section 112(d)(2) states that major source standards must be based on the maximum achievable control technology (MACT).
- Section 112(d)(3) sets minimum stringency criteria (MACT Floor) – costs may not be considered
  - For existing sources:
    - "The average emission limitation achieved by the best performing 12 percent of existing sources.."
  - For new sources, the MACT floor is:
    - "The emission control achieved in practice by the best controlled similar source

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Overview of Section 112 (cont.)

- EPA may regulate “beyond the floor” where justified – costs and other issues must be considered
- MACT may differ for new and existing sources.
- Section 112(d)(1) provides EPA with authority to distinguish among classes, types, and sizes of sources.
- Section 112(d)(4) provides EPA with discretionary authority to establish health-based emission standards for HAP for which a health threshold has been established.
- Section 112(h) allows the use of work practice standards instead of emission standards if enforcement of an emission standard is “not feasible”, as that term is defined in that section.

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Utility MACT is part of a package of EPA Regulations Affecting the Power Sector

- Tailoring Rule – new or modified plants much obtain permits for any increase in GHG emissions – final rule in May 2010
- Transport Rule (Clean Air Interstate Rule (CAIR) Remand Response) – to reduce SO_2 and NO_X emissions from existing power plants in 31 states/Washington DC – final rule in Spring 2011
- New Source Performance Standards (NSPS) for coal- and oil-fired electric utility steam generating units (EGUs) – to regulate SO_2, NO_X, and PM emissions from new EGUs – final rule in November 2011
- Effluent Guidelines for steam electric power generating – to address water quality impacts of EGUs - final rule in January 2014
- Solid waste regulations for EGU coal ash (coal combustion residuals) –I***s there a final deadline or expected date?***
- National Emission Standards for Hazardous Air Pollutants (NESHAP) for coal- and oil-fired EGUs (Utility NESHAP) – to regulate hazardous air pollutant (HAP) emissions from new/existing EGUs – final rule in November 2011

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Project History

- This action stems from a court decision overturning EPA's prior findings and rules
- EPA's 2000 determination that it was "appropriate and necessary" to regulate emissions of hazardous air pollutants (HAP) from coal- and oil-fired electric utility steam generating units (EGUs) was reversed in March 2005, when EPA found it was neither "appropriate *nor* necessary" to regulate HAP emissions from EGUs and removed those units from the CAA section 112(c) source category list
- EPA substituted the Clean Air Mercury Rule (CAMR) in May 2005, which regulated mercury from EGUs through a cap and trade program under CAA section 111.
- In February 2008, the Court vacated EPA's action that removed EGUs from the section 112(c) source category list and vacated CAMR.

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Effect of Court's Decision

- Coal- and oil-fired EGUs remain a listed source category for which EPA must issue emission standards under CAA section 112(d).
- EPA must address all Hazardous Air Pollutants that are emitted from coal- and oil-fired EGUs – not just mercury.
- EPA is operating under a Consent Decree negotiated with litigants
  - No later than March 16, 2011, EPA shall sign a notice of proposed rulemaking
  - No later than November 16, 2011, EPA shall sign a notice of final rulemaking

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Some Legal Constraints on Section 112 Rulemakings

- Emission standards must be established for EGUs that are located at major sources and at area sources.
- Voluntary or incentive-based approaches are not allowed.
- Emission standards must address all HAP emitted from EGUs.
- Standards must set technology-based limits
  - Viability of health-based emission standards and work practice standards will be explored.
- Method for determining the minimum level of emissions control (i.e., MACT floor) must be followed.
- Only units in the MACT floor may be used in determining variability unless a demonstrated relationship between the variability of sources outside the floor and the variability of sources within the floor can be shown.
- Regulatory options more stringent than the MACT floor must be considered.

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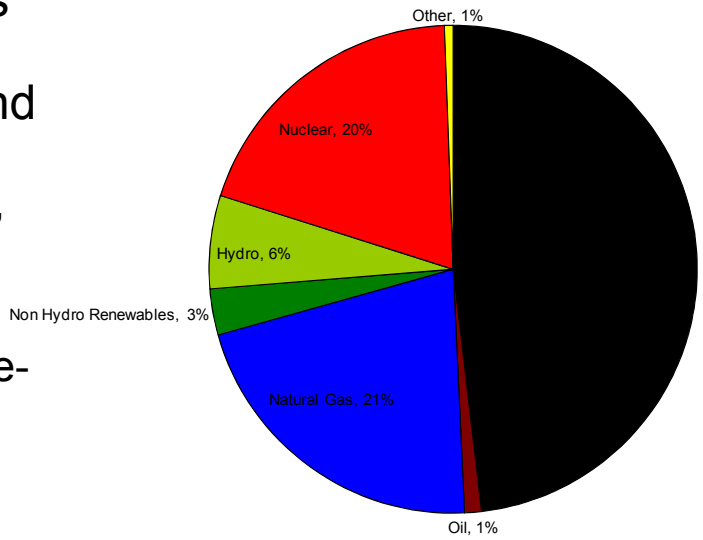
Affected Facilities

- Approximately 1,350 EGUs at 525 facilities
- Approximately 1,200 coal-fired boilers at approximately 450 facilities in 44 States and Puerto Rico
  - Coal-fired EGUs include units that burn coal, coal refuse, or a synthetic gas derived from coal either exclusively, in any combination together, or in any combination with other supplemental fuels (e.g., petroleum coke, tire-derived fuels).
    - Bituminous coal ~ 50% of coal generation
    - Subbituminous ~45% of coal generation
    - Lignite ~ 5% of coal generation
  - Many units are bigger sources that operate near their rated capacity called “base-load”
  - Base-load units are large units used to meet the electricity demand that is relatively constant.
    - Approximately 48 percent of nationwide net generation



Affected Facilities (cont.)

- Approximately 150 oil-fired boilers at approximately 75 facilities, mostly in Northeast, Midwest, Florida, Hawaii, Guam, and Puerto Rico, 3 in Indian country
  - Many units are peaking units with low capacity factor utilization over the past 3 – 5 years.
  - Peaking units are used to meet the demand for electricity during peak periods of the day, and run for shorter periods of time.
  - Many co-fire with natural gas or use natural gas preferentially but must have oil capability for use during periods of natural gas curtailments to industry.
  - Approximately 1 percent of nationwide net generation
- Industry includes investor-owned, publicly-owned, and rural cooperatives.
- Natural gas was not listed in the December 2000 regulatory determination.
  - Approximately 21 percent of nationwide net generation

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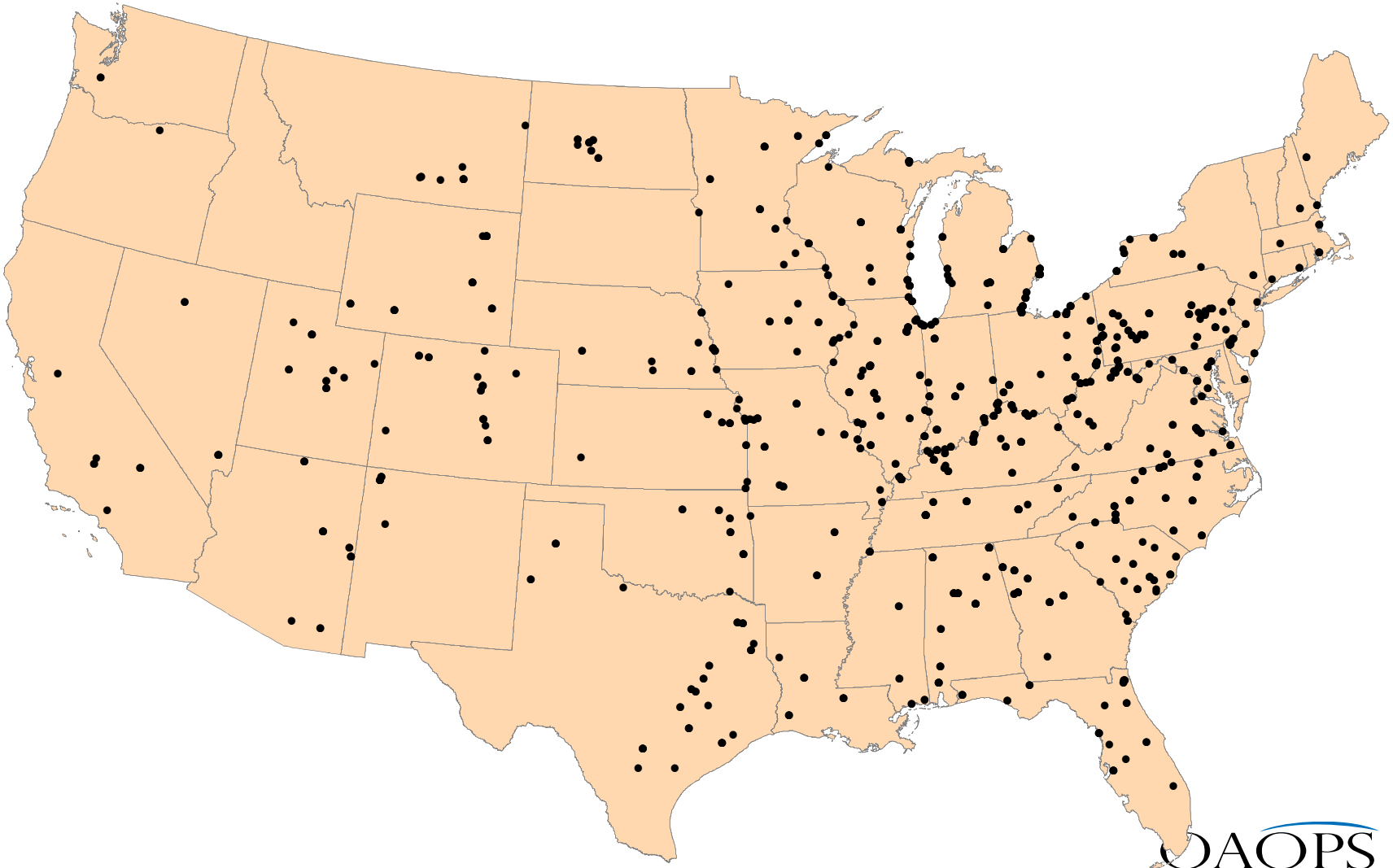
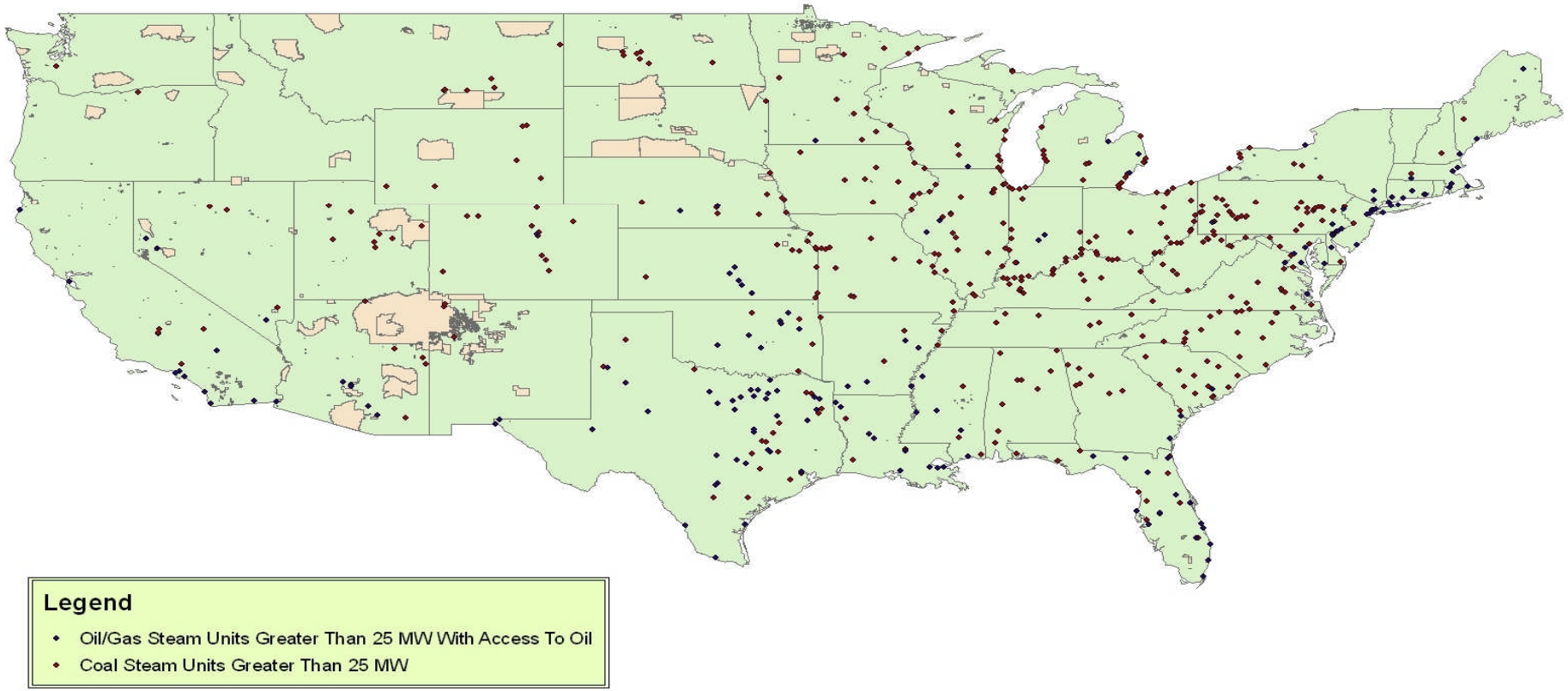
EGU Coal Steam Units ≥25 MW



- Location of Coal Steam EGU units ≥ 25 MW

Dataset: NEEDS4.0_Draft_03_17_09v3toEPA

EGU Units (Coal and Steam >25 MW) and Tribal Lands Overlay



Data Needs

- Have considerable data from 1999 for mercury from coal-fired units; limited data for all other HAP and for oil-fired units.
- Completing a major information collection request (ICR) to obtain the necessary data from coal- and oil-fired units
- Data necessary for development of legally supportable regulation
- Testing requirements established for a significant number of units (some units will test more than one HAP group)

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Rulemaking Options under Consideration

- Scope of rulemaking
  - Pollutant-specific limits vs. use of surrogates (e.g., PM)
  - Approach to assess variability
  - Must explore “beyond-the-floor” options
- Subcategorization
  - CAA authorizes subcategorization by class, type and size
  - Will consider and evaluate bases for subcategorization
- Alternative standards available under CAA section 112
  - Work Practice Standards
  - Health Based Emission Limits
- Oil-fired units
  - Will consider impact on marginal, low-capacity factor, peaking units for which compliance could result in closure

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Pollutants Covered

- All HAP emitted from EGUs must be addressed.
- Surrogate standards are allowed if reasonable.
- Same controls will be installed regardless of use of surrogates.
- Saves on monitoring and testing costs
- Major and Area Source Portland Cement NESHAP – as amended in 2010
  - Set emission limits for 5 pollutants (Hg, dioxin/furan, HCl – major sources only, PM, and total hydrocarbon (THC))
- Major Source Boiler NESHAP – proposed rule
  - Set emission limits for 5 pollutants (Hg, dioxin/furan, HCl, PM and carbon monoxide (CO))
- Expect to set limits for 5 pollutants to address all HAP emitted from EGUs
  - Mercury
  - PM (surrogate for non-mercury HAP metals)
  - SO_2 or HCl (surrogate for acid gas HAP)
  - CO (surrogate for non-dioxin/furan organic HAP) vs. other pollutants (e.g., polycyclic aromatic hydrocarbons (PAH) or formaldehyde)
  - Dioxin/furan

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Floors and Variability

- Must adhere to language of section 112 regarding MACT floors
- Determine variability based on the top performing 12 percent
- Beyond-the-floor options
  - Regulatory options more stringent than the MACT floor must be considered.
  - Can include additional control technologies, process changes, or other means of reducing HAP
  - Costs and other impacts are considered.
  - Major Source Boilers NESHAP proposed one-time energy audit.

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Subcategorization

- CAA authorizes subcategorization by class, type and size
  - Must be a basis for distinguishing between subcategories (e.g., design differences, operating mode, or other characteristics)
- EPA will consider and evaluate various bases for subcategorization
  - Boiler design (e.g., units designed to burn coal vs. units designed to burn oil vs. IGCC)
  - Coal rank (e.g., bituminous, subbituminous, lignite)
  - Unit type (e.g., fluidized bed, pulverized coal)
  - Oil type (e.g., residual (no. 4 and 6 oils) vs. distillate (no. 2 oil))
  - Duty cycle (e.g., peaking units vs. base-load units)
- The more we subcategorize, the more data needed to establish the MACT floor

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Alternative Standards Available under CAA section 112(d)(4)

- EPA has discretionary authority to establish health-based emission standards for HAP for which a health threshold has been established.
  - Provision is intended for cases where a less stringent emission standard will still ensure that the health threshold will not be exceeded, with an ample margin of safety.
- Solicited comment on a number of specific issues associated with regulation under section 112(d)(4)

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Alternative Standards Available under CAA section 112(h)

- Work practice standards are allowed instead of emission standards if it is not feasible to prescribe or enforce an emission standard.
  - "Not feasible to prescribe or enforce an emission standard" is defined, in part, to mean that "the application of measurement methodology to a particular class of sources is not practicable due to technological *and* economic limitations" (*emphasis added*).

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Control Technologies Potentially Required to Meet Standards

- Mercury and PM (surrogate for non-mercury metal HAP)
  - A new fabric filter installation is likely to be capable of achieving the PM emission limits and will likely assist in achieving the mercury emission limits
  - If a unit already equipped with a fabric filter emits Hg above the emission limit, the incremental Hg removal required to meet the limit can likely be achieved with installation of activated carbon injection (ACI) technology
- SO_2 or HCl (surrogate for acid gas HAP)
  - Either a wet scrubber or dry sorbent injection system is likely to be capable of achieving the SO_2 or HCl emission limit
  - If a unit already equipped with a wet scrubber or dry sorbent injection system emits SO_2 or HCl above the emission limit, the incremental required SO_2 or HCl removal can likely be achieved by increasing the sorbent injection rate into the scrubber or the flue gas
- CO (surrogate for non-dioxin/furan organic HAP)
  - Organic HAP and CO are likely to be controlled to required levels by improving the combustion efficiency of the unit

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Questions?

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Appendix

Project Background

- On 12/20/2000, pursuant to section 112(n)(1)(A), EPA determined that it was “appropriate and necessary” to regulate emissions of hazardous air pollutants (HAP) from coal- and oil-fired EGUs under CAA section 112.
  - Based on that determination, EPA listed EGUs for regulation pursuant to CAA section 112(c).
- On 03/29/2005, EPA issued the Section 112(n) Revision Rule that found it was neither “appropriate *nor* necessary” to regulate HAP emissions from EGUs and removed such units from the section 112(c) source category list.
  - The reversal of the 2000 “appropriate and necessary” finding was based, in large part, on projected mercury reductions achieved as a co-benefit of CAIR.
- On 05/18/2005, EPA issued the Clean Air Mercury Rule (CAMR), which regulated mercury from EGUs through a cap and trade program under section 111.

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Recent Legal History

- 02/08/2008 – D.C. Circuit Court of Appeals vacated the Section 112(n) Revision Rule and CAMR
- 03/14/2008 – Mandate Issued in Section 112(n) Revision Rule and CAMR vacaturs
- 10/17/2008 – U.S. Government filed a petition for writ of certiorari with the U.S. Supreme Court
- 12/18/2008 – Mandatory duty suit filed by *American Nurses Assn., et al.*, for failure to establish MACT standards for coal- and oil-fired electric generating units by 12/20/2002
- 02/06/2009 – U.S. Government moves to withdraw its petition for writ of certiorari
- 02/23/2009 – U.S. Supreme Court denies industry petition for writ of certiorari and grants U.S. Government's request to withdraw its petition

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Effect of Vacatur

- Coal- and oil-fired EGUs remain a listed source category for which EPA must issue emission standards under CAA section 112(d).
- EPA will address all HAP that are emitted from coal- and oil-fired EGUs – not just mercury.
- Operating under a Consent Decree negotiated with litigants (American Nurses Assn., et al.; represented by Earthjustice)
  - No later than March 16, 2011, EPA shall sign for publication in the Federal Register a notice of proposed rulemaking
  - No later than November 16, 2011, EPA shall sign for publication in the Federal Register a notice of final rulemaking

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Project History

- In December 2000, EPA determined that it was “appropriate and necessary” to regulate emissions of hazardous air pollutants (HAP) from coal- and oil-fired electric utility steam generating units (EGUs) and added such units to the CAA section 112(c) list of sources to be regulated under CAA section 112.

- In March 2005, EPA found it was neither “appropriate *nor* necessary” to regulate HAP emissions from EGUs and removed those units from the CAA section 112(c) source category list.

- In May 2005, EPA issued the Clean Air Mercury Rule (CAMR), which regulated mercury from EGUs through a cap and trade program under CAA section 111.

- In February 2008, the Court vacated EPA’s action that removed EGUs from the section 112(c) source category list and vacated CAMR.

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Data Needs

- Have considerable data from 1999 for mercury from coal-fired units; limited data for all other HAP and for oil-fired units.
- Completing a major information collection request (ICR) to obtain the necessary data from coal- and oil-fired units
  - 1,332 units to provide updated facility information on boiler, fuels, controls, etc. and all available data from past 5 years
  - Requires emission testing of ~800 units
  - Approximately 95% of data collection is complete; analyses are ongoing
  - "Air Toxics Standards for Utilities" web page can be found at: http://www.epa.gov/ttn/atw/utility/utilitypg.html
    - Data files of emissions data (Microsoft Access format)
    - Extracted data worksheets (Microsoft Excel format)
- Data necessary for development of legally supportable regulation
  - Need sufficient representative data for MACT floor determinations
  - Need data on variability
  - Need data on range of fuels
  - Need data to demonstrate that any surrogate standards are reasonable

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Utility MACT Information Collection

- Testing requirements (some units will test more than one HAP group)
  - 170 coal-fired units for acid gas HAP
    - e.g., hydrogen chloride (HCl), hydrogen fluoride (HF), hydrogen cyanide (HCN)
    - Selected as being among the top performing units
  - 170 coal-fired units for non-dioxin/furan organic HAP
    - Selected as being among the top performing units
  - 170 coal-fired units for metallic HAP
    - e.g., mercury, cadmium, chromium, lead
    - Selected as being among the top performing units
  - 50 coal-fired units for dioxin/furan organic HAP
    - Selected at random from the entire coal-fired EGU population
  - 50 coal-fired units for acid gas, non-dioxin/furan organic, and metallic HAP
    - Selected at random from the population of “non-top performing units”
  - 2 coal-fired integrated gasification combined cycle (IGCC) units for all HAP (i.e., acid gas, organic, metallic)
  - 100 oil-fired units for all HAP
    - Selected at random from the oil-fired EGU population
  - 16 petroleum coke-fired units for all HAP

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Floors and Variability

- Must adhere to language of section 112 regarding MACT floors
- Determine variability based on the top performing 12 percent
  - May not go outside the top performing 12 percent unless EPA can show a demonstrated relationship between the variability of the worst performers and the variability of the best performers.
  - May include fuel variability and performance variability
  - Will look at load variability
  - Recent regulatory actions (Portland Cement NESHAP and Major Source Boilers NESHAP) have assessed variability based on the 99th percentile upper predictive limit (UPL).
    - Means that for a future test from a best performing source, there is 99 percent confidence that the reported level will fall at or below the UPL value
- Beyond-the-floor options
  - Regulatory options more stringent than the MACT floor must be considered.
  - Can include additional control technologies, process changes, or other means of reducing HAP
  - Costs and other impacts are considered.
  - Major Source Boilers NESHAP proposed one-time energy audit.

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Subcategorization

- The more we subcategorize, the more data needed to establish the MACT floor – 5 data points for each subcategory with less than 30 sources and sufficient data to take top 12% of available data for subcategories with 30 or more sources.
- Portland Cement NESHAP – final rule
  - No subcategories
  - Discussion begins in last paragraph of page 54977 of 75 FR 54970, September 9, 2010
    - http://frwebgate2.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=8SWVqI/0/2/0&WAISaction=retrieve
- Major Source Boilers NESHAP – proposed rule
  - Proposed rule included 11 subcategories based on boiler "type"
    - 3 coal subcategories (pulverized coal, stokers, fluidized bed units)
    - 4 biomass subcategories (stokers, fluidized bed units, suspension burners/dutch ovens, fuel cells)
    - 1 liquid subcategory
    - 2 gas subcategories (natural gas/refinery gas, other gases)
    - 1 metal processing furnace subcategory
  - Discussion begins in last paragraph of page 32016 of 75 FR 32006,
  - June 4, 2010
    - http://frwebgate1.access.gpo.gov/cgi-bin/PDFgate.cgi?WAISdocID=e61yXI/0/2/0&WAISaction=retrieve