

NSPS AND MACT STANDARDS FOR COMBUSTION SOURCES AT UTILITY AUTHORITIES

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NSPS and MACT Standards for Combustion Sources at Utility Authorities

What happens when a permit has both
federal and state regulations?

NSPS and MACT Standards for Combustion Sources at Utility Authorities



NSPS and MACT Standards for Combustion Sources at Utility Authorities

Facilities get confused with Federal and State Regulations when one type is more stringent than the other.

They could include:

- Compliance with emission rate or parameter
- Stack testing
- Monitoring and Recordkeeping
- Submittals

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Stationary Combustion Sources:

- Boilers and Heaters
- Emergency Generators
- Cogeneration Units (Non-Emergency Electrical Generators)
- Turbines
- Flares
- Incinerators
- Portable Equipment

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Clean Air Act

- Signed into law 1970 – First major piece of legislation for pollution control nationally.
- Brought initial standards of pollution control for certain equipment including New Source Performance Standards (NSPS) and the initial National Emission Standards for Hazardous Air Pollutants (NESHAP)

Clean Air Act Amendments (1990)

- Title V Operating Permit Program
- Expanded NSPS and NESHAP

NSPS and MACT Standards for
Combustion Sources at Utility Authorities



NSPS and MACT Standards for
Combustion Sources at Utility Authorities

New Source Performance Standards (NSPS)

- Promulgated under the Clean Air Act under Federal Regulations of 40 CFR Part 60
- Technology based standards for specific stationary sources whether they are new or modified (not existing)
- Standards may require controls, monitoring and testing measures
- Criteria Pollutants – NO_x, CO, VOC, SO₂, and Particulates (Total, PM-10 and PM_{2.5})
- Other pollutants may come into play.

NSPS and MACT Standards for
Combustion Sources at Utility Authorities

New Source Performance Standards

- Criteria Major Source of any criteria pollutant for facilities are State Promulgated depending on Attainment Status under Title I of the Clean Air Act Amendments
- SO₂, TSP, PM-10 and CO are 100 tons per year
- VOC and NO_x vary from 10 through 100 tons per year depending on Ozone Non-Attainment Status (100 tons per year for attainment)
- NSPS is independent of major source limits of each state

NSPS and MACT Standards for Combustion Sources at Utility Authorities

National Emission Standards for Hazardous Air Pollutants (NESHAPs)

- Original Clean Air Act (1970) monitors sources of Asbestos, Beryllium, Mercury, Vinyl Chloride, Radon/Radionuclides, Mercury, Benzene and Arsenic - 40 CFR 61

NSPS and MACT Standards for Combustion Sources at Utility Authorities

National Emission Standards for Hazardous Air Pollutants (NESHAPs)

- Title 3 of Clean Air Act Amendments (1990) monitors 188 Hazardous Air Pollutants (HAPs)
- Issues standards for pollution control of HAPs under 40 CFR Part 63 known as Maximum Achievable Control Technology Standards (MACT)

NSPS and MACT Standards for Combustion Sources at Utility Authorities

National Emission Standards for Hazardous Air Pollutants (NESHAPs)

- Major Source for HAPs – Facilities that have potential to emit greater than or equal to 10 tons per year of a single HAP; or greater than or equal to 25 tons per year of total HAPs (regardless of location)
- Area Source for HAPs – Facilities that emit HAPs but are not major sources

NSPS and MACT Standards for
Combustion Sources at Utility Authorities



NSPS and MACT Standards for
Combustion Sources at Utility Authorities

Boilers

- NSPS 40 CFR 60 Subpart D - Dc
- MACT 40 CFR 63 Subparts DDDDD and JJJJJ

Engines

- NSPS 40 CFR 60 Subparts IIII and JJJ
- MACT 40 CFR 63 Subpart ZZZZ

NSPS and MACT Standards for
Combustion Sources at Utility Authorities

Boilers

- AKA "Steam Generating Units"
- Electric Utility - Power Plant boilers at least 100 million BTU/hr (MMBTU/hr)
- Industrial-Commercial-Institutional (ICI)
- Small Boilers - Space Heaters

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers

- Subpart D (40 CFR 60.40-60.46)- Boilers and heaters burning fossil fuels with a heat input of 250 MMBTU/hr or greater constructed after August 17, 1971.
- Establishes particulate and SO₂, and NO_x emission rates as well as opacity.
- NO_x and SO₂ emissions monitored by a Continuous Emissions Monitoring System (CEMS) and Continuous Opacity Monitoring System (COMS).

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers

- Subpart Da (40 CFR 60.40a-60.52a)- Boilers and heaters (electric utility) burning fossil fuels with a heat input of 250 MMBTU/hr or greater constructed after September 18, 1978.
- Establishes particulate and SO₂, and NO_x and Mercury (Hg) emission rates as well as opacity.
- Monitored by CEMS and COMs.
- Performance Test Data and Quarterly Reports for SO₂, NO_x, Hg and Opacity are to be submitted to the Administrator (EPA Regional Office).

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers

- Subpart Db (40 CFR 60.40b-60.49b)- ICI Boilers and heaters (burning fossil fuels) with a heat input of 100 MMBTU/hr or greater constructed after June 19, 1984.
- Establishes particulate and SO₂, and NO_x and emission rates as well as opacity.
- CEMS not necessary for some gaseous or liquid fuels but need to retain certificates of sulfur content.
- Performance Test Data and Quarterly Reports for SO₂, NO_x, and Opacity are to be submitted to the Administrator (EPA Regional Office).

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers

- Subpart Dc (40 CFR 60.40c-60.48c)- ICI Boilers and heaters (burning fossil fuels with a heat input between 10 and 100 MMBTU/hr constructed after June 9, 1989.
- Establishes particulate and SO₂ rates only emission rates as well as opacity.
- Does not require CEMS for gaseous or liquid fuels but need to retain certificates of sulfur content.
- Performance Test Data and Quarterly Reports for SO₂, NO_x, and Opacity are to be submitted to the Administrator (EPA Regional Office).

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers - Subpart Dc

- Sulfur content for liquid fuels is 0.5% or SO₂ emission rate of 0.5 lb/MMBTU
- Natural gas AP-42 emission rate is 0.6 lb/MMCF ÷ 1,020 MMBTU/MMCF = 0.00049 lb/MMBTU.
- No. 2 Fuel Oil AP-42 emission rate is (142 X 0.5) = 71 lb/Mgal or 0.071 lb/gal ÷ 0.142 MMBTU/gal = 0.5 lb/MMBTU.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers - Subpart Dc

- Particulate standards for new and reconstructed boilers and heaters of 30 MMBTU/hr or greater after February 28, 2005 is 0.03 lb/MMBTU (or 0.51 lb/MMBTU with 99.8% combustion reduction)
- Boilers that burn fuel oil that has sulfur content of no more than 0.5% is not subject to this standard.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers - Subpart Dc

- Particulates in natural gas from AP-42 is 7.6 lb/MMCF ÷ 1,020 MMBTU/MMCF = .0075 lb/MMBTU
- Particulates in No. 2 Fuel oil from AP-42 is 2 lb/Mgal or 0.002 lb/gal ÷ 0.142 MMBTU/gal = 0.014 lb/MMBTU.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers - Subpart Dc

- Fuel meters will need to be installed on individual boilers for monitoring of fuel.
- Facilities using fuel oil must obtain records including the name of the supplier and a statement pertaining that the oil concentration is less than 0.5% (states may require more stringent limits).

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

- Subpart DDDD (40 CFR 63.7480 – 63.7575)
- Recently amended on March 21, 2011 with amendments taking effect on May 21, 2011.
- Applies to Major Source facilities (Title V for HAPs).
- Large boilers – greater than 10 MMBTU/hr
- Small boilers – 10 MMBTU/hr or less

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

- 40 CFR 60 Subpart DDDDD
- Current rule – Pre Amendment emission limits
- 400 ppmvd @3% O₂ for large and small liquid fuels and large gaseous fuels.
- 0.03 lb/MMBTU particulates for liquid fuels all boilers.
- 0.0005 lb/MMBTU HCl for large liquid fuel and 0.0009 lb/MMBTU HCl for small liquid fuel

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

- May 21st amendment puts more stringent limits on large boilers (greater than 10 MMBTU/hr).

Liquid Fuels – New or Reconstructed Boilers:

- 0.0013 lb/MMBTU – Particulates
- 0.000033 lb/MMBTU – HCl
- 2.1 E-07 lb/MMBTU – Hg
- 3 ppmvd @ 3% O₂ – CO
- 0.002 ng/dscm @ 7% O₂ – Dioxins and Furans

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

Gaseous Fuels – New or Reconstructed Boilers

- 0.0013 lb/MMBTU – Particulates
- 0.000033 lb/MMBTU – HCl
- 7.8 E-07 lb/MMBTU – Hg
- 51 ppmvd @ 3% O₂ – CO
- 0.002 ng/dscm @ 7% O₂ – Dioxins and Furans
- Also there are emission standards for biofuels and biosolids.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

Liquid Fuels – New or Reconstructed Boilers (June 4, 2010 – May 20, 2011):

- 0.002 lb/MMBTU – Particulates
- 0.0032 lb/MMBTU – HCl
- 2.1 E-07 lb/MMBTU – Hg
- 3 ppmvd @ 3% O₂ – CO
- 0.002 ng/dscm @ 7% O₂ – Dioxins and Furans
- The limits of temporary as the boiler must comply with New or Reconstructed boiler limits by May 21, 2014.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

Gaseous Fuels – New or Reconstructed Boilers (June 4, 2010 – May 20, 2011):

- 0.0067 lb/MMBTU – Particulates
- 0.0017 lb/MMBTU – HCl
- 7.9 E-06 lb/MMBTU – Hg
- 3 ppmvd @ 3% O₂ – CO
- 0.08 ng/dscm @ 7% O₂ – Dioxins and Furans
- The limits are temporary as the boiler must comply with New or Reconstructed boiler limits by May 21, 2014.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

Liquid Fuels – Existing Boilers:

- 0.075 lb/MMBTU – Particulates
- 0.0033 lb/MMBTU – HCl
- 3.5 E-06 lb/MMBTU – Hg
- 10 ppmvd @ 3% O₂ – CO
- 0.0075 ng/dscm @ 7% O₂ – Dioxins and Furans

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)
 Gaseous Fuels – Existing Boilers:

- 0.0043lb/MMBTU – Particulates
- 0.0017 lb/MMBTU – HCl
- 1.3 E-05 lb/MMBTU – Hg
- 9 ppmvd @ 3% O₂ - CO
- 0.08 ng/dscm @ 7% O₂ – Dioxins and Furans

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – MACT Standards (ICI Boilers only)

- Submit semi-annual compliance reports to EPA.
- January – June due July 31st.
- July – December due January 30th.
- Compliance report includes (but not limited to) name of company, signed certification form, fuel uses for each source, and deviations from emission limits.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boiler Area Sources – Subpart JJJJJJ (40 CFR 63.1193 – 63.11237)

- Promulgated March 20, 2011
- Effective May 20, 2011
- Affects boilers from area sources 10 MMBTU/hr or greater.
- Exempt – Boilers covered by other MACT regs (Subpart DDDDD), gas fired boilers, hot water heaters and boilers used as control devices.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Boilers – Subpart JJJJJ

- New oil fired boilers must meet particulate limit of 0.03 lb/MMBTU.
- Also has standards for solid and biomass fuel.
- Emission standards for existing boilers to be met by March 21, 2014.

NSPS and MACT Standards for Combustion Sources at Utility Authorities



NSPS and MACT Standards for Combustion Sources at Utility Authorities

Engines – Stationary

- Lean Burn vs. Rich Burn (Air to Fuel Ratio)
- Gas Fuel Fired Engines (Natural Gas, Biogas)
- Liquid Fuel Fired Engines (Diesel, Biodiesel, Gasoline)
- Electrical vs. Mechanical Generation
- Most common form is the Reciprocating Internal Combustion Engine (RICE)
- Spark Ignition (gas fueled) vs. Compression Ignition (liquid fueled).
- Most common use of the stationary engine is...

NSPS and MACT Standards for Combustion Sources at Utility Authorities



NSPS and MACT Standards for Combustion Sources at Utility Authorities

Engines – Stationary

- Emergency Generators
- Portable Generators
- Engines powering portable units
- Electrical Generators/Cogeneration Units
- Cogeneration – provides heat and electricity from the power generated in the engine.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Engines

- EPA Manufacturing Emission Standards for Diesel Engines
- Parameters include NO_x, Particulates, CO, Total Hydrocarbons (HC) and NO_x plus Nonmethane Hydrocarbons (NMHC).
- Tier 1 – adopted 1994 for 37 kilowatt engines or greater which was phased in between 1998 and 2000.
- In 1998 Tier 1 standards for engines less than 37 kilowatts along with Tier 2 and 3 standards which were phased in between 2000 – 2008.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Engine Manufacturing Standards

- In 2004 EPA promulgated Tier 4 Engine Standards to be phased in between 2008 and 2015.
- Engines 56 kW or less already in effect.
- Engines between 19 and 56 kW will have more stringent standards starting 2013
- Engines between 56 and 560 kW have phased in standards from 2011 to 2015.
- Engines greater than 900 kW have standards go into effect in 2011. (Gensets and non-gensets have different standards)
- Engines between 560 and 900 kW go into effect in 2015.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Engines – Non Road Compression

- Tier 1 through Tier 4 Standards listed here
<http://www.epa.gov/OMS/standards/nonroad/nonroadci.htm>
- NSPS and MACT regulations for engines can differ based on certified engine standards.
- If certified by a certain Tier, certain testing and reporting is not required.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Subpart IIII – NSPS Compression Ignition RICE (40 CFR 60.4200 – 60.4219)

- Applies to compression ignition engines with a cylinder displacement less than 30 liters with a model year of 2007 or later.
- Applies to Fire Pumps (diesel engines powering emergency sprinkler systems) for model years 2008 through 2011 depending on size.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Subpart IIII – NSPS Compression Ignition RICE

- Engines prior to model year 2007 with a cylinder displacement of less than 10 liters and engines from model year 2007 through 2010 that are greater than 2,237 kW and have cylinder displacement of greater than 10 liters must meet Tier 1 standards.
- Engines less than 37 kW with a cylinder displacement of less than 10 liters for model year 2008 emergency stationary must comply with Tier 4 standards.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Fire Pump Standards

- Pumps less than 75 kW must comply with Tier 1 Standards for model year 2010 and earlier and Tier 4 Standards for model year 2011 and later.
- Pumps greater than or equal to 75 kW and less than 130 kW must comply with Tier 1 Standards for model year 2009 or earlier and Tier 4 Standards for model year 2010 or later.
- Pumps greater than or equal to 130 kW or less than 560 kW must comply with Tier 1 standards for model year 2008 or earlier and Tier 4 standards for model year 2009 or later.
- Pumps greater than or equal to 560 kW must comply with Tier 1 standards for model year 2007 or earlier and Tier 4 standards for model year 2008 or later.

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Subpart IIII Engines

- Performance Test requirements for engines with cylinder displacement of greater than 30 liters.
- Engines need to be certified (specific Tier) and compliant to the this standard. Otherwise initial notification providing information on the engine parameters is required for non-emergency engines (certain sizes and older model years only).
- Recordkeeping requirements for emergency generators starting with model years 2011 – 2013 depending on the size.

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Subpart JJJJ – NSPS Spark Ignition Internal Combustion Engines (40 CFR 60.4230 – 60.4248)

- Engines less than or equal to 19 kW manufactured after July 1, 2008 must adhere to emission standards located here <http://www.epa.gov/OMS/standards/nonroad/smallsi-exhaust.htm>.
- Phase 2 for engines manufactured prior to certain years and Phase 3 for engines manufactures after certain years (2008-2011 depending on engine replacement greater or less than 225 cc)

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Subpart JJJJ

- Emission Standards for engines that are for NOx, CO and VOC in grams/bhp-hr and ppm @ 15 O₂ depending on size and model year of engine.
- Depending on whether engine is certified to required standards, notification is required including engine parameters and emissions from performance testing.

NSPS and MACT Standards for Combustion Sources at Utility Authorities

Subpart ZZZZ – Engine MACT Standards (40 CFR 63.6580 through 63.6675)

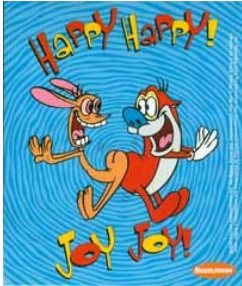
- RICE engines that are either in a major or area source for HAPs.
- MACT standards aim for reduction of CO and formaldehyde emissions depending on the size and model year of the engine.
- Semi annual and annual reports must be submitted based on size and use of engine (emergency or non-emergency).

NSPS and MACT Standards for Combustion Sources at Utility Authorities

When writing or modifying a permit for boilers or engines:

- Check applicability for NSPS and MACT standards
- Look for common monitoring and recordkeeping requirements for federal and state regulations.
- Testing and reporting for federal and state parameters should be done at the same time.
- Submit reports to appropriate personnel (EPA or State Agency).

NSPS and MACT Standards for Combustion Sources at Utility Authorities



Thank You!

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