# NSR/PSD Compliance Workshop

## September 29-October 1, 2026

Jay Hofmann
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# Welcome, Attendees!

- Christian Adejoh - TCEQ
- Emilee Agnew - Kansas KDHE
- Jason Ballard - Oklahoma DEQ
- Isaac Breedlove - TCEQ
- Heather Brister - TCEQ
- David Broussard - TCEQ
- Shanetta Brown - Arkansas DEQ
- Priscilla Carlo-Polanco - TCEQ
- Karen Cerney - Arkansas DEQ
- Laura Chavira Molina - Kansas KDHE
- Chelsea Davis - TCEQ
- Michael Gervasi - TCEQ
- William Hildeson - TCEQ
- Grace Hosek - TCEQ
- Jae Jung - Arkansas DEQ
- Gary Kurtz - Oklahoma DEQ
- Jason La - TCEQ
- Constance Marshall - TCEQ
- John Mazurkiewicz - Arkansas DEQ
- Tan Nguyen - TCEQ
- Sara Norman - TCEQ
- Jay Northern - Arkansas DEQ
- Wisdom Ogheneruie - TCEQ
- Ahmed Omar - TCEQ
- Paula Parker - Arkansas DEQ
- Caroline Parnell - TCEQ
- Rama Patlola - TCEQ
- Bart Patton - Arkansas DEQ
- Victoria Ramirez - TCEQ
- Maryam Rasti - TCEQ
- Prashant Rimal - Kansas KDHE
- Kellen Rowe - TCEQ
- Shai Sabaroche - Arkansas DEQ
- Natalie Savage - Nebraska DEE
- Jesse Smith - Arkansas DEQ
- Madison Snodgrass - Nebraska DEE
- Ann Sudmeyer - Arkansas DEQ
- Adetola Tiamiyu - TCEQ
- Rachel Vo - TCEQ
- Margaret White - TCEQ

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**Instructors profile**

# Jay Hofmann

## Divisional President | Trinity Consultants, Inc.

Jay Hofmann has a bachelor's and a master's degrees in chemical engineering (MIT) and a master's degree in atmospheric sciences (University of Arizona). Mr. Hofmann has extensive experience and is an authority on Clean Air Act regulations, air pollution (source) impact assessments, air pollution control technologies, and environmental management systems. He is particularly knowledgeable regarding new source permitting and compliance requirements. For more than three decades, Mr. Hofmann has been the primary instructor of Trinity's NSR/PSD Compliance Workshop. He teaches the public course several times per year in addition to delivering numerous custom presentations for a variety of organizations.

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# NSR/PSD Workshop – Approximate Schedule

- Day 1
  - 8:00 AM to 9:15 AM – Introductions, PSD program history, and overview
  - 9:15 AM to 9:30 AM – Break
  - 9:30 AM to 11:15 AM – Key program definitions
  - 11:15 AM to 11:30 AM – Break
  - 11:30 AM to 1:00PM – Definitions (cont.) and Netting

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# NSR/PSD Workshop – Approximate Schedule

- Day 2
  - 8:00 AM to 9:30 AM – More definitions and PSD applicability assessments
  - 9:30 AM to 9:45 AM – Break
  - 9:45 AM to 11:15 AM – PSD applicability assessments (cont.)
  - 11:15 AM to 11:30 AM – Break
  - 11:30 AM to 1:00 PM – Source Obligation and Evolving PSD Regulation
- Day 3
  - 8:00 AM to 9:30 AM – Control Technology Assessments (BACT)
  - 9:30 AM to 9:45 AM – Break
  - 9:45 AM to 11:15 AM – Air Quality Analysis (dispersion modeling procedures, ambient monitoring, etc.)
  - 11:15 AM to 11:30 AM – Break
  - 11:30 AM to 1:00 PM – Additional Impacts Analysis, Class I Areas, and Non-attainment NSR overview

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## Manual

- The workshop manual
  - Is designed to be a practical reference document for NSR permitting activities
  - Has more material (slides and content) than will be presented during the webinar. The slides will be presented in the same order as contained in the manual. However, a significant number of slides and reference materials contained in the manual will not be presented during the class.

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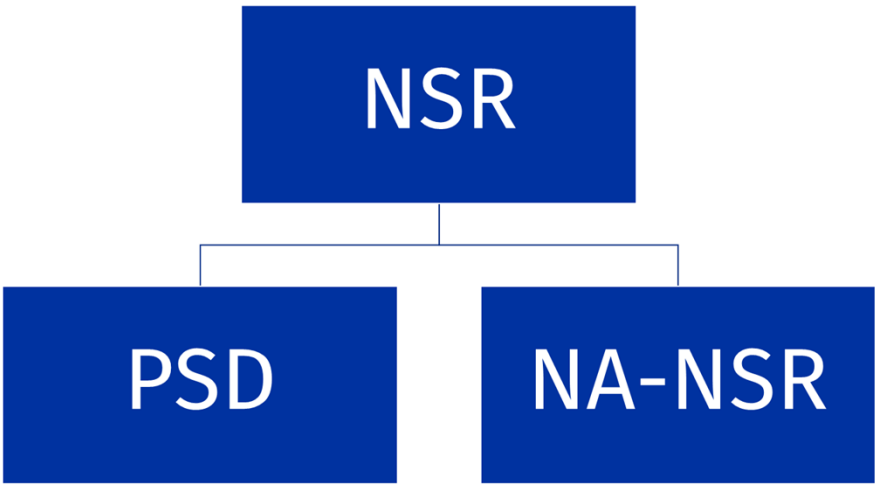
## Course Objectives

- Gain understanding of Major New Source Review (NSR) Permitting Program and Process
  - Major NSR Applicability Assessments
  - Major NSR Permitting Requirements
    - Control Technology Reviews (BACT) and Permit Limits
    - Air Quality Modeling and Ambient Monitoring
    - Additional Impacts
    - Class I Areas
    - Non-attainment NSR
- Have a practical reference text for future NSR permitting activities – The workshop material undergoes continuous updating of contents and referenced material!

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## Major New Source Review (NSR)




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## NSR/PSD COMPLIANCE WORKSHOP

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**Nonattainment Area NSR ..... 9**

## Chapter Handouts

**(Files contained on the workshop Zip Drive)**

### Chapter 2 – Prevention of Significant Deterioration (PSD) Program Applicability

### Definition of Stationary Source

2-A Prevention of Significant Deterioration (PSD) Applicability Determination for Multiple Owner/Operator Point Sources Within a Single Facility

2-A1 Letter from Richard Long, EPA Air and Radiation Program, to Margie Perkins, COAPCD – Source Definition Issue for KN Power/Front Range Energy Associates, LLC/PSCo Generating Facility, Oct 1, 1999

2-A2 Letter from R. Douglas Neeley, Air and Radiation Tech Branch, EPA Region 4, to C.H. Fancy, FDEP – Applicability of Prevention of Significant Deterioration Permitting Requirements, Wellcraft Marine Corporation, Sarasota, Florida, Jan 28, 2000

2-A3 Letter from R. Douglas Neeley, Air and Radiation Tech Branch, EPA Region 4, to Errol Reksten, Chattanooga-Hamilton County Air Control Bureau – Emission source permitting between DUSA & DuPont, Aug 8, 2001

2-A4 Letter from Pamela Blakley, Air Permits Section, EPA Region 5, to John Mayo, JM Products, Inc. – PSD permit withdrawal plus Enclosure, Sep 20, 2006

2-A5 Letter from Cheryl L Newton, Director, Air and Radiation Division, EPA Region 5, to Scott Huber, Summit Petroleum Corp. – Summit Petroleum operations in Mount Pleasant, MI,– Oct 18, 2014

2-A6 Letter from Douglas E Hardesty, Federal and Delegated Air Programs, EPA Region 10, to John Kuterbach, AK DEC – Permitting of Forest Oil's Kustatan Production Facility and Osprey Platform Pursuant to the Alaska SIP – Aug 21, 2001

2-A7 US Court of Appeals Summit Petroleum - Aug 7, 2012

2-A8 Memo from Stephan D Page, US EPA, to Regional EPA Air Division Directors, Regions 1-10 – Applicability for the Summit Decision to EPA Title V and NSR Source Determinations, Dec 21, 2012

2-A9 Letter from Kathleen Cox, Office of Permits & Air Toxics, EPA Region 3, to Troy D Breathwaite, VA DEQ – General Power Corp - Green River LLC, Jan 10, 2012

2-A10 Letter from Gregg M Worley, Air Permits Division, EPA Region 4, to James Capp, GA DNR – Gas-to-Energy plant operated by PowerSecure, Dec 16, 2011

2-A11 Letter from Pamela Blakley, Air Permits Section, EPA Region 5, to Don Smith, MPCA – MPCA decision to permit EWS and DESP, Mar 23, 2010

2-A12 Letter from William A Spratlin, Director, Air, RCRA and Toxic Div, US EPA, to Peter R Hamlin, IA DNR – Stationary Source Determination, Sep 18, 1995

2-A14 Letter from Mark A Smith, Air and Waste Mgmt Division, EPA Region 1, to Douglas L McVay, RI DEM – Determination from EPA, Mar 25, 2016

2-A16 Letter from William L Wehrum, US EPA, to Patrick McDonnell, Secretary, PA DOEP - Review submitted on behalf of Meadowbrook Energy LLC on emissions from a biogas processing facility, Apr 30, 2018

2-A17 Letter from Becky Weber, US EPA, to Kevin Stoner, NE DEQ – Pacific Aurora, LLC. Response to stationary source applicability determination, Feb 1, 2018

2-A18 Draft EPA Memo - Interpreting "Adjacent" for NSR and Title V Source Determinations in All Industries Other Than Oil and Gas, Sep 4, 2018

2-A19 Letter from EPA Region 5 to William Baumann, Chief WDNR - Oscar Mayer Foods facility, Aug 25, 1999

2-A20 Letter from EPA Region 4 to James Capp, GA DNR – Common control determination concerning the landfill gas-to-energy plant, Dec 16, 2011

2-A21 Letter from US EPA to Gail Good, WI DNR – Source determination that WI DNR is making for landfill, Oct 16, 2018

2-A22 Memo from Anne L Idsal, US EPA to EPA Regional Administrators - Interpretation of regulations that determine the scope and extent of a stationary source – Nov 26, 2019

2-A23 August 2, 1996 - Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs of the Clean Air Act (Act) – John Seitz (OAQPS).

2-DD EPA Memo: Source Determination Analysis for River Bend Dehydrator Site – Aug 9, 2017

**Definition of a Major Stationary Source**

2-GG EPA Region 5 letter to Dell Collins, Impell Power Projects, September 30, 1987

2-HH EPA Region 4 letter to Harry M Wilson Environment Permit Divisions MDEQ – Jun 27, 2011

2-II EPA Region 4 letter to Ms. E.A. Veronica Barringer Bureau of Air Quality South Carolina Department of Health – Jun 4, 2007

2-KK EPA Region 4 letter to Mecklenburg County Dept of Enviro Protection – Feb 18, 1998

2-LL EPA Region 5 letter to MPCA - Williams Pipeline – Nov 11, 2003

2-A15 Letter from Mark Smith, EPA Region 8, to Catharine Fitzsimmons, Iowa Dept of Natural Resources – Response to letter dated Aug 24, 2016 requesting EPA guidance to Iowa Dept of Nat Resources by John Deere Dubuque Works in Dubuque, Iowa - Nov 10, 2016

2-QQ EPA Region 1 letter to Excelerate Energy, L.P., - Emissions from vessels - Aug 13, 2020

2-SS Letter from William B. Hathaway, Director, Air, Toxics and Pesticides Division, EPA Region 6, to Steve Spaw, P.E. Deputy Executive Director, Texas Air Control Board - Request for PSD Applicability Determination Golden Aluminum Company, Jul 28, 1989

**Routine Maintenance, Repair and Replacement (RMRR) Exclusion**

2-D Air Issues Review, Number 24: Interpreting "Routine Maintenance, Repair, and Replacement," Apr 2000

2-F Enforcement Alert: Compliance with Permitting Critical to Clean Air Act Goals, Jan 1999

2-G Letter from Francis X Lyons, Reg Admin, to Henry Nickel, Counsel for Detroit Edison Co – Detroit Edison Company Dense Pack Project, Monroe Power Plant, May 23, 2000

2-H Letter from R. Douglas Neeley, Air and Radiation Tech Branch, to Jimmy Johnston, GA EPD – Recovery Furnace Maintenance, Repair, and Replacement Project PCA Pulp and Paper Mill, Sep 13, 2000

2-R Letter from Steven Riva, Air Programs Branch, EPA Region 2, to Thomas Micai, NJ DEP – EPA Findings for the Review of the Turbine Replacement Issue, PSE&G Plants, Apr 1, 1999

2-J Notice of Violation – General Chemical Corporation, Anacortes, WA, Mar 21, 2000

2-P US District Court – Sierra Club v Michael Morgan, Jay Ehrfurth, John Wiley and Kevin Reilly, Nov 7, 2007

2-V Letter from Robert B Miller, Permits and Grants Section, EPA Region 5, to Steven Dunn, WI DNR – P.H. Glatfelter permit determination, Jan 29, 2003

2-V1 Wisconsin Electric Power Company v. William K. Reilly, Administrator, US EPA

2-V2 Applicability of PSD and NSPS Requirements to the WEPCO Port Washington Life Extension Project – 9/9/88

2-X Louisiana Department of Environment Quality v. Louisiana Generating, LLC – Civil Action NO. 09-100-JJB-CN, Sep 18, 2012

2-Y Commonwealth of Pennsylvania, Department of Environmental Protection, et. al. versus Allegheny Energy, Inc., et. al. Civil Action NO: 05-885, Feb 6, 2014

2-CC EPA Region 9 - Supplemental PSD Applicability Determination, Cyprus Casa Grande Corporation Copper Mining and Processing Facilities, Nov 6, 1987

2-MM Letter from David Neliegh, EPA Region 6 to OK DEQ – Wynnewood Refining Company, Feb 12, 2004

2-NN Letter from EPA Region 4 to TN DEQ – Proposed Determination for pulp and paper mill in Counce, TN, Sep 14, 2001

2-OO Letter from Robert Miller to Marathon Ashland Petroleum – Request for PSD Applicability Determination, Aug 6, 2002

2-PP The Routine Overhaul of Natural Gas-Fired Combustion Turbines in Interstate Natural Gas Transmission Service, Dec 2004

2-WW Tennessee Valley Authority – Final Order on Reconsideration – EAB – September 15, 2000.

**Alternative Fuels Exclusion**

2-E Air Issues Review, Number 27 - Exploring the NSPS and PSD "Alternative Fuels" Exemption, Jun 2001

2-Q Letter from John S. Seitz, EPA Office of Air Quality Planning & Standards, to Howard L Rhodes, FL DEP – Request that EPA Repeal the Alternative Rules Exemption, Jan 21, 1998

2-U Letter from Winston A Smith, Air, Pesticides & Toxics, EPA Region 4, to Ronald W Gore, AL DEM – Request for Clarification of EPA Guidance on the Alternative Fuels Exemption under the PSD Program, Jan 21, 2000

2-JJ Memo in Response to Request for PSD Applicability Determination, Jun 7, 1988

**Debottleneck/Associated Emissions**

2-K Letter from Jole C. Luehrs, NSR Section, to Larry Devillier, LA DEQ – Application from Union Carbide Chemicals and Plastics, Sep 17, 1993

2-L Letter from Rebecca Weber, Dir Air Multimedia Planning Permits Div to Bliss Higgins, LADEQ – RE: Motiva Enterprises – Low Sufur Gasoline Project – July 25, 2001

**Particulate Matter Testing**

2-S EPA Fact Sheet – Final Rule-Implementation of the NSR Program for Particulate Matter less than 2.5 Micrometers

2-T Memo from Stephen D Page, US EPA Office of Air Quality Planning and Standards, to EPA Regional Air Directors – Interim Guidance on the Treatment of Condensable Particulate Matter Test Results in the PSD and Nonattainment NSR Permitting Program, Apr 8, 2014

2-T1 Condensable PM Adjustment for Ammonium Sulfate Formation in M202 Test Results

2-VV November 21, 2024 - Condensable PM Adjustment for Ammonium Sulfate Formation in M202 Test Results

**Project Aggregation/Sham Minor Permits**

2-B Memo from Terrell E. Hunt, Air Enforcement Division (EPA) - Guidance on Limiting Potential to Emit in NSR Permitting, Jun 13, 1989

2-M Letter from Gregg M. Worley, Air Permits Section EPA Region 4, to Heather Abrams, GAEPD – Southwire Company – Jul 5, 2005

2-N Memo from John B Rasnic, US EPA Stationary Source Compliance Division, to George T Czerniak, US EPA Region 5 - Applicability of NSR Circumvention Guidance to 3M, 1993

2-O Letter from Cheryl L Newton, US EPA Permits and Grants Section, to Mike Hopkins, Ohio EPA – Permit Modifications for Honda of America, Aug 8, 1996

2-RR Letter from US EPA Region 7 to IA DNR – Relaxation of Synthetic Minor Limits in Permits, Sep 1, 2021

**Fugitive Emissions**

2-W Memo from John S. Seitz to EPA Regional Directors – Classification of Emissions from Landfills for NSR Applicability Purposes, Oct 21, 1994

2-BB EPA Region 5 Correspondence to States – Analysis: What Effect Did the November 27, 2001, Title V Rulemaking (66 FR 59161) Have on the Counting of Fugitive Emissions? Mar 6, 2003

2-TT Interpretation of the Definition of Fugitive Emissions in Parts 70 and 71, February 10, 1999

**Potential to Emit**

2-C Calculating Potential to Emit – Clear as Mud? – Janet Alfermann, PE

2-EE Letter from Monica Mathew–Morales, EPA Region 8 to Bob Georgius, Merit Energy, Merit Energy NSR Permit Application, May 25, 2018

**Miscellaneous Topics**

2-Z USA, Environmental Defense NC Sierra Club and NC Public Interest Research Group v. Duke Energy Corporation – 1:00CV1262, Mar 17, 2014

2-A13 Court of Appeals - NEDACAP Petitioner v. US EPA (Decision to vacate the Summit Directive), May 30, 2014

2-AA1 USA v. Ameren Missouri - Case No. 4:11 CV 77 RWS, Feb 24, 2016

2-AA2 EPA v. Ameren Missouri ED 4-11 CV 77 RWS, Jan 23, 2017

2-FF Memo from Anne L Idsal, US EPA, to EPA Regional Air Division Directors - Interpretation of "Begin Actual Construction" Under the New Source Review Preconstruction Permitting Regulations, Mar 25, 2020

2-UU Draft Preamble to Revised Part 51 and Part 70 (2/18/1998)

2-XX USA, No 78-1006 Alabama Power Co. vs. Costle (12/14/79)

2-YY December 5, 1974, PSD Rules (12/5/74)

**Chapter 3 – Emissions Netting**

3-A Memo from John Calcagni, US EPA, to Bruce P. Miller, EPA Region 9 – In response to memo concerning EPA's position on netting, Dec 29, 1989

3-B Memo from John S. Seitz, US EPA Office of Air Quality Planning and Standards, to Bob Hannesschlager, EPA Region 9, Multimedia Planning & Permitting Div – Crediting of MACT Reductions for NSR Netting and Offsets, Nov 12, 1997

3-C Memo from John Calcagni, US EPA), to William B Hathaway, EPA Region 9, Air, Pesticides & Toxics Div - Request for Clarification of Policy regarding the "Net Emissions Increase," Sep 18, 1989

## Chapter 5 – Calculating Baseline and Projected Emissions

### Plant-wide Applicability Limits

5-A Letter from Pamela Blakley, Air Permits Section, to Donald Sutton, IL EPA - US EPA interpretation on 5-year lookback period for establishing a PAL for electric utility, May 11, 2005

5-D Letter from Pamela Blakley, Air Permits Section, to Nisha Sizemoren, IN DEM – Essroc Plant-wide Applicability Limitation Permit (No. 019-21450-00008), Mar 26, 2007

5-V Letter from Anna Marie Wood to Bart E Cassidy - Elements of NSR Regulations and the PAL

5-W Letter from Stephen Page, US EPA Office of Air Quality Planning and Standards, to David Isaacs, Semiconductor Industry Association, Concerning PALs, Dec 22, 2011

5-CC Memo – Final Guidance on Plant-wide Applicability Limitation Provisions Under the NSR Regulations, Aug 4, 2020

### Emissions Netting

5-H Letter from Cheryl L Newton, Air and Radiation Div, to Keith Baugues, IN DEM – ATPA applicability test for PSD & NNSR permitting, Apr 4, 2011

### Greenhouse Gases

5-I Memo from Janet G McCabe, US EPA Office of Air and Radiation, to EPA Regional Administrators – Next Steps and Preliminary Views on the Application of CAA Permitting Programs to GHG Following the Supreme Court's Decision in Utility Air Regulatory Group v. EPA, July 24, 2014

5-OO Petition for Reconsideration if EPA'S Final Rule: Rescission of The Greenhouse Gas Endangerment Finding and Motor Vehicle Greenhouse Gas Emission Standards Under The Clean Air Act, April 15, 2026

### Reactivation

5-J Petition No 6-99-2 Order responding to Petitioner's request that the administrator object to issuance of a state operating permit – Monroe Electric Generating Plant Entergy Louisiana, Inc., Proposed Operating Permit, Aug 12, 1999

5-T Letter from US EPA to LeAnn Johnson Koch, Perkins Coie, regarding Limetree Bay Terminals St. Croix, US Virgin Islands – Permitting Questions, Apr 5, 2018

5-T1 Letter from US EPA to Julie R. Domike, Esq. and Thomas V. Eagan, Esq., regarding Limetree Bay Refinery, St. Croix, US Virgin Islands – November 16, 2022

5-T2 July 25, 2023 - Port Hamilton Refining versus EPA – US Court of Appeals for the Third Circuit

5-T3 September 18, 2025 – New Source Review Program "Reactivation Policy"

### Replacement Units

5-U Letter from US EPA to Michael G Dennis, Newport News Shipbuilding, Replacement Unit, Mar 20, 2018
5-U1 Letter from EPA Region 10 to AK DEC – Replacement unit interpretation in PSD, May 12, 2017

**Preconstruction Obligations**

5-F Letter from Dianne McNally, Office of Permits & Air Toxics, to Mark Wejkszner, PA DEP – PADEP draft plan approval for the Northhampton Generating Co. – NSR PSD, Apr 20, 2010
5-M Memo from E Scott Pruitt to EPA Regional Administrators – NSR Preconstruction Permitting Requirements, Dec 7, 2017
5-M1 Enforceability and Use of the Actual-to-Projected-Actual Applicability Test in Determining Major Modification Applicability: Rescission of 2017 Memorandum, Dec 9, 2022
5-M2 September 15, 2025 – Reinstatement of 2017 Policy (Handout 5-M)
5-N USA, Sierra Club vs DTE Energy Nos. 14-2274/2275 Appeal from USDC for the Eastern District of Michigan at Detroit, Jan 10, 2017
5-O United States v DTE Energy et al., Civil Action 10-13101 USA vs Natural Resources Defense Council, Inc and Sierra Club, Aug 23, 2011
5-P USA vs DTE Energy Company Case No 11-2328 – March 28, 2013
5-Q United States v DTE Energy et all Civil Action 10-13101 USA vs Natural Resources Defense Council, Inc and Sierra Club Opinion & Order Granting Defendants Motion for Summary Judgment – March 3, 2014
5-R Memo from EPA – Project Emissions Accounting under the NSR Preconstruction Permitting Program, Mar 13, 2018

**Project Emissions Accounting ("Project Netting")**

5-G Letter from Barbara A Finazzo, Div of Environmental Planning and Protection to Kathleen Antoine, HOVENSA – HOVENSA Gas Turbine Nitrogen Oxides PSD Permit Application-Emission Calculation Clarification, Mar 30, 2010
5-S Letter from EPA to Kathleen Antoine, Enviro Dir, - HOVENSA Gas Turbine Nitrogen Oxides – Mar 30, 2010. EPA's retraction of Handout 5-G.
5-AA Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Project Emissions Accounting – Final Rule, Nov 24, 2020
5-EE US EPA Letter to Sierra Club – Denying petition to stay PEA rule, October 12, 2021
5-GG May 3, 2024 (89FR 36870) - Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Regulations Related to Project Emissions Accounting
5-HH November 14, 2025 - DC Court of Appeals, Case Number 18-1149, Petitioners' Proof Opening Brief
5-II January 26, 2026 – EPA Proof Brief for DC Circuit Court Case 18-1149
5-KK March 27, 2026 – Petitioners' Opening Brief
5-LL March 27, 2026 – Final Brief for US Environmental Protection Agency
5-MM March 27, 2026 – Brief of Intervenor-Respondents Air Permitting Forum
5-NN March 27, 2026 – Petitioners' Reply Brief
5-PP July 28, 2026 - United States Court of Appeals (DC) - Case No. 18-1149. Project Emissions Accounting.

**Debottleneck Projects**

5-B Letter from Sam Portanova, Air Permits Section, to Steve Dunn, WIDNR – Regulatory aspects of a potential project at the Murphy Oil USA in Superior, WI, Feb 24, 2005

5-DD EPA Archived document – July 28, 1983. Memo: USEPA to EPA Region X, PSD Applicability Pulp and Paper Mill

**Excluded Emissions**

5-C NCASI Southern Regional Meeting - Presentation: NSR Reform Rule and its Implementation in Region 4 States – Contact: Jim Little, US EPA – Jun 27, 2006

5-E Letter from Gregg M. Worley, Air Permits Section, to Mark Robinson, GP Wood Products – MSDEQ 502(b)(10) change request, Nov 16, 2009

5-K Letter to Kate Gleeson, Atty, KS Dept of Health and Environment – Columbian Chemicals, Dec 17, 2015

5-L ADM Decatur West Soybean Plant, Aug 27, 2015

**Project Aggregation**

5-X Letter from USEPA to Alan Prouty, JR Simplot Company, 3 issues – debottlenecking, aggregation and the projected actual emissions exclusion provision of 40 CFR 52.21(b)(41)(ii)(c)), Aug 29, 2013

**Source Obligation**

5-Y FL DEP – Permit No 1130037-013-AC, Sep 19, 2011

5-BB Letter from US EPA to Attorney General of NJ – Reasonable Possibility rule reconsideration, Nov 5, 2019

**Fugitive Emissions Exclusion**

5-Z Counting GHG Fugitive Emissions in Permitting Applicability

**Chapter 6 – Best Available Control Technology (BACT)**

**BACT Guidance on Air Pollution Controls**

6-A Draft for Public Review – $NO_X$ Control on Combined Cycle Turbines, August 4, 2000

6-B Letter from Robert S Kripowicz, Office of Fossil Energy & Melanie A. Kenderdine, Office of Policy, to Pamela J Smith, US EPA – Draft Guidance on BACT for $NO_X$ Control at Combined Cycle Turbines, Sep 18, 2000

6-D Letter from Lori Kaplan, Commissioner, Thoroughbred Generating Station, Muhlenberg County, KY, to Jeffrey Holmstead, US EPA, Nov 12, 2002

6-MM Best Available Control Technology Requirements for Proposed Coal-Fired Power Plant Projects, Dec 13, 2005

6-SS Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Combustion Turbine Electric Generating Units – 4/21/22

6-UU New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions From Existing Fossil Fuel-Fired Electric Generating Units – May 9, 2024

**Defining Emission Unit for BACT Purposes**

6-C Letter from Donald C Toensing, US EPA Air Permitting & Compliance Branch, to Wayne E Penrod, Sunflower Electric Power Corp – Sunflower's application for a PSD permit for a proposed steam-electric generating plant near Holcomb, KS – Aug 28, 1998

6-C1 Letter from Judith M. Katz, Director Protection Division, EPA to John M Daniel, Commonwealth of Virginia – Response to June 22, 2000 letter; PSD/BACT questions, Nov 30, 2000

6-II Letter from Stephen D Page, US EPA, to David Isaacs, Semiconductor Industry Assoc., concerning permitting for semiconductor industry, Aug 26, 2011

**GHG BACT Guidance**

6-F Interim Phase I Report of the Climate Change Work Group of the Permits – NSR and Toxics Subcommittee, CAA Advisory Committee, Feb 3, 2010

6-G Phase II Report of the Climate Change Work Group of the Permits – NSR and Toxics Subcommittee, CAA Advisory Committee, Aug 5, 2010

6-H CAA Permitting for GHG: Guidance and Technical Information Questions and Answers

6-I CAA Permitting for GHG: Guidance and Technical Information – FACT Sheet

**Example GHG BACT Permits**

6-E Letter: To Ed Bakowski, ILEPA – From: Genevieve Damico, Air Permits Section – Re: PSD construction permit for Christian County Generation – Taylorville, IL – Dec 29, 2011

6-J Letter from Genevieve Damico, Air Permits Section, to Ed Bakowski, IL EPA – PSD permit for Universal Cement in Chicago, IL, Nov 18, 2011

6-K Letter from Gregg M Worley, Air Permits Section, to Barry Stephens, DAPC – PSD permit application for proposed US Nitrogen facility in Green County, TN, Aug 8, 2011

6-L PSD Permit for GHG Emissions Issued Pursuant to the Requirements at 40 CFR § 52.21 – Sand Hill Energy Center

6-M PSD Permit for GHG Emissions Issued Pursuant to the Requirements at 40 CFR § 52.21 – PDH Chocolate Bayou Plant

6-N Letter from Kathleen Cox, Office of Permits and Air Toxics, to Paul Foster, DEDNR&EC – Draft Permit for Garrison Energy Center, Aug 7, 2012

6-O Letter from Kathleen Cox, Office of Permits and Air Toxics, to Charles King, VADEQ – Draft Permit for Gateway Cogeneration I, Aug 7, 2012

6-P Letter from Gregg Worley, Air Permits Section, to Jim Attar, DEC – PSD Permit Preconstruction Review, Prelim Determination and Draft PSD Permit for Gibson County Generation, Oct 1, 2012

6-Q PSD Permit for GHG Emissions #PSD-TX-1288-GHG – La Paloma Energy Center, Harlingen, TX, Mar 20, 2013

6-U PSD Permit for GHG Gas Emissions Issued Pursuant to the Requirements at 40 CFR 52.21 – Flint Hills Resources Corpus Christi, May 23, 2014
6-W Letter from Kyle Ivar Winter, PE, Commonwealth of Virginia, to Mark D Mitchell, Virginia Electric and Power Co – RE: Permit to construct and operate an electric power generation facility
6-CC MI DOE Permit to Install 19-18 Issued to DTE Electric Company – Belle River Combined Cycle – Region
6-DD VA DEQ Permit to Construct and Operate - C4GT, LLC (NOVI Energy) - Charles City VA – Region 3
6-FF MI DOE, Great Lakes and Energy Air Quality Division – Permit to Install 186-17 (revised), Apr 18, 2019
6-GG Letter from Michael Hopkins, OH EPA, to Jack Payne, PTTGCA Petrochemical Complex, Dec 12, 2018
6-JJ Westlake Vinyls, Calvert City, KY, EPA Region 4 – GHG BACT Permit, November 13, 2020
6-JJJ Supplemental Guidance on Implementing the North County Prevention of Significant Deterioration (PSD) Remand – July 28, 1988
6-KK Nucor Steel Gallatin, LLC, Ghent, KY, EPA Region 4 – GHG BACT Permit, April 19, 2021
6-OO Midwest Fertilizer Company, LLC, Mt. Vernon, IN, EPA Region 5 – GHG BACT, May 6, 2022
6-PP Nucor Steel, Arkansas, Blytheville, AR, EPA Region 6 – GHG BACT
6-VV Valero Refining New Orleans, LA (10/24/23) – EPA Region 6
6-WW Marathon Petroleum Garyville, LA (12/4/23) – EPA Region 6
6-XX Cronus Chemicals (Ammonia Plant) Tuscola, IL (12/21/23) – EPA Region 5
6-YY Calpine Corporation (Pealing Plant) Fairfield, IL (7/6/24) – EPA Region 6
6-AAA Freestone Peakers Plant (Peaking plant) Fairfield, TX (6/12/24) – EPA Region 6
6-BBB Shintech Louisiana Plaquemine, LA (12/16/24) – EPA Region 6
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6-FFF Rayburn Country Electric Cooperative, Sherman, TX (2/11/26) – EPA Region 6
6-GGG Pecos Power Plant, Pecos, TX (3/27/26) – EPA Region 6
6-HHH MPH BASTROP PEAKERS, Cedar Creek, TX (3/25/26) – EPA Region 6
6-III Clean Energy Future, Lordstown, OH (original PSD Permit issued on 3/11/2020)

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6-R EAB Petition for Review of PSD Permit issued by Region 6 for La Paloma Energy Center, Harlingen, TX
6-R1 EAB PSD Appeal No. 13-10 RE: La Paloma Energy Center, LLC; decided Mar 14, 2014
6-R2 EAB PSD Appeal No. 16-01 RE: Arizona Public Services Company, Sep 1, 2016
6-X 9th Circuit Appeal – Helping Hand Tools v. US EPA, Sep 2, 2016
6-Y Defining and Redefining the "Source" for the PSD BACT Analysis
6-BB EAB Appeal for Palmdale Energy, LLC PSD Permit NO SE 17-01 Order Denying Review, October 23, 2018
6-EE EAB PSD Appeal No 13-11, Order Denying Review ExxonMobil Chemical Co Baytown Olefins Plant, May 14, 2014

6-LL US Court of Appeals – Algonquin Gas Transmission BACT Decision, Dec 20, 2021
6-NN EAB PSD Appeal – Prairie State Generating Company - No. 05- 05, Aug 24, 2006
6-QQ EAB PSD Appeal – Pico Energy Center, Nos. 12-04 through 12-06, Aug 2, 2013
6-RR EPA Region 6 comments on Port Arthur LNG Facility in Jefferson County, Texas Aug 31, 2022
6-TT Port Arthur Community Action Network versus Texas Commission on Environmental Quality – US Fifth Circuit Court (Case Number 22-60556) – 11/14/23
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6-V Memo from Janet G McCabe, Office of Air and Radiation, to Air Division Directors, Regions 1-10 – Addressing Biogenic Carbon Dioxide Emissions from Stationary Sources, Nov 19, 2014
6-V1 August 2019 AF&PM Article: Forest Biomass Residuals Worthy of Carbon Neutral Recognition
6-V2 EPA's Treatment of Biogenic Carbon Dioxide (CO2) Emissions from Stationary Sources that Use Forest Biomass for Energy Production, Apr 23, 2018

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6-S Memo from Stephen D. Page, Office of Air Quality Planning and Standards, to Regional Air Division Directors, Regions 1-10, Guidance on Extension of PSD Permits under 40 CFR 52.21(r)(2), Jan 31, 2014

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6-T Memo from Gary McCutchen, NSR Section SIB, to J. David Sullivan, ALO Enforcement Section Reg VI —- Request for Determination on BACT Issues, Nov 19, 1987

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6-Z RBLC Process Type Codes
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6-AA Current Timeline for Activities Needed for Development of EPA Air Pollution Control Cost Manual, 7th Edition, September 2024
6-HH Carbon Dioxide Transport and Storage Costs in NETL Studies, Aug 19, 2019

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7-A Memo from Robert Bauman, SO2/Particulate Matter Programs Branch, to Gerald Fontenot, Air Programs Branch Reg VI – Ambient Air, Oct 17, 1989

7-A1 Memo from Stephen Page, Office of AQ Planning & Standards to Regional Air Division Directors Regions 1-10 – Interpretation of "Ambient Air" in Situations Involving Leased Land Under the Regs for PSD, Jun 22, 2007

7-A2 US EPA – Revised Policy on Exclusions from Ambient Air, Dec 2, 2019

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7-B Memo from John Calcagni, AQ Mgmt Div to Thomas Maslany, Air Mgmt Div Region III & William Hathaway, A, Pesticides, & Toxics Div Region VI – Use of Allowable Emissions for NAAQS Impact analyses Under the Requirement for PSD, Mar 16, 1989

7-K Final Guidance on Developing Background Concentrations for Use in Modeling Demonstrations – Nov 2024

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7-C Guidance on the Use of Models for Assessing the Impacts of Emissions from Single Sources on the Secondarily Formed Pollutants: Ozone and $PM_{2.5}$

7-D Guidance for Ozone and Fine Particulate Matter Permit Modeling, July 29, 2022

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7-H Memo from Peter Tsirigotis, US EPA, to Regional Air Divisions Directors, Regions 1-10 – Guidance on Significant Impact Levels for Ozone and Fine Particles in PSD Permitting Program, Apr 17, 2018

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7-G Memo from Tyler Fox, Leader, to Regional Dispersion Modeling Contacts – Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour N02 National Ambient Air Quality Standard, Mar 1, 2011

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7-N1 Alternative Demonstration Approach for the 1971 Secondary 3-Hour Sulfur Dioxide National Ambient Air Quality Standard under the Prevention of Significant Deterioration Program – Oct 10, 2025

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7-M December 27, 2024 – Federal Register – EPA 40 CFR Part 50
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7-Q December 23, 2025 - EPA Reply Brief – 2024 PM2.5 NAAQS DC Circuit Court Case
7-R June 26, 2026 – DC Circuit Court Case Number 24-1050. COMMONWEALTH OF KENTUCKY, ET AL. v. EPA

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8-D Map produced by the National Park Service Resources Division: National Park Service Class I Areas, Feb 22, 1999

**Class I Visibility Impact Assessment Guidance**

8-L 4/16/13 - Letter from USEPA to North Carolina DAQ – Class I Visibility Impact Assessment Requirements
8-R Workbook for Plume Visual Impact Screening and Analysis – October, 1992

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8-E Appendix C – General Policy for Managing Air Quality Related Values in Class I Areas

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8-F Memo from Tyler Fox, AQ Modeling Group, to Regional Modeling Contacts – Clarification on EPA-FLM Recommended Settings for CALMET, Aug 31, 2009

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8-H December 2022 – EPA Memorandum - EJ in Air Permitting Principles for Addressing Environmental Justice Concerns in Air Permitting
8-I August 2022 - Interim Environmental Justice and Civil Rights in Permitting - Frequently Asked Questions

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8-K January 2023 - EPA Legal Tools to Advance Environmental Justice: Cumulative Impacts Addendum
8-M March 12, 2025 – Implementing National Enforcement and Compliance Initiatives Consistently with Executive Orders and Agency Priorities
8-N January 21, 2025 – Ending Illegal Discrimination and Restoring Merit-Based Opportunity
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8-G National Park Services – Federal Land Managers' Interagency Guidance for Nitrogen and Sulfur Deposition Analyses, Nov 2011
8-O A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas – January 1989
8-P A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals – December 1980
8-Q Air Quality Criteria for Oxides of Nitrogen – August, 1993

**Chapter 9 – Nonattainment Area NSR**

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9-A GA EPD – Alternatives Analyses Guidelines, Jan 23, 2002
9-T IL EPA – Attachment D: Analysis of Alternatives to the Proposed Project
9-V Texas Table 6N – Alternative Site Analysis for Texas

**8-Hour Ozone NAAQS Implementation Rule/Area Classifications**

9-B Memo from Robert Meyers, Principal Deputy Assistant Admin to Regional Administrators, Regions I-X – NSR Aspects of the Decision of the US Court of Appeals for the DC Circuit on the Phase 1 Rule to Implement the 8-Hour Ozone NAAQS, Oct 3, 2007
9-C Letter from David S Baron, Attorney, to Air & Radiation Docket & Information Center – Docket ID No. EPA-HQ-2007-0956, Proposed Rule to Implement 1997 8-Hour Ozone NAAQS
9-E US Court of Appeals – No. 08-1200, State of Mississippi Petitioner v. EPA County of Nassau, et al., Jul 23, 2013
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9-I Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements (78FR 34178), Jun 6, 2013

9-J Implementing EPA's 2015 Ozone Air Quality Standards, Apr 17, 2018

9-K Letter from Janet McCabe, US EPA, to Regional Administrators, Regions 1-10 Area Designations for the 2015 Ozone National Ambient Air Quality Standards, Feb 25, 2016

9-P Anna Marie Wood, Air Quality Policy Division – NAAQS and Other Implementation Updates, Apr 5, 2018

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9-H Memo from Gina McCarthy, Assistant Admin, to Regional Air Division Directors, Regions 1-10 – Revised Policy to Address Reconsideration of Inter-pollutant Trading Provisions for Fine Particles ($PM_{2.5}$), Jul 21, 2011

9-R Letter from US EPA to Krishnan Ramamurthy – Approval of First Quality Tissue inter-precursor trade to offset a significant net emissions increase, Feb 8, 2019

9-S Technical Guidance for Demonstration of Inter-Precursor Trading (IPT) for Ozone in the Nonattainment New Source Review Program, May 2018

9-U DC Circuit Case No 15-1465, January 29, 2021

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9-O Memo from John Calcagni, Director Air Quality Mgmt, to David Kee, Director Air & Radiation Division – Guidance on Determining Lowest Achievable Emission Rate (LAER), Feb 28, 1989

**Permit Appeal Petitions**

9-Q Review Order Governing Petitions for Review of Clean Air Act NSR Permits, March 27, 2013

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9-W Guidance on Clean Air Act Nonattainment New Source Review Emissions Offsets (July 1, 2026)

# Appendices

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| | |
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| B1 | NSR Reform |
| B2 | e-CFR 52-21 – PSD |
| B3 | FR Flex Rule Oct 6_09 |
| B4 | Tailoring Rule FR |
| B6 | PSD_GHG_Step3_Fina_2012 |
| C1 | e-CFR 51 - 165 – Permit Requirements |
| C2 | e-CFR 51 - 166 – PSD of AQ |
| C3 | e-CFR Subpart X |
| C4 | e-CFR 51 Subpart Z |
| D1 | EPA Method 201_202 |
| E2 | FR – Vol 38, No 221 Thursday, November 15, 2018 |
| E3 | PSD FUG Stay 0410 |
| E5 | FR-PSD SIL_increments 2010 |
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| L1 | Guidance_1-HourSO2NonAtt_Area_SIP_Submission |
| L2 | SO2 NAAQS Designations Modeling Technical Asst Doc Aug 2016 |
| M1 | FR_SIP_MP2 - 5_NAAQS_2014-10395 |
| N1 | GuidancePM2.5_PermitModeling |
| O1 | OzoneNAAQS_2014_Proposal |
| P1 | PSD_May_2015_Direct_rule_FR |
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| R1 | Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements – 8/24/16 |
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| T1 | 2015 Ozone NAAQS FR |
| U1 | TSD_PSD and NA NSR Reconsideration 10 2003 |
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| W | Revised Modeling Guidance 40 CFR 51 App W |
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| Y1 | The Environmental Appeals Board Practice Manual |

# Chapter 1

Overview of Air Quality Regulations and Permitting

## Clean Air Act Evolution

- 1963 Clean Air Act
- 1967 Air Quality Act
- 1970 Clean Air Act
  - NAAQS, SIPs, NSPS, NESHAPs
- 1977 Clean Air Act Amendments
  - PSD, NA-NSR
- 1990 Clean Air Act Amendments
  - Title V, Toxics, ODS
  - Expansion of federal authority
- 2022 Clean Air Act Amendment
  - Added Sections 132 to 138 – Elements contained in the Inflation Reduction Act

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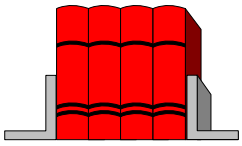
## Titles of the Clean Air Act

| | |
|---|---|
| *Title I:*<br>*Air Pollution*<br>*Prevention & Control* | Title III:<br>General |
| *- Emission Limits (Part A)* | Title IV:<br>Acid Deposition Control |
| *- PSD (Part C)* | *Title V:*<br>*Permits* |
| *- Nonattainment (Part D)* | |
| Title II:<br>Mobile Sources | Title VI:<br>Stratospheric Ozone<br>Protection |

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## Code of Federal Regulations

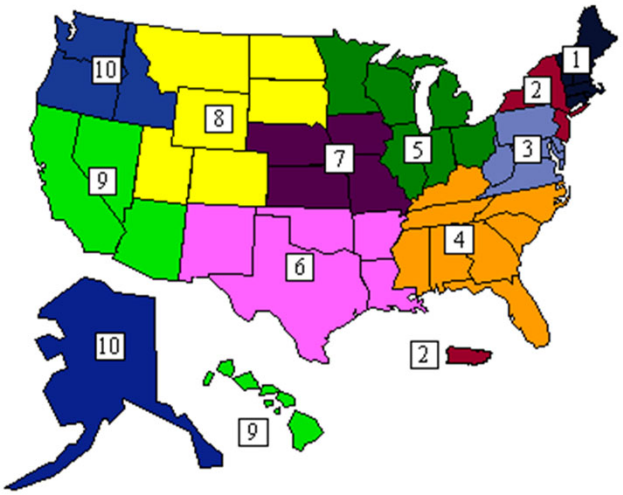
- Rules of the Executive departments and agencies of the U.S. Government
- 50 Titles
  - Title 40: Protection of Environment
- Chapter 1, Subchapter C (Parts 50 to 99) contain air regulations



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## U.S. EPA Regional Offices




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## Goal of 1970 Clean Air Act Amendments

**“To protect and enhance the quality of the nation’s air resources so as to promote the public health and welfare and productive capacity of its population.”**



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## Achieving the Goal of the Clean Air Act

- Establish benchmarks - NAAQS
  - Control emissions of air pollutants where necessary to protect and enhance air quality
- Federal programs regulating certain industries and sources (e.g., NSPS, NESHAP)
  - Control emissions of air pollutants where practically and economically feasible
- Require states to develop “State Implementation Plans” (SIPs)
  - Review of new/modified stationary sources (permitting)

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## National Ambient Air Quality Standards (NAAQS)

- 6 criteria pollutants used as indicators of air quality
- Maximum ambient concentration levels
  - Adverse effects on human health or public welfare can occur above these levels
  - Thresholds termed the “National Ambient Air Quality Standards”
- Areas where air concentrations exceed NAAQS designated as “nonattainment”

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# Air Quality Standards Table

PSD Significant Emission Rates (SERs), Significant Monitoring Concentrations (SMCs), Significant Impact Levels (SILs), PSD Increments and National Ambient Air Quality Standards (NAAQS) – Page 1 of 2

| Pollutant | Averaging Period | PSD Significant Emission Rates (SERs)[a] (tons/year) | Significant Monitoring Concentrations (SMCs) ($\mu g/m^3$) | Class II Significant Impact Levels (SILs) ($\mu g/m^3$) | PSD Increments ($\mu g/m^3$) Class I | PSD Increments ($\mu g/m^3$) Class II | National Ambient Air Quality Standards (NAAQS)[b] Primary ($\mu g/m^3$) | Primary (ppm) | Secondary ($\mu g/m^3$) | Secondary (ppm) | Form (i.e., How Standard is Applied) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $PM_{10}$ | Annual | 15[c] | -- | 1 | 4 | 17 | ~~50~~[d] | ~~--~~[d] | ~~50~~[d] | ~~--~~[d] | ~~Annual arithmetic mean, averaged over 3 years~~[d] |
| | 24-hour | | 10 | 5 | 8 | 30 | 150 | -- | 150 | -- | Not to be exceeded more than once per year on average over 3 years |
| $PM_{2.5}$ | Annual | 10 of $PM_{2.5}$ 40 of $SO_2$ 40 of $NO_x$[e] | -- | 0.13[f] | 1 | 4 | 9.0 | -- | 15.0 | -- | Annual arithmetic mean from single or multiple monitors, averaged over 3 years |
| | 24-hour | | 0[g] | 1.2[f] | 2 | 9 | 35 | -- | 35 | -- | 98th percentile of concentrations in a given year, averaged over 3 years |
| $SO_2$[h,i] | Annual | 40 | -- | 1 | 2 | 20 | ~~(80)~~ | ~~0.03~~ | (26) | 0.010 | Annual arithmetic mean, averaged over 3 years |
| | 24-hour | | 13 | 5 | 5 | 91 | ~~(365)~~ | ~~0.14~~ | -- | -- | ~~Not to be exceeded more than once per calendar year~~ |
| | 3-hour | | -- | 25 | 25 | 512 | -- | -- | ~~(1,300)~~ | ~~0.5~~ | ~~Not to be exceeded more than once per calendar year~~ |
| | 1-hour | | -- | -- | -- | -- | (196) | 0.075 | -- | -- | 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations |
| $NO_2$ | Annual | 40 of $NO_x$ | 14 | 1 | 2.5 | 25 | (100) | 0.053 | (100) | 0.053 | Annual arithmetic mean |
| | 1-hour | | -- | -- | -- | -- | (188) | 0.1 | -- | -- | 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations |
| Ozone | 8-hour | 40 of VOC or $NO_x$ | VOC or $NO_x$ emissions increase > 100 tpy | 1 ppb | -- | -- | (137) | 0.070 | (137) | 0.070 | 3-year average of annual 4th highest daily maximum 8-hour concentrations |
| CO | 8-hour | 100 | 575 | 500 | -- | -- | (10,000) | 9 | -- | -- | Not to be exceeded more than once per calendar year |
| | 1-hour | | -- | 2,000 | -- | -- | (40,000) | 35 | -- | -- | Not to be exceeded more than once per calendar year |
| Lead[k] | Rolling 3-month avg | 0.6 | 0.1 | -- | -- | -- | 0.15 | -- | 0.15 | -- | Maximum arithmetic mean |

a. Lower SERs apply in certain nonattainment areas for nonattainment new source review. Sources within 10 km of Class I areas can trigger PSD if impacts exceed 1 $\mu g/m^3$ (24-hour average).

b. The NAAQS are expressed in the Code of Federal Regulations in $\mu g/m^3$ for particulate matter and lead and in ppm or ppb for other pollutants. For reference, any standard expressed in ppm or ppb has its corresponding equivalent standard at 25°F and 760 mm Hg shown in parentheses. The equivalent standards were calculated by multiplying the concentration in ppm by the molecular weight divided by 0.02447.

c. In addition to $PM_{10}$, there is a PSD SER for Total Suspended Particulate (TSP) of 25 tpy.

d. EPA revoked the $PM_{10}$ annual standard effective December 18, 2006. See 71 FR 61144 for additional details.

e. $NO_x$ emissions regulated unless demonstrated not to be a $PM_{2.5}$ precursor. Ammonia and VOC emissions are presumed not to be precursors. See 73 FR 28321 for additional details.

f. EPA allows states to use alternate SILs if properly justified, but does not allow a value higher than 0.3 $\mu g/m^3$ (Annual) or 1.2 $\mu g/m^3$ (24-hour). For more information see the "Supplement to Guidance for Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program" memo from Richard Wayland and Scott Mathias on April 30, 2024.

g. On January 22, 2013, the U.S. DC Court of Appeals vacated the $PM_{2.5}$ SMC of 4 $\mu g/m3$.

h. The existing annual and 24-hour $SO_2$ NAAQS will be revoked one year after the effective date in areas with a designated status for the revised $SO_2$ NAAQS, per 40 CFR §50.4(e).

i. EPA issued a memorandum explaining that permit applicants and authorities may use a demonstration of compliance with the 1-hr primary $SO_2$ NAAQS as an alternative demonstration approach to demonstrate compliance with the annual secondary $SO_2$ NAAQS.

j. PSD Increments, Significant Impact Levels, and Significant Monitoring Concentration levels for the 1-hour $SO_2$ and $NO_2$ standards have not yet been proposed. However, interim Significant Impact Levels of 3 ppb (~7.8 $\mu g/m^3$) for $SO_2$ and 4 ppb (~7.5 $\mu g/m^3$) for $NO_2$ were provided by EPA in general guidance implementation memos dated August 23, 2010 and June 28, 2010, respectively.

k. The calendar quarter standard of 1.5 $\mu g/m^3$ is no longer in effect for areas designated on November 18, 2010 or November 8, 2011 but will remain in effect until implementation plans to attain or maintain the 2008 standard are approved for areas designated nonattainment for the 1978 standard.

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# State Implementation Plans (SIPs)

- Defines how state will attain/maintain NAAQS
  - State emission standards for certain types of sources or industries
- Incorporates new federal requirements as promulgated (e.g., NSPS, NESHAP)
  - State SIPs adopted by EPA – 40 CFR 52.21 Subpart B to FFF (MN = Subpart Y)
  - Minnesota - www.epa.gov/air-quality-implementation-plans/epa-approved-statutes-and-regulations-minnesota-sip
  - Tribes - www.epa.gov/tribal-air/tribal-authority-rule-tar-under-clean-air-act
    - EPA is the permitting authority for most
      - EPA is responsible for implementing federal environmental statutes in Indian country. In the absence of a federally approved tribal program, EPA retains program implementation authority. Currently, EPA maintains responsibility for the implementation of the vast majority of federal environmental statutes in Indian country.
- Air permitting programs to review impacts of new industrial growth and modifications

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## New Source Performance Standards (1 of 2)

Based on:

*"the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reductions and any non-air quality health and environments)…has been adequately demonstrated"*

(40 CFR Part 60)

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## New Source Performance Standards (2 of 2)

- Does not apply to existing "facilities"
- Applicability triggered by construction, reconstruction, or modification
- Modification emission calculations different and distinct from other permit applicability methodologies
  - Generally, an increase in 1-hour "maximum" emissions
- Clean Air Act Section 111:
  - "The term "modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted."

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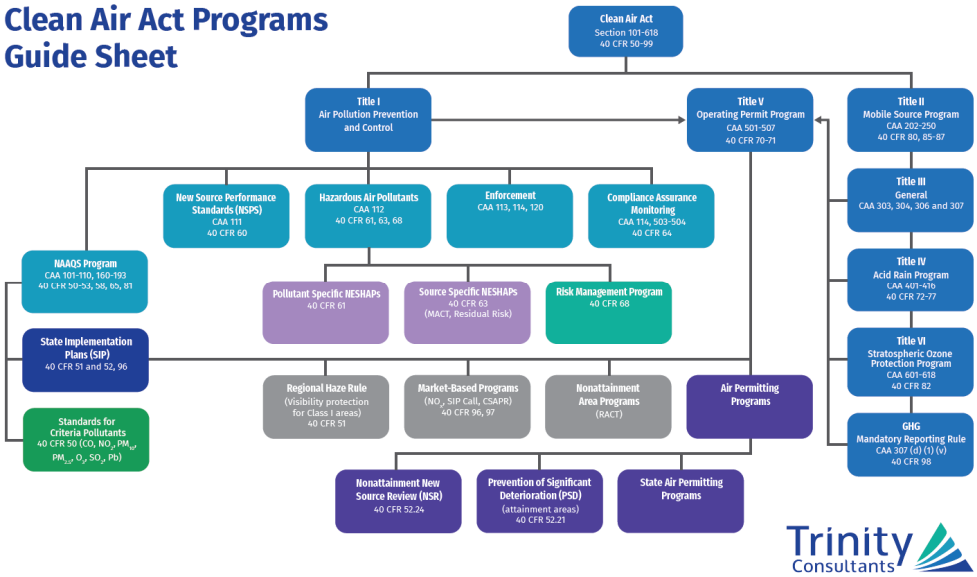
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# New Source Review Permitting Program

- Air permitting for construction of new major sources or major modifications to existing sources
  - Prevention of Significant Deterioration (PSD) – 40 CFR 52.21
  - Non-attainment NSR – 40 CFR 51 Appendix S

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## Clean Air Act Programs Guide Sheet




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# NEW SOURCE PERFORMANCE STANDARDS FACT SHEET

The Clean Air Act of 1970, Section III, required that EPA develop standards for the performance of control equipment on industrial source categories. The first of these standards became effective in 1971. Since then, New Source Performance Standards (NSPS) have been published for over sixty source categories.

Unlike other Federal regulations, NSPS regulations become effective on the date the proposal is published, not on the date the final rules are published. Thus there is a period of time from the publication of the proposal to the publication of final rules that an affected source may not know the final emission standard it is required to meet. The reason that this unique rule applies is that Congress sought to forestall companies from building inexpensive facilities with inadequate controls once the company found out how stringent it would be to apply proposed required controls.

The NSPS reflect Best Demonstrated Technology (BDT). To develop these standards, EPA reviews the performance of the plants that are determined to have the best controls. Thus, NSPS are not technology forcing, but rather reflect the best that currently exist. EPA conducts extensive research, often lasting over 3 years and publishes a Background Information Document (BID). Public hearings are part of the process to evaluate the proposed rules which are then often refined prior to publications of final rules.

Because the NSPS reflect operational facilities, the technology embodied in the standards may be on the order of five years old. Thus, the requirements of Prevention of Significant Deterioration (PSD) and non-attainment areas, which require application of Best Available Control Technology (BACT) or Lowest Achievable Emission Rates (LAER), respectively, are generally more stringent than NSPS. These permits require that the applicant employ the most up-to-date technology.

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# TABLE OF NSPS AND NESHAP REGULATIONS

**Last Updated: January 2025**

Note: This table is a tool designed to assist users in searching for potentially applicable NSPS and NESHAP regulations. It is recommended that the user search by keyword. For example, to find regulations pertaining to petroleum refineries, search for "petroleum," "oil," or "refine" (will find "refinery" and "refineries").

Disclaimer: The reader is referred to the Code of Federal Regulations to determine the actual scope and specifics of the regulations.

| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 60 Subpart Cb<br>Large Municipal Waste Combustors (on/before 9/20/1994) | incinerators<br>>250 tons/day municipal solid waste |
| Part 60 Subpart Cc<br>Municipal Solid Waste Landfills<br>(on/before 5/30/1991) | MSW, landfills |
| Part 60 Subpart Cd<br>Sulfuric Acid Production Units | sulfuric acid plant |
| Part 60 Subpart Ce<br>Hospital/Medical/Infectious Waste Incinerators<br>(constructed on/before 12/1/2008 or modified on/before 4/6/2010) | Incinerators, HMIWI |
| Part 60 Subpart Cf<br>Municipal Solid Waste Landfills<br>(on/before 7/17/2014) | MSW, landfills |
| Part 60 Subpart D<br>Fossil Fuel Fired Steam Generators<br>(after 8/17/1971) | boilers<br>>250 MMBTU/hr |
| Part 60 Subpart Da<br>Electric Utility Steam Generators<br>(after 9/18/1978) | boilers<br>>250 MMBTU/hr<br>IGCC |
| Part 60 Subpart Db<br>Industrial-Commercial-Institutional Steam Generators<br>(after 6/19/1984) | boilers<br>>100 MMBTU/hr |
| Part 60 Subpart Dc<br>Small Industrial-Commercial-Institutional Steam Generators<br>(after 6/9/1989) | boilers<br>steam generating unit<br>heater<br>duct burner<br>10 - 100 MMBTU/hr |
| Part 60 Subpart E<br>Incinerators<br>(after 8/17/1971) | >50 tons/day (>45 metric tons/day) |
| Part 60 Subpart Ea<br>Municipal Waste Combustors<br>(12/20/1989 – 9/20/1994) | >250 tons/day<br>incinerators |
| Part 60 Subpart Eb<br>Large Municipal Waste Combustors<br>(after 9/20/1994) | >250 tons/day<br>incinerators |
| Part 60 Subpart Ec<br>Hospital/Medical/Infectious Waste Incinerators<br>(after 6/20/1996) | Incinerators, HMIWI, combustor, co-fired combustor |

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 60 Subpart F<br>Portland Cement Plants<br>(after 8/17/1971) | kiln, clinker cooler, raw mill, finish mill, raw material storage, clinker storage, finished product storage, conveyor transfer point, bagging and bulk loading & unloading. |
| Part 60 Subpart G<br>Nitric Acid Plants<br>(8/17/1971 – 10/14/2011) | nitric acid |
| Part 60 Subpart Ga<br>Nitric Acid Plants<br>(after 10/14/2011) | nitric acid |
| Part 60 Subpart H<br>Sulfuric Acid Plants<br>(after 8/17/1971) | sulfuric acid |
| Part 60 Subpart I<br>Hot Mix Asphalt Facilities<br>(after 6/11/1973) | asphalt<br>dryers, screening, handling, storing, weighing hot aggregate<br>loading, transferring, storing mineral filler<br>mixing hot mix asphalt<br>loading, transfer, storage emission control systems |
| Part 60 Subpart J<br>Petroleum Refineries | catalyst regenerator, fuel gas combustion, Claus sulfur recovery |
| Part 60 Subpart Ja<br>Petroleum Refineries (construction, reconstruction, modification after 5/14/2007) | catalyst regenerator, fuel gas combustion, Claus sulfur recovery<br>fluid catalytic cracking units (FCCU), fluid coking units (FCU), delayed coking units, fuel gas combustion devices (including process heaters), flares and sulfur recovery plants |
| Part 60 Subpart K<br>Petroleum Liquid Storage Vessels<br>(6/11/1973 – 5/19/1978) | petroleum, gasoline, crude oil, distillate<br>storage tank<br>>40,000 gal. |
| Part 60 Subpart Ka<br>Petroleum Liquid Storage Vessels<br>(5/19/1978 – 7/23/1984) | petroleum, gasoline, crude oil, distillate<br>storage tank<br>>40,000 gal. |
| Part 60 Subpart Kb<br>Volatile Organic Liquid Storage Vessels<br>(7/23/1984 – 10/4/2023) | volatile organic liquid, petroleum, gasoline, crude oil, distillate<br>storage tank<br>≥75 $m^3$. |
| Part 60 Subpart Kc<br>Volatile Organic Liquid Storage Vessels<br>(after 10/4/2023) | volatile organic liquid, petroleum, gasoline, crude oil, distillate<br>storage tank<br>≥20,000 gal. |
| Part 60 Subpart L<br>Secondary Lead Smelters<br>(6/11/1973 – 12/1/2022) | pot furnaces >550 lb capacity<br>blast (cupola) furnaces<br>reverberatory furnaces |
| Part 60 Subpart La<br>Secondary Lead Smelters<br>(after 12/1/2022) | process fugitive emissions<br>blast (cupola) furnaces<br>reverberatory furnaces |
| Part 60 Subpart M<br>Secondary Brass and Bronze Production Plants<br>(after 6/11/1973) | reverberatory furnaces >2,205 lb capacity<br>electric furnaces >2,205 lb capacity<br>blast (cupola) furnaces >550 lb/hr capacity |

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 60 Subpart N<br>Basic Oxygen Process Furnaces<br>(after 6/11/1973) | steel production furnaces, BOPF, refractory lining |
| Part 60 Subpart Na<br>Basic Oxygen Process Steelmaking Facilities<br>(after 1/20/1983) | Iron and steel plant<br>steel production furnaces<br>hot metal transfer stations<br>skimming stations<br>BOPF |
| Part 60 Subpart O<br>Sewage Treatment Plants<br>(after 6/11/1973) | incinerator<br>sewage sludge<br>municipal sewage treatment plant |
| Part 60 Subpart P<br>Primary Copper Smelters<br>(after 10/16/1974) | copper smelter, dryer, roaster, smelting furnace, copper converter |
| Part 60 Subpart Q<br>Primary Zinc Smelters<br>(after 10/16/1974) | roasters<br>sintering machines |
| Part 60 Subpart R<br>Primary Lead Smelters<br>(after 10/16/1974) | sintering machine<br>blast furnace<br>dross reverberatory furnace<br>electric smelting furnace<br>converter |
| Part 60 Subpart S<br>Primary Aluminum Reduction<br>(after 10/23/1974) | potroom<br>anode bake plants |
| Part 60 Subpart T<br>Phosphate Fertilizer - Wet Process Phosphoric Acid Plants<br>(after 10/22/1974) | reactors<br>filters<br>evaporators<br>hot wells |
| Part 60 Subpart U<br>Phosphate Fertilizer - Superphosphoric Acid Plants<br>(after 10/22/1974) | evaporators<br>hot wells<br>acid sumps<br>cooling tanks |
| Part 60 Subpart V<br>Phosphate Fertilizer - Diammonium Phosphate Plants<br>(after 10/22/1974) | reactors, granulators, dryers, coolers, screens, mills |
| Part 60 Subpart W<br>Phosphate Fertilizer - Triple Superphosphate Plants<br>(after 10/22/1974) | mixers, curing belts, reactors, granulators, dryers, cookers, screens, mills, storage |
| Part 60 Subpart X<br>Phosphate Fertilizer - Granular Triple Superphosphate Storage Facilities<br>(after 10/22/1974) | storage piles, curing piles, conveyors, elevators, screens, mills |
| Part 60 Subpart Y<br>Coal Preparation and Processing Plants<br>(after 10/24/1974) | Thermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems, and coal transfer and loading systems. |

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|---|---|
| Part 60 Subpart Z<br>Ferroalloy Production Facilities<br>(after 10/21/1974) | steel mill, electric submerged arc furnace, dust handling equipment |
| Part 60 Subpart AA<br>Steel Plants: Electric Arc Furnaces<br>(10/21/1974 – 8/17/1983) | electric arc furnace (EAF), dust handling equipment |
| Part 60 Subpart AAa<br>Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels<br>(8/17/1983 – 5/16/2022) | electric arc furnace (EAF), decarburization vessels, dust handling equipment |
| Part 60 Subpart AAb<br>Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels<br>(after 5/16/2022) | electric arc furnace (EAF), decarburization vessels, dust-handling systems |
| Part 60 Subpart BB<br>Kraft Pulp Mills<br>(9/24/1976 – 5/23/2013) | paper mill, digester, brown stock washer, multiple-effect evaporators, recovery furnace, smelt dissolving tank, lime kiln, condensate stripper |
| Part 60 Subpart BBa<br>Kraft Pulp Mills<br>(after 5/23/2013) | paper mill, digester, brown stock washer, multiple-effect evaporators, recovery furnace, smelt dissolving tank, lime kiln, condensate stripper |
| Part 60 Subpart CC<br>Glass Manufacturing Plants<br>(after 6/15/1979) | glass melting furnace |
| Part 60 Subpart DD<br>Grain Elevators<br>(after 8/3/1978) | terminal elevator, storage elevator, loading, unloading, grain dryer, grain handling |
| Part 60 Subpart EE<br>Surface Coating of Metal Furniture<br>(after 11/28/1980) | surface coating |
| Part 60 Subpart GG<br>Stationary Gas Turbines<br>(after 10/3/1977) | gas turbines (≥10 MMBTU/hr) |
| Part 60 Subpart HH<br>Lime Plants<br>(after 5/3/1977) | rotary lime kiln |
| Part 60 Subpart KK<br>Lead-Acid Battery Manufacturing Plants<br>(1/14/1980 – 2/23/2022) | lead-acid battery manufacturing<br>grid casting, paste mixing, three-process operation, lead oxide, lead reclamation |
| Part 60 Subpart KKa<br>Lead-Acid Battery Manufacturing Plants<br>(after 2/23/2022) | lead-acid battery manufacturing<br>grid casting, paste mixing, three-process operation, lead oxide, lead reclamation |
| Part 60 Subpart LL<br>Metallic Mineral Processing Plants<br>(after 8/24/1982) | rock, mineral, quarry<br>crusher, screen, bucket elevator, conveyor belt transfer point, thermal dryer, product packaging station, storage bin, enclosed storage area, loading, unloading |
| Part 60 Subpart MM<br>Automobile and Light Duty Truck Surface Coating<br>(10/5/1979 – 5/18/2022) | car, prime coat, guide coat, topcoat |

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|---|---|
| Part 60 Subpart MMa<br>Automobile and Light Duty Truck Surface Coating<br>(after 5/18/2022) | car, prime coat, guide coat, topcoat |
| Part 60 Subpart NN<br>Phosphate Rock Plants<br>(after 9/21/1979) | >4 tons/hr capacity<br>phosphate rock processing<br>dryers, calciners, grinders, ground rock handling, storage |
| Part 60 Subpart PP<br>Ammonium Sulfate<br>(after 2/4/1980) | dryers |
| Part 60 Subpart QQ<br>Publication Rotagravure Printing<br>(after 10/28/1980) | publication rotagravure printing presses |
| Part 60 Subpart RR<br>Pressure Sensitive Tape and Label Surface Coating<br>(after 12/30/1980) | coating lines |
| Part 60 Subpart SS<br>Large Appliance Surface Coating<br>(after 12/24/1980) | coating lines |
| Part 60 Subpart TT<br>Metal Coil Surface Coating<br>(after 1/5/1981) | coating lines |
| Part 60 Subpart UU<br>Asphalt Processing and Asphalt Roofing<br>(after 11/18/1980) | saturators<br>mineral handling/storage<br>storage tanks<br>blowing stills |
| Part 60 Subpart VV<br>Synthetic Organic Chemicals Manufacturing Industry (SOCMI) VOC Equipment Leaks<br>(1/5/1981 – 11/7/2006) | chemical plant<br>equipment in VOC service |
| Part 60 Subpart VVa<br>SOCMI VOC Equipment Leaks<br>(11/7/2006 – 4/25/2023) | chemical plant<br>equipment in VOC service |
| Part 60 Subpart VVb<br>SOCMI VOC Equipment Leaks<br>(after 4/25/2023) | chemical plant<br>equipment in VOC service |
| Part 60 Subpart WW<br>Beverage Can Surface Coating<br>(after 11/26/1980) | coating lines |
| Part 60 Subpart XX<br>Bulk Gasoline Terminals<br>(12/17/1980 – 6/10/2022) | loading racks |
| Part 60 Subpart XXa<br>Bulk Gasoline Terminals<br>(after 6/10/2022) | loading racks<br>vapor collection systems, vapor processing system |
| Part 60 Subpart AAA<br>Residential Wood Heaters<br>(after 7/1/1988) | Wood pellet stoves |

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 60 Subpart BBB<br>Rubber Tire Manufacturing<br>(after 1/20/1983) | tires |
| Part 60 Subpart DDD<br>Polymer Manufacturing<br>(after 9/30/1987) | polypropylene<br>polyethylene<br>polystyrene<br>poly ethylene terephthalate |
| Part 60 Subpart FFF<br>Flexible Vinyl and Urethane Coating and Printing<br>(after 1/18/1983) | rotagravure printing |
| Part 60 Subpart GGG<br>Petroleum Refinery VOC Equipment Leaks<br>(1/4/1983 – 11/7/2006) | petroleum refinery<br>equipment leaks |
| Part 60 Subpart GGGa<br>Petroleum Refinery VOC Equipment Leaks<br>(after 11/7/2006) | petroleum refinery<br>equipment leaks |
| Part 60 Subpart HHH<br>Synthetic Fiber Production<br>(after 11/23/1982) | solvent-spun synthetic fiber |
| Part 60 Subpart III<br>Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit VOC Emissions<br>(after 4/25/2023) | chemical plant<br>air oxidation reactor<br>recovery system |
| Part 60 Subpart IIIa<br>Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit VOC Emissions<br>(10/21/1983 – 4/25/2023) | chemical plant<br>air oxidation reactor<br>recovery system |
| Part 60 Subpart JJJ<br>Petroleum Dry Cleaners<br>(after 12/14/1982) | petroleum dry cleaning plant<br>dryers, washers, filter, stills, settling tanks |
| Part 60 Subpart KKK<br>Onshore Natural Gas Processing Plants VOC Equipment Leaks<br>(1/20/1984 – 8/23/2011) | natural gas<br>equipment leaks |
| Part 60 Subpart LLL<br>Onshore Natural Gas Processing: $SO_2$ Emissions<br>(1/20/1984 – 8/23/2011) | natural gas<br>sweetening unit<br>sulfur recovery unit |
| Part 60 Subpart NNN<br>Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Unit VOC Emissions<br>(12/30/1983 – 4/25/2023) | chemical plant<br>distillation unit<br>recovery system |
| Part 60 Subpart NNNa<br>Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Unit VOC Emissions<br>(after 4/25/2023) | chemical plant<br>distillation unit<br>recovery system |
| Part 60 Subpart OOO<br>Non-Metallic Mineral Processing Plants<br>(after 8/31/1983) | Rock, mineral, quarry,<br>crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station |

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|---|---|
| Part 60 Subpart PPP<br>Wool Fiberglass Insulation Manufacturing<br>(after 2/7/1984) | rotary spin wool fiberglass insulation |
| Part 60 Subpart QQQ<br>Petroleum Refinery Wastewater Systems VOC Emissions<br>(after 5/4/1987) | petroleum refinery<br>wastewater<br>drain system<br>oil-water separator |
| Part 60 Subpart RRR<br>Synthetic Organic Chemical Manufacturing Industry<br>(SOCMI) Reactor VOC Emissions<br>(6/29/1990 – 4/25/2023) | chemical plant<br>reactor<br>recovery system |
| Part 60 Subpart RRRa<br>Synthetic Organic Chemical Manufacturing Industry<br>(SOCMI) Reactor VOC Emissions<br>(after 4/25/2023) | chemical plant<br>reactor<br>recovery system |
| Part 60 Subpart SSS<br>Magnetic Tape Coating<br>(after 1/22/1986) | magnetic tape<br>audio tape<br>video tape |
| Part 60 Subpart TTT<br>Plastic Parts for Business Machines Surface Coating<br>(1/8/1986 – 6/21/2022) | plastic parts<br>business machines<br>prime coats, color coats, texture coats, touch-up coats |
| Part 60 Subpart TTTa<br>Plastic Parts for Business Machines Surface Coating<br>(after 6/21/2022) | plastic parts<br>business machines<br>prime coats, color coats, texture coats, touch-up coats |
| Part 60 Subpart UUU<br>Mineral Calciners and Dryers<br>(after 4/23/1986) | calcining<br>drying<br>minerals<br>rock<br>quarry<br>furnace<br>alumina, ball clay, bentonite, diatomite, feldspar, fire clay, fuller's earth, gypsum, industrial sand, kaolin, lightweight aggregate, magnesium compounds, perlite, roofing granules, talc, titanium dioxide, and vermiculite |
| Part 60 Subpart VVV<br>Polymeric Coating of Supporting Substrates<br>(after 4/30/1987) | web coating<br>fabric<br>cord<br>yarn |
| Part 60 Subpart WWW<br>Municipal Solid Waste Landfills<br>(after 5/30/1991) | landfill |
| Part 60 Subpart XXX<br>Municipal Solid Waste Landfills<br>(after 7/17/2014) | |
| Part 60 Subpart AAAA<br>Small Municipal Waste Combustion Units<br>(after 8/30/1999) | Incineration, yard waste |

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|---|---|
| Part 60 Subpart BBBB<br>Small Municipal Waste Combustion Units<br>(before 8/30/1999) | incineration |
| Part 60 Subpart CCCC<br>Commercial and Industrial Solid Waste Incinerators<br>(after 11/30/1999) | Incineration<br>CISWI<br>Air curtain incinerator (ACI) |
| Part 60 Subpart DDDD<br>Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incinerators<br>(before 11/30/1999) | Incineration<br>CISWI<br>Air curtain incinerator (ACI) |
| Part 60 Subpart EEEE<br>Other Solid Waste Incineration Units<br>(after 12/9/2004) | Incinerator<br>air curtain incinerator<br>OSWI |
| Part 60 Subpart FFFF<br>Emissions Guidelines and Compliance Times for Other Solid Waste Incineration Units<br>(on or before 12/9/2004) | Incinerator<br>air curtain incinerator<br>OSWI |
| Part 60 Subpart IIII<br>Stationary Compression Ignition Internal Combustion Engines<br>(after 7/11/2005) | diesel engine<br>emergency generator |
| Part 60 Subpart JJJJ<br>Stationary Spark Ignition Internal Combustion Engines<br>(after 7/1/2007) | emergency generator<br>engine |
| Part 60 Subpart KKKK<br>Stationary Combustion Turbines<br>(after 2/18/2005) | Turbine<br>≥10 MMBtu/hr |
| Part 60 Subpart LLLL<br>New Sewage Sludge Incineration Units<br>(after 10/14/2010) | sewage sludge incineration (SSI) units, wastewater treatment facility |
| Part 60 Subpart MMMM<br>Emission Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units<br>(on or before 10/14/2010) | Sewage sludge incineration (SSI) units |
| Part 60 Subpart OOOO<br>Crude Oil and Natural Gas Facilities<br>(8/23/2011 – 9/18/2015) | Oil<br>Natural gas<br>Onshore, gas well, centrifugal compressor, reciprocating compressor, storage vessel, sweetening |
| Part 60 Subpart OOOOa<br>Crude Oil and Natural Gas Facilities<br>(9/18/2005 – 12/6/2022) | Oil<br>Natural gas<br>Onshore, gas well, centrifugal compressor, reciprocating compressor, pneumatic controller, storage vessel, sweetening |
| Part 60 Subpart OOOOb<br>Crude Oil and Natural Gas Facilities<br>(after 12/6/2022) | Oil<br>Natural gas<br>Onshore, gas well, centrifugal compressor, reciprocating compressor, process controller, storage vessel, sweetening |

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|---|---|
| Part 60 Subpart OOOOc<br>Emissions Guidelines for Greenhouse Gas Emissions from Existing Crude Oil and Natural Gas Facilities<br>(on or before 12/6/2022) | crude oil and natural gas source category |
| Part 60 Subpart QQQQ<br>New Residential Hydronic Heaters and Forced-Air Furnaces<br>(after 5/15/2015) | Residential heaters, furnaces |
| Part 60 Subpart TTTT<br>Greenhouse Gas Emissions for Electric Generating Units<br>(after 1/8/2014) | GHG, electric generating unit (EGU), integrated gasification combined cycle (IGCC), coal-fired steam |
| Part 60 Subpart TTTTa<br>Greenhouse Gas Emissions for Modified Coal-Fired Steam Electric Generating Units and New Construction and Reconstruction Stationary Combustion Turbine Electric Generating Units<br>(after 5/23/2023) | |
| Part 60 Subpart UUUUb<br>Emission Guidelines for Greenhouse Gas Emissions for Electric Utility Generating Units | GHG, electric generating unit (EGU) |

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|---|---|
| Part 61 Subpart B<br>Radon Emissions from Underground Uranium Mines | uranium<br>mine |
| Part 61 Subpart C<br>Beryllium | beryllium ore<br>beryllium oxide<br>beryllium alloys<br>beryllium waste<br>machine shops |
| Part 61 Subpart D<br>Beryllium Rocket Motor Firing | propellant<br>rocket |
| Part 61 Subpart E<br>Mercury | mercury ore<br>mercury chlor-alkali cells<br>sludge incinerator<br>sludge dryer<br>wastewater treatment plant sludge |
| Part 61 Subpart F<br>Vinyl Chloride | ethylene dichloride<br>vinyl chloride |
| Part 61 Subpart H<br>Department of Energy Facilities Radionuclides | radionuclide |
| Part 61 Subpart I<br>Radionuclides from Federal Facilities | radionuclide |
| Part 61 Subpart J<br>Benzene Fugitive Equipment Leaks | benzene |
| Part 61 Subpart K<br>Radionuclide Emissions from Elemental Phosphorous Plants | radionuclide<br>phosphorous<br>calciners, nodulizing kilns |
| Part 61 Subpart L<br>Benzene Emissions from Coke By-Product Recovery Plants | benzene<br>coke |
| Part 61 Subpart M<br>Asbestos | asbestos |
| Part 61 Subpart N<br>Inorganic Arsenic Emissions From Glass Manufacturing Plants | glass<br>arsenic<br>melting furnace |
| Part 61 Subpart O<br>Inorganic Arsenic Emissions From Primary Copper Smelters | copper<br>arsenic |
| Part 61 Subpart P<br>Inorganic Arsenic Emissions From Arsenic Trioxide and Metallic Arsenic Production | arsenic |
| Part 61 Subpart Q<br>Department of Energy Facilities Radon Emissions | radon<br>radium |
| Part 61 Subpart R<br>Radon Emissions from Phosphogypsum Stacks | radon<br>phosphogypsum |
| Part 61 Subpart T<br>Radon Emissions from Disposal of Uranium Mill Tailings | uranium<br>radon |
| Part 61 Subpart V<br>Fugitive Equipment Leaks | volatile hazardous air pollutant (VHAP) |
| Part 61 Subpart W<br>Radon Emissions from Operating Mill Tailings | uranium<br>radon |

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|---|---|
| Part 61 Subpart Y<br>Benzene Storage Vessels | benzene<br>tanks |
| Part 61 Subpart BB<br>Benzene Transfer Operations | benzene<br>loading |
| Part 61 Subpart FF<br>Benzene Waste | benzene<br>chemical plants<br>coke by-product recovery plants<br>petroleum refineries<br>hazardous waste treatment, storage, and disposal |
| Part 62 Subpart FFF<br>Large Municipal Waste Combustors<br>(on or before 9/20/1994) | municipal waste combustor<br>incinerator |
| Part 62 Subpart GGG<br>Municipal Solid Waste Landfills<br>(constructed on or before 5/30/1991, not modified or reconstructed since then) | landfill |
| Part 62 Subpart HHH<br>Hospital/Medical/Infectious Waste Incinerators<br>(on or before 12/1/2008) | Incinerator, HMIWI |
| Part 62 Subpart III<br>Commercial and Industrial Solid Waste Incineration Units<br>(on or before 11/30/1999) | Incinerator, CISWI |
| Part 62 Subpart JJJ<br>Small Municipal Waste Combustion Units<br>(on or before 8/30/1999) | incinerator |
| Part 62 Subpart LLL<br>Sewage Sludge Incineration Units<br>(on or before 10/14/2010) | Incinerator, SSI |
| Part 62 Subpart OOO<br>Municipal Solid Waste Landfills<br>(constructed on or before 7/17/2014, not modified or reconstructed since then) | landfill, MSW |

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|---|---|
| Part 63 Subpart F<br>Synthetic Organic Chemical Manufacturing Industry | chemical plants, SOCMI |
| Part 63 Subpart G<br>Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater | chemical plants<br>loading<br>tanks<br>SOCMI |
| Part 63 Subpart H<br>Equipment Leaks and Fenceline Monitoring | organic HAP service |
| Part 63 Subpart I<br>Certain Processes Subject to the Negotiated Regulation for Equipment Leaks | organic HAP<br>chemical plants |
| Part 63 Subpart J<br>Polyvinyl Chloride & Copolymers Production | PVC plant |
| Part 63 Subpart L<br>Coke Oven Batteries | by-product coke oven<br>coke plant |
| Part 63 Subpart M<br>Dry Cleaners | dry cleaner<br>perchloroethylene |
| Part 63 Subpart N<br>Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks Chromium Electroplating and Anodizing | hard chromium electroplating, decorative chromium electroplating, chromium anodizing |
| Part 63 Subpart O<br>Sterilization | sterilize<br>ethylene oxide<br>sterilization chamber vent (SCV), aeration room vent (ARV), chamber exhaust vent (CEV) |
| Part 63 Subpart Q<br>Industrial Process Cooling Towers | cooling tower<br>chromium |
| Part 63 Subpart R<br>Bulk Gasoline Terminals and Breakout Stations | gasoline<br>loading rack<br>storage tank<br>equipment leak |
| Part 63 Subpart S<br>Pulp and Paper | paper mill<br>wood |
| Part 63 Subpart T<br>Halogenated Solvent Cleaning<br>(Major and Area Sources) | degreaser<br>degreasing<br>metal cleaning<br>wipe cleaning |
| Part 63 Subpart U<br>Group I Polymers and Resins | elastomer product process units (EPPU)<br>chemical plant |
| Part 63 Subpart W<br>Epoxy Resins and Non-Nylon Polyamides Production | chemical plant<br>basic liquid epoxy resins (BLR), wet strength resins (WSR) |
| Part 63 Subpart X<br>Secondary Lead Smelting | secondary lead smelter |
| Part 63 Subpart Y<br>Marine Tank Vessel Loading | boat<br>ship<br>terminal<br>tank |

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|---|---|
| Part 63 Subpart AA<br>Phosphoric Acid Manufacturing | chemical plant |
| Part 63 Subpart BB<br>Phosphate Fertilizers Production Plants | chemical plant |
| Part 63 Subpart CC<br>Petroleum Refineries | oil refinery<br>petroleum |
| Part 63 Subpart DD<br>Off-Site Waste and Recovery Operations | hazardous waste<br>waste management operation<br>used oil<br>used solvent |
| Part 63 Subpart EE<br>Magnetic Tape Manufacturing<br>(Major and Area Sources) | audio tape<br>video tape |
| Part 63 Subpart GG<br>Aerospace Manufacturing and Rework Facilities | airplane, aircraft<br>painting, coating<br>commercial, civil, military aerospace vehicles |
| Part 63 Subpart HH<br>Oil and Natural Gas Production Facilities<br>(Major and Area Sources) | glycol dehydration |
| Part 63 Subpart II<br>Shipbuilding and Ship Repair | boat<br>painting |
| Part 63 Subpart JJ<br>Wood Furniture Manufacturing | painting<br>staining |
| Part 63 Subpart KK<br>Printing and Publishing | rotagravure<br>flexographic |
| Part 63 Subpart LL<br>Primary Aluminum Reduction Plants | aluminum |
| Part 63 Subpart MM<br>Chemical Recovery Combustion Sources at Kraft, Soda, & Sulfite Pulp and Paper Mills | kraft, soda, sulfite, stand-alone semichemical pulp |
| Part 63 Subpart NN<br>Wool Fiberglass Production<br>(Area Sources) | Insulation<br>chromium |
| Part 63 Subpart OO<br>Tanks – Level 1 | storage tank<br>storage vessel |
| Part 63 Subpart PP<br>Containers | drum<br>dumpster<br>portable tank<br>tote<br>cargo tank truck<br>tank railcar |
| Part 63 Subpart QQ<br>Surface Impoundments | pit<br>pond<br>lagoon |
| Part 63 Subpart RR<br>Individual Drain Systems | wastewater<br>sewer |

# TABLE OF NSPS AND NESHAP REGULATIONS

**Last Updated: January 2025**

| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart SS<br>Closed Vent Systems, Control Devices, Recovery Devices, Fuel Gas System or Process | control equipment<br>incinerator<br>oxidizer<br>storage vessel<br>transfer rack<br>process vent |
| Part 63 Subpart TT<br>Equipment Leaks – Level 1 | fugitive |
| Part 63 Subpart UU<br>Equipment Leaks – Level 2 | fugitive |
| Part 63 Subpart VV<br>Oil-Water Separators and Organic-Water Separators | wastewater |
| Part 63 Subpart WW<br>Storage Vessels (Tanks) – Level 2 | storage tank<br>storage vessel |
| Part 63 Subpart XX<br>Ethylene Manufacturing Process Units: Heat Exchange Systems and Waste Operations | ethylene<br>benzene<br>butadiene<br>heat exchange<br>cooling tower |
| Part 63 Subpart YY<br>Generic Maximum Achievable Control Technology Standards | MACT<br>acetal resin<br>acrylic fiber<br>hydrogen fluoride<br>polycarbonate<br>carbon black<br>cyanide<br>ethylene<br>spandex<br>chemical plant |
| Part 63 Subpart CCC<br>Steel Pickling – HCl Process & Hydrochloric Acid Regeneration Plants | steel<br>HCl |
| Part 63 Subpart DDD<br>Mineral Wool Production | insulation |
| Part 63 Subpart EEE<br>Hazardous Waste Combustors<br>(Major and Area Sources) | incinerator<br>oxidizer<br>kiln<br>fuel boiler |
| Part 63 Subpart GGG<br>Pharmaceuticals Production | pharma<br>drugs |
| Part 63 Subpart HHH<br>Natural Gas Transmission and Storage Facilities | glycol dehy<br>dehydration |
| Part 63 Subpart III<br>Flexible Polyurethane Foam Production | foam<br>rebond |

# TABLE OF NSPS AND NESHAP REGULATIONS

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart JJJ<br>Polymers and Resins – Group IV | thermoplastic<br>acrylonitrile-butadiene-styrene<br>methyl methacrylate-acrylonitrile<br>methyl methacrylate-butadiene<br>polystyrene<br>styrene acrylonitrile<br>polyethylene terephthalate<br>nitrile resins |
| Part 63 Subpart LLL<br>Portland Cement Manufacturing<br>(Major and Area Sources) | cement<br>concrete<br>kiln<br>clinker<br>mill |
| Part 63 Subpart MMM<br>Pesticide Active Ingredient Production | pesticide<br>chemical plant |
| Part 63 Subpart NNN<br>Wool Fiberglass Production | insulation |
| Part 63 Subpart OOO<br>Amino/Phenolic Resins | resin<br>formaldehyde<br>chemical plant |
| Part 63 Subpart PPP<br>Polyether Polyols Production | chemical plant |
| Part 63 Subpart QQQ<br>Primary Copper Smelting | copper |
| Part 63 Subpart RRR<br>Secondary Aluminum Production<br>(Major and Area Sources) | aluminum |
| Part 63 Subpart TTT<br>Primary Lead Smelting | lead |
| Part 63 Subpart UUU<br>Petroleum Refineries: Catalytic Cracking, Catalytic Reforming, Sulfur Recovery Units | oil refinery |
| Part 63 Subpart VVV<br>Publicly Owned Treatment Works<br>(Major and Area Sources) | POTW<br>sewage<br>wastewater |
| Part 63 Subpart XXX<br>Ferroalloys Production: Ferromanganese and Silicomanganese | steel<br>iron |
| Part 63 Subpart AAAA<br>Municipal Solid Waste Landfills<br>(Major and Area Sources) | Landfill<br>MSW |
| Part 63 Subpart CCCC<br>Nutritional Yeast | yeast |
| Part 63 Subpart DDDD<br>Plywood and Composite Wood Products | particleboard<br>oriented strand board<br>lumber kiln<br>PCWP |

# TABLE OF NSPS AND NESHAP REGULATIONS

**Last Updated: January 2025**

| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart EEEE<br>Organic Liquids Distribution (non-gasoline) | OLD<br>chemical plant<br>terminal |
| Part 63 Subpart FFFF<br>Miscellaneous Organic Chemical | explosives<br>paint<br>coating<br>adhesive<br>chemical plant<br>MCPU |
| Part 63 Subpart GGGG<br>Solvent Extraction for Vegetable Oil Production | hexane isomer |
| Part 63 Subpart HHHH<br>Wet-Formed Fiberglass Mat Production | Fiberglass<br>drying and curing oven |
| Part 63 Subpart IIII<br>Automobiles and Light Duty Trucks – Surface Coating | car, vehicle<br>painting |
| Part 63 Subpart JJJJ<br>Paper and Other Web Coating | pressure sensitive tape<br>photographic film, coated vinyl, wall coverings, sandpaper, abrasives, paperboard boxes, vinyl flooring, industrial and decorative laminates, carbon and carbonless paper, circuit boards and business forms |
| Part 63 Subpart KKKK<br>Metal Can – Surface Coating | can<br>painting<br>substrate |
| Part 63 Subpart MMMM<br>Miscellaneous Metal Parts and Products – Surface Coating | metal pipe<br>painting<br>asphalt<br>coal tar<br>substrate |
| Part 63 Subpart NNNN<br>Large Appliances – Surface Coating | metal<br>electronic |
| Part 63 Subpart OOOO<br>Fabric Printing, Coating, Dyeing | printing, coating, slashing, dyeing or finishing<br>textile |
| Part 63 Subpart PPPP<br>Plastic Parts – Surface Coating | plastic<br>rubber<br>painting |
| Part 63 Subpart QQQQ<br>Wood Building Products – Surface Coating | doors<br>windows<br>flooring<br>paneling<br>tileboard<br>siding |
| Part 63 Subpart RRRR<br>Metal Furniture – Surface Coating | metal<br>painting |
| Part 63 Subpart SSSS<br>Metal Coil – Surface Coating | sheet metal<br>painting |
| Part 63 Subpart TTTT<br>Leather Finishing | leather<br>coating |

# TABLE OF NSPS AND NESHAP REGULATIONS

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart UUUU<br>Cellulose Products<br>(Major Sources) | cellophane<br>rayon<br>viscose<br>ethers |
| Part 63 Subpart VVVV<br>Boat Manufacturing | fiberglass |
| Part 63 Subpart WWWW<br>Reinforced Plastics Composite | fiberglass<br>resin<br>gel coat |
| Part 63 Subpart XXXX<br>Rubber Tire Manufacturing | tire |
| Part 63 Subpart YYYY<br>Stationary Combustion Turbines | turbine |
| Part 63 Subpart ZZZZ<br>Stationary Reciprocating Internal Combustion Engines<br>(Major and Area Sources) | RICE<br>generator<br>compressor |
| Part 63 Subpart AAAAA<br>Lime Manufacturing | lime kilns, coolers, processed stone handling (PSH) operations system<br>LMP, calcination |
| Part 63 Subpart BBBBB<br>Semiconductor Production | semiconductor |
| Part 63 Subpart CCCCC<br>Coke Ovens: Pushing, Quenching, Battery Stacks | coke plant |
| Part 63 Subpart DDDDD<br>Industrial, Commercial, Institutional Boilers, Process Heaters<br>(Major Sources) | boiler<br>process heater |
| Part 63 Subpart EEEEE<br>Iron & Steel Foundries | iron<br>steel |
| Part 63 Subpart FFFFF<br>Integrated Iron & Steel | steel<br>iron |
| Part 63 Subpart GGGGG<br>Site Remediation | cleanup |
| Part 63 Subpart HHHHH<br>Coating Manufacturing | coating<br>paint |
| Part 63 Subpart IIIII<br>Mercury Cell Chlor-Alkali Plants<br>(Major and Area Sources) | mercury cell<br>chlorine, caustic |
| Part 63 Subpart JJJJJ<br>Brick, Structural Clay Products | brick<br>clay<br>BSCP |
| Part 63 Subpart KKKKK<br>Clay Ceramics | ceramic<br>pressed tile<br>porcelain<br>glazes |
| Part 63 Subpart LLLLL<br>Asphalt Processing and Asphalt Roofing | asphalt<br>tar |

# TABLE OF NSPS AND NESHAP REGULATIONS

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart MMMMM<br>Flexible Polyurethane Foam Fabrication Operations | loop slitter adhesive<br>flame lamination |
| Part 63 Subpart NNNNN<br>Hydrochloric Acid Production | HCl<br>chemical plant |
| Part 63 Subpart PPPPP<br>Engine Test Cells/Stands | rocket<br>turbine |
| Part 63 Subpart QQQQQ<br>Friction Materials Manufacturing | clutch<br>brake |
| Part 63 Subpart RRRRR<br>Taconite Iron Ore Processing | taconite |
| Part 63 Subpart SSSSS<br>Refractory Products Manufacturing | Chromium<br>lining furnaces |
| Part 63 Subpart TTTTT<br>Primary Magnesium Refining | magnesium |
| Subpart UUUUU<br>Coal- and Oil-Fired Electric Utility Steam Generating Units | Power plant<br>EGU |
| Part 63 Subpart WWWWW<br>Hospital Ethylene Oxide Sterilizers<br>(Area Sources) | ethylene oxide |
| Part 63 Subpart YYYYY<br>Electric Arc Furnace – Steelmaking Facilities<br>(Area Sources) | EAF<br>steel |
| Part 63 Subpart ZZZZZ<br>Iron & Steel Foundries<br>(Area Sources) | iron<br>steel<br>foundry |
| Part 63 Subpart BBBBBB<br>Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities<br>(Area Sources) | gasoline<br>terminal<br>pipeline |
| Part 63 Subpart CCCCCC<br>Gasoline Dispensing Facilities<br>(Area Sources) | gasoline<br>gas stations<br>storage tank<br>GDF |
| Part 63 Subpart DDDDDD<br>Polyvinyl Chloride and Copolymers Production<br>(Area Sources) | PVC |
| Part 63 Subpart EEEEEE<br>Primary Copper Smelting<br>(Area Sources) | copper |
| Part 63 Subpart FFFFFF<br>Secondary Copper Smelting<br>(Area Sources) | copper |
| Part 63 Subpart GGGGGG<br>Primary Non-Ferrous Metals – Zinc, Cadmium, Beryllium<br>(Area Sources) | cadmium<br>zinc ore<br>zinc sulfide ore<br>beryllium ore |

# TABLE OF NSPS AND NESHAP REGULATIONS

**Last Updated: January 2025**

| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart HHHHHH<br>Surface Coating & Paint Stripping<br>(Area Sources) | paint<br>metal part painting<br>plastic part painting<br>autobody refinishing<br>motor vehicle painting<br>car painting<br>methylene chloride |
| Part 63 Subpart JJJJJJ<br>Industrial, Commercial, & Institutional Boilers<br>(Area Sources) | boiler |
| Part 63 Subpart LLLLLL<br>Acrylic & Modacrylic Fiber<br>(Area Sources) | acrylic fiber<br>modacrylic fiber<br>acrylonitrile |
| Part 63 Subpart MMMMMM<br>Carbon Black Production<br>(Area Sources) | carbon black |
| Part 63 Subpart NNNNNN<br>Chromium Compounds Manufacturing<br>(Area Sources) | chemical plant<br>chromium<br>chromite ore<br>sodium dichromate<br>chromic acid<br>chromic oxide |
| Part 63 Subpart OOOOOO<br>Flexible Polyurethane Foam Production and Fabrication<br>(Area Sources) | polyurethane foam |
| Part 63 Subpart PPPPPP<br>Lead Acid Battery Manufacturing<br>(Area Sources) | lead acid battery |
| Part 63 Subpart QQQQQQ<br>Wood Preserving<br>(Area Sources) | creosote<br>CCA (chromated copper arsenate) |
| Part 63 Subpart RRRRRR<br>Clay Ceramics Manufacturing<br>(Area Sources) | clay ceramics<br>kiln<br>glaze |
| Part 63 Subpart SSSSSS<br>Glass Manufacturing<br>(Area Sources) | flat glass<br>glass containers<br>pressed glass<br>blown glass |
| Part 63 Subpart TTTTTT<br>Secondary Nonferrous Metals Processing<br>(Area Sources) | brass<br>bronze<br>magnesium<br>zinc<br>scrap |
| Part 63 Subpart VVVVVV<br>Chemical Manufacturing<br>(Area Sources) | chemical plant<br>CMPU |

# TABLE OF NSPS AND NESHAP REGULATIONS

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| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart WWWWWW<br>Plating and Polishing<br>(Area Sources) | non-chromium electroplating<br>electroless plating<br>non-electrolytic plating<br>non-electrolytic metal coating<br>chromate conversion coating<br>nickel acetate sealing<br>sodium dichromate sealing<br>manganese phosphate coating<br>thermal spraying<br>dry mechanical polishing<br>electroforming<br>electropolishing |
| Part 63 Subpart XXXXXX<br>Metal Fabrication and Finishing<br>(Area Sources) | spray paint<br>dry grinding<br>dry polishing<br>dry abrasive blasting<br>welding<br>machining<br>finishing<br>fabricate<br>forging<br>fitting |
| Part 63 Subpart YYYYYY<br>Ferroalloys Production Facilities<br>(Area Sources) | electric arc furnace<br>EAF<br>silicon |
| Part 63 Subpart ZZZZZZ<br>Aluminum, Copper, and Other Nonferrous Foundries<br>(Area Sources) | metal<br>foundry<br>brass<br>bronze |
| Part 63 Subpart AAAAAAA<br>Asphalt Processing & Asphalt Roofing Manufacturing<br>(Area Sources) | asphalt<br>roofing |
| Part 63 Subpart BBBBBBB<br>Chemical Preparations Industry<br>(Area Sources) | chemical plant<br>chromium<br>lead<br>nickel<br>manganese |
| Part 63 Subpart CCCCCCC<br>Paints and Allied Products Manufacturing<br>(Area Sources) | paints<br>inks<br>adhesives<br>stains<br>varnishes<br>shellacs<br>putties<br>sealers<br>caulks |
| Part 63 Subpart DDDDDDD<br>Prepared Feeds Manufacturing<br>(Area Sources) | animal feed<br>manganese<br>chromium |
| Part 63 Subpart EEEEEEE<br>Gold Mine Ore Processing and Production<br>(Area Sources) | gold |

# TABLE OF NSPS AND NESHAP REGULATIONS

**Last Updated: January 2025**

| REGULATION | ADDITONAL KEY WORDS |
|---|---|
| Part 63 Subpart HHHHHHH<br>Polyvinyl Chloride and Copolymers Production | PVC |

# Air Permitting and Clean Air Act Related Acronyms

| | |
|---|---|
| ACC | Annual Compliance Certification |
| ACE | Any Credible Evidence |
| ACGIH | American Conference of Governmental Industrial Hygienists |
| ACM | Asbestos-Containing Material |
| AERMOD | AERMIC Model |
| AERMIC | In 1991, the American Meteorogical Society (AMS) proposed to EPA the formation of a working group, the AMS/EPA Regulatory Model Improvement Committee. |
| AGA | American Gas Association |
| AIRS | Aerometric Information Retrieval System |
| ALAPCO | Association of Local Air Pollution Control Officials |
| AP-42 | Compilation of Air Pollutant Emission Factors |
| API | American Paper Institute/American Petroleum Institute |
| ARP | Acid Rain Program |
| AQCR | Air Quality Control Region |
| AQRV | Air Quality Related Value |
| ASTM | American Society for Testing & Materials |
| AWMA | Air & Waste Management Association |
| BACT | Best Available Control Technology |
| BAE | Baseline Actual Emissions |
| BART | Best Available Retrofit Technology |
| BDT | Best Demonstrated Technology |
| BID | Background Information Documents |
| BIF | Boilers and Industrial Furnaces (EPA's) |
| BMP | Best Management Practices |
| CAA | Clean Air Act |
| CAAA | Clean Air Act Amendments |
| CAIR | Clean Air Interstate Rule |
| CALPUFF | CALPUFF dispersion model |
| CAM | Compliance Assurance Monitoring |
| CARB | California Air Resources Board |
| CAMR | Clean Air Mercury Rule |
| CAS | Chemical Abstract Service |
| CCS | Carbon Capture and Storage |
| CCAR | California Climate Action Registry |
| CE | Cost Effectiveness (as in average cost effectiveness) |
| CEM | Continuous Emissions Monitoring |
| CEMS | Continuous Emission Monitoring System |
| CERCLA | Comprehensive Environmental Responsibility, Compensation and Liability Act |
| CFC | Chlorofluorocarbon |
| CFR | Code of Federal Regulations |
| CIBO | Council of Industrial Boiler Owners |
| CMA | Chemical Manufacturers Association |
| CMS | Compliance Monitoring System |
| CRIS | Climate Registry Information System |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| CO2e | Carbon Dioxide Equivalent |
| COM | Continuous Opacity Monitor |
| CSAPR | Cross States Air Pollution Rule |
| CTG | Control Technique Guideline CAA Section 183 |
| CWA | Clean Water Act |
| DGE | Demand Growth Exclusion |
| DOE | Department of Energy |

# Air Permitting and Clean Air Act Related Acronyms

| | |
|---|---|
| DOJ | Department of Justice |
| DOT | Department of Transportation |
| DSCF | Dry Standard Cubic Feet (or Foot) |
| DSCM | Dry Standard Cubic Meters |
| EA | Environmental Assessment |
| EEPT | Energy Efficient Processes and Technologies |
| EHS | Extremely Hazardous Substances |
| EI or EIQ | Emissions Inventory |
| EIS | Environmental Impact Statement |
| EMS | Environmental Management System |
| EOR | Enhanced Oil Recovery |
| EPA | Environmental Protection Agency |
| EPI | Energy Performance Indicator |
| EPCRA | Emergency Planning and Community Right-to-Know Act |
| ESP | Electrostatic Precipitator |
| FGD | Flue Gas Desulfurization |
| FGR | Flue Gas Recirculation |
| FESOP | Federally Enforceable State Operating Permit |
| FIP | Federal Implementation Plan |
| FLAG | Federal Land Managers Air Quality Related Values Work Group |
| FR | Federal Register |
| FRP | Facility Response Plan |
| FS | Forest Service |
| FWS | Fish and Wildlife Service |
| GACT | Generally Available Control Technology |
| GAQM | Guideline on Air Quality Models |
| GEP | Good Engineering Practice |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| GWP | Global Warming Potential |
| HAP | Hazardous Air Pollutant |
| HFC | Hydrofluorocarbon |
| HHV | Higher Heating Volume |
| HON | Hazardous Organic NESHAP (see NESHAP below) |
| IAC | Iowa Administrative Code |
| ICCP | International Climate Change Partnership |
| ICCR | Industrial Combustion Coordinated Rulemaking |
| ICT | Innovative Control Technology |
| IDLH | Immediate Danger to Life & Health |
| INGAA | Interstate Natural Gas Association of America |
| ISCST3 | Industrial Source Complex Short-Term Model (Version 3) |
| IUR | Inventory Update Rule |
| LAER | Lowest Achievable Emission Rate |
| LDAR | Leak Detection and Repair |
| LEPC | Local Emergency Planning Committee |
| LDR | Land Disposal Restrictions |
| LHV | Lower Heating Value |
| LDV | Light Duty Vehicle |
| LDVR | Light Duty Vehicle Rule |
| LQG | Large Quantity Generator |
| MACT | Maximum Achievable Control Technology |
| MMBtu | Million British Thermal Units |
| MON | Miscellaneous Organic NESHAP (see NESHAP below) |
| MPTER | Multiple Point Gaussian Dispersion Algorithm with Terrain Adjustment |

# Air Permitting and Clean Air Act Related Acronyms

| | |
|---|---|
| MRR | Mandatory Reporting Rule |
| MSDS | Material Safety Data Sheet |
| MSW | Municipal Solid Waste |
| MWC | Municipal Waste Combuster |
| NA | Nonattainment |
| NAAQS | National Ambient Air Quality Standards Title I |
| NADP | National Atmospheric Deposition Program |
| NAICS | North American Industrial Classification System |
| NAPAP | National Acid Precipitation Assessment Program |
| NCASI | National Council of the Paper Industry for Air and Stream Improvement |
| NESHAPs | National Emission Standards for Hazardous Air Pollutants |
| NHTSA | National Highway Transportation Safety Administration |
| NFPA | National Fire Protection Association |
| NOV | Notice of Violation |
| NPDES | National Pollutant Discharge Elimination System |
| NRC | National Response Center |
| NSPS | New Source Performance Standard |
| NSR | New Source Review |
| OAQPS | Office of Air Quality Planning and Standards |
| ODC | Ozone Depleting Compound |
| ODS | Ozone Depleting Substance |
| OMB | Office of Management and Budget |
| OMMP | Operating, Maintenance and Monitoring Plan |
| OSHA | Occupational Safety and Health Administration |
| OTAG | Ozone Transport Assessment Group |
| PAE | Projected Actual Emissions |
| PAL | Plantwide Emissions Cap or Plantwide Emissions Limit |
| PBT | Persistent Bioaccumulative and Toxic |
| PCB | Polychlorinated Biphenyls |
| PEMS | Predictive Emissions Monitoring System |
| PFC | Perfluorocarbon |
| PHA | Process Hazard Analysis |
| POTW | Publicly Owned Treatment Works |
| PSD | Prevention of Significant Deterioration |
| PSM | Process Safety Management |
| PTE | Potential To Emit |
| RACM | Regulated Asbestos-Containing Material |
| RACT | Reasonably Available Control Technology |
| RBLC | EPA's RACT/BACT/LAER Clearinghouse |
| RCO | Regenerative Catalytic Oxidizer |
| RCRA | Resource Conservation and Recovery Act |
| RDF | Refuse Derived Fuel |
| RFP | Reasonable Further Progress |
| RICE | Reciprocating Internal Combustion Engine |
| RIM | Regulatory Interpretive Memorandum |
| RMP | Risk Management Program or Risk Management Plan |
| RMRR | Routine Maintenance, Repair, and Replacement |
| ROM | Regional Oxidant Model |
| RSCR | Regenerative Selective Catalytic Reduction |
| RTO | Regenerative Thermal Oxidizer |
| SARA | Superfund Amendments and Reauthorization Act |
| SCAQMD | South Coast Air Quality Management District (in California) |
| SCC | Source Classification Code/Source Category Code |
| SCR | Selective Catalytic Reduction |

# Air Permitting and Clean Air Act Related Acronyms

| | |
|---|---|
| SDA | Spray Dryer Absorber |
| SER | Significant Emission Rate |
| SERC | State Emergency Response Commission |
| SIC | Standard Industrial Classification (replaced by NAICS in 1998) |
| SIP | State Implementation Plan |
| SNCR | Selective Non-Catalytic Reduction |
| SPCC | Spill Prevention, Control, and Countermeasure |
| SOCMI | Synthetic Organic Chemical Manufacturing Industry |
| SQG | Small Quantity Generator |
| SSM | Start-up, Shut-down, Malfunction |
| STAPPA | State and Territorial Air Pollution Program Administrators |
| SUE | Small Unit Exemption |
| TAP | Toxic Air Pollutant |
| TAPPI | Technical Association of the Pulp and Paper Industry |
| TCR | The Climate Registry |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TLV | Health Threshold Limit Value |
| TPQ | Threshold Planning Quantity |
| TPY | Tons Per Year |
| TR | Transport Rule |
| TRI | Toxic Releases Inventory |
| TRIS | Toxic Release Information System |
| TSCA | Toxic Substances Control Act |
| TSDF | Treatment, Storage or Disposal Facility |
| UAM | Urban Airshed Model |
| ULSD | Ultra-Low Sulfur Diesel |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USC | United States Code |
| USGS | U.S. Geological Survey |
| UST | Underground Stoarge Tank |
| UTM | Universal Transverse Mercator |
| VOC | Volatile Organic Compound |
| WBCSD | World Business Council for Sustainable Development |
| WRI | World Resources Institute |
| WWTP | Waste Water Treatment Plant |

# Code of Federal Regulations

The Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 Titles, which represent broad areas of national interest subject to Federal regulation.

Title 40, "Protection of Environment," broadly covers environmental issues. All key air regulations are located in individual Parts of Title 40. There are five Chapters that make up Title 40. Chapter I, which is subdivided into 14 Subchapters as shown below, covers regulations promulgated by the Environmental Protection Agency. **Subchapter C of Chapter I is where all the air program regulations are located.**

Although Title 40 is categorized by Chapter and Subchapter, most citations to Title 40 refer to a particular "Part" of the Title (e.g., 40 CFR 60, which refers to Part 60 of Title 40 of the Code of Federal Regulations). The following pages show all of the individual Parts of Title 40. Subchapter C encompasses Parts 50 through 99 of Title 40. The key Parts of Subchapter C relevant to stationary source air permitting include Parts 50, 52, 60, 61, 63, 64, 68, 70, 81, 82 and 96.

## TITLE 40 – PROTECTION OF THE ENVIRONMENT

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- Subchapter B Grants and Other Federal Assistance
- Subchapter C Air Programs
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- Subchapter E Pesticide Programs
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- Subchapter J Superfund, Emergency Planning, and Community Right-To-Know Programs
- Subchapter N Effluent Guidelines and Standards
- Subchapter O Sewage Sludge
- Subchapter P [RESERVED]
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**CHAPTER IV – Environmental Protection Agency and Department of Justice**
**CHAPTER V – Council on Environmental Quality**
**CHAPTER VI – Chemical Safety and Hazard Investigation Board**
**CHAPTER VII – Environmental Protection Agency and Department of Defense; Uniform National Discharge Standards for Vessels of the Armed Forces**


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# Code of Federal Regulations
# TITLE 40 – PROTECTION OF THE ENVIRONMENT

## CHAPTER I – Environmental Protection Agency

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| Part 32 | Governmentwide debarment and suspension (nonprocurement) and governmentwide requirements for drug-free workplace (grants); Clean Air Act and Clean Water Act ineligibility of facilities in performance of Federal contracts, grants and loans |
| Part 34 | New restrictions on lobbying |
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| Part 46 | Fellowships |
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Part 49 Tribal Clean Air Act Authority

***Subchapter C Air Programs***

⇒ Part 50 National primary and secondary ambient air quality standards
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| Part 129 | Toxic pollutant effluent standards |
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| Part 131 | Water quality standards |
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| Part 135 | Prior notice of citizen suits |
| Part 136 | Guidelines establishing test procedures for the analysis of pollutants |
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| Part 240 | Guidelines for the thermal processing of solid wastes |
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| Part 247 | Comprehensive procurement guideline for products containing recovered materials |
| Part 254 | Prior notice of citizen suits |


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Part 256 Guidelines for development and implementation of State solid waste management plans
Part 257 Criteria for classification of solid waste disposal facilities and practices
Part 258 Criteria for municipal solid waste landfills
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Part 260 Hazardous waste management system: General
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Part 263 Standards applicable to transporters of hazardous waste
Part 264 Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities
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Part 303 Citizen awards for information on criminal violations under superfund
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Part 305 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) administrative hearing procedures for claims against the superfund
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Part 310 Reimbursement to local governments for emergency response to hazardous substance releases
Part 311 Worker protection
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Part 370 Hazardous chemical reporting: Community right-to-know
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Part 409 Sugar processing point source category
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Part 420 Iron and steel manufacturing point source category
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Part 423 Steam electric power generating point source category
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Part 426 Glass manufacturing point source category
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Part 442 Transportation equipment cleaning point source category
Part 443 Effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources for the paving and roofing materials (tars and asphalt) point source category
Part 444 Waste combustors point source category
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Part 454 Gum and wood chemicals manufacturing point source category
Part 455 Pesticide chemicals
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Part 459 Photographic point source category
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Part 461 Battery manufacturing point source category
Part 463 Plastics molding and forming point source category
Part 464 Metal molding and casting point source category
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Part 467 Aluminum forming point source category
Part 468 Copper forming point source category
Part 469 Electrical and electronic components point source category
Part 471 Nonferrous metals forming and metal powders point source category

***Subchapter O Sewage Sludge***

Part 501 State sludge management program regulations


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# Chapter 2

Prevention of Significant Deterioration

(PSD) Program Applicability

# Brief History of PSD Program

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# PSD History

- Begins in 1972 (Court Case - Round 1)
  - **SIERRA CLUB et al., Plaintiffs, v. RUCKELSHAUS, Defendant. (EPA)**
    - Civ. A. No. 1031-72., **United States District Court, District of Columbia**., June 2, 1972.
  - Sierra Club wanted to stop EPA from approving SIPs in western states (Sierra Club's historical "home turf")
    - They didn't want the atmosphere to be polluted up to the NAAQS in "clean air states"
  - Sierra Club won this case in US District Court (Judge John H. Pratt) – the "non-degradation" doctrine was born
    - "Having considered the stated purpose of the Clean Air Act of 1970, the legislative history of the Act and its predecessor, and the past and present administrative interpretation of the Acts, it is our judgment that the Clean Air Act of 1970 is based in important part on a policy of non-degradation of existing clean air and that 40 C.F.R. § 51.12(b), in permitting the states to submit plans which allow pollution levels of clean air to rise to the secondary standard level of pollution, is contrary to the legislative policy of the Act and is, therefore, invalid. Accordingly, we hold that plaintiffs have made out a claim for relief."

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# PSD History (cont.)

- Ruckelshaus v. Sierra Club (Court Case -Round 2 - 1972)
  - EPA appealed the Judge Pratt decision
  - Three judge panel affirmed the lower court ruling without writing an opinion
    - Affirmed that the Environmental Protection Agency (EPA) could not allow air quality in "clean air" areas to be degraded down to the national standards, even if those standards were technically being met.
    - Affirmed per curiam, 4 E.R.C. 1815 (D.C. Cir. 1972) – unanimous decision
    - Non-degradation doctrine was still alive
- Fri v. Sierra Club (Court Case - Round 3 - 1973)
  - United States Supreme Court, FRI v. SIERRA CLUB, Argued: April 18, 1973, Decided: June 11, 1973
  - Supreme Court heard EPA's appeal of Pratt decision
  - Sierra Club won again
  - No opinion was written by court (4 to 4 split decision)
  - Oral argument can he heard at: FRI v. SIERRA CLUB | 412 U.S. 541 (1973) | Justia U.S. Supreme Court Center
    - Justice Powell recused himself (new judge - he did not hear the oral testimony)

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## PSD History (cont.)

- EPA proposed first PSD rules, August 1974
- First PSD rules final on December 5, 1974 (39FR 42510) – See Handout 2-YY
  - PSD Increments defined
  - TSP and $SO_2$ only
  - 18 source categories identified
  - New sources and modifications required BACT

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## PSD History (cont.)

- Sierra Club sued EPA over new PSD rule (Court Case - Round 4 - 1976)
  - Sierra Club prefers preventing deterioration (entirely) rather than preventing significant deterioration
  - EPA won this case - different lower court judge (Pratt out), years of scholarly criticism, nothing from Congress - non-degradation doctrine dead
  - **D.C. Cir. 1976, Argued June 9, 1976. Decided Aug. 2, 1976.**
    - "We find no ground on which to disturb the regulations under review, and we therefore affirm the EPA "Prevention of Significant Air Quality Deterioration" regulations."

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## PSD History (cont.)

- Montana Power et. al. appealed Round 4 (to overturn the new PSD rules 1977) to the Supreme Court
- Sierra Club also appealed with Montana Power (Sierra Club wanted to see PSD gone in favor of the non-degradation doctrine)
- The Supreme Court agreed to hear the case on April 4, 1977.
- The Supreme Court dismissed the case on October 3, 1977, at EPA's request. This effectively vacated the lower court ruling

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## PSD History (cont.)

- 1977 Clean Air Act Amendments (CAAA) from Congress – August 8, 1977
  - PSD rules spelled out in detail: Title I/Part C
  - PSD versus non-degradation doctrine debate over
- Revised PSD rules following 1977 CAAA promulgated June 16, 1978
- December 14, 1979: Alabama Power Co. vs. Costle – See Handout 2-XX
  - DC Circuit Court requires EPA to change rules
    - Define potential to emit
    - Change stationary source definition
- August 7, 1980 (45FR 52676) - "Modern" PSD program was born – 40 CFR 52.21

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# PSD History (cont.)

- July 21, 1992 (57FR 32314) - EPA amended rules to incorporate special provisions for utility units due to the "WEPCO" court decision
- December 31, 2002 (67FR 80186) - EPA promulgated selected elements of the 1996/98 NSR reform proposal – See Appendix B1
- June 24, 2005 - DC Circuit supported key elements of December 31, 2002 Rule
- November 29, 2005 - Identified $NO_x$ as ozone precursor in PSD rules
- April 2, 2007 – Supreme Court reversed 4th Circuit Decision in (Environmental Defense v. Duke Energy) – Confirmed EPA's historical (1980) definition of modification using "actual" emissions change thresholds (annual basis)
- May 1, 2007 (72FR 24060) - Prevention of Significant Deterioration, Nonattainment New Source Review, and Title V: Treatment of Certain Ethanol Production Facilities Under the "Major Emitting Facility" Definition – Currently under reconsideration.
- December 21, 2007 (72FR 72607) – EPA finalized the "Reasonable Possibility in Recordkeeping" rule – Impacts the "source obligation" provisions in situations where a modification does not trigger major NSR.
- December 19, 2008 (73FR 77882) - EPA amended PSD regulations - fugitive emissions for modified sources – not considered at "unlisted" source types – under EPA review, indefinitely stayed on March 30, 2011 (76FR 17548). Update: October 14, 2022, EPA proposal to remove the stayed clauses (87FR 62322). Not finalized.

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# PSD History (cont.)

- NSR "Debottleneck, Project Aggregation, and Project Netting (project emissions accounting)" saga
- September 14, 2006 (71FR 54235) - Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Debottlenecking, Aggregation, and Project Netting (proposal)
- January 15, 2009 (74FR 2376) - EPA "Debottlenecking, Aggregation, and Project Netting" rules –– Aggregation only –– Project Netting not finalized and "Debottlenecking" proposal withdrawn
  - May 14, 2009 – EPA delayed the effective date of project "Aggregation" rule by one year.
  - April 15, 2010 – EPA proposed to revoke the January 15, 2009, project "Aggregation" rule (75FR 19567)
  - November 15, 2018 (83FR 57324) - Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Aggregation; Reconsideration – Lifted the administrative stay - effective 11/15/2018 - See Appendix E2 – Also see NRDC v. EPA (USCA – Case No. 19-1007 – dismissed on 6/25/19)
- March 13, 2018 – EPA Memo – Project Emissions Accounting Under the NSR Preconstruction Permitting Program (Handout 5-R) – "Project Netting" now referred to as "Project Emissions Accounting."
  - August 9, 2019 (84FR 39244) - Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Project Emissions Accounting - Proposed Rule
  - November 24, 2020 (85FR 74890) – Final Rule (Handout 5-AA) – Supported by DC Circuit Court ruling on 7/28/26 (Handout 5-PP).
  - October 12, 2021 – EPA Letter – Denied Sierra Club's petition to stay the November 24, 2020, rule. Denied request to withdraw the 2018 guidance memo (Handout 5-EE).
  - May 3, 2024 (89FR 36870) – EPA Proposed Amendments (Handout 5-GG) – Withdrawn on July 21, 2025 (90FR 34206)
- April 5, 2018 – EPA Letter - Limetree Bay Terminals, St. Croix, U.S. Virgin Islands - Permitting Questions (Handout 5-T)

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# PSD History (cont.)

- June 3, 2016 (81FR 35944) - Source Determination for Certain Emission Units in the Oil and Natural Gas Sector – Impacts the Major Source definition for NSR and Title V purposes
- June 14, 2016 (81FR 38640) - Rescission of Preconstruction Permits Issued Under the Clean Air Act (Proposed Rule). November 7, 2016 (81FR 78043) – Final Rule
- August 3, 2016 (81 FR 51102) - Final Amendments to Regional Consistency Regulations
- October 18, 2016 (81FR 71613) - Revisions to the Public Notice Provisions in Clean Air Act Permitting Programs
- April 30, 2018 – EPA letter to Meadowbrook Energy – Addresses the definition of "common control" when defining the scope of a stationary source for major NSR purposes (Handout 2-A16)
- September 4, 2018 (Draft EPA Memo) - Defining "adjacent" for the purposes of defining the scope of a stationary source for major NSR purposes (Handout 2-A18)
- December 2, 2019 – EPA's Revised Policy - On Exclusions from "Ambient Air" (Handout 7-A2)
- December 20, 2019 (84FR 70092) - Error Corrections to New Source Review Regulations (Proposed). Finalized on July 19, 2021 (86FR 37918).

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# PSD History (cont.)

- July 1, 2011 - Federal Minor New Source Review Program in Indian Country (76 FR 38748) – 40 CFR 49.151
- May 30, 2014 – Amendments to the July 1, 2011 Federal Indian Country Minor NSR Rule (79FR 31035) – 40 CFR 49...
- June 16, 2014 – Review of New Sources and Modifications in Indian Country Amendments to the Registration and Permitting Deadlines for True Minor Sources (79FR 34231) – Permit deadline for true minor sources in the Oil&Gas sector October 3, 2016.
- May 1, 2015 (80FR 25068) - General Permits and Permits by Rule for the Federal Minor NSR Program in Indian Country for Five Source Categories - Hot mix asphalt plants; Stone quarrying, crushing, and screening facilities; Gasoline dispensing facilities; Petroleum dry cleaners; and Auto body repair and miscellaneous surface coating operations.
- June 3, 2016 (81FR 35944) - FIP for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector; Amendments to the Federal Minor NSR Program in Indian Country To Address Requirements for True Minor Sources in the Oil and Natural Gas Sector
- October 14, 2016 (81FR 70944) - General Permits and Permits by Rule for the Federal Minor NSR Program in Indian Country – Concrete batch plants, boilers, stationary spark ignition engines, stationary compression ignition engines, graphic arts and printing operations, and sawmills.
- May 14, 2019 (84FR 21240) - Amendments to FIP for Managing Air Emissions From True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector
- July 15, 2019 (84FR 33715) – Proposed Amendments to FIP for Managing Air Emissions From True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector. Finalized - March 19, 2020 (85FR 15729)
- December 8, 2022 (87FR 75334) - Federal Implementation Plan for Managing Emissions From Oil and Natural Gas Sources on Indian Country Lands Within the Uintah and Ouray Indian Reservation in Utah

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## PSD History (cont.)

- March 25, 2020, EPA issued draft guidance – "Interpretation of "Begin Actual Construction" Under the New Source Review Preconstruction Permitting Regulations" – See Handout 2-FF
  - September 2, 2025, the EPA replied to a letter sent from the Maricopa County Air Quality Department (MCAQD) requesting clarification of EPA policy on "begin actual construction" (Handout 2-FF1)
- August 4, 2020, EPA issued NSR PAL guidance covering many aspects of PALs (PAL renewals, terminations, monitoring provisions, etc.) - See Handout 5-CC
- July 19, 2021 (86FR 37918) - EPA finalized the "Error Corrections Rule" in 40 CFR 51.165, 51.166, Appendix S, and 52.21
- October 14, 2022, (87FR 62322) - EPA proposal - Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Reconsideration of Fugitive Emissions Rule

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## PSD History (cont.)

- EPA's GHG Permitting and Related Regulations for Stationary Sources
  - June 3, 2010 – GHG "tailoring" rule published in the Federal Register (75FR 31514). Rule effective on August 2, 2010 – See Appendix B4
  - June 26, 2012 – US Court of Appeals (DC Circuit) – Ruling on GHG issues (see Appendix J2) – Decision largely favored the "tailoring" rule
  - June 23, 2014 – Supreme Court ruling (GHG permitting case) - UTILITY AIR REGULATORY GROUP v. ENVIRONMENTAL PROTECTION AGENCY ET AL. (see Appendix G-2) – Decision significantly reduced the applicability of the "tailoring" rule
    - April 10, 2015 – Amended judgement issued by DC circuit court (amended the June 26, 2012, DC Circuit decision)
  - May 7, 2015 (80FR 26183) – PSD Permitting for Greenhouse Gases: Providing Option for Rescission of EPA-Issued Tailoring Rule Step 2 Prevention of Significant Deterioration Permits – Effective July 6, 2015 – See Appendix P1
  - August 19, 2015(80FR 50199) - PSD Permitting for Greenhouse Gases: Removal of Vacated Elements – See June 23, 2014, Supreme Court ruling (Appendix G2)
  - October 3, 2016 (81FR 68110) - EPA proposed rule amendments formally add a "significant emission rate" (SER) threshold for GHG (Proposed rule) – Not finalized
  - August 31, 2018 (83FR 18746) - Emission Guidelines for Greenhouse Gas Emissions From Existing Electric Utility Generating Units; Revisions to Emission Guideline Implementing Regulations; Revisions to New Source Review Program (Proposed Rule) – Final published on July 8, 2019 (84FR 32520) – Repeal of the Clean Power Plan - NSR revisions NOT included in Final (2019) Rule

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## PSD History (cont.)

- EPA's GHG Permitting and Related Regulations for Stationary Sources (cont.)
  - May 9, 2024 (89FR 39798) - NSPS for GHG Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for GHG Emissions From Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule - NSPS Subparts TTTT & TTTTa and Emissions Guidelines Subpart UUUUb
  - June 17, 2025 (90FR 25752) – EPA proposed repeal of NSPS subparts TTTT & TTTTa. Proposed repeal for Emissions Guidelines Subpart UUUUb
  - August 1, 2025 (90FR 36288) - EPA proposed Reconsideration of 2009 Endangerment Finding and Greenhouse Gas Vehicle Standards.
  - February 18, 2026 (91 FR 7686) Rescission of the Greenhouse Gas Endangerment Finding and Motor Vehicle Greenhouse Gas Emission Standards Under the Clean Air Act (Final). See Handout 5-JJ

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## PSD History (cont.)

- $PM_{2.5}$ Implementation Rule - May 16, 2008 (73FR 28321) - First $PM_{2.5}$ (1997 NAAQS) Implementation Rule (see Appendix R2) – DC Court remanded on January 4, 2013.
- October 25, 2012 (77FR 65107) – Final Rule - Clarification of condensable particulate (see Handout 2-S and Appendix H1)
- DC Court Remand - January 4, 2013 – NRDC and Sierra Club v. EPA (US Court of Appeals – DC District) – Court remanded the 2007 and 2008 fine particulate implementation rules (1997 PM NAAQS). EPA must regulate $PM_{2.5}$ under the Clean Air Act, Title I, Part D, Subpart 4.
- Annual $PM_{2.5}$ NAAQS - January 15, 2013 (78FR 3086) - National Ambient Air Quality Standards for Particulate Matter (see Appendix I1) – 2012 $PM_{2.5}$ Standard
  - January 27, 2023 (88FR 5558) - Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (Proposal)
  - March 6, 2024 (89FR 16202) - Reconsideration of the National Ambient Air Quality Standards for Particulate Matter – PM2.5 NAAQS (Handout 7-J) – Final rule – 2024 $PM_{2.5}$ Standard - December 19, 2024 (89FR 103652) Technical Corrections
- Air Quality Designations (2012 Standard) - January 15, 2015 (80FR 2206) - Air Quality Designations for the Primary Annual Fine Particle ($PM_{2.5}$) NAAQS – Effective date was April 15, 2015.
  - April 7, 2015 (80FR 18535) - Technical amendments
- August 24, 2016 (81FR 58010) - Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements (see Appendix R1)

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# PSD History (cont.)

- $PM_{2.5}$ SIL and SMC - PSD air quality modeling and monitoring saga (see Chapter 7)
  - October 20, 2010 – EPA finalized $PM_{2.5}$ Increments, SMC, and SILs (75FR 64864) – See Appendix E5
  - January 22, 2013 – Sierra Club v. EPA (US Court of Appeals – DC District) – Court vacated and remanded specific elements of the PSD rules pertaining to SILs and SMCs
  - March 4, 2013 – EPA issued Q/A document to address January 22, 2013, court ruling
  - December 9, 2013 (78FR 73698) – Amendments to PSD rule to remove court mandated vacated elements (addressing January 22, 2013, court ruling above) – See full discussion in Chapter 7
  - May 20, 2014 – EPA issued Guidance on $PM_{2.5}$ Permit Modeling
  - August 18, 2016 – EPA issued updated memos on SILs for ozone and fine particles for the PSD Permitting Program
  - January 17, 2017 (82FR 5182) - Revisions to the Guideline on Air Quality Models. (see Chapter 7 and Appendix W)
  - April 17, 2018 – EPA Memo - Guidance on Significant Impact Levels for Ozone and Particulate Matter (Handout 7-H)
  - May 30, 2019 – EPA issued guidance for fine particulate matter ($PM_{2.5}$) precursor demonstrations (Handout 7-I)
  - April 30, 2024 – EPA issued Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program (Handout 7-L)

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# PSD History (cont.)

- 2008/2015 Ozone NAAQS
  - March 27, 2008 (73FR 16436)- EPA finalized the 2008 Ozone NAAQS
  - December 17, 2014 (79FR 79234) - National Ambient Air Quality Standards for Ozone (proposed rule) – See Appendix O1
  - March 6, 2015 (80FR 12264) – State Implementation Plan Requirements (2008 NAAQS)
  - October 26, 2015 (80FR 65292) - National Ambient Air Quality Standards for Ozone (final rule) – see Appendix T1
  - November 17, 2016 (81FR 81276) - Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications and State Implementation Plan Requirements (proposed rule)
  - August 10, 2017 (82FR 37318) – EPA's initial Non-attainment area designations due 10/1/2017 (2015 NAAQS) – Two years after promulgation of the standard
  - November 16, 2017 (82FR 54232) - Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards (NAAQS)
  - March 9, 2018 (83FR 10376) - Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area Classifications Approach
  - April 30, 2018 – EPA finalized additional air quality designations for the 2015 Ozone NAAQS

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## PSD History (cont.)

- Sulfur Dioxide Area Designations
  - August 5, 2013 (78FR 47191) - Air Quality Designations for the 2010 Sulfur Dioxide ($SO_2$) Primary National Ambient Air Quality Standard
  - July 12, 2016 (81FR 45039) - Air Quality Designations for the 2010 Sulfur Dioxide ($SO_2$) Primary National Ambient Air Quality Standard—Round 2
    - December 13, 2016 (81FR 89870) - Air Quality Designations for the 2010 Sulfur Dioxide ($SO_2$) Primary National Ambient Air Quality Standard— Supplement to Round 2 for Four Areas in Texas: Freestone and Anderson Counties, Milam County, Rusk and Panola Counties, and Titus County
  - January 9, 2018 (83FR 1098) - Air Quality Designations for the 2010 Sulfur Dioxide ($SO_2$) Primary National Ambient Air Quality Standard—Round 3
    - April 5, 2018 (83FR 14597) - March Air Quality Designations for the 2010 Sulfur Dioxide ($SO_2$) Primary National Ambient Air Quality Standard—Round 3—Supplemental Amendment
  - Sulfur Dioxide NAAQS
    - December 27, 2024 (87FR 105692) - Review of the Secondary National Ambient Air Quality Standards for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter – Revised Secondary Annual NAAQS (Handout 7-M)
    - January 16, 2025 (EPA Memo) - Initial Area Designations for the 2024 Revised Secondary Annual Sulfur Dioxide National Ambient Air Quality Standard (Handout 7-O)

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## PSD History (cont.)

- DTE Energy (DTE) NSR Enforcement Action and Court Cases
  - August 23, 2011 - District Court – USA versus DTE Energy (DTE I) - Granted summary judgement to DTE
  - March 28, 2013 - US Court of Appeals (6th Circuit) – USA versus DTE Energy (DTE I appeal) - District court order was reversed and remanded
  - August 3, 2014 - District Court – USA versus DTE Energy (DTE II) - Granted summary judgement to DTE (again)
  - January 10, 2017 - US Court of Appeals (6th Circuit) – USA versus DTE Energy - District court order was reversed and remanded (again) (See Handout 5-N)
  - December 7, 2017 – EPA Memorandum - Enforceability and Use of the Actual-to-Projected-Actual Applicability Test in Determining Major Modification Applicability (see Handout 5-M and Handout 5-M1)
  - December 11, 2017 – Supreme Court denied DTE Energy's petition to review the Sixth Circuit case decided on January 10, 2017

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# PSD History (cont.)

- March 12, 2025 – EPA EJ based enforcement memorandum - Implementing National Enforcement and Compliance Initiatives Consistently with Executive Orders and Agency Priorities (Handout 8-M)
- March 12, 2025 – EPA Administrator Lee Zeldin announced the agency is revisiting the 2024 $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS). EPA also announced that it will release guidance to increase flexibility on NAAQS implementation, reforms to New Source Review, and direction on permitting obligations.
  - The 2024 $PM_{2.5}$ NAAQS case is still pending in the DC Circuit Court. EPA would like the court to vacate the 2024 standard. See handout 7-Q.

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# PSD Rules Evolution

The Prevention of Significant Deterioration (PSD) rules originated from a lawsuit over one of the Clean Air Act (CAA) goals, i.e., to "protect and enhance" the quality of the nation's air. The PSD regulations, applicable to new and modified major stationary sources of air pollution, first appeared in final form on December 5, 1974.

The two main goals of this program were to: 1) create "classes" of allowable incremental increases in sulfur dioxide and total suspended particulate matter (TSP) concentrations (PSD Class I, II, and III increments), and 2) establish a New Source Review (NSR) program that would require a source to: demonstrate that it would not violate PSD increments; apply state-of-the-art controls — Best Available Control Technology (BACT); and undergo public review.

Versions of the rules surfaced in two sections of the Code of Federal Regulations (CFR). Part 52 contained PSD rules for programs run by EPA or states receiving PSD delegation. Part 51 defined requirements for states to develop their own PSD rules and programs. Over the years, the rules have gone through several revisions due to lawsuits and changes to the CAA. This chart presents a chronology of changes to the PSD regulations as they appeared in the *Federal Register*. Since the PSD rules in 40 CFR Parts 51 and 52 went through a similar evolution, only the changes to Part 52 are shown.

| | | |
|---|---|---|
| 12/5/74 | 39 FR 42510-42517 | The first set of PSD rules applied to sulfur oxides or particulate matter emissions from a list of 18 source categories. New or modified stationary sources that had not commenced construction prior to 6/1/75 were required to obtain a PSD permit. |
| 11/3/77 | 42 FR 57459-57462 | Changes to the 12/5/74 PSD rules were required by the 1977 Clean Air Act (CAA) amendments (signed 8/7/77). Key changes included new mandatory Class I areas (e.g., national parks), more restrictive Class II and III increments, and requirements to show compliance with the National Ambient Air Quality Standards (NAAQS). These rules applied to sources that commenced construction on or after 8/7/77. |
| 6/19/78 | 43 FR 26380-26410 | This set of rules replaced the 12/5/74 PSD rules (as amended) and implemented the remaining new requirements of the 1977 CAA amendments, including collection of up to a year of ambient monitoring data for any PSD permit application submitted after 8/7/78. (However, dispersion modeling was often accepted in place of monitoring data.) The list of covered sources expanded to 28 categories. PSD permits were required for any listed source with potential emissions increases of 100 tons per year or more of *any pollutant* regulated under the CAA. Sources not on the list but with potential emissions increases of 250 or more tons per year were also required to obtain a PSD permit. Potential emissions were defined *before* application of controls. Sources that obtained preconstruction permits before 3/1/78 and commenced construction before 3/19/79 were exempt from the 6/19/78 rules. |
| 5/10/79 | 44 FR 27558-27604 | Reference to the quality assurance requirements for collecting PSD ambient air monitoring data (Appendix B of Part 58) was incorporated into §52.21(n). |
| 8/7/80 | 45 FR 52676-52748 | As a result of the *Alabama Power* court decision on the 1978 rules, the PSD regulations were substantially rewritten. *The 8/7/80 rules form the basis of the current program.* "Potential emissions" were redefined and based on maximum capacity taking into account any *federally enforceable* physical and operational limits (such as pollution control equipment). The list of 28 source categories and the 100/250 ton per year thresholds for defining new "major" sources remained. The same thresholds applied to modifications of "minor" sources. Lower, "significant" thresholds for individual pollutants were established for modifications of major sources. Stringent preconstruction monitoring requirements were added (i.e., modeling data could be substituted only under limited conditions). PSD permits required by the 6/19/78 rules but not by the 8/7/80 rules could be rescinded, and numerous transition dates were specified for various new requirements (e.g., applicability, BACT, monitoring). |

# PSD Rules Evolution (cont.)

| | | |
|---|---|---|
| 6/25/82 | 47 FR 27554-27562 | An EPA interpretation in the 8/7/80 rules was changed by deleting requirements to: 1) include vessel emissions when determining if a new source or modification was significant or major and 2) include mobile source emissions as secondary emissions when assessing air quality impacts of new/modified sources. |
| 10/26/84 | 49 FR 43202-43216 | EPA reaffirmed the current requirement to include fugitive emissions from listed source categories when determining if a source is major for NSR. |
| 7/12/85 | 50 FR 28544-28553 | Additional requirements to address adverse impacts on visibility in Class I areas were listed. |
| 11/7/86 | 51 FR 40656-40677 | References to sections of Part 51 were changed to reflect restructuring and consolidation of Part 51. |
| 7/1/87 | 52 FR 24634-24723 | EPA replaced the particulate matter NAAQS with the $PM_{10}$ NAAQS, and §52.21 was updated with a $PM_{10}$ significant net emissions increase and preconstruction monitoring significance level. Changes were also made to the monitoring significance levels for lead, beryllium, and hydrogen sulfide. |
| 7/14/87 | 52 FR 26401-26402 | Corrections were made to the 7/1/87 $PM_{10}$ rules. |
| 1/6/88 | 53 FR 392-396 | Supplement A to the *Guideline on Air Quality Models (Revised)* was incorporated. |
| 10/17/88 | 53 FR 40656-40672 | PSD increments were defined for nitrogen oxides. |
| 6/28/89 | 54 FR 27274-27300 | "Federal enforceability" guidance was reaffirmed and amended to specify conditions that allow state operating permits to be federally enforceable. Other parts of the PSD rules were also reaffirmed. Requirements for the innovative technology waiver in relation to Class I areas were relaxed. The definition of Volatile Organic Compounds (VOC) was revised to exclude certain negligibly photochemically reactive compounds. |
| 2/11/91 | 56 FR 5488-5527 | Significant net emissions increases were defined for regulated air pollutants added by the Municipal Waste Combustors New Source Performance Standard. |
| 2/3/92 | 57 FR 3941-3946 | The VOC definition was changed to refer to §51.100(s) where VOC was redefined to exclude additional negligibly photochemically reactive compounds. |
| 7/21/92 | 57 FR 32314-32339 | A broad NSR exclusion for utility pollution control projects was added (in part due to the *WEPCO* and *Puerto Rican Cement* court decisions). |
| 6/3/93 | 58 FR 31622-31638 | EPA replaced the particulate matter PSD increments with $PM_{10}$ PSD increments, and portions of §52.21 were updated accordingly. |
| 7/20/93 | 58 FR 38816-38884 | The reference to the modeling guideline was changed to Appendix W of Part 51, and Supplement B to the *Guideline on Air Quality Models (Revised)* was incorporated. |
| 8/9/95 | 60 FR 40465-40474 | Supplement C to the *Guideline on Air Quality Models (Revised)* was incorporated. |

Trinity's *History of PSD Rules* is an historical reference of *Federal Register* notices on final PSD rules (as defined in §52.21) from December 1974 to present. Preambles to the final rules are included. To purchase a copy, call our Education Department at (214) 661-8100.

# Goals and Framework of PSD Permitting Program

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## PSD Program Goals

- EPA's NSR Workshop Manual
  - To ensure that economic growth will occur in harmony with the preservation of existing clean air resources
  - To preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wildlife areas
  - To protect the public health and welfare from any adverse effect which might occur even at air pollution levels better than the NAAQS

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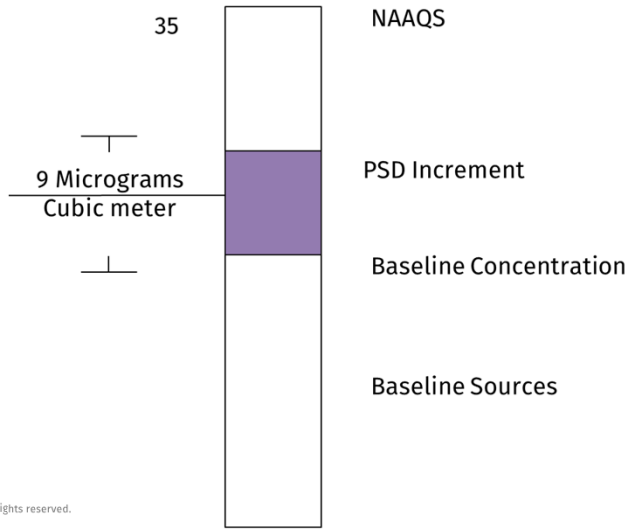
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## PSD Program Goals - Metrics

- Allow economic growth to occur while limiting air quality degradation to "PSD Increments"
  - PSD Increments: Maximum increases in ambient pollutant concentrations allowed over baseline concentrations
  - Baseline concentrations are defined for each pollutant and averaging period

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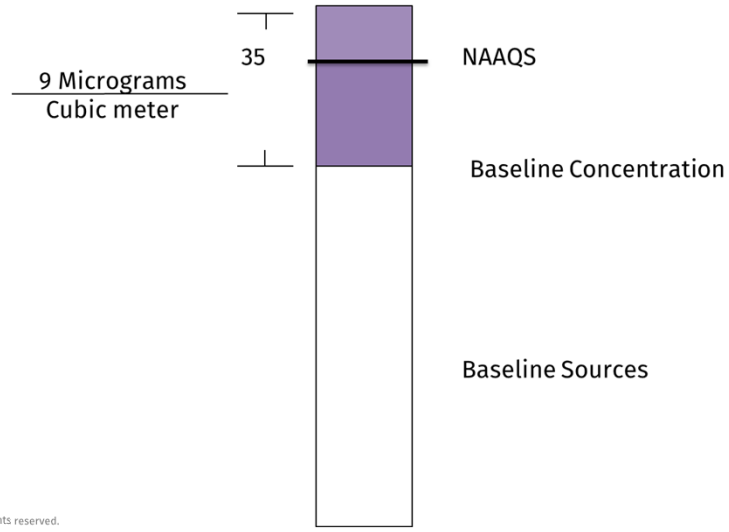
## Case 1: PSD Increment Limited Area $PM_{2.5}$ 24-hour Standards




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## Case 2: NAAQS Limited Area $PM_{2.5}$ 24-hour Standards




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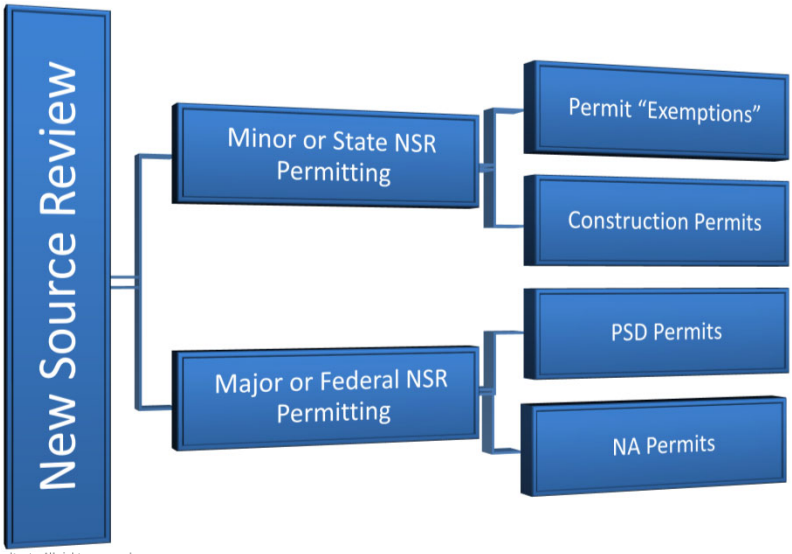
## Achieving Goals of PSD Program

- A source should install modern pollution controls…
  - when it is built (new source)
  - when it makes a major modification (existing source)
    - (i.e., LARGE capital investment [?])
- A source shall demonstrate no adverse impacts on air quality prior to construction
  - Compliance with NAAQS
  - Compliance with PSD Increments
  - No adverse impacts on soils, vegetation, visibility, Class I Areas

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## New Source Review (Classifications)




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## PSD Applicability Basics

- PSD permitting requirements are triggered by an event
  - Construction of a new major source
  - Major expansion of an existing major source
  - Physical or operational change at an existing major source (i.e. a "project")
- PSD applicability is evaluated on a pollutant-by-pollutant basis

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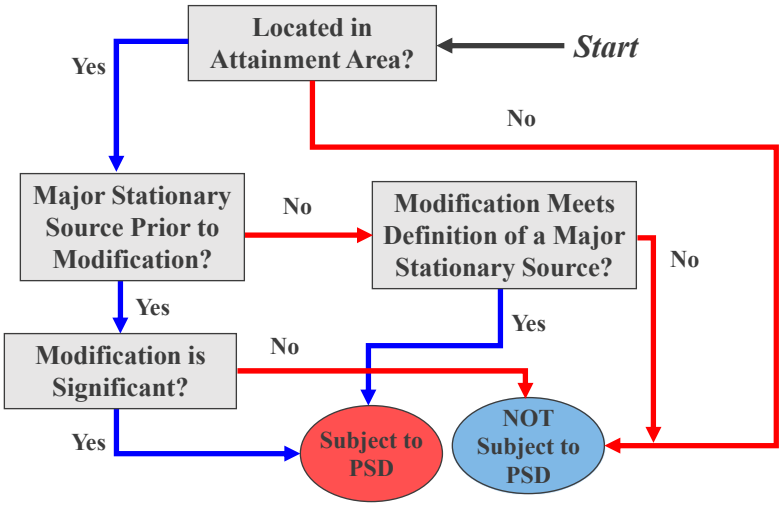
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## PSD Applicability Basics (cont.)

- New Sources
  - PSD is triggered (for a certain pollutant) when potential emissions from new source exceed thresholds that define a major source under the PSD program
- Existing Major Sources
  - PSD is triggered (for a certain pollutant) when net emission increases exceed thresholds that define a major modification

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## Is a Project Subject to PSD?




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## PSD Applicability Basics

- Key Definitions and Concepts
  - Source (Stationary Source)
  - Regulated NSR Pollutant
  - Potential-to-Emit
  - Major Source vs. Minor Source
  - Major Modification
    - Routine Maintenance, Repair & Replacement
    - Other Exclusions
  - Net Emissions Increases

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# Definition of Source

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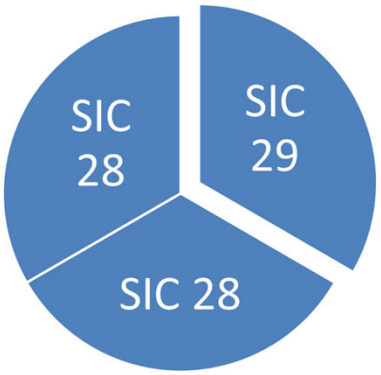
## PSD - Stationary "Source" Definition – 40 CFR 52.21(b)(5) & (6)

- All of the pollutant-emitting activities which:
  - belong to the same SIC major group (or "support facility"), and
  - are located on one or more contiguous or adjacent properties, and
  - are under common control
- Review EPA letters and memos - Handouts 2-A, 2-A1, 2-A2, 2-A3, 2-A4, 2-A6, 2-A8, 2-A9, 2-A10, 2-A11, 2-A12, 2-A14, 2-A16, 2-A17, 2-A18, 2-A19, 2-A20, 2-A21, 2-A22, and 2-A23
- Sixth Circuit Case (August 7, 2012) – Summit Petroleum v. EPA – Ruling that addressed the second criteria in the definition of a major source (Handouts 2-A5 and 2-A7)

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## SIC Code Criteria

- SIC 28 – Chemical Plants
- SIC 29 – Petroleum Refineries




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## Support Facility Defined 1980 PSD Final Rule Preamble (1/3)

- EPA defined “support facilities” in its 1980 final PSD rule preamble.
  - Support facilities are typically those which convey, store, or otherwise assist in the production of the principal product.
  - Each source is to be classified according to its primary activity, which is determined by its principal product or group of products produced or distributed, or services rendered. Thus, one source classification encompasses both primary and support facilities, even when the latter includes units with a different two-digit SIC code.

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## Support Facility Defined 1980 PSD Final Rule Preamble (2/3)

- Where more than 50% of the output or services provided by one facility is dedicated to another facility that it supports, then a support facility relationship is presumed to exist. Even where this 50% test is not met, however, other factors may lead the permitting authority to make a support facility determination.
- Support facility determinations can depend upon a number of financial, functional, contractual, and/or other legal factors. These include, but are not limited to:
  - (1) the degree to which the supporting activity receives materials or services from the primary activity (which indicates a mutually beneficial arrangement between the primary and secondary activities);
  - (2) the degree to which the primary activity exerts control over the support activity's operations;
  - (3) the nature of any contractual arrangements between the facilities; and
  - (4) the reasons for the presence of the support activity on the same site as the primary activity (e.g., whether the support activity would exist at that site but for the primary activity).
- Where these criteria indicate a support relationship, permitting authorities may conclude that a support activity contributing more or less than 50% of its output may be classified as a support facility and aggregated with the facility it supports as part of a single source.
- See Handout 2-A19 and Handout 2-UU

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## Support Facility Defined 1980 PSD Final Rule Preamble (3/3)

- "Where a single unit is used to support two otherwise distinct sets of activities, the unit Is to be included within the source which relies most heavily on its support. For example, a boiler might be used to generate process steam for both a commonly controlled and located kraft pulp mill and plywood manufacturing plant. If the yearly boiler output is used primarily by the pulp mill, then the total emissions of the boiler should be attributed to the mill."

See 59 FR 52695 (August 7, 1980)

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## Dockside Activities

- EPA also specifically addressed marine terminal loading operations.
  - Three commenters on the proposed rule focused on whether and to what extent the emissions from each ship that would dock at a proposed marine terminal should be taken into account in determining whether the terminal would be "major" for PSD purposes.
  - EPA response indicated it depends on whether and to what extent the term "stationary source'" (in the final regulations) encompasses not only the activities of the terminal itself, but also the activities of the ships while they are coming to, staying at, or going from the terminal.
    - "EPA intends the term "stationary source" ... to encompass the activities of a marine terminal and only those dockside activities that would serve the purposes of the terminal directly and would be under the control of its owner or operator." (See Handout 2-QQ)
    - "The term "dockside activities" means those activities in which the ships would engage while docked at the terminal. While "stationary source" encompasses combinations of activities, it is limited to combinations that would be "stationary," that is, fixed to the particular site."
- Therefore, a support facility (in addition to the basic criteria – "convey, store or otherwise assist...") must also satisfy the basic tenants of a "stationary" (fixed in one place) source.

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## Common Control – SEC Definition

- The EPA attempted to define “common control” in a revision to its final Emission Offset Interpretive Rule (40 CFR 51 Appendix S) in 1980
  - EPA acknowledged that control can be a difficult factual determination, involving the power of one business entity to affect the construction decisions or pollution control decisions of another business entity.
  - Upon receiving comments on the proposed rule, the EPA did not find a convincing argument in favor of any particular, simplified test of control.
  - The EPA decided that determinations of control would be made case-by-case, without benefit of a simple voting-share test or other simplifying test.
  - The EPA indicated it would be guided by the general definition of control used by the Securities and Exchange Commission.
    - 17 CFR 210 Control: The term control (including the terms controlling, controlled by and under common control with) means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a person, whether through the ownership of voting shares, by contract, or otherwise.
- See Handout 2-A, Handout 2-A16, Handout 2-A23, and 45FR 59878 (September 11, 1980)

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## Adjacency Defined

- In the preamble to its 1980 final PSD rule, EPA addressed comments that were provided in the proposed rule pertaining to the issue of adjacency as follows:
  - Some commenters on the proposed rule thought that the proposed definition was not inclusive enough. These commenters urged EPA to formulate a definition that looked only to proximity and function (without considering common control or ownership).
  - EPA rejected these comments because any such definition - looking to function and not common control/ownership - would unnecessarily increase uncertainty and drain the Agency's resources. EPA also stated that such a definition would present groupings “that would severely strain the boundaries of even the most elastic of the four terms, "building," "structure,“ "facility," and "installation."

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## Adjacency Defined (cont.)

- EPA stated that it did not intend a single source to encompass activities that would be many miles apart along a longline operation.
- For example: EPA wrote it would not treat all of the pumping stations along a multistate pipeline as one "source."
- One commenter on the proposed rule asked whether EPA would treat a surface coal mine and an electrical generator separated by 20 miles and linked by a railroad as one "source," if the mine, the generator, and the railroad were all under common control. EPA confirmed that it would not.

See 45FR 52694-52695 – August 7, 1980

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## Adjacency – Distance Criteria

- In rare situations, EPA has made single source decisions involving facilities separated by 6 miles or more.
- These cases have tended to involve a clear physical connection via a pipeline or dedicated conveyance between the entities.
- EPA's main assertion (in the past) - The physical connection between the facilities tends to suggest a high degree of "functional interrelationship."

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# Adjacency and Interrelatedness Summit Petroleum Case

- The Sixth Circuit Court – in Summit Petroleum v. EPA (August 7, 2012) – addressed adjacency and interrelatedness issues in detail
- EPA's rationale in Summit case:
  - On the issue of the facilities' adjacency, the EPA indicated that it had never established a specific distance between pollutant-emitting entities at which they were no longer adjacent.
  - The EPA reiterated that, historically, factors such as the "nature of the relationship between the facilities" and the "degree of interdependence between them" had been important to the question of whether two facilities were adjacent.
  - The agency discussed its view that Summit's plant, wells, and flares worked together as a single unit that "together produced a single product" and found that Summit had failed to provide any evidence to demonstrate that the emissions sources were not "truly interdependent."
  - The EPA thus concluded that given this functional interrelationship, Summit's facilities "should not be considered separate emission sources."
- The Sixth Circuit ultimately ruled against EPA primarily because two of the three judges found the interdependence and interrelatedness argument unsupportable.
- Refer to Summary: Sixth Circuit Case – Summit Petroleum

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# United States Court of Appeals for the Sixth Circuit – Summit Petroleum Case – Major Stationary Source Definition

On August 7, 2012, the United States Court of Appeals for the Sixth Circuit (Court) ruled against EPA regarding the interpretation of the criteria for which major stationary source status is to be evaluated under the Title V permitting program. Summit Petroleum Corporation (Summit) challenged EPA's determination that a natural gas sweetening plant and associated sour gas production wells constituted a major stationary source under the Federal Title V permitting program. The Court's ruling vacates EPA's final determination that Summit's plant and wells constitute a single stationary source and remands the case to EPA for re-evaluation of the major source determination.

As required by the Clean Air Act (CAA), EPA has established the Title V permitting programs which require every "major source" of air pollution to obtain a Title V operating permit.[1] With regard to pollutants "subject to regulation" under the Title V permitting programs, the definition of a major source is any stationary source that emits or has the potential to emit 100 tons per year (tpy) or more of any individual pollutant "subject to regulation".[2] A stationary source is then defined as "any building, structure, facility, or installation that emits or may emit any regulated air pollutant … ."[3] Under the Title V permitting programs, several stationary sources may be grouped together to be considered a single source for which major source status is evaluated. This practice is commonly known as "source aggregation." The pollutant emitting activities or stationary sources may be aggregated as a single source only if **all of the following criteria** are met:[4]

1. The stationary sources are located on one or more contiguous or adjacent properties
2. The stationary sources are under common control
3. The stationary sources belong to the same major industrial grouping (i.e., all activities have a Standard Industrial Classification (SIC) code beginning with the same two digits)

In Summit's particular case, the dispute centers around whether the individual wells and associated sweetening plant are considered to be "adjacent" according to the first criterion above. As a result of the ruling, the term "adjacent" has been clarified for major source determinations involving source aggregation. Historically, common practice has been to evaluate the adjacency of sources by considering the distance separating the sources as well as the functional relatedness of such facilities. As described in the August 7, 2012 Court majority opinion, ***adjacency should only be established using proximity or distance as a basis*** with no consideration for the functional relatedness of the sources.

## Overview of Summit's Case

Summit owns and operates a natural gas sweetening plant in Rosebush, Michigan. Sweetening is the process of removing hydrogen sulfide from field gas so that it meets the specifications of pipeline quality natural gas prior to distribution to end users. The sweetening plant processes gas from approximately 100 production wells surrounding the plant. Each production well is directly connected to the sweetening plant by subsurface pipeline. Summit owns and operates all the production wells, subsurface pipelines, and the gas sweetening plant. The wells are located over an area of approximately 43 square miles and at distances ranging from 500 feet to eight miles from the sweetening plant

itself. While Summit owns the wells and associated infrastructure, Summit does not own property between individual well sites or between wells and the sweetening plant. Similarly, none of the production well sites have a common boundary with another well or the sweetening plant.

The sweetening plant and wells primarily emit sulfur dioxide and oxides of nitrogen. The sweetening plant by itself does not have the potential to emit over 100 tpy of any regulated pollutant. Furthermore, each of the wells does not have the potential to emit over 100 tpy of any regulated pollutant. However, if potential emissions from the production wells are aggregated with the potential emissions from the sweetening plant, the combined potential to emit is greater than 100 tpy for sulfur dioxide. Therefore, if the wells and sweetening plant are aggregated as a single source, then the collection of stationary sources would be considered a major source under EPA's Title V permitting programs. Conversely, if the wells and plant were not aggregated, then none of the individual stationary sources would be considered major sources. Thus, source aggregation plays a crucial role in determining Summit's compliance obligations under the CAA.

The Rosebush sweetening plant is located within an area where EPA has the authority to implement CAA programs applicable to Summit's operations.[5] In January 2005, Summit and the Michigan Department of Environmental Quality (MDEQ) submitted a request to the EPA to determine whether Summit's sources met the definition of a major source under the Title V programs.[6] Between 2005 and 2010, Summit and EPA corresponded regarding the major source status of Summit's operations. During this time, EPA issued a final determination and two memorandums containing information about procedures to use when evaluating the major source status of a stationary source or group of sources. In the correspondence, EPA and Summit agree that the sweetening plant and production wells are under common control and share the same major industrial grouping. Thus, both parties fully concur that two of the three criteria for source aggregation are satisfied. Further, EPA and Summit agree that the sweetening plant and production wells are not located on contiguous properties. Therefore, it is clear that the single disputed issue of the determination is that of adjacency.

Summit argued that aggregation of its sources would not be appropriate because the production wells are "located at great distances" from the sweetening plant and on "entirely different tracts, leases and surface sites."[7] Summit also noted that EPA's regulations for hazardous air pollutant (HAP) emissions specifically state that source aggregation is not appropriate for production wells and facilities in the oil and gas industry.[8] EPA stated that while proximity is the primary mechanism through which adjacency is evaluated, historically, source interdependence has been taken into account when determining whether sources are adjacent. EPA maintained that there was little evidence to demonstrate that the sources were not "truly interdependent" and subsequently found that this "functional interrelationship" supported the conclusion that the sources should be aggregated for the purpose of a major source determination under the Title V permitting programs.[9]

Following EPA's final determination issued in late 2010, Summit challenged the determination and filed a Petition for Review to the US Court of Appeals. The result of that petition is the subject of this article. In its ruling, the Court stated that the term "adjacent" implies physical proximity and that historical cases have arrived at the same conclusion. From this notion, the Court found that it is unreasonable to consider the purpose for which activities exist (i.e., their functional interrelatedness) when evaluating whether sources are considered "adjacent." Since EPA had included functional interrelatedness in its evaluation of Summit's sources under the adjacency criterion, the Court found

that EPA had evaluated the adjacency of Summit's sources inappropriately. The Court vacated EPA's final determination that Summit's sweetening plant and production wells constituted a major source and remanded the case to EPA. EPA was directed to "reassess the aggregation of Summit's facilities under the ordinary understanding of its requirement that Summit's plant and wells be located on adjacent, i.e., physically proximate, properties."[10]

In response to the Court's decision issued August 7, 2012, EPA filed a petition for panel rehearing on October 22, 2012. A week later, the Court ordered that the petition be denied, thereby formally vacating EPA's major source status determination for Summit's operations. On October 31, 2012, the Court issued a mandate which formally remanded the case back to EPA thereby requiring EPA to issue a new major source status determination using physical proximity as the sole basis for establishing adjacency. The recent denial of EPA's motion to rehear the case and the subsequent mandate reinforce the Court's August ruling regarding the use of adjacency in major source determinations and source aggregation.

### Current Relevance of EPA's Historical Guidance for Source Aggregation

As part of EPA's argument supporting the consideration of functional relatedness in the evaluation of sources' adjacency, EPA stated that it had used functional relatedness in previous determinations to justify the aggregation of individual sources of emissions. Below are some historical examples of instances in which consideration for functional relatedness of sources is included in guidance documents or determinations:

- Determination provided to Don Smith at the Minnesota Pollution Control Agency from Pamela Blakley of EPA Region V (March 23, 2010). Two sources separated by three miles were determined to be adjacent because a significant amount of material is transported between them on a daily basis.
- Guidance letter written to Clyde Eller at EPA Region IX from Edward Reich of EPA (May 16, 1980). Two sections of a refinery approximately two miles apart were determined to be adjacent because neither section produces products independently due to a connection via pipeline between them.
- Determination provided to Richard Long of EPA Region VIII from Robert Kellam at EPA's Office of Air Quality Planning and Standards (August 27, 1996). A landfarm and a brewery are located approximately 6 miles apart. The landfarm disposes of the brewery's wastewater and is connected to the brewery via pipeline. The brewery and landfarm were determined to be adjacent because the operation of the landfarm is integral to the operation of the brewery.
- Proposed permit review comments provided to Dennis Meyers at the Colorado Air Pollution Control Division from Richard Long of EPA Region VIII (April 20, 1999). A mine and processing plant are separated by approximately 35 miles but are connected by a pipeline. The two sources were considered to be adjacent because of their clear functional interdependence.

The Court rejected EPA's appeal that deference is owed to its interpretation of the term "adjacent" in part because of the use of functional relatedness in its historical guidance documents and determinations. To clarify the opinion, the Court stated that "the agency may not insulate itself from correction merely because it had not been corrected soon enough, for a longstanding error is still an error."[11] As a result of this conclusion, the Court's finding could invalidate the basis of many historical

major source determinations and guidance documents which include functional relatedness as part of an evaluation of adjacency.

## Implications of the Ruling on Past and Future Regulatory Applicability Analyses

As suggested by the previous examples, the Court's opinion on the matter of functional relatedness may have a significant impact on future regulatory applicability analyses and major source determinations carried out by regulatory entities. According to the Court's decision, it appears that EPA or any other regulatory body evaluating major source status will not be able to rely on functional relatedness to support a determination that concludes two or more sources are adjacent.

In Summit's particular case, EPA's major source determination was issued in regard to the Federal Title V permitting program under 40 CFR 71. The criteria for determining major source status under the State Title V permitting program (40 CFR 70) are identical to those under the Federal Title V permitting program (40 CFR 71). Therefore, it is expected that the Court's decision will affect major source interpretations and determinations made under each program in the same way.

Major source determinations are also made when evaluating the applicability of the federal New Source Review (NSR) programs. The criteria for determining major source status under the Title V permitting programs are nearly identical to those in place for the federal NSR programs (Prevention of Significant Deterioration (PSD) under 40 CFR 52.21 and Nonattainment New Source Review (NNSR) under 40 CFR 52.24). Inherent to the definition of major source under the federal NSR programs is the definition of "stationary source." The following definitions pertinent to "stationary source" apply to the federal PSD and NNSR programs [emphasis added]:[12]

Stationary source means any *building, structure, facility, or installation* which emits or may emit a regulated NSR pollutant. *Building, structure, facility, or installation* means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or **adjacent** properties, and are under the control of the same person (or persons under common control) except the activities of any vessel. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement (U. S. Government Printing Office stock numbers 4101–0066 and 003–005–00176–0, respectively).

As shown, the definition of "building, structure, facility, or installation" contains the same three basic criteria for source aggregation under the federal NSR programs that are evaluated for source aggregation under the Title V programs, with the largest difference being which edition of the SIC code manual is used when determining a source's industrial grouping(s). Consequently, it is reasonable to expect that the Court's decision and conclusions will affect major source determinations for NSR major source status (Part 52) in a similar manner as that of the Title V permitting programs (Parts 70 and 71).

Going forward, the procedure for evaluating source aggregation will likely only change for the adjacency criterion as a result of the Court's ruling. According to EPA's December 21, 2012, response to the court ruling, EPA considers the case geographically limited to the 6th circuit (Michigan, Ohio, Tennessee, and Kentucky). In short, the procedure for determining whether certain sources should be aggregated when evaluating major source status is summarized below:

1. Determine if the individual sources belong to the same major industrial grouping. The first two digits of a facility's SIC code are considered to be its major industrial group. Thus, if the sources share first two digits of their SIC code obtained from the appropriate edition SIC Manual, then those sources belong to the same major industrial grouping.[13]
2. Determine if the individual sources are under "common control." Common control is a notion that has not been clearly defined by EPA. However, EPA has issued guidance regarding what constitutes common control. In this guidance, EPA considers key characteristics such as ownership, decision making authority, service contracts, or business dependency.[14]
3. Determine if the individual sources are located on one or more contiguous or adjacent properties. Contiguous properties are those that share a common property line or are in another way connected to each other.[15] Following the August 7, 2012 ruling by the Court, it appears that adjacency may not be evaluated using functional relatedness (in the 6th circuit) but rather only by considering physical proximity or distance separating sources in question.

In order for sources to be aggregated, all three criteria above must be satisfied (i.e., the result of each step above is affirmative). The outcome of Summit's case is especially pertinent to major sources which may only meet the Title V major source emissions thresholds (e.g., potential to emit greater than 100 tpy of any criteria pollutant) due to the aggregation of certain sources when determining the source's total potential to emit. In these cases, sources may choose to re-evaluate the applicability of Title V requirements to particular operations. It is important to note that oil and gas exploration and production operations have an exceptionally strong opportunity to do so because the Summit case deals specifically with the aggregation of production wells and an associated processing plant. Finally, and perhaps most importantly, by more clearly and more narrowly defining the term "adjacent," the Court's decision seems to provide companies with more complete and definite regulatory information to consider when determining where to strategically locate future operations.

……

[1] The State and Federal Title V Operating Permit programs are codified at 40 CFR 70 and 40 CFR 71 respectively.

[2] Pollutants that are subject to regulation include (but are not limited to): CO, SOx, NOx, Ozone (regulated as NOx and VOC), Pb, PM, PM10, PM2.5, and greenhouse gases (GHGs). Note that for GHGs to be subject to regulation, the stationary source must also have the potential to emit 100,000 tpy or greater of CO2 equivalent emissions. Major source status can be triggered at other, lower emissions thresholds for other pollutants such as Hazardous Air Pollutants (HAPs) and radionuclides. Furthermore, lower thresholds may apply for pollutants that are subject to regulation in areas that are not in attainment with one or more National Ambient Air Quality Standards (NAAQS).

[3] 40 CFR 70.2 and 40 CFR 71.2

[4] Ibid.

[5] Per 73 FR 53366. It is most common for a Title V permitting program to be implemented by the state under 40 CFR 70. Note that a Title V permitting program implemented by EPA is regulated under 40 CFR 71.

[6] Summit Petrol. Corp. v. US EPA, Nos. 09-4348 and 10-4572, at *5 (6th Cir. Aug. 7, 2012). Available athttp://www.ca6.uscourts.gov/opinions.pdf/12a0248p-06.pdf.

[7] Ibid.

[8] 40 CFR 63.761

[9] Summit Petrol. Corp. v. US EPA, Nos. 09-4348 and 10-4572, at *9 (6th Cir. Aug. 7, 2012). Available athttp://www.ca6.uscourts.gov/opinions.pdf/12a0248p-06.pdf.

[10] Summit Petrol. Corp. v. US EPA, Nos. 09-4348 and 10-4572, at *16 (6th Cir. Aug. 7, 2012). Available athttp://www.ca6.uscourts.gov/opinions.pdf/12a0248p-06.pdf.

[11] Summit Petrol. Corp. v. US EPA, Nos. 09-4348 and 10-4572, at *18 (6th Cir. Aug. 7, 2012). Available athttp://www.ca6.uscourts.gov/opinions.pdf/12a0248p-06.pdf.

[12] Per 40 CFR 52.21(b) and Appendix S to 40 CFR 51

[13] Note that in certain cases, a source may be deemed to be a "support facility" to a "primary facility." A support facility may have a different SIC code than the primary facility but the two may be treated as if they are part of the same major industrial grouping. Per 45 FR 52695, "Each source is to be classified according to its primary activity, which is determined by its principal product or group of products produced or distributed, or services rendered. Thus, one source classification encompasses both primary and support facilities, even when the latter includes units with a different two digit SIC code. Support facilities are typically those which convey, store, or otherwise assist in the production of the principal product."

[14] Per guidance letter from Steven C. Riva (EPA Region II) to Michael L. Rodburg signed November 25, 1997 (http://www.epa.gov/region7/air/title5/t5memos/2-jntven.pdf). Further guidance is available in the "William Spratlin Letter" dated September 18, 1995 (http://www.epa.gov/region07/air/policy/control.pdf).

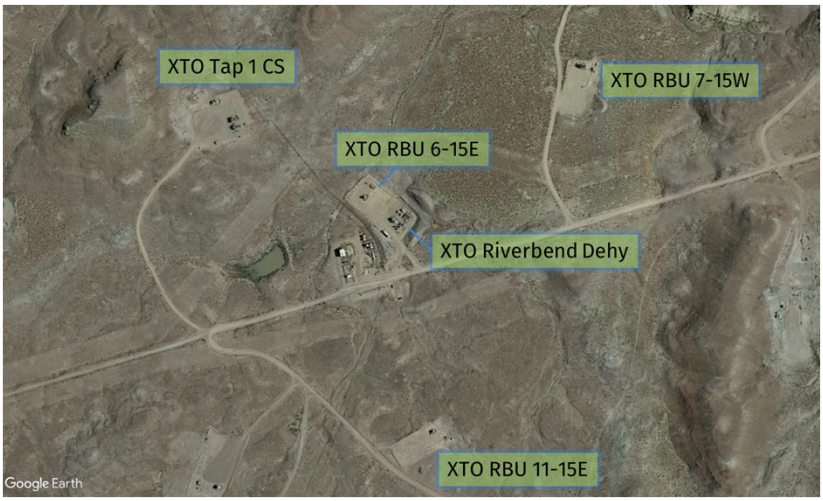
[15] Letter from Joan Cabreza (EPA Region X) to Andy Ginsberg (Oregon Department of Environmental Quality) on August 7, 1997 (http://www.epa.gov/region7/air/title5/t5memos/util-at2.pdf).

# Special Source Definition Oil and Gas Extraction Operations

- As a result of the Summit case and EPA's failure to contain the reach of the Sixth Circuit ruling to only the Sixth Circuit states, the EPA amended the applicable rules pertaining to the definition of a source for SIC Major Group 13
- For onshore activities under SIC Major Group 13: Oil and Gas Extraction - All of the pollutant-emitting activities included in SIC Major Group 13 that are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control).
- Pollutant emitting activities shall be considered adjacent if:
  - They are located on the same surface site; OR
  - They are located on surface sites that are located within ¼ mile of one another (measured from the center of the equipment on the surface site) and they share equipment.
    - Shared equipment includes, but is not limited to, produced fluids storage tanks, phase separators, natural gas dehydrators or emissions control devices.
    - Surface site means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.
- See Handout 2-DD

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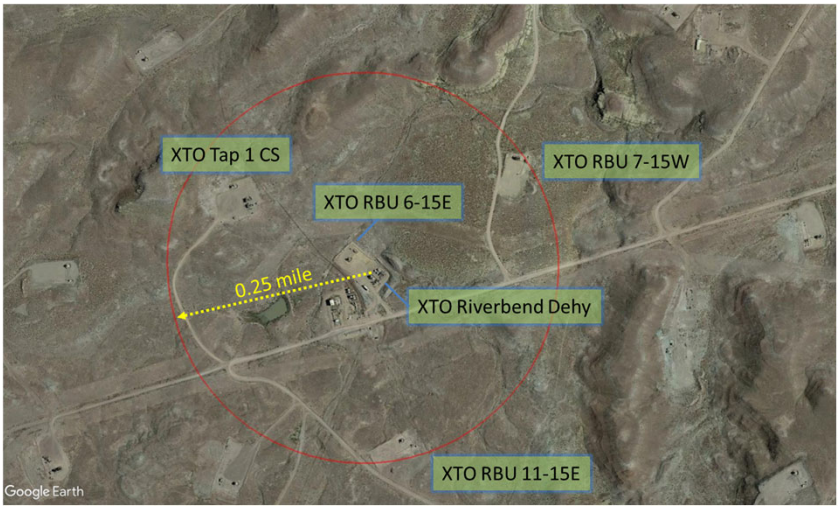
# Special Source Example* – SIC 13




*See Handout 2 DD, Wortman Memo, 8/9/2017

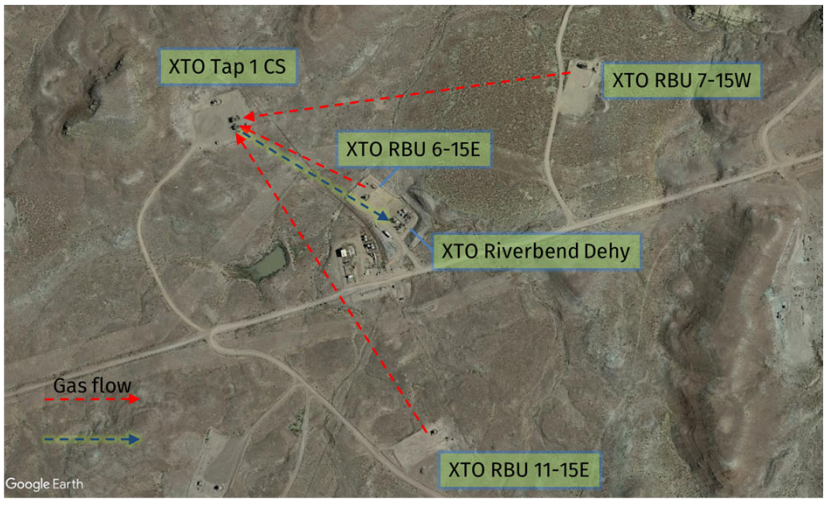
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## Special Source Example – SIC 13




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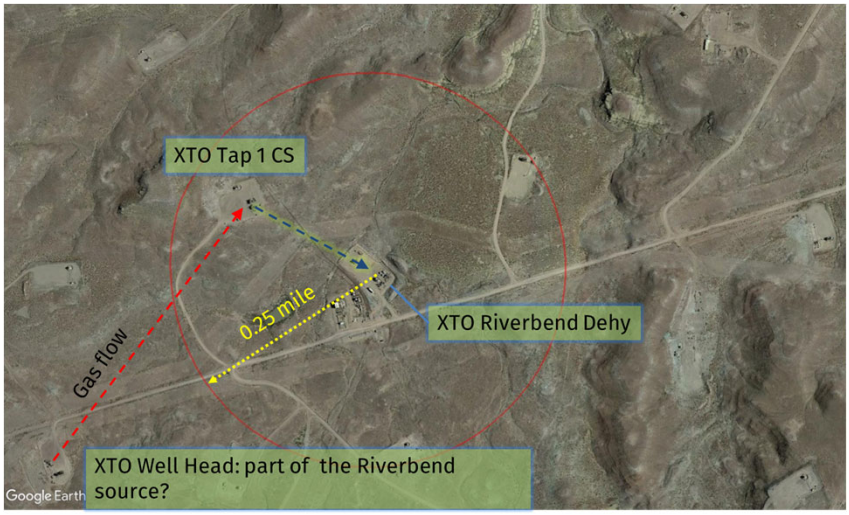
## Special Source Example – SIC 13




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## What if?




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## Defining Adjacent (for everyone else) – November 26, 2019 EPA Memo

- "In Summit Petroleum Corp. v. EPA, 690 F.3d 733 (6th Cir. 2012), the U.S. Court of Appeals for the Sixth Circuit overturned a title V source determination in the oil and gas industry by EPA that relied, in part, on functional interrelatedness in determining whether properties were "adjacent." In the decision, the court said that EPA's use of interrelatedness in determining whether sources were "adjacent" was unreasonable and contrary to the plain meaning of the term as then used in EPA's regulations."
- "EPA interprets the term "adjacent" to entail physical proximity, and the perceived "functional interrelatedness" of pollutant-emitting activities is NOT a relevant consideration in this inquiry. This interpretation is consistent both with the Agency's original understanding of the term, as was explained by EPA in the preamble to the 1980 rule for the PSD program, and with the reasoning of the court in the *Summit Petroleum* decision."

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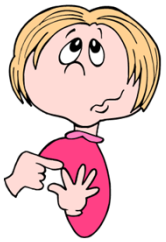
## Defining Adjacent (for everyone else) – November 26, 2019 EPA Memo

- "Use of functional interrelatedness when determining adjacency has resulted in less clarity and the burdensome, fine-grained analyses in source determinations that EPA in 1980 predicted would occur, and which the Agency wished to avoid."
- "Therefore, in sum, for purposes of making source determinations for NSR and title V, EPA interprets the term "adjacent" to entail physical proximity between properties. From this point forward, EPA will consider properties that do not share a common boundary or border, or are otherwise not physically touching each other, to be "adjacent" only if the properties are nevertheless nearby, side-by-side, or neighboring (with allowance being made for some limited separation by, for example, a right of way)."
- See Handout 2-A18 and Handout 2-A22

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## Definition of "Source" in Air Regulations

- What group of emission units are regulated as one entity
- Different criteria for different regulatory programs
  - State SIP Permitting
  - Federal NSR Permitting (New Source Review)
  - Title V Program (similar to NSR)
  - Title I - NESHAP

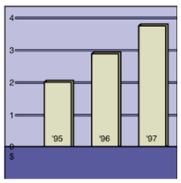


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## “Source Classification”

- Permitting procedures often depend on “source classification”
  - Major
  - Synthetic Minor
  - True Minor
- Different emission thresholds for different regulatory programs
  - Source classification depends on “Potential to Emit”




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## Potential to Emit (PTE) – 40 CFR 52.21(b)(4)

- One of several ways to categorize how much a source emits
- PTE is the maximum capacity to emit and it -
- May be limited by:
  - Physical and operational limits
  - Air pollution control equipment
  - Restricted hours of operation
  - Type or amount of material combusted, stored, or processed
- Limitations must be enforceable on controls, but certain equipment may be “inherent” to a process
  - See Handout 2-EE
- See Handout 2-B: June 13, 1989, EPA memo - Guidance on Limiting PTE in New Source Permitting
- See Handout 2-C: Calculating PTE Article

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# Non-road Engines and Stationary Sources under NSR

- 1990 CAA Amendments effectively removed certain IC engines from NSR/PSD
  - CAA § 216(10) and (11) added new definitions for "nonroad engine" and "nonroad vehicle," respectively.
  - Definition of "stationary source" at § 302(z) excludes nonroad engines/vehicle
    - The term “stationary source” means generally any source of an air pollutant except those emissions resulting directly from an internal combustion engine for transportation purposes or from a nonroad engine or nonroad vehicle as defined in section 7550 of this title.
    - Nonroad engine.—The term “nonroad engine” means an internal combustion engine (including the fuel system) that is not used in a motor vehicle or a vehicle used solely for competition, or that is not subject to standards promulgated under section 7411 of this title or section 7521 of this title.
    - Nonroad vehicle.—The term “nonroad vehicle” means a vehicle that is powered by a nonroad engine and that is not a motor vehicle or a vehicle used solely for competition.
- Some IC engines continue to be regulated under NSR/PSD (must qualify as stationary IC engines.)
- Engines serving a dual purpose (transportation + stationary mode) treated as nonroad engines. (12-month residency at a location generally constitutes stationary engine and locomotives generally cannot be treated as stationary engines regardless of residency time. Residency threshold varies for seasonal sources.)

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# Non-road Engines and Stationary Sources under NSR

- 1990 CAA Amendments effectively removed certain IC engines from NSR/PSD (cont.)
  - Nonroad engine is defined under 40 CFR 89.2, 40 CFR 90.3, and 40 CFR 1068.30
  - Internal combustion engines such as welders, compressors, generators, steam cleaners and pressure washers that are portable or transportable meet the definition of a nonroad engine as defined in the CFR
    - 40 CFR 89: “That, by itself or in or on a piece of equipment, is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.”
    - Engines otherwise included in [above] definition that remain or will remain at a location for more than 12 consecutive months (or a shorter period of time for an engine located at a seasonal source) is not a nonroad engine.”

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# Non-road Engines and Stationary Sources under NSR

- 1990 CAA Amendments effectively removed certain IC engines from NSR/PSD (cont.)
  - 40 CFR 1068.30 - Nonroad engine means:
    - (1) Except as discussed in paragraph (2) of this definition, a nonroad engine is an internal combustion engine that meets any of the following criteria:
      - (i) It is (or will be) used in or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function (such as garden tractors, off-highway mobile cranes and bulldozers).
      - (ii) It is (or will be) used in or on a piece of equipment that is intended to be propelled while performing its function (such as lawnmowers and string trimmers).
      - (iii) By itself or in or on a piece of equipment, it is portable or transportable, meaning designed to be and capable of being carried or moved from one location to another. Indicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform.
    - (2) An internal combustion engine is not a nonroad engine if it meets any of the following criteria:
      - (i) The engine is used to propel a motor vehicle, an aircraft, or equipment used solely for competition.
      - (ii) The engine is regulated under 40 CFR part 60, (or otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. 7411)). Note that this criterion does not apply for engines meeting any of the criteria of paragraph (1) of this definition that are voluntarily certified under 40 CFR part 60.
      - (iii) The engine otherwise included in paragraph (1)(iii) of this definition remains or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. A location is any single site at a building, structure, facility, or installation. For any engine (or engines) that replaces an engine at a location and that is intended to perform the same or similar function as the engine replaced, include the time period of both engines in calculating the consecutive time period. An engine located at a seasonal source is an engine that remains at a seasonal source during the full annual operating period of the seasonal source. A seasonal source is a stationary source that remains in a single location on a permanent basis (i.e., at least two years) and that operates at that single location approximately three months (or more) each year. See §1068.31 for provisions that apply if the engine is removed from the location.
  - Guidance from New Mexico (NMED).
    - www.env.nm.gov/wp-content/uploads/sites/2/2019/10/Permitting_Guidance_for_Non_Road_Engines_2April2014.pdf

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# Non-road Engines and Stationary Sources under NSR

- 1990 CAA Amendments effectively removed certain IC engines from NSR/PSD (cont.)
  - Any engine regulated under NSPS is not a nonroad engine
  - U.S. EPA Region 7 made the determination that partially constructed non-road engines at a John Deere plant in Iowa are not considered part of the stationary source (November 10, 2016 – See Handout 2-A15)
  - U.S. EPA Region 9 made the determination that nonroad engines are not included in federal permitting programs (See response to Comment 12 in Region 9 letter to the Law Office of Chytillo dated December 14, 2001.)
    - See: www.epa.gov/sites/default/files/2015-08/documents/camarc.pdf

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## What is a Major Source? – 40 CFR 52.21(b)(1)

- Source's PTE exceeds major source thresholds
- Source can not or chooses not to propose limits on emissions and/or operations to reduce its PTE
- Points made in state specific guidance concerning synthetic minor sources:
  - "A synthetic minor source is a source that would normally be a major source, with the exception that the source is held to emission rates that are less than major source significant emission rate through a permit condition."
  - "The equipment is physically capable of producing emission rates that would make the source a major source. In such cases, if a source becomes a major source because of a relaxation of a permit condition, the source will be treated as a new major source."
  - "The source will be subject to Major NSR, and the source will be reviewed as if it was never constructed, even though the increase over the sources previous allowable emission rates is less than significant."

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## "Major Source" Thresholds Under PSD

- Two thresholds depending on whether in one of 28 named source categories (these are "hard coded" in the Clean Air Act)
  - On "List of 28" : Major Source if PTE > 100 tpy for at least one regulated pollutant
  - NOT on "List of 28" : Major Source if PTE > 250 tpy for at least one regulated pollutant
- PSD addresses "regulated" pollutants and those "subject to regulation"

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## “Listed Stationary Sources” - 100 tons per year (1 of 6)

1. Fossil-fuel fired steam electric plants of > 250,000,000 Btu/hr heat input (Handout 2-GG)
2. Coal cleaning plants (with thermal dryers)
3. Kraft pulp mills
4. Portland cement plants
5. Primary zinc smelters

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## “Listed Stationary Sources” - 100 tons per year (2 of 6)

6. Iron and steel mills
7. Primary aluminum ore reduction plants
8. Primary copper smelters
9. Municipal incinerators capable of charging > 50 tons of refuse/day

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## “Listed Stationary Sources” - 100 tons per year (3 of 6)

10. Hydrofluoric acid plants
11. Sulfuric acid plants
12. Nitric acid plants
13. Petroleum refineries
14. Lime plants
15. Phosphate rock processing plants
16. Coke oven batteries

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## “Listed Stationary Sources” - 100 tons per year (4 of 6)

17. Sulfur recovery plants
18. Carbon black plants (furnace process)
19. Primary lead smelters
20. Fuel conversion plants (involving fossil fuels – See Handout 2-II)

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## “Listed Stationary Sources” - 100 tons per year (5 of 6)

21. Sintering plants
22. Secondary metal production facilities
23. Chemical process plants - which does NOT include ethanol production facilities that produce ethanol by natural fermentation included in NAICS codes 325193 or 312140
24. Fossil-fuel boilers of >250,000,000 Btu per hour heat input (Handout 2-HH)

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## “Listed Stationary Sources” - 100 tons per year (6 of 6)

25. Petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels (Handout 2-KK and Handout 2-LL)
26. Taconite ore processing facilities
27. Glass fiber processing plants
28. Charcoal production facilities

- “Listed” sources (40CFR52.21(b)(1)(iii)) must include fugitive emissions in determining PTE. Threshold for all other sources - 250 tons per year

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# Regulated NSR Pollutant – 40 CFR 52.21(b)(50)

- (b)(50) Regulated NSR pollutant, for purposes of this section, means the following:
- (1) Any pollutant for which a national ambient air quality standard has been promulgated. This includes, but is not limited to, the following:
  - (a) $PM_{2.5}$ emissions and $PM_{10}$ emissions shall include gaseous emissions from a source or activity, which condense to form particulate matter at ambient temperatures. On or after January 1, 2011, such condensable particulate matter shall be accounted for in applicability determinations and in establishing emissions limitations for $PM_{2.5}$ and $PM_{10}$ in PSD permits.
  - (b) Any pollutant identified under this paragraph (b)(50)(1)(b) as a constituent or precursor for a pollutant for which a national ambient air quality standard has been promulgated. Precursors identified by the Administrator for purposes of NSR are the following:
    - (1) Volatile organic compounds and nitrogen oxides are precursors to ozone in all attainment and unclassifiable areas.
    - (2) Sulfur dioxide is a precursor to $PM_{2.5}$ in all attainment and unclassifiable areas.
    - (3) Nitrogen oxides are presumed to be precursors to $PM_{2.5}$ in all attainment and unclassifiable areas, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of nitrogen oxides from sources in a specific area are not a significant contributor to that area's ambient $PM_{2.5}$ concentrations.
    - (4) Volatile organic compounds are presumed not to be precursors to $PM_{2.5}$ in any attainment or unclassifiable area, unless the State demonstrates to the Administrator's satisfaction or EPA demonstrates that emissions of volatile organic compounds from sources in a specific area are a significant contributor to that area's ambient $PM_{2.5}$ concentrations.

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# Regulated NSR Pollutant (cont.)

- (2) Any pollutant that is subject to any standard promulgated under section 111 (NSPS) of the Act;
- (3) Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act (Ozone Depleting Substances);
- (4) Any pollutant that otherwise is “subject to regulation” under the Act as defined in paragraph (b)(49) of this section. (This is where GHGs are addressed.)
- (5) The term regulated NSR pollutant shall NOT include any or all hazardous air pollutants either listed in section 112 of the Act, or added to the list pursuant to section 112(b)(2) of the Act, and which have not been delisted pursuant to section 112(b)(3) of the Act, UNLESS the listed hazardous air pollutant is also regulated as a constituent or precursor of a general pollutant listed under section 108 of the Act.
  - This is how HAPs (that also qualify as VOC or PM) remain subject to NSR as part of a class or group of compounds that are a “constituent or precursor” of a pollutant listed under CAA Section 108

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## PSD Regulated Pollutants (1 of 2)

- CO, $NO_X$, $SO_2$, $PM_{2.5}$&$_{10}$
- TSP
- VOC
- Lead
- Hydrogen sulfide ($H_2S$)
- Total reduced sulfur (including $H_2S$)
- Reduced sulfur compounds (including $H_2S$)
- Sulfuric Acid Mist



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## PSD Regulated Pollutants (2 of 2)

- Fluorides (other than HF)
- ODS
  - CFCs (11, 12, 112, 114, 115)
  - Halons
- Municipal waste combustor acid gases, metals, and organics
- Municipal solid waste landfill emissions
- GHG – $CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, and $SF_6$ – “subject to regulation” scenarios

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## Does $PM_{2.5}$ Include Condensables?

- Condensables are that portion of the exhaust that passes through the filter in a Method 5 test, but that gets condensed and captured in the cooled sample train used in Method 202 ("back half catch")
- Per the 5/16/2008 final $PM_{2.5}$ implementation rule, condensables (CPM) must be considered in setting emission limits and determining NSR applicability when EPA came up with an acceptable test method:
  - December 21, 2010 - New Method 201A and 202 (Dry Impinger Method) for CPM measurements – See Appendix D1
- Also see Handout 2-VV

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## Condensable Particulate (clarification)

- October 25, 2012, (77 FR 65107) amendments to Parts 51 and 52 clarify the status of condensable particulate matter (CPM) – See Handout 2-S
  - 5/16/2008 $PM_{2.5}$ implementation rule included language that created confusion over when to count CPM. It appeared to imply that CPM is part of PM
  - Clarification:
    - Count CPM as part of $PM_{2.5}$ and $PM_{10}$
    - Do not count CPM as part of PM/TSP (States/jurisdictions vary on this)
- Interim policy clarification for stack tests – See Handout 2-T

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# PM2.5 Implementation Rule for NSR Permitting

Nearly 11 years after finalizing the original $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS), EPA issued rules on how states should implement the standards in the New Source Review (NSR) permitting framework. Highlights from the final rule as recorded in the May 16, 2008, Federal Register, include:

1. **Both directly emitted $PM_{2.5}$ (primary) and its precursors, which include sulfur dioxide ($SO_2$) and nitrogen oxides ($NO_x$), are regulated in the NSR permitting framework, as was originally proposed.** With supporting evidence, states can exempt $NO_x$ as a precursor, and also add volatile organic compounds (VOCs) and/or ammonia as precursors.

2. **EPA did not require condensable particulate matter (CPM) be considered in the quantification of $PM_{2.5}$ until EPA issues adequate test methods for CPM, or until January 1, 2011, whichever is earlier.** The measurement of condensables is seen as a growing concern across a variety of regulations and permitting programs, and EPA's postponing of the consideration of CPM is tacit acknowledgment of this concern. This development is significant not only for $PM_{2.5}$, but also for $PM_{10}$, particularly for states with delegated Prevention of Significant Deterioration (PSD) programs. Between the effective date of the 2008 rule and January 1, 2011 (or earlier date if adequate test method is codified), condensables would not need to be considered in determining NSR applicability for $PM_{10}$, or in determining compliance with PSD permit limits. Note that this situation was temporary, however, and that compliance and NSR applicability determinations would once again need to consider condensables after January 1, 2011. (EPA finalized new PM2.5 stack test methods (75FR 80118) on December 21, 2010.) State implementation plan (SIP) approved states were unlikely to see the benefit of this loophole, since many or most did not have SIP revisions until after January 1, 2011. Furthermore, EPA acknowledged that states with SIPs that address condensables should continue to regulate this pollutant component, and even encouraged them to do so.

3. **The major source thresholds (MSTs) for $PM_{2.5}$ remain consistent with other pollutants under the major NSR program as defined in the Clean Air Act.** For purposes of the PSD program, the MST for $PM_{2.5}$ is 100 tons per year (tpy) for sources belonging to 28 listed source categories, and 250 tpy for all other sources. For purposes of Nonattainment (NA) NSR, the MST for $PM_{2.5}$ is 100 tpy. Direct emissions of $PM_{2.5}$ and each precursor are assessed individually (not aggregately) versus the appropriate MST.

4. **The significant emission rate (SER) for $PM_{2.5}$ (excluding precursors) is 10 tpy.** This value compares to the 15 tpy SER for $PM_{10}$. The SERs for $PM_{2.5}$ precursor ($SO_2$), presumptive precursor ($NO_x$), and candidate precursor (VOCs), are 40 tpy each (identical to the existing SERs for these same pollutants). This means, for instance, that a source applying for a PSD permit for $SO_2$ would likely need to evaluate the effect of its $SO_2$ emissions increases on the $SO_2$ NAAQS as well as the $PM_{2.5}$NAAQS; implications on Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) determinations are also expected to some extent. On October 20, 2010, EPA finalized $PM_{2.5}$ Increments, SMC, and SILs (See 75FR 64864)

5. **EPA addresses requirements for non-major sources of $PM_{2.5}$.** Under the new rule, state and local agencies must include $PM_{2.5}$ requirements for non-major sources in their minor NSR programs; these programs must consider both direct $PM_{2.5}$ emissions and $PM_{2.5}$ precursors.

## Regulated NSR Pollutant – Some Important Details

- Nitrogen Oxides: For PSD emissions purposes (major source/major modification), "$NO_x$" is reported as $NO_2$ (even the stack/vent portion emitted as NO).
- VOC: For PSD emissions purposes (major source/major modification), VOC is reported as the mass sum of the individual regulated organic compounds. (NOT necessarily based on just EPA Method 25 or 25A tests (alone). Also see EPA test Method 18 – Gas Chromatography and other compound specific test methods).
  - Method 18 (alone) is not appropriate for all stack gas emissions/VOC constituents.
  - To measure VOC emissions, one of two approaches is generally taken:
    - Total Hydrocarbon (THC) emissions are measured with one method (e.g., EPA Method 25A) while methane and ethane emissions are measured with a second method (e.g., EPA Method 18) and subtracted from the THC emissions, or
    - Emissions of individual compounds are measured with one or more test methods and then summed to obtain the VOC emissions. Depending on the gas stream being measured, the number of organic compounds present in the gas stream can be numerous, and it can be difficult to measure all of the compounds individually.

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## Regulated NSR Pollutant – Some Important Details

- Sulfuric Acid Mist: includes $SO_3$ and vapor $H_2SO_4$.
- Directly emitted ozone is not a regulated NSR Pollutant because ozone is considered a secondary pollutant (not directly emitted by sources).
- HAPs (normally excluded as individual compounds) are included if they are considered part of an NSR regulated pollutant (i.e. Benzene is a VOC) and/or the HAP is a NSR regulated pollutant precursor.
- Finally, for PSD purposes, NSPS pollutants (not listed under CAA Section 108) exclude named HAPs
  - HF (a HAP) is not included as part of PSD regulated "Fluorides."
  - Reduced sulfur compounds exclude the HAPS - $CS_2$ and COS.

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## Definition - Fugitive Emissions – 40 CFR 52.21(b)(20)

"Those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening."

Examples: open coal pile, open product storage piles, pumps, flanges, and valves, open process or storage tanks, haul roads, open waste storage piles, open top storage bins, open conveyors, WWT without enclosures or cap (NOT ALL PERMITTING AUTHORITIES AGREE ON WHAT CONSTITUTES FUGITIVE EMISSIONS)

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## Definition - Fugitive Emissions – 40 CFR 52.21(b)(20)

- The preamble to the U.S. EPA's 1980 promulgation of the definition for "fugitive emissions" states (45FR 52692-93):
- "EPA has considered comments with respect to the proposed definition of "fugitive emissions," and has determined that one change is appropriate. Instead of defining fugitive emissions as "those emissions which do not pass through a stack, chimney, vent, or other functionally equivalent opening," EPA believes that the term should apply to "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." This change will ensure that sources will not discharge as fugitive emissions those emissions which would ordinarily be collected and discharged through stacks or other functionally equivalent openings, and will eliminate disincentives for the construction of ductwork and stacks for the collection of emissions. **Emissions which could reasonably pass through a stack, chimney, vent, or other functionally equivalent opening will be treated the same as all other point emissions for threshold calculation purposes."**
- See Handout 2-TT and also see Handout 2-W concerning landfills

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## Special PTE Considerations – Fugitive Emissions

- Fugitive emissions are not included in determining **major source status** unless the source belongs to one of the source categories:
  - listed previously (list of 28) or
  - if, as of August 7, 1980, the source category was regulated by an NSPS or NESHAP (Sections 111 or 112 of the CAA) – See handout 2-BB
    - Example: A coal prep plant of the type covered by the NSPS in 40 CFR part 60, subpart Y. The coal prep plant falls within a listed source category as this source category was regulated by subpart Y as of August 7, 1980. The coal prep plant includes emissions units that are not regulated as "affected facilities" under the NSPS. You include fugitive emissions from ALL emission units at the coal prep plant to determine if the source is a major stationary source, including fugitive emissions from the units that are not regulated as "affected facilities" under the NSPS.
- Fugitive emissions associated with modifications at ALL types of existing major sources are a different matter from a regulatory perspective.

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## NSPS and NESHAPs promulgated on or before August 7, 1980

- 40 CFR 60 Subpart A
- 40 CFR 60 Subpart E
- 40 CFR 60 Subparts F through J
- 40 CFR 60 Subpart K (Storage tanks)
- 40 CFR 60 Subpart Ka (Storage tanks)
- 40 CFR 60 Subparts L through Z
- 40 CFR 60 Subparts AA through DD
- 40 CFR 60 Subparts GG, HH, JJ, KK, MM, NN, and PP
- 40 CFR 61 Subparts A, C through F, and M

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# Modifications - Fugitives

- When assessing the baseline actual emissions (BAE) and projected actual emissions (PAE), fugitive emissions are considered for ALL stationary source types (including the "unlisted" source categories).
- This is because certain clauses in the rule (40 CFR 52.21(b)(2)(v) and 40 CFR 52.21(b)(3)(iii)(c)) are currently stayed (see 76FR 17548). These stayed clauses exempt fugitive emissions (at unlisted source categories) from applicability assessments (emissions change calculations) for modifications.
  - Note: On October 14, 2022 (87FR 62322), EPA proposed to remove these currently stayed clauses - 40 CFR 52.21(b)(2)(v) and 40 CFR 52.21(b)(3)(iii)(c).
- However, there is broad requirements exemption for modifications undertaken at "unlisted" sources that would trigger major NSR (PSD), but only if fugitives ARE considered.
  - The requirements exemption is noted at 40 CFR 52.21(i)(1)(vii) for unlisted source types – See Handout 5-Z.
  - 52.21(i)(1): The requirements of paragraphs (j) through (r) of this section shall not apply to a particular major stationary source or major modification, if;
  - (vii) The source or modification would be a major stationary source or major modification only if fugitive emissions, to the extent quantifiable, are considered in calculating the potential to emit of the stationary source or modification and the source does not belong to any of the following categories:.....(the "listed" source categories).

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TABLE A-2. NEW SOURCE PERFORMANCE STANDARDS PROPOSED AND NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS PROMULGATED PRIOR TO August 7, 1980

New Source Performance Standards 40 CFR 60

| Source | Subpart | Affected Facility | Proposed Date |
|---|---|---|---|
| Fossil-fuel fired steam generators for which construction is commenced after 08/17/71 and before 09/19/78 | D | Utility and industrial (coal, oil, gas, wood, lignite) | 08/17/71 |
| Elect. utility steam generating units for which construction is commenced after 09/18/78 | Da | Utility boilers (solid, liquid, and gaseous fuels) | 09/19/78 |
| Municipal incinerators (≥50 tons/day) | E | Incinerators | 08/17/71 |
| Portland cement plants | F | Kiln, clinker cooler | 08/17/71 |
| Nitric acid plants | G | Process equipment | 08/17/71 |
| Sulfuric acid plants | H | Process equipment | 08/17/71 |
| Asphalt concrete plants | I | Process equipment | 06/11/73 |
| Petroleum refineries | J | Fuel gas combustion devices Claus sulfur recovery | 06/11/73 |
| Storage vessels for petroleum liquids construction after 06/11/73 and prior to 05/19/78 | K | Gasoline, crude oil, and distillate storage tanks ≥40,000 gallons capacity | 06/11/73 |
| Storage vessels for petroleum liquids construction after 05/18/78 | Ka | Gasoline, crude oil, and distillate storage tanks ≥40,000 gallons capacity, vapor pressure ≥1.5 | 05/18/78 |
| Secondary lead smelters and refineries | L | Blast and reverberatory furnaces, pot furnaces | 06/11/73 |

TABLE A-2. NEW SOURCE PERFORMANCE STANDARDS PROPOSED AND NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS PROMULGATED PRIOR TO August 7, 1980

New Source Performance Standards 40 CFR 60

| Source | Subpart | Affected Facility | Proposed Date |
|---|---|---|---|
| Secondary brass and bronze ingot production plants | M | Reverberatory and electric furnaces and blast furnaces | 06/11/73 |
| Iron and steel mills | N | Basic oxygen process furnaces (BOPF)<br><br>Primary emission sources | 06/11/73 |
| Sewage treatment plants | O | Sludge incinerators | 06/11/73 |
| Primary copper smelters | P | Roaster, smelting furnace, converter dryers | 10/16/74 |
| Primary zinc smelters | Q | Roaster sintering machine | 10/16/74 |
| Primary lead smelters | R | Sintering machine, electric smelting furnace, converter<br><br>Blast or reverberatory furnace, sintering machine discharge end | 10/16/74 |
| Primary aluminum reduction plants | S | Pot lines and anode bake plants | 10/23/74 |
| Primary aluminum reduction plants 111(d) | | Pot lines and anode bake plants | 04/11/79 |
| Phosphate fertilizer industry | T<br>U<br>V<br>W<br>X | Wet process phosphoric<br>Superphosphoric acid<br>Diammonium phosphate<br>Triple superphosphate products<br>Granular triple superphosphate products | 10/22/74 |
| Coal preparation plants | Y | Air tables and thermal dryers | 10/24/74 |
| Ferroalloy production facilities | Z | Specific furnaces | 10/21/74 |

TABLE A-2. NEW SOURCE PERFORMANCE STANDARDS PROPOSED AND NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS PROMULGATED PRIOR TO August 7, 1980

New Source Performance Standards 40 CFR 60

| Source | Subpart | Affected Facility | Proposed Date |
|---|---|---|---|
| Steel plants: electric arc furnaces | AA | Electric arc furnaces | 10/21/74 |
| Kraft pulp mills | BB | Digesters, lime kiln recovery furnace, washer, evaporator, strippers, smelt and BLO tanks<br><br>Recovery furnace, lime, kiln, smelt tank | 09/24/76 |
| Glass manufacturing plants | CC | Glass melting furnace | 06/15/79 |
| Grain elevators | DD | Truck loading and unloading stations, barge or ship loading and unloading stations railcar loading and unloading stations, and grain handling operations | 01/13/77 |
| Stationary gas turbines | GG | Each gas turbine | 10/03/77 |
| Lime manufacturing plants | HH | Rotary kiln, hydrator | 05/03/77 |
| Degreasers (organic solvent cleaners) | JJ | Cold cleaner, vapor degreaser, conveyorized degreaser | 06/11/80 |
| Lead acid battery manufacturing plants | KK | Lead oxide production grid casting, paste mixing, three-process operation and lead reclamation | 01/14/80 |
| Automobile and light-duty truck surface coating operations | MM | Prime, guide coat, and top coat operations at assembly plants | 10/05/79 |

TABLE A-2. NEW SOURCE PERFORMANCE STANDARDS PROPOSED AND NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS PROMULGATED PRIOR TO August 7, 1980

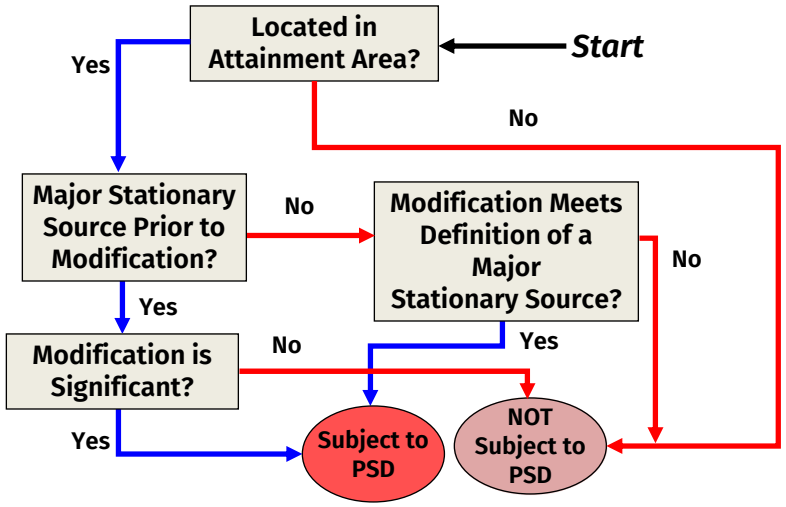
New Source Performance Standards 40 CFR 60

| Source | Subpart | Affected Facility | Proposed Date |
|---|---|---|---|
| Phosphate rock plants | NN | Grinding, drying and calcining facilities | 09/21/79 |
| Ammonium sulfate manufacture | PP | Ammonium sulfate dryer | 02/04/80 |

National Emission Standards for Hazardous Air Pollutants 40 CFR 61

| Pollutant | Subpart | Affected Facility | Promulgated Date |
|---|---|---|---|
| Beryllium | C | Extraction plants, ceramic plants, foundries, incinerators, propellant plants, machining operations | 04/06/73 |
| Beryllium, rocket motor firing | D | Rocket motor firing | 04/06/73 |
| Mercury | E | Ore processing, chloralkali manufacturing, sludge incinerators | 04/06/73 |
| Vinyl chloride | F | Ethylene dichloride manufacture via $O_2$ HCl, vinyl chloride manufacture, polyvinyl chloride manufacture | 10/21/76 |
| Asbestos | M | Asbestos mills; roadway surfacing (asbestos tailings); demolition; spraying, fabrication, waste disposal and insulting | 04/06/73 |
| | | Manufacture of shotgun shells, renovation, fabrication, asphalt concrete, products containing asbestos | 06/19/78 |

## Is a Project Subject to PSD?




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## PSD Triggering Thresholds: PSD Applies If....

- New Sources: Plant will be a major source (>major source threshold is 100 or 250 tons/year)
- Existing Minor Sources: Make a modification that in itself is "major" (>major source threshold is 100 or 250 tons/year)
- Existing Major Sources: Make a modification that exceeds de minimis levels (also called PSD Significant Emission Rates); a "major modification"
  - Existing major sources may "net-out" of PSD review

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# What is a “Major Modification”?

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## Major Modification (under PSD) – 40 CFR 52.21(b)(2)

*ANY physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase.*

*(unless meeting exclusion criteria…)*

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# PSD Major Modification - Exclusions

- Routine maintenance, repair, or replacement (RMRR) – 40 CFR 52.21(b)(2)(iii)(A)
  - See Handout 2-D: Air Issues Review - Number 24 - April 2000
  - See Handout 2-J: Catalyst Change Example
- Use of an alternative fuel or raw material (if capable of using before Jan. 6, 1975) – 40 CFR 52.21(b)(2)(iii)(B)
  - See Handout 2-E: Air Issues Review – Number 27 – June 2001
  - See Handout 2-Q: USEPA letter to FDEP – January 1998
  - See Handout 2-U: Request for Clarification of EPA Guidance on the Alternative Fuels Exemption under the Prevention of Significant Deterioration Program – January 21, 2000 (US EPA Region 4)
  - See Handout 2-JJ: USEPA (OAQPS) Memo concerning TDF – June 7, 1988

  Refer to Summary: Interpreting NSPS and PSD "Alternative Fuels" Exemption
- Increase in hours of operation or production rate (unless prohibited) – 40 CFR 52.21(b)(2)(iii)(F)
- Change in ownership – 40 CFR 52.21(b)(2)(iii)(G)

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# Interpreting NSPS and PSD "Alternative Fuels" Exemption

Recent electricity shortages and highly variable natural gas prices have prompted many facilities to consider alternative fuels. However, especially given EPA's recent enforcement activity associated with the alleged improper application of the "routine maintenance, repair, and replacement" exemption to NSPS and PSD applicability, the seemingly straightforward exemption associated with the use of alternative fuels warrants careful consideration. For any industrial facility planning to modify existing facility capital to increase production, compliance with New Source Performance Standards (NSPS) or Prevention of Significant Deterioration (PSD) regulations can be expensive and time consuming. Both programs contain applicability criteria that are broad in scope and reach, whereby applicability is the rule and not the exception. A facility that can legitimately use one or more of the exemptions to NSPS and PSD applicability in the course of modifying an affected facility, can increase production (and emissions) without undergoing the stringent permitting requirements that each program requires. This article examines the "alternative fuels" exemption to NSPS and PSD applicability and the potential for its acceptable use.

## Origin of the NSPS "Alternative Fuels" Exemption

On August 17, 1971, U.S. EPA proposed standards of performance for steam generators, portland cement plants, incinerators, nitric acid plants, and sulfuric acid plants (35FR15704). The proposed standards, which applied to sources that initiated construction or modification after the proposal date, included emission limits for one or more of four pollutants (particulate matter, sulfur dioxide, nitrogen oxides, and sulfuric acid mist) for each source category. The proposal included requirements for performance testing, stack gas monitoring, record keeping and reporting, and procedures by which EPA would provide preconstruction review.

The final rule was promulgated on December 23, 1971 (36FR24876) and created what is now commonly referred to as the "alternative fuels" exemption. As originally promulgated and codified at 40 CFR § 60.2(h)(2)(iii), the "alternative fuels" exemption to NSPS applicability provided:

*The following shall not be considered a change in the method of operation:*

*…*

*(iii) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, as provided by § 60.1, the existing facility was designed to accommodate such alternative use.*

The preamble to the August 17, 1971 proposed rule noted that:

*The definition of modification, as it pertains to increases in production rate and changes of fuels, has been clarified. Increases in production rates up to design capacity will not be considered a modification nor will fuel switches if the equipment was originally designed to accommodate such*

*fuels. These provisions will eliminate inequities where equipment had been put into partial operation prior to the proposal of the standards.*

From the outset, the idea behind the "alternative fuels" exemption to NSPS applicability was simple. The exemption was intended to protect the substantial financial investment multiple fuel or raw material capability represents over and above single fuel or raw material designs. The exemption would avoid penalizing the use of alternative fuels or raw materials after the NSPS applicability date as long as the potentially affected facility contemplated multiple fuels or raw materials prior to the NSPS applicability date. In other words, potentially affected facilities that incurred significant costs in designing and purchasing units capable of multiple fuels or raw materials could elect to use the alternatives without losing the grandfathered status of the unit. The "alternative fuels" exemption is consistent with the general concept of grandfathering existing facilities under the NSPS rules.

Additional changes were proposed October 15, 1974 (39FR36946). The current version of the "alternative fuels" exemption to NSPS applicability codified at 40CFR § 60.14(e)(4) provides:

*The following shall not, by themselves, be considered modifications under this part:*

*…*

*(4) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, as provided by § 60.1, the existing facility was designed to accommodate that alternative use.*

*A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change….*

The modern version of the "alternative fuels" exemption to NSPS applicability expands the concept to include "modifications" (instead of merely "changes in the method of operation") while attempting to clarify the inequities-based argument that served as the genesis of the 1971 exemption.

## Application of the "Alternative Fuels" Exemption in PSD

The "alternative fuels" exemption appeared in the first round of the PSD regulations published December 5, 1974. As originally promulgated and codified at 40CFR § 52.01(d)(2)(iii), the "alternative fuels" exemption to PSD applicability provided:

*The following shall not be considered a change in the method of operation:*

*…*

*(iii) Use of an alternative fuel or raw material if, prior to the effective date of a paragraph in this Part, which imposes conditions on or limits modifications, the source is designed to accommodate such alternative use.*

The current version of the "alternative fuels" exemption to PSD applicability codified at 40 CFR § 52.21(b)(2)(iii)(e) provides:

*A physical change or change in the method of operation shall not include:*

*…*

*(e) Use of an alternative fuel or raw material by a stationary source which:*

*(1) The source was capable of accommodating prior to January 6, 1975, unless such change would be prohibited under any federally enforceable permit condition established after January 6, 1975….*

The preamble to the 1974 PSD regulations makes it clear that, at least in terms of the exemptions to potential applicability, the Part 52 (PSD) "alternative fuels" exemption should match the Part 60 (NSPS) "alternative fuels" exemption detailed above. Accordingly, the exemption deserves essentially the same analysis regardless of the program under which one attempts to apply the rule—with a single exception. For the NSPS exemption to apply, the "capable of accommodating" benchmark is the applicability date of the NSPS at issue. For the PSD exemption to apply, the "capable of accommodating" benchmark date is January 6, 1975. For the sake of clarity, the dates under the NSPS and PSD programs after which the "alternative fuels" exemption is *per se* inapplicable will be referred to as the "exemption benchmarks" for the remainder of this discussion. The rest of this article will examine various applications of the "alternative fuels" exemption in both the NSPS and PSD settings, drawing distinctions between the two as necessary.

## Initial Applications of the "Alternative Fuels" Exemption

One of the earliest applications of the PSD "alternative fuels" exemption concerned the 1978 conversion of five pellet dryers at Cabot Corporation's Ville Platte, Louisiana furnace process carbon black manufacturing plant. The proposed modifications would allow the dryers to burn waste gas as a substitute for natural gas. The dryers were in existence prior to January 6, 1975, and the original construction plans expressly provided for waste gas combustion. The only changes needed involved additional piping and modifications to the dryer burners to adjust to the lower heat value of the waste gas. U.S. EPA ultimately determined that, because the necessary modifications were minimal and were clearly contemplated prior to dryer construction, the inequities-based rational for the exemption was satisfied and the units could make the fuel switch without PSD review.

Another early application of the PSD "alternative fuels" exemption took place in 1981, when the Ashland Chemical Company considered a change in feedstock at its Neal, West Virginia maleic anhydride plant. The proposed modification involved switching raw material feedstock from benzene to butane. While the actual facility was not constructed until after January 6, 1975, the original construction plans and equipment purchase contracts for the facility were dated prior to January 6, 1975, and specifically called for dual feedstock capability. U.S. EPA ultimately determined that, because the dual feedstock capability was specifically called for in the construction plans prior to January 6, 1975, the project was exempt from PSD review.

Early application of both NSPS and PSD "alternative fuels" exemptions concerned the 1983 proposed conversion of United Illuminating Company's 400 MW-capacity Bridgeport Harbor Unit #3. The proposed modification would allow a switch from fuel oil to coal firing. United Illuminating Company provided a proposal, purchase contract, and design information, all dating prior to the NSPS and PSD benchmarks, to support the contention that the coal firing was originally contemplated, although never actually performed. Modifications to the boiler tubing and the addition of flame scanners, burners, ignitors and other equipment to receive coal were necessary at an estimated cost of approximately 5 million dollars.

U.S. EPA concluded that, because the necessary modifications were minimal and clearly contemplated prior to the NSPS and PSD benchmark dates, the inequities-based rational for the exemption was satisfied, and the units could make the fuel switch without NSPS or PSD review. EPA noted that while assessment of construction plans to determine the NSPS exemption applicability was limited to the boiler, the PSD exemption applicability determination required an assessment of the entire facility. While additional applications of the "alternative fuels" exemption to NSPS and PSD applicability exist, these three examples illustrate the basic framework within which the exemption should be applied. The regulated party must demonstrate that prior to the NSPS applicability date (for the NSPS exemption) or January 6, 1975 (for the PSD exemption), multiple fuel or raw material operations were planned. This demonstration can take the form of construction plans, feasibility studies, appropriation requests, equipment purchase contracts, or any other relevant materials indicating that time, money, and effort were invested to provide for multi-fuel or multi-raw material capabilities. As long as the intent existed prior to the benchmark dates, even if some additional capital outlay and facility modifications are required after the benchmark dates, the exemption applies.

## A Near Misapplication of the "Alternative Fuels" Exemption – The FPC Case

A review of the applicability determination databases available to the public reveals no significant deviations from the above-outlined "alternative fuels" application framework until 1995. At that time, Florida Power Company (FPC) attempted to invoke the exemption in a permit application to the Florida Department of Environmental Protection (DEP) in which FPC proposed to blend 5 percent petroleum coke with the coal burned at its Crystal River facility. FPC claimed that the "alternative fuels" exemption applied because the units could have fired a 95 percent coal/5 percent coke blend prior to January 6, 1975. The Florida DEP initially determined that the exemption did not apply since the units could not burn coal (much less a coal/coke blend) on January 6, 1975 despite the fact that they had been able to in the past. In fact, the units were only able to burn coal several years later after being ordered to switch to coal by the Federal Energy Administration and making the necessary expenditures. The Florida DEP also determined that the addition of coke was not a fuel switch at all but merely the addition of a waste fuel. Finally, the Florida DEP determined that the use of such a fuel was not consistent with the inequities based rationale intended in the 1971 NSPS and 1974 PSD rules. Accordingly, the Florida DEP denied FPC's request to blend petroleum coke with full support from EPA Region IV.

FPC subsequently petitioned for a formal administrative hearing and convinced an Administrative Law Judge (ALJ) that the interpretations of intent via the original preambles and

guidance memoranda could not overrule what FPC termed the "plain meaning" of the exemption. Under remand, the Florida DEP reversed its initial determination—only to reverse itself again a short time later. After additional legal wrangling, the issue was put to rest only after EPA Region IV notified FPC senior management that, should FPC proceed with firing the coal/coke blend, severe enforcement ramifications would ensue, regardless of the ALJ's ruling.

Despite nearly 15 years of clear and consistent application of the "alternative fuels" exemption, FPC likely owed its temporary victory in front of the ALJ to the ambiguous phrase "capable of accommodating." All parties to the dispute agreed that the units in question could of course "accommodate" the 5 percent coke blend—as it could conceivably accommodate any combustible material that could fit past the feeder grates.

The rationale behind the "alternative fuels" exception, however, requires more than being able to utilize a fuel or raw material by opportunity or chance. It requires the active, purposeful, meaningful intent to do so as represented by construction plans and equipment purchase records. Otherwise, virtually any fuel could qualify for the exemption. Without such intent to utilize an alternative fuel or raw material—and the associated capital expenditure associated with multiple capabilities—the rationale behind the exemption does not exist, inequities inherent to denying the multiple use do not arise, and the exemption is not applicable.

## Future Applications of the "Alternative Fuels" Exemption

Nearly 40 years have passed since the "alternative fuels" exemption arose in the context of the NSPS program and nearly 37 years since the PSD exemption was promulgated. Over the last three decades, most facilities constructed prior to the benchmark dates with multiple fuel or raw material capabilities have either exercised the exemption by now or simply forgone the chance to do so. Thus, future applicability determination requests for such changes will likely be few. However, facilities that have changed fuels without regulatory review according to their understanding of the applicability of the "alternative fuels" exemption may be well served to proactively revisit those decisions before being called on by EPA to do so.

## PSD Major Modification – Exclusions – Use of an Alternative Fuel or Raw Material

- Use of an alternative fuel or raw material (if capable of using before Jan. 6, 1975)
  - PSD:
    - The source was capable of accommodating before January 6, 1975, unless such change would be prohibited under any federally enforceable permit condition which was established after January 6, 1975, pursuant to 40 CFR 52.21 or under regulations approved pursuant to 40 CFR part 51, subpart I; or
    - The source is approved to use under any permit issued under 40 CFR 52.21 or under regulations approved pursuant to 40 CFR 51.166;
  - By comparison - NSPS:
    - Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, as provided by § 60.1, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change.

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## Alternative Fuel or Raw Material (example)

- Ashland Chemical - 1981
  - Ashland Chemical Company notified EPA Region 3 on January 19, 1981 that Ashland wished to change the feedstock of its maleic anhydride plant in Neal, West Virginia, from benzene to butane.
  - Ashland stated that it was aware of the PSD requirements and believed that they did not require Ashland to obtain a permit before changing feedstocks.
  - The company argued that its Neal plant was "capable of accommodating" butane before January 6, 1975 and that PSD, therefore, did not apply, as specified by 40 CFR 52.21(b) (2) (iii) (e).
  - On April 10, 1981 Region 3 notified Ashland that [Region 3] believed the company did require a PSD permit.

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## Alternative Fuel or Raw Material (example)

- EPA Region 3's May 27, 1981, initial determination (Ashland Chemical)
  - "Region III stated that our view was that under the PSD regulations a source could be considered "capable of accommodating" an alternative fuel as of January 6, 1975 only if construction of the source had "commenced" as of that date. We pointed out that Ashland could not be considered to have "commenced" construction as of January 6, 1975 since Ashland had not obtained a State construction permit as of that date."

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## Alternative Fuel or Raw Material (example)

- Ashland Chemical – July 13, 1981 memo from USEPA to EPA Region 3
  - "In a memo dated May 27, 1981, you requested a determination from this Office regarding the applicability of PSD review for a switch in feedstock materials at Ashland Chemical's maleic anhydride plant in Neal, West Virginia. Ashland proposes to change its feedstock from benzene to butane, which will eliminate benzene emissions but will increase VOC emissions by approximately 2500 tons per year."
  - "The PSD regulations (40 CFR 52.21 (b) (2) (iii) (e)) exempt from review fuel switches or use of an alternate raw material if the source was capable of accommodating the fuel or material before January 6, 1975. This exemption is a result of the intent expressed by Congress that Section 169 of the Clean Air Act (Act) adopt to the extent possible, the same definition of "modification" used in Section 111 (a) of the Act (43 FR 26396)."

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## Alternative Fuel or Raw Material (example)

- Ashland Chemical (cont.)
  - "A facility shall be considered to be designed to accommodate an alternate fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change."
  - "Information from Ashland Chemical indicates that the facility was originally designed to use either benzene or butane. Contracts for the construction of the facility, which included dual feedstock capability, were signed in May 1974. Thus, it appears that the facility was capable of accommodating butane as an alternate feedstock before January 6, 1975 and the proposed switch to butane should not be subject to PSD review."

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## Alternative Fuels – January, 2000

- USEPA Region 4 letter (to ADEM):
  - "The stated intent of the NSPS exemption was to "eliminate inequities where equipment had been put into partial operation prior to the proposal of the standards," 36 FR 15,704 (August 3, 1971). Hence, the alternative fuels exemption was designed to eliminate inequities faced by facilities which designed and constructed units to burn more than one fuel, but which were not burning all of those fuels as of January 6, 1975."
  - "For example, absent the exemption, a facility equipped to burn coal and oil, but which was only burning oil at the time the NSPS were adopted, would be subject to the NSPS and subsequently PSD review merely by switching back to coal."
  - "Therefore, EPA believes it is reasonable to interpret the alternative fuels exemption to apply only to fuels which were contemplated in the design and construction of a unit prior to January 6, 1975 **and to which the unit remains continuously able to burn."**

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# Routine Maintenance, Repair, Replacement Exclusion

- Likely the most hotly debated NSR topic over the past 40 years
- There has always been doubt among the legal community whether the exclusion has any legal basis or foundation
- If a legal basis exists, how narrow or broad should the RMRR exclusion be?

See “The Legal Basis for EPA’s Proposed Revision to the Routine Maintenance, Repair, and Replacement Exception”

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# A Tale of Two Theories: The Legal Basis for EPA's Proposed Revision to the Routine Maintenance, Repair, and Replacement Exception, and the Implications for Administrative Law

by Matthew C. Stephenson

How many lawyers, regulators, engineers, and contractors does it take to change a light bulb? Lots, if you happen to be changing the light bulb at a "stationary source" of pollution, and the bulb change counts as a "modification" of the source under the Clean Air Act (CAA).[1] According to that statute, any physical or operational change that results in an increase in the source's emission of certain pollutants triggers an exacting and costly set of permitting requirements. Since emissions can increase if a source operates faster or more frequently than it did before, numerous physical or operational changes could potentially trigger an "emissions increase" within the meaning of the statute. Perhaps not changing a light bulb, but replacing old turbine blades, upgrading a computer system, fixing leaky pipes, repairing a broken gauge, or any of a host of other activities might increase total emissions (by causing a source to operate at a higher capacity), and, if these activities count as physical or operational changes, they will all have to undergo the rigors of the CAA's aggressive permitting requirements.

Something seems intuitively wrong with that, even from a committed environmentalist's perspective. Some activities, though technically physical or operational "changes," appear to be so much a part of the routine operation of power plants, incinerators, factories, or other facilities that it seems illogical to subject them to permitting requirements designed to regulate more significant construction or modification programs. And so, the U.S. Environmental Protection Agency (EPA) has quite sensibly chosen to exempt certain types of activities, known as "routine maintenance, repair, and replacement" (RMRR) activities, from the stringent permitting requirements that the CAA would otherwise impose. So, you can change your light bulb or fix your leaky pipe without having to worry, but if you decide to spend a million dollars completely redesigning and renovating your main generator, you'll need to go get your permit.

That's all well and good, and fairly uncontroversial. But the hard questions that arise with respect to RMRR—as is often the case with these sorts of legal and regulatory provisions—concern the scope, form, and legal justification for the exemption.

First, with respect to *scope*, which activities should be considered RMRR, and which should not? The leaky pipe and the million-dollar renovation are easy cases; what about the harder intermediate cases, like the turbine replacement or computer upgrade? Should the RMRR category be broad or narrow?

Second, with respect to *form*, should EPA try to apply the RMRR exemption through something that looks more like a bright-line rule or something that looks more like an open-ended standard? Should EPA and state enforcement authorities try to make these determinations on a case-by-case basis? Or, should EPA give effect to its substantive policy judgments through broad, general, rule-like categories—rules that, while perhaps overinclusive or underinclusive, provide clarity and certainty?

Third, with respect to *legal justification*, on what grounds does EPA have the authority to create and delimit the RMRR exception? Are there legal constraints on EPA's choices regarding scope or form? What must EPA show in order to establish that its choices in these matters are supported by congressional authority?

Currently, the *scope* of the RMRR exception is relatively narrow, its *form* is that of an open-ended, multi-factor standard, and its *legal justification* is not entirely clear, though courts have accepted (without much discussion) EPA's authority to promulgate the exception as it currently exists. But on December 31, 2002, EPA proposed a substantial change in the RMRR rule. The new proposal would broaden the scope of the RMRR exception and would put it in the form of a rule rather than a standard. The legal basis for this change, however, is unclear. This is in part because the courts have never articulated clearly the legal basis for EPA's authority to *create* the RMRR exception, as distinct from the Agency's authority to limit the application of that exception. Given that EPA's new rule, if and when it is published in final form, is almost certain to be challenged in court, understanding the legal basis for the RMRR exception has become more important.

The goal of this Article is threefold: to explain more fully the role of the RMRR exception in the CAA's regulatory scheme; to describe the distinct and potentially competing legal bases for the current rule and the proposed rule change; and to argue for what I view as the most theoretically and practically satisfying view of the proper legal basis for the RMRR exception. The Article addresses each of these objectives in turn.

Part I lays out the statutory and regulatory framework of the CAA and its various permitting requirements, describes the history and significance of the RMRR exemption to those requirements, and explains how the newly proposed rule would change the current regime.

Part II scrutinizes the legal basis for the RMRR exemption, demonstrating that there are two distinct potential legal theories for this exemption. Both theories, however, are po-

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1. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

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tentially problematic as justifications for the proposed rule change. On the one hand, EPA could argue that the CAA is sufficiently ambiguous that the Agency can exempt certain activities as RMRR as an exercise of its authority, under the deferential standard of *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*,[2] to interpret the statutes it administers when the U.S. Congress has not spoken clearly. On the other hand, EPA might justify the categorical definition of certain activities as RMRR by relying on its recognized—but limited—authority to create so-called de minimis[3] exceptions to the requirements of the CAA even when the text of the statute is not ambiguous. In the official preamble to the proposed rule, EPA tried to paper over the distinction between these two approaches, but prior drafts of the preamble indicate that the issue of the proper legal basis for the rule change was the subject of considerable discussion within EPA and during interagency review. As the preamble was drafted and re-drafted, EPA moved away from a de minimis theory and toward a *Chevron* theory, though the published preamble remains somewhat ambiguous on this point.

The different theories turn out to have quite different implications for the scope and limits of EPA's authority under the CAA, and for broader administrative law issues as well. Thus, Part III considers the question of how EPA, and the court that reviews the challenge to the final version of the rule, ought to choose between these theories. I argue that the de minimis theory is the more satisfying legal justification, despite EPA's apparent reluctance to defend its rule change on that basis. From EPA's self-interested perspective, relying on a *Chevron* theory is risky because of the apparently clear language of the statute, whereas the safeguards built into the proposed rule put EPA in the position to make a good case that the new RMRR proposal is justified even under a more constrained de minimis approach. From the point of view of the court, and in the interests of administrative law development more generally, upholding the RMRR rule on a *Chevron* basis threatens to gut the "congressional intent" prong of *Chevron*. Relying on the de minimis theory, in contrast, strikes the appropriate balance between congressional, judicial, and agency power in determining the scope of this and other exemptions.

Moreover, invoking the de minimis exemption in this case would also enable the reviewing court to resolve the currently open question of how much deference is due an agency's specification of a de minimis exemption. I argue that the appropriate standard of judicial review for this particular kind of agency determination is not the extremely deferential *Chevron* Step Two test but rather the more intermediate, standard-like approach of *Skidmore v. Swift & Co*.[4] A court applying the *Skidmore* standard to the proposed RMRR rule change would probably uphold the rule as a reasonable exercise of EPA's power to create de minimis exceptions, but it would give challengers a fair chance to show that the scope and form of the proposed rule sweep in too many activities that cannot be justified on a de minimis theory.

2. 467 U.S. 837, 14 ELR 20507 (1984).

3. The term "de minimis" is short for the phrase *de minimis non curat lex* ("The law does not concern itself with trifles.").

4. 323 U.S. 134, 139-40 (1944).

## I. The Statutory and Regulatory Framework

### *A. The CAA's Permitting Requirements: New Source Performance Standards (NSPS), New Source Review (NSR), and Prevention of Significant Deterioration (PSD)*

Under the CAA Amendments of 1970,[5] the construction or modification of a "stationary source" of certain "criteria pollutants" must meet NSPS promulgated by EPA. The NSPS require sources to install the best available control technology (BACT) at new or "modified" sources. In 1977, Congress—frustrated at the failure to meet the CAA's initial clean air goals by the original statutory deadlines—enacted new amendments to the CAA, several of which imposed additional requirements for new or modified stationary sources. Most importantly, the 1977 Amendments established the NSR program,[6] under which new or modified major stationary sources in "nonattainment areas"—that is, geographic regions where concentrations of criteria pollutants exceed the national ambient air quality standards (NAAQS)—are subjected to additional preconstruction permitting requirements more stringent than those already imposed by the NSPS.[7] Most significantly, NSR requires projects to employ technologies that guarantee the lowest achievable emissions rate (LAER)[8]—a requirement even stricter than BACT[9]—and to offset any new emissions from the new or modified source by equivalent reductions in emissions from some other source.[10]

The 1977 Amendments also established a PSD program.[11] Unlike the NSR program, which applies only in *nonattainment* areas, PSD applies only in *attainment* areas—the goal of the program is to prevent especially clean areas from becoming any dirtier.[12] The PSD program im-

5. Pub. L. No. 91-604, 84 Stat. 1676.

6. 42 U.S.C. §§7501 et seq., ELR STAT. CAA §§171 et seq.

7. *Id*. §§7502(c)(5), 7503(a), ELR STAT. CAA §§172(c)(5), 173(a).

8. *Id*. §7503(a)(2), ELR STAT. CAA §173(a)(2).

9. According to the statute, LAER is

> that rate of emissions which reflects (A) the most stringent emissions limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or (B) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.

*Id*. §7501(3), ELR STAT. CAA §171(3).

10. *Id*. §7503(a)(1), ELR STAT. CAA §173(a)(1). In addition to the offset and LAER requirements, NSR permits also require that the owner or operator of the proposed new or modified source show that all major stationary sources in the state that he/she owns or operates are in compliance with all applicable emissions limitations, *id*. §7503(a)(3), ELR STAT. CAA §173(a)(3); that the state's implementation plan is being adequately implemented, *id*. §7503(a)(4), ELR STAT. CAA §173(a)(4); and that a cost-benefit analysis shows the benefits of the new or proposed source "significantly outweigh" the environmental and social costs. *Id*. §7503(a)(5), ELR STAT. CAA §173(a)(5).

11. *Id*. §§7470 et seq., ELR STAT. CAA §§160 et seq. The 1977 Amendments affirmed and codified the principle first articulated in the controversial decision in Sierra Club v. Ruckelshaus, 344 F. Supp. 253, 2 ELR 20262 (D.D.C. 1972). For a comprehensive review of the CAA Amendments, see ARNOLD W. REITZE JR., AIR POLLUTION CONTROL LAW: COMPLIANCE AND ENFORCEMENT (Envtl. L. Inst. 2001).

12. *See* 42 U.S.C. §7470, ELR STAT. CAA §160.

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poses three requirements on new or modified[13] sources in attainment areas. First, these sources must employ BACT.[14] While this is the same standard that would otherwise be imposed by NSPS, the PSD program requires that the BACT determination be made on a case-by-case basis, rather than through an industrywide determination.[15] Second, additional technological and other requirements apply if the source is located in certain designated areas, such as those near natural parks or other pristine wilderness regions.[16] Third, no individual source is allowed to degrade more than a certain percentage of the existing clean air in an attainment region.[17]

From the perspective of both environmentalists and regulated industries, a great deal turns on the question of when the NSR and PSD requirements apply. This question is especially difficult when considering some change to the operation of an existing source of pollution, as opposed to the construction of a new power plant or incinerator from scratch. The NSPS, NSR, and PSD programs can all be triggered by a "modification" of an existing source—but what counts as a "modification?"

The statutory definition of "modification" for purposes of all three programs is "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted."[18] The "modification" question thus involves a two-step inquiry. First, is the challenged activity a "physical change" or a "change in the method of operation" of the source? Second, if the answer to the first question is yes, does that physical or operational change increase emissions?[19]

The answer to the second question turns on the way EPA calculates and projects emissions. Though this subject is important and controversial—and is the main focus of another major clean air rule change recently promulgated by the Bush Administration EPA[20]—the focus of this Article is on the first question: what constitutes a physical or operational change for purposes of the CAA?

### *B. The RMRR Exception: The Current Approach*

Though the definitions section of the CAA says that the permitting programs apply to "*any* physical change [ ] or change in the method of operation"[21] that increases emissions, EPA realized early on that, given the way the Agency determines emissions increases, a literal reading of "any physical or operational change" would sweep within its scope many activities that the Agency did not think were appropriate subjects of NSR or PSD regulation, and which the Agency thought Congress could not reasonably have intended it to regulate. Thus, in its regulations implementing these provisions of the CAA, EPA explicitly provided that the statutory phrase "physical change or change in the method of operation" did not include "routine maintenance, repair, and replacement" activities.[22]

EPA's regulations did not define further what activities counted as "routine maintenance, repair, and replacement." Rather, EPA has made "case-by-case determination[s] by weighing the nature, extent, purpose, frequency, and cost of the work, as well as other relevant factors, to arrive at a common-sense finding."[23] More recently, EPA has described this standard as a "four-factor test."[24] To aid parties in understanding how the standard applies in practice, EPA has made available a searchable database of its past applicability determinations.[25] EPA also encourages owners and operators who are unsure if a particular planned activity falls within the scope of the RMRR exception "to consult the appropriate reviewing authority for assistance."[26] Nonetheless, the precise definition of RMRR is not crystal-clear—it is a standard rather than a rule, though its substantive scope appears, from the available evidence, to be relatively narrow.[27]

There has been some litigation over the appropriate scope of the RMRR exception, but, interestingly enough, the lawsuits have generally not involved challenges to EPA's authority to create the exception in the first place, nor claims

13. While the substantive section of the statute imposes the PSD permitting requirements in case of "construction" of a new "facility," *id*. §7475(a), ELR STAT. CAA §165(a), the definitions section of the statute makes clear that, for purposes of the PSD program, "construction" includes "modification" as defined for purposes of NSPS review, *id*. §7479(2)(C), ELR STAT. CAA §169(2)(C), and "facility" means any of several dozen enumerated stationary sources that have the potential to emit more than 100 tons per year of any air pollutant, *id*. §7479(1), ELR STAT. CAA §169(1).

14. *Id*. §7475(a)(4), ELR STAT. CAA §165(a)(4).

15. *Id*. §7475(a)(3), ELR STAT. CAA §165(a)(3).

16. *Id*. §7475(a)(5), (d), ELR STAT. CAA §165(a)(5), (d).

17. *Id*. §7479(3), ELR STAT. CAA §169(3).

18. *Id*. §7411(a)(4), ELR STAT. CAA §111(a)(4). This definition of modify was originally established for the NSPS program, but it was explicitly incorporated by both the NSR program, *id*. §7501(4), ELR STAT. CAA §171(4), and by the PSD program, *id*. §7479(C), ELR STAT. §169(C).

19. *See* 57 Fed. Reg. 32314, 32316 (July 21, 1992).

20. 67 Fed. Reg. 80186 (Dec. 31, 2002).

21. 42 U.S.C. §7411(a)(4), ELR STAT. CAA §111(a)(4) (emphasis added).

22. 40 C.F.R. §51.165(a)(1)(v)(C)(1); *id*. §51.166(b)(2)(iii)(a); *id*. §52.21(b)(2)(iii)(a); *id*. §52.24(f)(5)(iii)(a); *id*. §60.14(e)(1).

23. Wisconsin Elec. Power Co. (WEPCO) v. Reilly, 893 F.2d 901, 910, 20 ELR 20414, 20418 (7th Cir. 1990) (quoting memorandum from Don R. Clay, Acting Assistant Administrator for Air and Radiation, U.S. EPA, to David A. Kee, Director of Air and Radiation Division, U.S. EPA Region V (Sept. 9, 1988)).

24. *See* In re Tennessee Valley Auth., No. CAA-2000-04-008 at 65-69 (EAB 2000). The four factors are the same as those cited in *WEPCO*: (1) nature and extent; (2) purpose; (3) frequency; and (4) cost. The content of each of these four factors is further elaborated in U.S. EPA, APPLICABILITY DETERMINATION REGARDING THE PROPOSED REPLACEMENT AND RECONFIGURATION OF THE HIGH PRESSURE SECTION OF TWO STEAM TURBINES AT DETROIT EDISON'S MONROE POWER PLANT—DETROIT EDISON APPLICABILITY DETERMINATION DETAILED ANALYSIS 10 (2000), *available at* http://www.epa.gov/Region7/programs/artd/air/nsr/nsrpg.htm [hereinafter DETROIT EDISON APPLICABILITY DETERMINATION].

25. 67 Fed. Reg. at 80292 ("[A]pplicability determinations are available electronically from Region 7 NSR Policy and Guidance Database (http://www.epa.gov/Region7/programs/artd/air/nsr/nsrpg.htm).").

26. 67 Fed. Reg. at 80293.

27. For some examples of EPA's use of the current RMRR standard in the context of specific applicability determinations, see, e.g., *In re Tennessee Valley Auth.* at 65; DETROIT EDISON APPLICABILITY DETERMINATION, *supra* note 24; U.S. EPA, OPINION ON WHETHER MAKING A BYPASS STACK FUNCTIONAL CONSTITUTES ROUTINE REPAIR AND MAINTENANCE (2002), *available at* http://www.epa.gov/Region7/programs/artd/air/nsr/nsrpg.htm; U.S. EPA, OPINION ON IF [SIC] PACKAGING CORPARATION [SIC] PROJECT IS ROUTINE MAINTENANCE (2001), *available at* http://www.epa.gov/Region7/programs/artd/air/nsr/nsrpg.htm. Notably, in all these cases EPA found the RMRR exception inapplicable.

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by environmental groups or other injured parties that EPA has construed the exception too broadly.[28] Rather, the most prominent cases that have addressed the proper scope of the RMRR exception have involved assertions by owners or operators of sources that EPA should have exempted some activity from NSR under the RMRR exception, but improperly failed to do so. None of these challenges have been successful.

In the most well-known and most-cited case raising the RMRR issue, *Wisconsin Electric Power Co. (WEPCO) v. Reilly*,[29] the Wisconsin Electric Power Company (WEPCO) wanted to renovate the five coal-fired steam-generating units at its Port Washington power plant.[30] This renovation project included replacement of the air heaters and steam drums, as well as repair and replacement of turbine-generators, boilers, and other auxiliary systems.[31] WEPCO thought that these activities ought to be considered RMRR under the CAA and EPA's regulations, but EPA disagreed, finding that the renovation program would have to comply with the NSPS and PSD permitting requirements.[32]

WEPCO sued, claiming that EPA's failure to classify its renovation project as RMRR was inconsistent with the CAA. WEPCO asserted "that Congress did not intend for simple equipment replacement to constitute a physical change for purposes of the [CAA's] modification provisions,"[33] and relied for this interpretive claim on *Webster's Dictionary* definitions of "modify" as meaning "to change or alter" or "to make basic or fundamental changes in."[34] WEPCO asserted that, because its activities would not effect a "fundamental change" in its plants, EPA's decision that the renovation program was covered by NSPS and PSD permitting requirements was inconsistent with the CAA's plain meaning.[35]

The U.S. Court of Appeals for the Seventh Circuit disagreed. At the outset, the court noted the potential scope of the term "modification" and explained the policy reasons why EPA "promulgated specific exceptions to the modification provisions" including RMRR.[36] Interestingly, the court never stopped to question whether EPA has the authority to carve out these exceptions, or explained the Agency's legal justification for doing so. The court went on to note that EPA was entitled to substantial—though not unlimited—discretion in interpreting the CAA.[37]

The court then turned to WEPCO's "plain meaning" argument—its implicit suggestion that the Agency was not entitled to *Chevron* Step Two deference because its decision was inconsistent with the clear intent of Congress under *Chevron* Step One. The court concluded that "[w]hat WEPCO calls 'plain' [i.e., the meaning of "modification"] is anything but plain and takes the definition far beyond the words enacted by Congress."[38] Congress, the court correctly observed, said "*any* physical change" that increased emissions would count as a modification.[39] The court went further, noting that WEPCO's definition of physical change "would open vistas of indefinite immunity" from the CAA's permitting requirements, and that EPA's reading of that phrase was more consistent with the CAA's technology-forcing goals.[40]

Finally, the court rejected WEPCO's alternative argument that EPA's determination was inconsistent with the Agency's own regulations, noting the "substantial deference due to an agency's interpretation of its own regulations, especially with respect to technical and complex matters."[41] The court assessed the application of EPA's multi-factor balancing test in this case, and found it satisfactory.[42]

Thus, the *WEPCO* decision upheld the legitimacy of EPA's relatively narrow, standard-like RMRR exception, but left two critical legal questions unanswered. First, the opinion did not clarify the legal basis for creating the exemption in the first place. Indeed, given the *WEPCO* court's stress on the plain meaning of Congress' definition of "modification,"[43] it would seem that the creation of *any* RMRR exemption would be legally problematic. But, the *WEPCO* court never deals with this problem, treating EPA's legal power to create *some* RMRR exception as self-evident. Second, and relatedly, the *WEPCO* decision offers little guidance as to what alternative versions of the RMRR exception would also be permissible. The exception that *WEPCO* and subsequent cases upheld was narrow in scope and standard-like in form. What about a substantively broader exception? Or an exception that eschewed case-by-case inquiry in favor of general rules?

*WEPCO* does not address these questions. Nor do most of the scattered subsequent cases that deal with the RMRR exception.[44] Yet they are about to become extremely important, given EPA's recently proposed revision to the RMRR exception.

28. This may be additional evidence that the scope of the exemption as currently applied is relatively narrow.
29. 893 F.2d 901, 20 ELR 20414 (7th Cir. 1990).
30. *Id.* at 905, 20 ELR at 20415.
31. *Id.* at 905-06, 20 ELR at 20416.
32. *Id.* at 906, 20 ELR at 20416.
33. *Id.* at 908, 20 ELR at 20417.
34. *Id.* (quoting Petitioner's Brief at 32-33).
35. *Id*.
36. *Id.* at 905, 20 ELR at 20415.
37. *Id.* at 906-07, 20 ELR at 20416 (citing Chevron, U.S.A., Inc. v. Natural Resources Defense Council, 467 U.S. 837, 14 ELR 20507 (1984).
38. *Id*. at 908, 20 ELR at 20417.
39. *Id*. (emphasis supplied by court).
40. *Id.* at 909, 20 ELR at 20417.
41. *Id.* at 910, 20 ELR at 20418 (citing Lyng v. Payne, 476 U.S. 926, 939 (1986)).
42. *Id*. at 910-13, 20 ELR at 20418-19.
43. *See id.* at 907-08, 20 ELR at 20416-17 ("Certainly, *under the plain terms of the Act*, WEPCO's replacement program constitutes a 'physical change.' . . . We follow *Congress's definition* of 'modification' . . . when interpreting this term within the context of the Clean Air Act.") (emphasis added).
44. *See, e.g.*, United States v. Southern Ind. Gas & Elec. Co. (SIGECO), No. IP 01-1070-C M/S, 2003 WL 367901, at *11 (S.D. Ind. Feb. 18, 2003) (stating that the "routine maintenance exemption is found in the CAA regulations promulgated by the EPA pursuant to a Congressional grant of authority" but not explaining what congressional authority authorizes that particular exemption). *See also* In re Tennessee Valley Auth., No. CAA-2000-04-008, at 7, 48, 76 (EAB 2000) (like the Seventh Circuit in *WEPCO*, upholding EPA's power to *deny* application of the de minimis exception to a challenged activity, but not addressing directly EPA's legal authority to *grant* a de minimis exemption). There are some decisions that do uphold EPA's authority to create a routine maintenance exception against an environmentalist challenge. The most important of these, Environmental Defense Fund v. EPA, 82 F.3d 451, 26 ELR 20968 (D.C. Cir. 1996) and Ober v. Whitman, 243 F.3d 1190, 31 ELR 20550 (9th Cir. 2001), are discussed more extensively in Part III.C, *infra*.

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*C. The RMRR Exception: The Proposed New Rule*

The Bush Administration, of its own accord and at the urging of various regulated industries and other groups, is seeking to effect substantial changes in the government's approach to environmental regulation. With regard to the NSR and PSD programs, EPA is revising its regulatory strategy with respect to both prongs of the definition of "modification"—physical/operational change and emissions increase over a base rate. With regard to the latter, EPA promulgated a final rule on December 31, 2002, that significantly altered how emissions increases are calculated.[45] On the same day, EPA issued a proposed rule that would broaden and make more systematic the RMRR exemption, thereby altering the reach of the "physical or operational change" prong of the "modification" definition. EPA's proposed rule seeks to replace the relatively narrow, case-by-case approach to the RMRR exemption described above with a more rule-like, across-the-board exclusion for certain types of activities that would henceforth be considered RMRR per se.

What is the reason for this change? A cynic (or realist) might suggest that it is simply an effort by a conservative administration to make it easier for regulated industries to avoid stringent environmental regulation. But there is perhaps a more sympathetic interpretation. EPA, in the preamble to its proposed rule, identified three serious problems with the prevailing case-by-case approach to the RMRR exemption.

First, the present approach creates substantial uncertainty for owners or operators of affected facilities. While a potentially affected owner or operator could seek an applicability determination from EPA, the process can be expensive and time-consuming. If an owner or operator does not seek an applicability determination, the open-ended nature of the current RMRR standards makes it extremely difficult to figure out what is covered and what is not.[46]

Second, because the case-by-case approach is imprecise and complicated, it imposes substantial burdens on state and local reviewing authorities, which often bear the burden of making these complex determinations and ensuring that they are consistent with what EPA or other reviewing authorities require.[47]

Third, and perhaps most importantly, the risks and potential costs associated with NSR or PSD review may deter owners or operators from undertaking activities that should be considered RMRR, and that would, if pursued, improve reliability, efficiency, and safety.[48] Thus, the case-by-case approach may not only be costly, it may be counterproductive if it deters maintenance and repair activities that could improve energy efficiency and reduce air pollution.[49]

These objections, taken together, are an archetypical example of the case against open-ended standards and in favor of clear, bright-line rules.[50] And, indeed, EPA's proposed change to the RMRR regulation endorses a rule-like approach.[51] The proposed regulation contains two broad classes of activity that would, if the proposal were adopted, automatically be covered by the RMRR exemption.[52] These two broad categories are, first, activities whose collective cost is less than a regulatorily determined annual maintenance, repair, and replacement allowance (AMRRA), and, second, activities that are considered pure "equipment replacement" activities that make no functional change in source operation.[53]

Under the AMRRA provision, EPA would establish an annual allowance for each source that would be equal to the product of the source's replacement cost and an industry-specific percentage set by the Agency. The source would prepare an annual cost calculation, including its annual day-to-day maintenance and operations costs and the cost of each discrete activity carried out at the source in that year for which the source did not intend to obtain an NSR or PSD permit.[54] The source could then take the general mainte-

45. 67 Fed. Reg. at 80186. As noted above, this rule change, while significant and obviously related to the RMRR rule, will not be discussed in this Article.

46. *Id*. at 80293.

47. *Id.*

48. *Id.* One might reasonably conclude that here EPA is smuggling into its critique of the *form* of the current RMRR exemption (a standard as opposed to a rule) an implicit criticism of the *scope* of that exemption under the current regime, which the Bush EPA appears to view as excessively narrow.

49. *Id.* EPA's rhetoric here may seem a bit confusing, or perhaps even disingenuous, since presumably a physical or operational change that *reduced* rather than increased emissions would not be considered a "modification" for purposes of NSR or PSD. Nonetheless, EPA's general point may still have merit, since environmental gains achieved through efficiency improvements may not get a source out of NSR requirements, especially if the efficiency gains at the target source mean that its own activity (and hence emissions) increase at the expense of some other, less-efficient source.

50. *See* Kathleen M. Sullivan, *The Justices of Rules and Standards*, 106 Harv. L. Rev. 22, 62-67 (1992); Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 Duke L.J. 557, 585-95 (1992).

51. Note that this was not the only approach available to EPA, even granting the flaws of the extremely open-ended case-by-case approach EPA had employed in the past. EPA could have adhered to a standard-based approach but articulated more clearly which factors were most important. It could have streamlined the process for applying for an administrative determination, or provided a special "fast-track" administrative determination process for proposed projects falling within certain clearly defined categories. Or, it could have promulgated the substance of its proposed regulation not in the form of a legally binding rule but rather in the form of an administrative guidance letter, stating that, in general, it did not intend to enforce the literal requirements of the Act against certain types of clearly defined modifications. *See, e.g.*, Pacific Gas & Elec. v. Federal Power Comm'n, 506 F.2d 33, 37-40 (D.C. Cir. 1974). EPA's decision to promulgate a blanket exemption for certain categories of activities that would henceforth be considered automatically to be RMRR thus represents a distinctive policy choice that goes beyond the mere diagnosis that the old system worked poorly.

52. Activities falling outside either per se category could still be justified as RMRR under the old case-by-case approach. 67 Fed. Reg. at 80293-94. In that light, EPA's avowed preference for rules over standards is perhaps a bit one-sided.

53. *Id*. at 80293-96.

54. Certain activities would not be eligible for exclusion under the AMRRA approach. These include the construction or replacement of an entire "process unit" or any change that would increase "the source's maximum achievable hourly emissions rate of any regulated NSR pollutant, or in the emission of any regulated NSR pollutant not previously emitted by the stationary source." *Id*. at 80294-95. A "process unit" would be defined as "any collection of structures and/or equipment that processes, assembles, blends, or otherwise uses material inputs to produce or store a completed product. A single facility may contain more than one process unit." *Id*. at 80302. The exclusion of activities that increase the achievable hourly emissions rate appears to be another example of EPA's concern that the existing approach to the air pollution problem fails to distinguish adequately between emissions increases at a source that reflect an increased *volume* at that particular source—a change that might reflect greater efficiency and lower overall pollution—and emissions increases that reflect an increase in the *rate* at which a particular source pollutes. EPA apparently wants to make sure that low-cost changes that increase pollution *rates* are not considered RMRR, but changes

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nance costs and add in the costs of the discrete activities one at a time, starting with the cheapest activities and ascending in order of expense, up to the point where the addition of one more discrete activity would cause the total cost to exceed the annual allowance. Those projects whose summed cost is less than the annual allowance would automatically be considered RMRR.[55]

The second proposed category of activity for automatic application of RMRR status is what EPA refers to as "equipment replacement." This categorical exemption from NSR would be limited to "replac[ement of] existing equipment with equipment that serves the same function and that does not alter the basic design parameters of a unit . . . provided the cost of the replacement equipment does not exceed a certain percentage of the cost of the process unit to which the equipment belongs."[56] The rationale for this change is similar to that for the AMRRA provision, but focuses more on the nature of the activity than on the cost.

EPA in its proposed rule makes clear that it is soliciting comments not only on the merits and drawbacks of each approach, but also on whether they should be adopted together, or whether one is superior to the other.[57] Yet regardless of whether the final version of the new rule endorses the AMRRA approach, the equipment replacement approach, or both, the new rule will shift the scope and form of the RMRR exemption from a narrowly applicable standard to a broadly applicable rule. Whether this is a good idea or a bad one as a matter of policy is an important question, and one where environmental lobbyists and industry representatives take sharply divergent positions, but it is not the focus of this Article. Rather, the remainder of this Article is concerned with the legal justification for the rule change, and for the RMRR exemption more generally. Prior court decisions did not have to confront this problem directly.[58] But, with the new rule change, the legal basis question is likely to come to the fore.

that do not increase rates are not so considered, even if those changes do lead to emissions increases that would satisfy the second prong of the statutory definition of "modification."

55. *Id*. at 80294-95. EPA offers the following example to illustrate how the AMRRA system would work. Suppose a source has an AMRRA set at $2 million. In a given year, the source spends $1 million on general maintenance activities, and it also undertakes five discrete projects that cost $600,000, $350,000, $250,000, $200,000, and $150,000, respectively. The sum of all alleged maintenance costs is $2.56 million, which exceeds the AMRRA by $560,000. The cost of the most expensive discrete activity—the $600,000 project—must therefore be subtracted from the annual cost calculation. The maintenance costs and the other four projects then come to a total of $1.94 million, under the $2 million allowance, and so all those activities are automatically considered RMRR. The $600,000 project, however, must either obtain an NSR permit, demonstrate that it should be considered RMRR under the old case-by-case review standard, or otherwise show some exemption from the NSR requirements. *Id*. at 80295. The reason that EPA would require sources to start with the least expensive projects is so that sources would not be able to circumvent the process by counting their most expensive activities toward the AMRRA, and then subjecting their smaller activities to the case-by-case assessment that they are almost certain to pass. *Id.* In the previous example, for instance, EPA doesn't want the source to be able to count the $600,000 project toward the AMRRA and subject the three smaller projects ($150,000, $200,000, and $250,000) to NSR instead, because the $600,000 project is less likely to be a routine maintenance activity than any of the smaller projects.

56. *Id*. at 80295.

57. *Id*. at 80296.

58. *See supra* notes 29-44 and accompanying text.

## II. The Legal Basis for the RMRR Exemption: Two Theories

As we have seen, the existing case law and EPA's own past explanations do not adequately address the question of the RMRR exemption's legal justification. I argue that there are two possible legal bases for the exemption, and, while these justifications are not necessarily mutually exclusive, they are distinct, independent, and, to a considerable extent, in tension.

First, the RMRR exemption might be justified on a "de minimis" theory. Here, the argument would be that, even though the relevant provisions of the CAA cover "any" physical or operational change, EPA may permissibly refuse to enforce the statute's literal provisions against activities that are so trivial, and where regulation would be of such minimal value, that they ought to be considered beyond the scope of the Act.[59]

Second, the RMRR exemption might be justified as a permissible agency interpretation of the phrase "any physical or operational change" under *Chevron* Step Two. Here, the argument would be that the statutory phrase is sufficiently open-ended that courts can conclude Congress intended to delegate to EPA the authority to determine the meaning of these words. Under *Chevron*, this determination should be upheld so long as it is reasonable.

The fundamental conceptual difference between these two theories is that the de minimis theory would concede that RMRR activities are "physical or operational changes" but nonetheless exempt them on other grounds, whereas the *Chevron* theory would hold that RMRR activities are simply not "physical or operational changes" as the Agency defines that allegedly ambiguous phrase.

A close reading of the legal basis section of the preamble to the proposed rule reveals the tension between the theories, though EPA appears deliberately to have obscured rather than highlighted the distinct theoretical grounds for the exemption. Previous drafts of the rule's preamble present the difference between the de minimis and *Chevron* theories much more clearly. Examination of successive drafts shows how EPA progressively distanced itself from the de minimis theory in favor of something more closely resembling the *Chevron* theory, but at the same time—perhaps in recognition of the weakness of a pure *Chevron* approach—incorporated the principles of the de minimis exception without alluding to it explicitly.

### *A. The Published Legal Basis for the Proposed Change*

The preamble to the proposed RMRR rule revision contains a two-paragraph section on the "Legal Basis for Recommended Approaches."[60] This section, however, is brief, opaque, and barely suggestive of the two quite distinct legal theories that might be advanced to defend the new rule. The first paragraph of the legal basis section merely restates the

59. *See* Alabama Power Co. v. Costle, 636 F.2d 323, 10 ELR 20001 (D.C. Cir. 1979) (recognizing EPA authority to create de minimis exemptions to provisions of the CAA); *see also* Monsanto v. Kennedy, 613 F.2d 947, 955 (D.C. Cir. 1979) (recognizing agency authority to authorize de miminis exemptions); Public Citizen v. Young, 831 F.2d 1108, 18 ELR 20173 (D.C. Cir. 1987) (describing the de minimis doctrine as an "escape hatch" from literalist interpretations that would lead to waste of agency resources or absurd results).

60. 67 Fed. Reg. at 80296.

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statutory definition of the term "modification" in the CAA—a physical change or change in operation that results in an emissions increase—and notes that this definition entails first determining whether a physical or operational change has occurred, and then assessing whether it increases emissions over baseline levels.[61]

The second paragraph of the legal basis section is more important, but it is here that a close reading reveals the fundamental ambiguity in the legal theory that EPA means to advance as justification for the RMRR rule revision. On the one hand, the first sentence of the paragraph reads: "The expression 'any physical change . . . or change in the method of operation' in [§]111(a)(4) of the CAA is not defined."[62] The implication of any suggestion by an administrative agency that a statutory term is not defined, or course, is that the agency believes that the courts ought to defer to the agency's interpretation of the statute under *Chevron* Step Two. But, the phrase "any physical change . . . or change in the method of operation" does not sound terribly vague or ambiguous. Indeed, this statutory definition is offered precisely to address the potential ambiguity that would otherwise inhere in the statutory term "modification."[63] So what is EPA's basis for claiming that physical and operational change are not defined?

The next sentence of the paragraph offers a possible answer, but one that suggests a quite different legal basis for the new rule—one more consistent with a de minimis theory. EPA notes that it has "recognized that Congress did not intend to make every activity at a source subject to the major NSR program."[64] Thus, EPA continues, it has previously adopted a number of exclusions from "what may constitute a 'physical or operational change,'" one of which is RMRR.[65] The proposed rule, EPA concludes, does nothing more than clarify this already existing exception.[66] But observe the subtle argumentative shift in this paragraph. EPA has adopted *exclusions*—specific types of activities that are not considered "modifications" for purposes of NSR or PSD, *even though* they would seem to be covered by a literal reading of the statutory definition of the term "modification." But to get to *Chevron* Step Two, you first have to get past *Chevron* Step One—whether Congress "has directly spoken to the precise question at issue."[67] How does EPA justify its exclusions in this paragraph? It invokes a policy consideration—the irrationality of subjecting *every* physical change, including "the most trivial activities [such as] the replacement of leaky pipes"[68]—to NSR if the change results in an emissions increase. EPA ascribes this policy consideration to Congress, notwithstanding the language Congress actually used.

Thus, by parsing the language of the legal basis section carefully, one can see the distinct potential theories that might offer legal justification for the RMRR rule revision. First, under a *Chevron* Step Two theory, EPA might argue that "physical or operational change," though perhaps clearer than "modification," is still a vague enough phrase that there are a range of permissible interpretations, and that among the reasonable constructions of those words is an interpretation that allows the per se exclusion of all the activities covered under the proposed RMRR rule. Second, EPA might claim, in keeping with a de minimis theory, that even though the phrase "physical or operational change" by its literal terms would cover activities that EPA wants to exclude from coverage under the new rule, another principle of statutory construction—one that grants agencies the discretion to refuse to interpret a statutory command literally in cases where it seems unreasonable given the purposes of the statute—trumps the literal meaning of the text.

### *B. Evidence From Prior Drafts*

The best evidence that EPA entertained these two distinct legal theories for the RMRR rule comes from the Agency itself. EPA includes, as part of the publicly available supporting documentation for the proposed rule, several earlier drafts of the rule and its preamble. And, in the earliest publicly available draft of the preamble to the proposed RMRR rule, dated August 28, 2002, EPA cited both the de minimis theory and the *Chevron* Step Two theory as possible independent legal bases for the rule.[69] Not only did EPA not commit itself to one position or the other in this earlier draft, but it actually went so far as to "solicit[ ] comments on [the] two possible alternative legal bases" for the proposed change to the RMRR rule.[70]

The August 28 Draft explains the de minimis justification for the RMRR rule as deriving from the "authority recognized . . ." by the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit in *Alabama Power Co. v. Costle*[71] to "decline to regulate activities fitting within statutory proscriptions when such regulation would be of trivial or no value."[72] The *Alabama Power* decision's discussion of the de minims exemption did not mention the RMRR exemption specifically. Rather, *Alabama Power* offers a general discussion of EPA's power to create de minimis exemptions to the CAA, and stresses that "this exemption authority is narrow in reach and tightly bounded by the need to show that the situation is genuinely *de minimis*. . . ."[73] The court admonished that the Agency must show that the regulation yields little or no benefits, not merely that "the acknowledged benefits are exceeded by the costs."[74] The August 28 Draft appears to accept this relatively narrow scope for the de minimis justification.[75]

The August 28 Draft also includes, as a separate and distinct possible basis for the RMRR rule change, a discussion

61. *Id.*

62. *Id.*

63. *See* Wisconsin Elec. Power Co. (WEPCO) v. Reilly, 893 F.2d 901, 907-08, 20 ELR 20414, 20417 (7th Cir. 1990) (noting that Congress had defined "modification" for purposes of interpreting the CAA and finding that "under the plain terms of the Act" the appellant utility's replacement program fell within the scope of the Act).

64. 67 Fed. Reg. at 80296.

65. *Id.*

66. *Id.*

67. *Chevron*, 467 U.S. at 842, 14 ELR at 20509.

68. *WEPCO*, 893 F.2d at 905, 20 ELR at 20415.

69. August 28 Draft [EPA Docket No. OAR-2002-0068-0054] (2002) at 27-29.

70. *Id.* at 27.

71. 636 F.2d 323, 10 ELR 20001 (D.C. Cir. 1979).

72. August 28 Draft, *supra* note 69.

73. 636 F.2d at 361, 10 ELR at 20012.

74. *Id.* at 360-61, 10 ELR at 20012.

75. August 28 Draft, *supra* note 69, at 28 ("[U]nder [the de minimis] approach, the exemption should be given a relatively narrow construction.") (citing Brief for Respondents, Tennessee Valley Auth. v. Whitman, No. 00-12310-E, Feb. 21, 2001, at 61).

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of "a *Chevron* approach" under which EPA would "construe" the relevant statutory provisions "as specifying the type of activities that constitute a 'physical change or change in the method of operation' that could trigger NSR, leaving EPA free to exercise its discretion to determine the type of activities that trigger NSR."[76] This is confusing wording, but the idea is clear enough: EPA, under *Chevron*, has the authority to construe "any physical change or change in the method of operation" as not extending to RMRR activities.[77]

The August 28 Draft is so clear on the two alternative legal theories, and yet the published preamble to the proposed rule is so opaque. What happened? Again, earlier drafts included in EPA's public record of the rulemaking process prove to be a valuable resource for answering this question, especially since many of these earlier drafts include red-lining, marginal commentary, and e-mail notes discussing the reasons for changes. These earlier drafts are suggestive of the internal agency process that led to the decision—or lack of a decision—about which theory to rely on.

1. Retreat From the Restrictive De Minimis Theory

The first development that emerges clearly from looking at the successive drafts is the downplaying, and ultimate abandonment, of the de minimis theory. The August 28 Draft's presentation of that theory is striking in four respects. First, this early document made clear that the de minimis justification was not an "interpretation" of the statutory language as such, but rather a legally justifiable decision to refuse to regulate certain activities that fell within the literal meaning of that language. Invoking the de minimis exemption, according to the August 28 Draft, involved EPA's making a decision "to decline to regulate activities *fitting within statutory proscriptions* when such regulation would be of trivial or no value."[78] Second, as noted above, the August 28 Draft cited *Alabama Power* as the basis for the de minimis exclusion; *Chevron* was not mentioned at all in this context.[79] Third, the August 28 Draft notes that the scope of the de minimis exclusion is "not without limit," and "should be given a relatively narrow construction."[80] Fourth, the August 28 Draft suggests that the de minimis theory is the Agency's preferred justification for the exemption, observing that EPA has "advanced the view that the routine maintenance exemption is justified on *de minimis* grounds" and in the process endorsed the view that this exception should be construed narrowly.[81]

For reasons that may seem obvious, EPA in subsequent drafts retreated from this restrictive justification for the RMRR exemption. A revised draft circulated on October 11, 2002, to legal counsel at EPA and the Office of Management and Budget (OMB)[82] includes red-lining that "depicts all changes made since the start of interagency review."[83] Tellingly, the accompanying message advises the recipients to "[n]ote especially that [EPA's Office of General Counsel] is still reviewing the revised legal rationale."[84] Indeed, the revisions to the legal basis section that had already been made by the October 11 Draft are particularly notable in their changes to the exposition of the de minimis exemption.

First, the explicit statement that the de minimis exemption excludes activities that would otherwise fall within the statutory definition disappears. Whereas the August 22 Draft said that under a de minimis approach EPA, relying on *Alabama Power*, could "decline to regulate activities fitting within statutory proscriptions when such regulation would be of trivial or no value,"[85] the October 11 Draft, while also citing *Alabama Power*, says that that case held EPA has the authority to "decline to regulate *routine maintenance* activities *on the grounds that* regulation of such activities under the NSR program would be of trivial or no value."[86] This revision is striking for at least three reasons. First, as (re)written it is a gross mischaracterization of *Alabama Power*, which says nothing specific about routine maintenance activities. Second, the subtle shift from "when" to "on the grounds that" appears to be a way of implying that the courts should be highly deferential to EPA on the question of whether a de minimis exemption applies.[87] Although the October 11 Draft does not explicitly invoke *Chevron* in the context of the de minimis exemption, the shift in language is a sign of things to come. Third, the October 11 Draft deletes the language making clear that the activities covered by the de minimis exemption would otherwise "fit[ ] within statutory proscriptions."[88]

Next, the October 11 Draft pointedly excludes the limiting language contained in the earlier draft—gone is the statement that the de minimis exemption's scope "is not without limit" and "should be given a narrow construction."[89] And, in the October 11 Draft, EPA carefully distanced itself from its past reliance on the de minimis exemption. While the August 22 Draft, as discussed above, stated that "EPA has advanced the view that the routine maintenance exemption is justified on *de minimis* grounds," citing

76. *Id.* at 28-29.

77. For reasons that are perhaps self-evident, the August 28 Draft omits the word "any" before "physical change or change in the method of operation" when explicating the *Chevron* approach. *See id.*

78. *Id.* at 27 (emphasis added).

79. *Id.* at 27-28.

80. *Id.* at 28.

81. *Id.* (citing Brief for Respondents, Tennessee Valley Auth. v. Whitman, No. 00-12310-E, Feb. 21, 2001, at 61).

82. October 11 Draft [EPA Docket No. OAR-2002-0068-0059] (2002).

83. E-mail from Bill Wehrum, U.S. EPA, accompanying circulation of October 11 Draft [EPA Docket No. OAR-2002-0068-0059] (2002).

84. *Id.*

85. August 22 Draft, *supra* note 69, at 27.

86. October 11 Draft, *supra* note 82, at 29-30 (emphasis added).

87. Again, this formulation of the requirements for invoking the de minimis exemption appears to be inconsistent with *Alabama Power* itself, which holds that "the agency will bear the burden of making the required showing" and that "this exemption authority is narrow in reach and tightly bounded by the [agency's] need to show the situation is genuinely *de minimis* or one of administrative necessity." *Alabama Power*, 636 F.2d at 360-61, 10 ELR at 20012. However, the October 11 Draft may nonetheless be consistent with more current thinking. In Environmental Defense Fund v. EPA, 82 F.3d 451, 467, 26 ELR 20968, 20976 (D.C. Cir. 1996), the court noted that *Alabama Power* was decided before *Chevron*, and that therefore "the same deference due to an agency's reasonable interpretation of an ambiguous statute may also be due to an agency's creation of a de minimis exemption." However, the court explicitly declined to reach and resolve the issue of "whether, under *Chevron*, an agency may create a de minimis exemption with a justification less rigorous than we indicated in *Alabama Power*." *Id.*

88. *Compare* August 22 Draft, *supra* note 69, at 27 *with* October 11 Draft, *supra* note 82, at 30.

89. *Compare* August 22 Draft, *supra* note 69, at 28 *with* October 11 Draft, *supra* note 82, at 30.

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EPA's brief in *Tennessee Valley Authority (TVA) v. Whitman*,[90] the October 11 Draft deletes the reference to *TVA* and qualifies the more general claim about EPA's endorsement of the de minimis theory by saying that "[*i*]*n the past*, EPA has advanced" the de minimis theory.[91]

The next draft, dated October 20, 2002,[92] evinces an even more dramatic shift away from the limited understanding of the de minimis exemption that appeared in the earlier versions. Indeed, the two theories are no longer portrayed as separate. Rather, the decision to exclude RMRR activities from the scope of the statute is described as an exercise of EPA's authority under *Chevron* "to adopt a reasonable construction of the phrase 'physical change' that is consistent with the policies of the Act and of the NSR program."[93] The draft goes on to describe EPA's current view—that the RMRR exclusion "is best viewed as limited to a small category of activities with low cost that are frequently undertaken at a particular source"—as one that "EPA has viewed . . . as counseled in part by certain statements in *Alabama Power*."[94] Thus, by the October 20 Draft EPA no longer articulated the de minimis theory as a separate and distinct legal theory, nor endorsed the restrictions imposed on that theory by *Alabama Power* and EPA's own past arguments. Rather, *Alabama Power*'s recognition of a de minimis exemption is implicitly folded into the Agency's ability to define ambiguous statutory terms.

2. Formulation and Re-Formulation of the *Chevron* Theory

Though the legal basis section of the preamble went through several more rounds of modification, the de minimis theory never resurfaced as an explicit justification for the RMRR exception or the proposed rule change. Instead, EPA, in this series of successive drafts, moved toward a greater emphasis on a *Chevron* theory. But the *Chevron* argument is tricky, given the apparently clear language of the statute—*any* physical or operational change counts—and the reinforcing language of judicial decisions that stress the plain meaning of the congressional definition of "modify." EPA's struggles to find a satisfactory legal explanation for why it should be entitled to *Chevron* deference when defining the scope of the RMRR exception are evident from the earlier drafts.

As noted above, the August 22 Draft does not so much explain the basis for the *Chevron* theory as assert it.[95] The October 11 Draft at least tries to clarify the argument by suggesting that not all activities that take place at a source are physical or operational changes, and since "Congress has not specified the types of activities that constitute a physical change or change in the method of operation, EPA is free to exercise its discretion to construe these terms, as long as that construction is reasonable under *Chevron*."[96] Of course, this is only a marginal explanatory improvement on the August 22 Draft, since the argument that the RMRR exemption is simply a matter of standard *Chevron*-style interpretive authority is still just an assertion, without any supporting evidence from case law or practice.

The October 22 Draft tries to remedy this problem. First, it seeks to give the *Chevron* theory for the RMRR exemption a more historical pedigree, claiming that "[e]ver since promulgation of its original [PSD] regulations in 1980, EPA has defined 'physical change' as not including 'routine maintenance, repair and replacement.'"[97] While this statement is true in one sense, it is clearly meant to imply that the original basis for the RMRR exemption was the *Chevron* theory, under which the RMRR exemption arises from an interpretation of the meaning of "physical or operational change." But, as discussed above, EPA's own earlier drafts of the preamble acknowledged that the Agency had in the past relied on a de minimis theory, under which RMRR activities *were* covered by the literal terms of the statute, but were nonetheless exempt because of their trivial impact.[98]

Second, as noted earlier, EPA in the October 11 Draft attempts to fold the de minimis theory and its associated arguments into the Agency's preferred *Chevron* theory. While suggesting that its earlier approach to the RMRR exemption—which seemed more like a classic de minimis approach—was "counseled" by "certain statements" in *Alabama Power*,[99] EPA stressed in the October 20 Draft that the Agency "does not believe (and has not argued) that its current view is compelled by the language or policies of the Act."[100]

Third, the first version of the October 20 Draft also tries to ground the claim that the phrase "physical or operational change" is ambiguous in some existing case law. Thus, this version included the sentence: "As the court stated in *WEPCO*, the meaning of the phrase 'any physical change' is 'anything but plain.'"[101] However, as we have seen,[102] the "anything but plain" language in *WEPCO* applied to the term "modification," not to "physical change"—and, in fact, the *WEPCO* court, though itself not entirely clear on this point, seemed to think that the "any physical change" language was a fairly direct and unambiguous congressional instruction. Perhaps because of this problem, the e-mail note accompanying the October 20 Draft from Lee Otis at the U.S. Department of Energy, who wrote the legal basis section of that version, acknowledges that "what I have over-reads the sentence in *WEPCO* . . . . I should modify the legal discussion not to rely on it and instead get to *Chevron* Step [Two] a different way."[103]

For this reason, in the supplement to the October 20 Draft, the reference to *WEPCO* is deleted and replaced with a different and more subtle argument as to why *Chevron* deference ought to apply to EPA's RMRR exception. The new version explains:

> It is consistent with the plain meaning of the phrase "any physical change" to understand it not to cover [RMRR] activities: they do not change a source's original design, and their function is to maintain the source in its pre-ex-

90. No. 00-12310-E (11th Cir. Feb. 21, 2001).

91. October 11 Draft, *supra* note 82, at 30 (emphasis added).

92. October 20 Draft [EPA Docket No. OAR-2002-0068-0041] (2002).

93. *Id.* at 66.

94. *Id.* at 66-67.

95. *See supra* notes 76-77 and accompanying text.

96. October 11 Draft, *supra* note 82, at 31.

97. October 20 Draft, *supra* note 92, at 66.

98. *See supra* notes 78-81 and accompanying text.

99. *See supra* note 94 and accompanying text.

100. October 20 Draft, *supra* note 92, at 67.

101. *Id.* at 66.

102. *See supra* notes 38-39 and accompanying text.

103. E-mail from Lee Otis accompanying October 20 Draft [EPA Docket No. OAR-2002-0068-0041] (2002).

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> isting condition rather than to modify it. Moreover interpreting "physical change" to encompass every activity undertaken at a source to maintain it would effectively nullify the distinction Congress drew with respect to coverage between new and existing sources.[104]

This argument is interesting in part because, while it is presented as a rationale for *Chevron* Step Two deference, it is really an argument—note the allusions to "plain meaning" and nullification of congressional intent—that *Chevron* Step One *demands* the RMRR exemption. This, however, might be a hard sell after *WEPCO* and *Alabama Power*, which seem to treat the RMRR regulations, and de minimis exemptions more generally, as discretionary rather than mandatory. Note also the subtle appeal, recast in definitional terms, to the principles that served to justify the de minimis exemption under *Alabama Power*—the worry that minor changes that do not alter the basic characteristics of sources are so trivial that they should not be covered by NSR or PSD.

However, this extended explanation and defense of the *Chevron* theory was quickly abandoned. In the interagency mark-up draft that circulated four days later, the entire legal basis section was struck out.[105] The deleted section was replaced with the brief, two-paragraph legal basis section that ultimately appeared in the published version of the preamble described above.[106] That section, as we have seen,[107] implicitly endorses a *Chevron* theory, but also incorporates some of the policy considerations associated with the narrower de minimis theory.

### *C. Are the Theories Really Separable? The Interaction of the* Chevron *Framework and the Absurdity Canon*

The foregoing discussion, and much of what follows, is premised on the notion that there is a legally salient conceptual difference between, on the one hand, interpreting an ambiguous statute and, on the other hand, creating a de minimis exemption to an otherwise unambiguous statute. But this is a contestable proposition. Indeed, although in prior drafts of the RMRR rule's preamble EPA treated the *Chevron* and de minimis theories as distinct, the Agency might now take the plausible position that the question whether a statute permits a given de minimis exemption is simply a question about statutory clarity. If a statute does not unambiguously *preclude* the creation of particular de minimis exemptions, the argument would go, then the statute is ambiguous on whether such an exemption is permitted,[108] and that ambiguity is sufficient for the Agency's creation of a de minimis exemption to survive *Chevron* Step One's inquiry into statutory clarity.[109]

A proponent of this argument could further point out that the creation of a de minimis exemption is essentially an application of the "absurdity" canon of statutory construction,[110] a canon meant to give effect to the presumed purpose of the legislation (or intent of the legislator)[111] even if the text seems to point to a different result.[112] Thus, if it is not clear whether or how the absurdity canon should apply to the statute at issue, one cannot say that the court, "employing traditional tools of statutory construction, [can] ascertain[ ] that Congress had an intention on the precise question at issue,"[113] as is required for a finding that a statute is unambiguous for purposes of *Chevron* Step One.

This argument is compelling in some respects, but it is inadequate as a justification for applying *Chevron* Step Two deference to any statutory phrase that admits of some possible de minimis exemption. After all, most statutes are not so

104. Supplement to October 20 Draft [EPA Docket No. OAR-2002-0068-0040] (2002), at 1.

105. October 24 Draft [EPA Docket No. OAR-2002-0068-0044] (2002), at 76-79.

106. *See supra* Part II.A. This version of the legal basis was apparently drafted in its final form by November 1. *See* E-mail from Bill Harnett, U.S. EPA, to Amy L. Farrell et al., "Legal Language for RMRR" [EPA Docket No. OAR-2002-0068-0047] (2002) (containing the legal basis language that appears in the published preamble).

107. *See supra* notes 62-68 and accompanying text.

108. Public Citizen v. Young, 831 F.2d 1108, 18 ELR 20173 (D.C. Cir. 1987), is an example of a case in which a court found that a statute precluded an agency from creating a de minimis exemption to a statutory command. However, the opinion implied that such a finding is exceptional; the canonical formulation of the de minimis exemption principle, the *Public Citizen* court noted, is "virtually a presumption in its favor." *Id.* at 1113, 18 ELR at 20175. Note also that, because the *Public Citizen* court decided that no de minimis exemption was permissible, the court did not have to reach the issue of how much deference was due the agency's determination of the particular de minimis threshold. *See id.* at 1112 n.4, 18 ELR at 20175 n.4 ("We do not . . . purport to decide the appropriate dividing point between *de minimis* and other risks.").

109. There is some authority for this proposition. *See* American Water Works Ass'n v. EPA, 40 F.3d 1266, 1271, 25 ELR 20335, 20336 (D.C. Cir. 1994) ("[W]here a literal reading of a statutory term would lead to absurd results, the term simply has no plain meaning . . . and is the proper subject of construction by EPA and the courts. . . .") (internal quotation marks omitted) (citing Chemical Mfrs. Ass'n v. Natural Resources Defense Council, 470 U.S. 116, 15 ELR 20230 (1985)). *See also* Wassenaar v. Office of Personnel Management, 21 F.3d 1090, 1094 (Fed. Cir. 1994) ("[B]ecause a literal construction . . . results in absurd conclusion, we conclude that the plain language of the statute does not provide us with an 'unambiguously expressed intent of Congress.'") (quoting *Chevron*); Northrop Grumman Corp. v. United States, 47 Fed. Cl. 20, 37 (Fed. Cl. 2000) ("Step [T]wo of *Chevron* is brought on . . . [w]hen the plain language of a statute leads to absurd consequences. . . .").

110. *See* Alabama Power Co. v. Costle, 636 F.2d 323, 360 & n.89, 10 ELR 20001, 20011 & n.89 (D.C. Cir. 1979), which states:

> The ability . . . to exempt *de minimis* situations from a statutory command is not an ability to depart from the statute, but rather a tool to be used in implementing the statutory design. . . . In this respect, the principle is a cousin of the doctrine that, notwithstanding the "plain meaning" of a statute, a court must look beyond the words to the purpose of the act where its literal terms lead to "absurd or futile results."

*See also Public Citizen*, 831 F.2d at 1112, 18 ELR at 20175.

111. Many scholars, influenced by modern work in social choice theory, have argued that the concept of "legislative intent," when applied to a collective decisionmaking body like Congress, is incoherent and useless as a guide for statutory construction. *See, e.g.*, Frank H. Easterbrook, *Statutes' Domains*, 50 U. Chi. L. Rev. 533, 547-48 (1983); Kenneth A. Shepsle, *Congress Is a "They," Not an "It": Legislative Intent as Oxymoron*, 12 Int'l Rev. L. & Econ. 239 (1992). This general critique actually predates modern social choice theory by several decades. *See* Max Radin, *Statutory Interpretation*, 43 Harv. L. Rev. 863, 871-72 (1930). Yet, for better or worse, the rhetoric of legislative intent persists despite its conceptual flaws.

112. *See, e.g.*, Holy Trinity Church v. United States, 143 U.S. 457, 459 (1897):

> It is a familiar rule that a thing may be within the letter of the statute and yet not within the statute, because not within its spirit nor within the intention of its makers. . . . [T]he absurd results which follow from giving such broad meaning to the words, makes it unreasonable to believe that the legislator intended to include the particular act.

113. *Chevron*, 467 U.S. at 843 n.9, 8 ELR at 20508-09 n.9.

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"extraordinarily rigid" that they overcome the general presumption in favor of permitting de minimis exemptions,[114] but this does not render all such statutes "ambiguous" in the same sense that a statute is ambiguous if it uses vague or open-ended terms, or leaves a gap or conflict that admits of multiple resolutions. "There is a basic difference," the U.S. Supreme Court has observed in other contexts, "between filling a gap left by Congress' silence and rewriting rules that Congress has affirmatively and specifically enacted."[115]

The critical distinction here is that the creation of a de minimis exemption, unlike most other exercises of statutory construction, involves an explicitly contratextual interpretation of a statute.[116] Whereas most canons of construction are designed to give a more determinate meaning to open-ended text, the absurdity canon—of which the creation of a de minimis exemption is an application—arises only when the statutory text is in fact relatively determinate. In the context of *Chevron* analysis, this distinction means that the debate about whether the absurdity canon justifies the exemption of particular activities from a statute's domain takes place at *Chevron* Step One.

If a reviewing court, applying the standard tools of statutory construction, were to conclude that the relevant statutory text is indeterminate, the *Chevron* Step One analysis is normally at an end and the agency is free to pick an interpretation that is reasonable under *Chevron* Step Two. But, if the relevant statutory text *is* determinate, then an agency must invoke the absurdity canon to avoid invalidation of an inconsistent rule. That is, before even getting to *Chevron* Step Two, the agency must first engage in an argument about the "plain meaning" of the statutory text—and this is a debate that occurs at *Chevron* Step One, where the court does not necessarily defer to agency interpretations.

The clearest authority for this understanding of the interaction of *Chevron* and the absurdity canon is the D.C. Circuit's opinion in *Mova Pharmaceuticals v. Shalala*,[117] which held that an agency that "concludes that a literal reading of a statute would thwart the purposes of Congress [ ] may deviate no further from the statute than is needed to protect congressional intent. . . . [O]ur review of the agency's deviation from the statutory text will occur under the first step of the *Chevron* analysis, in which we do not defer to the agency's interpretation of the statute."[118] The view that the applicability of the absurdity canon is a matter of *Chevron* Step One analysis has been accepted even by commentators who endorse broad agency power to create de minimis exemptions from broadly worded statutes.[119]

Thus, despite some incautious language in earlier decisions suggesting that a statute with a literal meaning that might lead to *some* absurd results "has *no* plain meaning,"[120] the agency does not get a free pass from *Chevron* Step One simply by demonstrating that the statute does not unambiguously preclude *any* de minimis exemptions. The agency must still establish that the *particular* categories of activities it wants to exempt are not covered by the "plain meaning" of the statute, despite the literal language.[121]

Thus, there is a real distinction between the de minimis theory and the *Chevron* Step Two theory as justifications for the proposed RMRR rule modification. The *Chevron* Step Two theory involves a claim that textual analysis—informed by context, statutory structure, and (perhaps) legislative history—yields no determinate answer on whether the CAA definition includes the activities EPA wants to exclude as RMRR. The de minimis theory, in contrast, would apply if the textual analysis *does* yield a determinate answer, but the Agency wants to argue that this result, i.e., the failure to exclude the proposed RMRR activities from the CAA's permitting requirements, is so absurd that a literal interpretation of the statute would be inconsistent with the statute's plain meaning, as a matter of *Chevron* Step One analysis.

This is not necessarily to say that the court should treat an agency's creation of a de minimis exemption less deferentially than an agency's interpretation of an ambiguous statute. Although *Mova* indicated that agency invocation of the absurdity canon ought to receive no special deference,[122] other decisions[123] and commentators[124] suggest that courts ought to treat agency authorization of de minimis exemptions with considerable deference. If the appropriate level of deference for agency-created de minimis exemptions is the same as that applied to agency interpretations of textually ambiguous terms (an argument I consider and reject below),[125] then the distinction between the *Chevron* Step Two theory and the de minimis theory would be a distinction without a difference. But if, as I argue, a different standard of review is appropriate, then the distinction is meaningful.

114. *See Alabama Power*, 636 F.2d at 360-61, 10 ELR at 20011; *Public Citizen*, 831 F.2d at 1113, 18 ELR at 20175.

115. United States v. Locke, 471 U.S. 84, 95 (1985) (refusing to depart from the literal text of the statute even when that text leads to a "harsh result") (quoting Mobil Oil Corp. v. Higginbotham, 436 U.S. 618, 625 (1978)). *See also* Brock v. Writers Guild of Am. W., 762 F.2d 1349, 1353 (1985) (rejecting Secretary of Labor's interpretation of the Labor-Management Reporting and Disclosure Act as extending the statute "beyond the point where Congress . . . would stop," stressing that there is a difference between "filling a gap left by Congress' silence" and rewriting the statute) (quoting 62 Cases of Jam v. United States, 340 U.S. 593, 600 (1951) and *Higginbotham*, 436 U.S. at 625).

116. For this reason, some committed textualists argue for abandoning the canon in its entirety. *See* John F. Manning, *The Absurdity Doctrine*, 116 HARV. L. REV. 2387. Most textualists, however, continue to recognize absurdity as an exception to the otherwise universal rule that the text controls, albeit an exception that ought to be construed as narrowly as possible. *Id*. at 2419-21.

117. 140 F.3d 1060 (D.C. Cir. 1998).

118. *Id*. at 1068.

119. *See* Cass R. Sunstein, *Avoiding Absurdity? A New Canon in Regulatory Law*, 32 ELR 11126 (Sept. 2002) (arguing that "courts should allow agencies to avoid absurdity, in the face of literal text, even in cases in which courts should not themselves exercise this power," but making clear that, as a matter of *Chevron* analysis, this issue is a matter of *Chevron* Step One).

120. American Water Works Ass'n v. EPA, 40 F.3d 1266, 1271, 25 ELR 20335, 20336 (D.C. Cir. 1994) (emphasis added).

121. In addition to these theoretical considerations, there is a good practical argument for adopting this understanding. Congress may want to give agencies the power to avoid truly absurd results, but reasonably fear that letting agencies carve out exemptions, subject only to very deferential judicial review, could give agencies too much power to curtail the scope of a deliberately broad statute. If the only way for Congress to constrain the agency's ability to narrow a statute's scope is to write a statute so rigid that no de minimis exemptions of any kind are allowed, Congress faces an unwelcome choice between giving agencies too little flexibility and giving them too much. If a statute can admit de minimis exemptions but still subject them to a higher standard of review, the problem is mitigated.

122. *Mova*, 140 F.3d at 1068.

123. *See infra* notes 160-70 and accompanying text.

124. *See* Sunstein, *supra* note 119.

125. *See infra* Part III.C.

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## III. Choosing a Theory: The Case for De Minimis Over *Chevron* Step Two

The preceding examination of the earlier drafts of the legal basis section of the RMRR rule's preamble indicates a retreat from the de minimis theory and an endorsement of the *Chevron* Step Two theory. However, while this legal strategy may appear tempting to an agency that hopes to avoid aggressive judicial review, it is sufficiently problematic from a doctrinal point of view that EPA ought to think twice. Moreover, if EPA were to prevail in upholding this proposed rule on *Chevron* Step Two grounds, the congressional and judicial constraints on agency action would be needlessly weakened.

The RMRR rule, or some version of it, should—and probably can—be justified as an exercise of EPA's power to create de minimis exemptions. The Agency's judgment on this point should receive *Skidmore* deference. The creation of such an exemption involves derogation of an explicit congressional command, but the exemption is justified on the theory that the Agency's expert assessment leads it to conclude that following the literal instructions of Congress would be absurd or otherwise inconsistent with the statute's purpose. This is therefore not a situation where we can reasonably conclude that Congress left the Agency a gap to fill, but it is a situation where the Agency's expert judgment ought to receive particular respect. *Skidmore* deference strikes the right balance, preserving agency flexibility and discretion, but also creating appropriate incentives for the Agency to tailor its rule narrowly and discouraging it from using its de minimis authority improperly to narrow the scope of the statute.

### *A. The Case Against the* Chevron *Theory*

EPA appears partial to a *Chevron* theory, under which the Agency's creation and subsequent modification of the RMRR exemption is grounded in an interpretation of the purportedly ambiguous statutory phrase "any physical change or change in the method of operation." However, to get to *Chevron* Step Two—where the Agency's interpretive choice would be entitled to deference—EPA must first surmount *Chevron* Step One, which asks whether Congress has "directly spoken to the precise question at issue."[126] And it is here that EPA's *Chevron* theory runs into its greatest difficulties. After all, is it really plausible that "any physical change or change in the method of operation" is sufficiently ambiguous to justify the exclusion of RMRR on a *Chevron* Step Two basis? At least four considerations support a negative reply.

First, the use of the word "any" to modify "physical change or change in the method of operation" is strongly indicative of a congressional purpose that the statute should apply broadly. The Court held in *United States v. Gonzales*[127] that, "[r]ead naturally, the word 'any' [in a statute] has an expansive meaning, that is, 'one or some indiscriminately of whatever kind.'" And, as the U.S. Court of Appeals for the Eighth Circuit observed in *Missouri Municipal League v. Federal Communications Commission*,[128] "[t]ime and time again, the Court has held that the modifier 'any' prohibits a narrowing construction of a statute."[129]

A second argument from "plain meaning"—though perhaps a weaker one—would draw on the Court's opinion in *Microwave Communications Inc. (MCI) v. American Telephone & Telegraph Co. (AT&T)*[130] There, the Court held that the term "modify" as used in the Federal Communications Act had a sufficiently plain meaning that the Federal Communications Commission's interpretation of that term was invalid under *Chevron* Step One. Justice Antonin Scalia's majority opinion rejected the argument that "modify" could mean "to change fundamentally"; he held that, as a matter of textual meaning, the word modify "connotes moderate change."[131] Interestingly, the unsuccessful petitioners in *MCI* had relied on essentially the same *Webster's Dictionary* definition that WEPCO had advanced unsuccessfully before the Seventh Circuit.[132] Justice Scalia characterized this definition of modify—as denoting a "fundamental" change—as "peculiar," perhaps reflecting "intentional distortions, or simply careless or ignorant misuse."[133] Given this definitional precedent, albeit in a different statutory context, the definitions section of the CAA might plausibly be read to broaden the definition of "modify" to include large changes as well as small ones, but it cannot be read to include *only* large changes. Such a definition would be flatly inconsistent with the plain meaning of "modify" as established in *MCI*.[134]

126. *Chevron*, 467 U.S. at 842, 14 ELR at 20508. *See also* Microwave Communications Inc. (MCI) v. American Tel. & Tel. Co. (AT&T), 512 U.S. 218, 229 (1994) ("[A]n agency's interpretation of a statute is not entitled to deference when it goes beyond the meaning that the statute will bear."); Atlantic City Elec. Co. v. Federal Energy Regulatory Comm'n, 295 F.3d 1, 11 (D.C. Cir. 2002) (holding that an agency "cannot rely on one of its own regulations to trump the plain meaning of a statute"); Hennepin County Med. Ctr. v. Shalala, 81 F.3d 743, 748 (8th Cir. 1996) ("The plain meaning of a statute controls, if there is one, regardless of an agency's interpretation.").

127. 520 U.S. 1, 5 (1997).

128. 299 F.3d 949 (8th Cir. 2002).

129. *Id.* at 954 (collecting sources); *see also* Merritt v. Dillard Paper Co., 120 F.3d 1181, 1186 (11th Cir. 1997) ("[T]he adjective 'any' is not ambiguous; it has a well established meaning . . . 'any' means all."); G.M. Trading Corp. v. Commissioner of Internal Revenue, 121 F.3d 977, 981 (5th Cir. 1997) (relying on the "plain meaning" and "broad scope" of the word "any" in a statute). *But see* Bell Atl. Tel. Cos. v. Federal Communications Comm'n, 131 F.3d 1044, 1047 (D.C. Cir. 1997) ("[T]he Supreme Court has specifically held that in context the word 'any' many be construed in a non-expansive fashion.") (citing O'Connor v. United States, 479 U.S. 27, 31 (1986)). However, the *O'Connor* opinion stressed that an expansive reading of "any" in a particular passage in the Panama Canal Treaty would require either "verbal distortions . . . to give plausible content" to other sections of the treaty, *O'Connor*, 479 U.S. at 33, or would render the entire treaty provision in question "utterly implausible." *Id.* at 31.

130. 512 U.S. 218 (1994). *But see* Environmental Defense Fund v. EPA, 82 F.3d at 466, 26 ELR at 20975 (upholding a de minimis exemption to a portion of the CAA that applied to "any [federal] activity" that does not conform to an implementation plan, explaining that

> [a]lthough the terms of the statute do prohibit the federal government from engaging in "any activity" that is not in conformity, it seems eminently reasonable for the EPA to interpret this provision to refer to "any activity" that is likely to interfere with the attainment goals in [an implementation plan].

131. *MCI*, 512 U.S. at 228.

132. *See supra* note 34 and accompanying text.

133. *MCI*, 512 U.S. at 228.

134. *But see* Chemical Mfrs. Ass'n v. Natural Resources Defense Council, 470 U.S. 116, 118, 15 ELR 20230, 20233 (1985) (finding that "[t]he word 'modify' . . . has no plain meaning as used in §301(*l*) [of the CWA], and is the proper subject of construction by EPA and the courts"). However, not only was *Chemical Manufacturers* decided almost a decade before *MCI*, but in the former case a broad, literal reading of "modify" would involve a direct conflict with another specific command in the statutory text. *See id.* ("[R]eading ['modify' as used in §301(*l*) broadly] would forbid what §307(*b*)(2) expressly directs. . . .").

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Third, as a matter of inference from context and statutory structure, it is significant that the allegedly ambiguous "physical or operational change" language appears in the "definitions" section of the CAA. Congress, apparently aware that the word "modification" in the operative section of the statute was potentially ambiguous, sought to define the word with greater precision. One would presume that the definition of a term is not meant to be as ambiguous as the term it is supposed to define. The more natural reading is that the phrase EPA claims is ambiguous in fact reflects an effort to make clear that the words "modify" and "modification," as used elsewhere in the statute, are not as ambiguous as they might otherwise appear. Refusing to read any additional precision into the definitional phrase than is inherent in the original term would render the congressional effort at definition an exercise in futility.

A fourth consideration also involves statutory context. As has already been noted, "physical or operational change" is only one part of the statutory definition of "modification." A "modification" also has to increase emissions, or result in the emission of new pollutants. Read in isolation, the "any physical or operational change" language tempts the interpreter to conclude that the language is ambiguous, because a literal reading seems to sweep so broadly as to be patently unreasonable.[135] But the necessary limiting principle is supplied by the emissions increase prong of the definition. Read in the context of that second prong, the first prong is understandably, and perhaps deliberately, quite broad.[136]

For these reasons, the potential legal attack on *Chevron* deference to the RMRR exemption is stronger than is usually the case when an administrative agency interprets a regulatory statute. EPA might therefore want to be wary of relying exclusively on a *Chevron* Step Two theory. True, chances are that the new RMRR rule would probably be upheld, given the D.C. Circuit's tendency to uphold challenged agency action—and, perhaps, given the court's ideological sympathy with the new rule's objectives.[137] But, it is nonetheless a risky strategy, especially if EPA chooses to fold the de minimis argument for its rule change into its *Chevron* Step Two theory. Doing so might deprive the Agency of an independent and more defensible ground for upholding the new rule.

Stepping out of EPA's shoes and into the position of a court, or of someone interested more broadly in the development of environmental and administrative law doctrine, upholding the RMRR rule on the basis of a *Chevron* Step Two theory is a bad idea. With respect to environmental law in particular, upholding the RMRR rule modification on this basis would allow EPA to exclude all sorts of other activities from the definition of "change"—even if those activities significantly increased emissions—so long as the exclusions conform to some "reasonable" definition of change. And, if we are now in a world where "any change" actually means "any big change," it is hard to articulate a judicially enforceable limiting principle as to the acceptable location of the line between "big" and "not big." Granting EPA *Chevron* deference in its definition of "physical or operational change" is likely to lead, as the *WEPCO* court feared, to "vistas of indefinite immunity from the provisions" of the CAA.[138] Concluding that a statutory provision is ambiguous, for purposes of *Chevron*, whenever the statute does not expressly foreclose the creation of *any* de minimis exemption whatsoever[139] is likely to lead to similar results—unless courts become more willing to find such foreclosure, in which case the result would be an undesirable loss of agency flexibility.[140]

Taking a more general view, *Chevron* already effects a considerable shift of power from Congress to administrative agencies.[141] The only real limitations on agency interpretive power after *Chevron* are, first, the requirement that even under *Chevron*'s deferential standard the agency's interpretation must be "reasonable," and, second, *Chevron* Step One's analysis of the language Congress actually used. That latter check is rendered nugatory in an interpretive regime where "any physical or operational change," as used in the context of the CAA, is sufficiently ambiguous that EPA can, subject only to "reasonability" review, define this phrase (virtually) any way it likes. But, as the Court has stressed in other contexts, EPA should not be allowed to "construe [the CAA] in a way that completely nullifies textually applicable provisions meant to limit its discretion."[142] Upholding the RMRR rule on the basis of a *Chevron* Step Two theory would thus be a dangerous precedent for those who are concerned about the balance of power in the administrative state.[143]

### *B. The Case for the De Minimis Theory*

Reliance on the problematic *Chevron* Step Two theory may also be unnecessary, given the strong arguments that EPA can make for upholding the RMRR rule revision solely as an

135. Here, a good analogy might be the Sherman Act, 15 U.S.C. §1, which on its face forbids "[e]very contract . . . in restraint of trade." The Court, has sensibly recognized that, because a "literal reading of the statute would outlaw the entire body of private contract law," Business Elecs. Corp. v. Sharp Elecs. Corp., 485 U.S. 717, 736 (1988) (Stevens, J., dissenting), "a completely literal interpretation of the word 'every' cannot have been intended by Congress." City of Columbia v. Omni Outdoor Adver., 399 U.S. 365, 385 (1991) (Stevens, J., dissenting). Thus, instead of interpreting the statute literally, the Court interprets the Sherman Act as forbidding only "unreasonable" restraints of trade. *See* Standard Oil Co. v. United States, 221 U.S. 1, 60, 87 (1911).

136. *Cf.* Public Citizen v. Young, 831 F.2d 1108, 1112, 18 ELR 20173, 20175 (D.C. Cir. 1987).

137. Whether the political affiliation of the judges on the D.C. Circuit affects their disposition of environmental cases is a controversial question, and one on which, for purposes of this Article, I take no position. For a sample of the scholarly debate over this issue, see Christopher H. Schroeder & Robert L. Glicksman, Chevron, State Farm, *and EPA in the Courts of Appeals During the 1990s*, 31 ELR 10271 (Apr. 2001); Richard L. Revesz, *Environmental Regulation, Ideology, and the D.C. Circuit*, 83 Va. L. Rev. 1717 (1997); Harry T. Edwards, *Collegiality and Decisionmaking on the D.C. Circuit*, 84 Va. L. Rev. 1335 (1998); Richard L. Revesz, *Ideology, Collegiality, and the D.C. Circuit: A Reply to Chief Judge Harry T. Edwards*, 85 Va. L. Rev. 805 (1999).

138. *WEPCO*, 893 F.3d at 909, 20 ELR at 20417.

139. *See supra* Part II.C.

140. *See supra* note 121.

141. *See, e.g.*, Cass R. Sunstein, *Law and Administrative Action After* Chevron, 90 Colum. L. Rev. 2071 (1990); William N. Eskridge Jr. & John Ferejohn, *The Article I, Section 7 Game*, 80 Geo. L.J. 523, 547-51 (1992); Cynthia R. Farina, *Statutory Interpretation and the Balance of Power in the Administrative State*, 80 Colum. L. Rev. 452 (1989). Of course, *Chevron* also entails a more direct shift of power from *courts* to administrative agencies, but an indirect result of this shift, as these and other works demonstrate, is to increase the potential deviation of agency policy choices from congressionally preferred policy outcomes.

142. Whitman v. American Trucking Ass'n, 531 U.S. 457, 485, 31 ELR 20512, 20517 (2001).

143. *Cf.* Farina, *supra* note 141.

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exercise of the Agency's authority, recognized in *Alabama Power*, to create de minimis exceptions to the CAA. As we have seen, EPA's early drafts of the preamble endorsed this theory as a possible basis for upholding the rule, but subsequent versions shied away. The reason for this shift was most likely the more limited nature of the de minimis exemption, and the greater possibility for judicial scrutiny. However, EPA may have a fairly strong case that the de minimis exception justifies the revised RMRR rule.

Certainly, the old version of the rule—in which EPA granted exemptions on a case-by-case basis, and interpreted the scope of the exemption narrowly—is defensible strictly on a de minimis basis. EPA's new RMRR proposal, however, has a more rule-like form, and is broader in scope. Do these changes make the rule harder to defend as an exercise of de minimis power? Not necessarily.

Though the extant law is not entirely clear on the point, the use of a rule rather than a standard should not render an exercise of de minimis authority invalid, even though all rules are acknowledged to be overinclusive and underinclusive. Indeed, several of the cases upholding administrative agency authority to create de minimis exemptions have involved rule-like categories or cutoff points.[144] So long as EPA defends the *scope* of its rule—and provides data and analysis sufficient to justify its choice—the fact that EPA uses a categorical rule rather than a standard applied on a case-by-case basis should not be a reason for invalidating the RMRR exemption.[145]

Choosing a rule-like form does, however, make the question of scope more salient. EPA's proposed rule makes certain activities RMRR per se, so a defense of the rule on de minimis grounds is an implicit assertion that the overwhelming majority of the activities that escape regulation under the proposed rule would in fact be considered de minimis activities if they were examined on a case-by-case basis. Rule-like categorical exemptions for purportedly de minimis activities are most vulnerable to invalidation if they exempt projects that fall squarely into the set of activities that the statute is supposed to regulate.[146] Thus, to defend its RMRR proposals, EPA would have to show that its categorical exemptions do not sweep so broadly that they cannot be fairly classified as merely de minimis exemptions.

To satisfy this standard, EPA would need to make some evidentiary showing that the general rule is, to borrow a phrase from an unrelated body of doctrine, "congruent and proportional" to the set of activities that the Agency could permissibly refuse to regulate on de minimis grounds.[147] Circuit courts have already adopted something like this requirement, applying a kind of "narrow tailoring" analysis when an agency invokes the absurdity doctrine to justify a contratextual rule. The clearest example is *Mova*, in which the D.C. Circuit rejected the U.S. Food & Drug Administration's (FDA's) invocation of the absurdity doctrine to justify an agency policy on new drug approvals that contravened the relevant statutory text. The "fatal flaw in the FDA's 'absurd results' argument," the court explained, "is that the agency could have . . . creat[ed] narrower exceptions" instead of the broad contratextual rule the agency had chosen.[148] The *Mova* court did not deny that agencies have the power to deviate from the literal language of the statute in order to avoid results that are truly absurd; indeed, the court invited the FDA to address the absurd results problem in "some narrower way, as long as that solution conforms to the statute."[149] What they *cannot* do, as the *Mova* court put it, is to "embark[ ] upon an adventurous transplant operation in response to blemishes in the statute that could have been alleviated with more modest corrective surgery."[150] An implicit adoption of something like this requirement in the context of de minimis exemptions from environmental regulation also appears in *Ober v. Whitman*,[151] where the U.S. Court of Appeals for the Ninth Circuit held that it would only defer to EPA's selection of a de minimis threshold for particulate matter if the Agency "has provided a full explanation of its de minimis levels and its application of those levels to sources of pollution," supported by adequate data.

EPA could provide the requisite evidence of congruence and proportionality in a number of ways. The Agency could provide data on the approximate cost of various projects and their associated environmental impacts (or lack thereof), as well as data on the average annual maintenance costs for various kinds of sources. It could also use its past determination decisions to establish that the overwhelming majority of the activities denied RMRR exemptions under the new rule would also have been denied under the old standard. Inasmuch as a de minimis theory would require EPA to engage in this kind of study—and perhaps would encourage the Agency to narrow the scope of the exemption where it otherwise would sweep in too many non-RMRR activities—the use of this theory would have beneficial policy effects.

144. *See, e.g.*, Ober v. Whitman, 243 F.3d 1190, 1195, 31 ELR 20550, 20551 (9th Cir. 2001); Environmental Defense Fund v. EPA, 82 F.3d 451, 465-67, 26 ELR 20968, 20975-76 (D.C. Cir. 1996); Ohio v. EPA, 997 F.2d 1520, 23 ELR 21157 (D.C. Cir. 1993). *But see* Environmental Defense Fund v. EPA, 636 F.2d 1267, 10 ELR 20972 (D.C. Cir. 1980) (denying a de minimis exemption from the Toxic Substances Control Act for polychlorinated biphenyls concentrations under 50 parts per million (ppm) where evidence demonstrated that exposure to concentrations below 50 ppm could have adverse environmental and health effects); Natural Resources Defense Council v. EPA, 966 F.2d 1292, 22 ELR 20950 (9th Cir. 1992) (invalidating as arbitrary and capricious a de minimis exemption for sites of less than five acres from the CWA where EPA admitted "that even small construction sites can have a significant impact on local water quality"). It is not clear whether these opinions object to *any* overinclusive de minimis exemption, or whether they stand only for the proposition that in those specific instances, EPA's rule was *too* overinclusive. The latter position would be entirely consistent with the approach urged here; the former, which implicitly demands case-by-case evaluations, would not be.

145. *See* Alabama Power Co. v. Costle, 636 F.2d 323, 361, 10 ELR 20001, 20012 (D.C. Cir. 1979) (noting that, if EPA sought to justify its "50-ton exemption" on de minimis grounds it would have to "show that the situation is genuinely *de minimis*" but not questioning the authority of the agency to promulgate a general rule); *Environmental Defense Fund*, 82 F.3d at 466-67, 26 ELR at 20975 ("[W]e find nothing in the [CAA] to preclude the EPA's identification of *categories* of federal action that would produce either no or a trivial level of emissions. . . .") (emphasis added). *But see also* Natural Resources Defense Council v. Costle, 568 F.2d 1369, 8 ELR 20028 (D.C. Cir. 1977) (invalidating a blanket exemption of certain categories point sources from the permitting requirements of the CWA, and requiring instead that EPA address pollution at these sources through the permitting process).

146. *See, e.g.*, *Natural Resources Defense Council*, 966 F.2d at 1292, 22 ELR at 20950; *Environmental Defense Fund*, 636 F.2d at 1267, 10 ELR at 20972; *Costle*, 568 F.2d at 1377, 8 ELR at 20031.

147. *Cf.* City of Bourne v. Flores, 521 U.S. 507, 519-20 (1997).

148. *Mova*, 140 F.3d at 1071.

149. *Id.* at 1074.

150. *Id.* at 1069.

151. 243 F.3d 1190, 1195, 31 ELR 20550, 20551 (9th Cir. 2001).

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### *C. The Appropriate Level of Deference for De Minimis Exemptions*

A critical question will be the level of scrutiny to apply to EPA's decision as to where to draw the line separating per se de minimis activities from other activities. Does *Chevron* deference apply to this decision, even though, as we have seen, a de minimis exemption is not a traditional exercise of *Chevron* Step Two interpretive authority? Should the courts construe the Agency's authority to create de minimis exemptions narrowly, and therefore apply a much more rigorous standard of review? Or something in between? This question has attracted surprisingly little attention, even from sophisticated commentators.[152]

#### 1. The Impact of *Chevron* on Deference to Agency De Minimis Determinations

*Alabama Power* appeared to envision relatively aggressive judicial review of the scope of de minimis exemptions. While the court noted that, in most cases, agencies have the power to create these exemptions,[153] it put the burden squarely on the agency to "make[ ] the required showing" that the matters excluded are truly de minimis[154] and admonished EPA that its authority to create de minimis exemptions "is narrow in reach and tightly bounded" by the need to make this showing."[155] However, *Alabama Power* was decided before *Chevron*. To the extent that we think the latter decision reshaped administrative law with respect to judicial deference to agency statutory interpretation,[156] we might well inquire whether and to what extent courts ought to show greater deference to agency creations of de minimis exceptions than *Alabama Power* implied was appropriate. Here, it is useful and important to distinguish two ways the *Chevron* decision could affect the power of an administrative agency to create a de minimis exemption.

First, *Chevron* might mean that a particular statutory phrase—a phrase that, pre-*Chevron*, the courts would have interpreted themselves—is sufficiently ambiguous that the agency has the power to interpret it. Therefore, whereas pre-*Chevron* an agency may have had to justify its exclusion of certain matters as a de minimis exemption to the *court's* construction of the "real" meaning of the statute, post-*Chevron* the agency need only show that its interpretation of the statutory language to exclude those matters is reasonable. Indeed, there is no need for a special de minimis theory in such a case. Where the statutory language is ambiguous, the agency may give its own construction to that language so long as the construction is reasonable—this is standard *Chevron* analysis.

To illustrate with a hypothetical example, imagine that the CAA did not define "modification." Suppose further that EPA did not want to subject the repair or replacement of old, leaky pipes to NSR permitting. Pre-*Chevron*, the court would have had to determine what the term "modification" means. If the court concluded that the best interpretation of "modification" includes pipe repair, then EPA would have had to justify its exclusion of pipe repair from NSR on a de minimis theory. But now suppose *Chevron* comes along. EPA interprets "modification" to mean "change affecting basic characteristics or operation," and concludes that pipe repair does not qualify. The reviewing court, applying *Chevron*, would say, "[a]lthough we might have interpreted the meaning of 'modification' differently, the term is ambiguous, and the agency's interpretation is not unreasonable, so we defer."[157] Because of *Chevron*, the agency would never have to invoke the de minimis theory at all, and would have no need to cite *Alabama Power*.

The interesting question, for purposes of applying the de minimis theory, is how much deference an agency's creation of a de minimis exemption should receive when the statute is *not* sufficiently ambiguous to infer a delegation of statutory interpretation authority to the agency. Where the statutory text clearly covers certain activities—and, according to the arguments above, the first prong of the CAA's modification definition meets that standard[158]—when can an agency nonetheless decline to interpret the statute as reaching those activities? As we have seen, *Alabama Power* recognized that agencies have this power, aptly comparing it to the "absurdity" canon in judicial statutory construction,[159] though the scope of that power is tightly constrained.

Perhaps *Chevron* might expand this power by affecting the amount of deference an agency creation of a de minimis exemption is due, even though the statute is not sufficiently ambiguous to get to *Chevron* Step Two. This second argument as to how *Chevron* affects the judicial deference to agency de minimis exemptions is more indirect—the essential idea is that the *Chevron* decision embodies a particular deferential attitude toward administrative agencies, and this attitude ought to carry over into other forms of agency statutory interpretation, including the invocation of the absurdity doctrine to create a de minimis exemption.

The actual RMRR exemption—if one stipulates for the moment that I am correct in arguing that the statutory definition is sufficiently clear that we would never get to *Chevron* Step Two as a matter of conventional *Chevron* analysis—serves as an example here. Suppose the RMRR exemption were challenged pre-*Chevron*. The exemption would be

152. Cass Sunstein, for example, argues: "[U]nder [*Chevron*] step one, the relevant administration should . . . be authorized, most of the time, to accept or to reject literalism when that approach would lead to an absurd or patently unreasonable outcome." Sunstein, *supra* note 119, at 11131. But that formulation begs the standard-of-review question. How much of the time is "most of the time"? What sort of showing must the agency make to establish that failure to grant a particular exemption from the scope of the statute would be "absurd"—and how closely will the courts scrutinize this agency's explanation? Though Sunstein's discussion indicates that he favors a relatively deferential standard of review, he does not articulate any particular test.

153. *Alabama Power*, 636 F.2d at 360, 10 ELR at 20011.

154. *Id.*

155. *Id.* at 361, 10 ELR at 20012.

156. The degree to which *Chevron* actually effected a dramatic shift in the level of judicial deference to agency interpretations of law is a matter of some dispute. *See* Peter Schuck & E. Donald Elliott, *To the* Chevron *Station: An Empirical Study of Federal Administrative Law*, 1990 Duke L.J. 984; Thomas W. Merrill, *Judicial Deference to Executive Precedent*, 101 Yale L.J. 969 (1992); Orin S. Kerr, *Shedding Light on* Chevron*: An Empirical Study of the* Chevron *Doctrine in the U.S. Courts of Appeals*, 15 Yale J. on Reg. 1 (1998); Linda R. Cohen & Matthew L. Spitzer, *Solving the* Chevron *Puzzle*, 57 Law & Contemp. Probs. 65 (1994), Aaron P. Avila, *Application of the* Chevron *Doctrine in the D.C. Circuit*, 8 N.Y.U. Envtl. L.J. 398 (2000).

157. Unless, of course, the court was aggressive in imputing a more specific meaning of "modify," as in the *MCI* decision. *See supra* notes 130-33 and accompanying text.

158. *See supra* notes 126-36 and accompanying text.

159. *See supra* note 110.

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defended on a de minimis theory, and the reviewing court, applying the *Alabama Power* standard, would require the agency to make a detailed showing that the matters it excludes are truly de minimis. Now suppose the challenge is made post-*Chevron*. One might argue that, even though we have stipulated that the court would hold, for purposes of *Chevron* Step One, that RMRR activities are covered by the language of the statute, EPA's creation of a de minimis exemption should receive the same level of deference that the Agency would receive if it were interpreting a textually ambiguous statute at *Chevron* Step Two. After all, the argument would go, these are both exercises of the Agency's statutory interpretation authority. At *Chevron* Step Two, the Agency interprets statutory language that is not plain, pursuant to an implicit delegation by Congress; when creating a de minimis exemption, an agency invokes an interpretive canon to give effect to the true purpose of the legislation, and this power also arises from implicit congressional delegation.

There appears to be something of a circuit split—or at least some circuit confusion—on this latter issue of whether the creation of a de minimis exemption to an apparently clear statutory command is entitled to a higher level of deference post-*Chevron*. The most extensive discussion of the issue comes in the D.C. Circuit's 1996 decision in *Environmental Defense Fund v. U.S. Environmental Protection Agency*.[160] There, in response to an environmental group's claim that EPA had not satisfied the level of justification demanded by *Alabama Power* for the creation of a de minimis exception, the court pointed out that it had

> decided *Alabama Power* . . . before the Supreme Court's decision in *Chevron*, which clarified the degree to which a reviewing court should defer to an agency acting within the scope of its delegated authority, whether implicit or explicit. To the extent that both *Chevron* and *Alabama Power* address agency power inherent in a statutory scheme, the same deference due to an agency's reasonable interpretation of an ambiguous statute may also be due to an agency's creation of a de minimis exemption.[161]

Though this would seem like a fairly conclusive statement from the circuit most likely to review the RMRR rule that *Chevron* applies to the creation of de minimis exemptions, the *Environmental Defense Fund* decision does not necessarily settle the question. First, the opinion is quite explicit that while the creation of de minimis exemptions *may* get *Chevron* deference, the court in that case did not need to "resolve whether, under *Chevron*, an agency may create a de minimis exemption with a justification less rigorous than we indicated in *Alabama Power*, because [in this litigation] the EPA has adequately explained itself even by the standard of the latter case."[162]

Also, the *Environmental Defense Fund* opinion appears to blend the two distinct arguments for why *Chevron* deference might attach to an agency's exemption of low-significance activities from the scope of a regulatory statute. The language just quoted suggests the second of the two arguments discussed above: that even where the language of the statute is clear enough to satisfy *Chevron* Step One, the creation of a de minimis exemption ought to receive the same level of deference that would obtain at *Chevron* Step Two. However, earlier in the *Environmental Defense Fund* opinion the court explicitly argues that the statutory phrase "any activity" at issue in that case,[163] when read in context, is sufficiently ambiguous that EPA could reasonably interpret it to mean "any activity that is likely to interfere with the attainment goals in a [state implementation plan]."[164] That implies an argument more along the lines of the first of the two *Chevron*-related claims discussed above—the statute is ambiguous enough that the agency is entitled to deference at *Chevron* Step Two, and so what looks like the creation of a de minimis exemption is properly understood as a straightforward exercise of construing ambiguous language. Viewed in that light, the *Environmental Defense Fund* court's discussion of *Alabama Power* is unnecessary dicta.

It is also not clear how to square the *Environmental Defense Fund* court's discussion of *Chevron*'s impact on *Alabama Power* with the D.C. Circuit's subsequent holding in *Mova* that, when an agency invokes the absurdity canon to escape the literal language of a statutory provision, judicial "review of the agency's deviation from the statutory text will occur under the first step of the *Chevron* analysis, in which [the courts] do not defer to the agency's interpretation of the statute."[165]

In apparent contrast to the D.C. Circuit's *Environmental Defense Fund* approach, the Ninth Circuit, in *Natural Resources Defense Council, Inc. v. U.S. Environmental Protection Agency*,[166] rejected EPA's claim that it has the power to create a de minimis exemption to certain provisions of the Clean Water Act (CWA) for certain small sites. The court, applying the *Alabama Power* test, held that the de minimis exemption is only available where the regulation would "yield a gain of trivial or no value" and that EPA had not provided data sufficient to show that the de minimis exemption at issue would "indeed have only a *de minimis* effect."[167]

The Ninth Circuit appeared to shift to a more deferential posture in the *Ober*[168] decision, though *Ober* tried to preserve the *Natural Resources Defense Council* court's emphasis on the agency's duty to provide sufficient data to justify its de minimis exemption. In *Ober*, the court stated that it would "defer to the agency's judgment only if EPA has provided a full explanation of its de minimis levels and its application of those levels to sources of pollution. Once we have received that explanation, however, we owe deference to the agency's decision if it is a permissible interpretation of the statute."[169] But, while *Ober*, like *Environmental De-*

160. 82 F.3d 451, 26 ELR 20968 (D.C. Cir. 1996).

161. *Id.* at 467, 26 ELR at 20976.

162. *Id.*

163. 42 U.S.C. §7506(c)(1), ELR STAT. CAA §176(c)(1).

164. 82 F.3d at 466, 26 ELR at 20975.

165. *Mova*, 140 F.3d at 1068. Though the *Mova* court included *Environmental Defense Fund* in a string citation for the proposition that the intention of the drafters can sometimes trump the literal language of the statute, *id*., the court did not note the tension between *Environmental Defense Fund*'s discussion of the standard of review for de minimis exemptions and its own application of more rigorous scrutiny to the FDA's invocation of the absurdity canon. Interestingly, Judge Laurence H. Silberman was on both the *Mova* and *Environmental Defense Fund* panels; apparently he perceived no tension between the decisions.

166. 966 F.2d 1292, 1306, 22 ELR 20950, 20957 (9th Cir. 1992).

167. *Id.* (citing *Alabama Power*, 636 F.2d at 361, 10 ELR at 20012) (internal quotation marks omitted).

168. 243 F.3d at 1190, 31 ELR at 20550.

169. *Id.* at 1195, 31 ELR at 20551 (citing *Environmental Defense Fund*, 82 F.3d at 467, 26 ELR at 20975).

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*fense Fund*, endorses *Chevron*-style review when the statute is *unclear*, it does not address the question of whether *Chevron* means that the *Alabama Power* standards ought to be relaxed when the statute *is* clear enough, as a matter of text and context, that *Chevron* Step One would otherwise be dispositive.[170]

Thus, while some—but not all—courts to have considered the question seem to conclude that *Chevron* affects the application of the de minimis exemption authority recognized by *Alabama Power*, these cases are not entirely clear about how or why this is so. The nature of the confusion seems to arise from the conflation of the two distinct lines of argument as to how *Chevron* might affect an agency's power to exclude certain low-impact activities from a regulatory statute's reach. The cases to date have considered situations where the creation of the so-called de minimis exclusions clearly takes place at *Chevron* Step Two, because an analysis of text and context yields no determinate result. The more rigorous *Alabama Power* standard of review has no applicability for these sorts of determinations. After all, it would be bizarre to subject EPA's decision to consider an entire power plant to be a "stationary source"[171]—a decision with potentially enormous economic and environmental consequences—to a more deferential standard of review than an EPA decision to exclude activities with a trivial impact from the scope of the statute. The RMRR case, as we have seen, is different because of the need to invoke the de minimis exemption at *Chevron* Step One in order to get around the insurmountable obstacle that the text of the statute would otherwise pose.

### 2. The Case for *Skidmore* Deference for De Minimis Exemptions From Clear Statutory Language

What, then, is the appropriate level of deference in a case where Congress has "spoken clearly"—that is, used statutory language of seemingly sufficient clarity to satisfy *Chevron* Step One and preclude application of *Chevron* Step Two—but the agency nonetheless wants to create a de minimis exemption to the apparently clear statutory command? The best approach would be for the courts to review these types of agency determinations under the *Skidmore*[172] standard. *Skidmore* is less deferential than *Chevron* but more deferential than *Alabama Power*, and strikes the appropriate balance between granting the agency appropriate discretion to administer a complex statute and constraining the agency's ability to circumvent statutory limitations on its power.

*Skidmore* deference—recently revived as an alternative to *Chevron* deference by the Court in the *Christensen v. Harris County*[173] and *United States v. Mead Corp.*[174] opinions—treats agency decisions not as "controlling" but as "entitled to respect" proportional to "the thoroughness evident in [the decision's] consideration, the validity of its reasoning, its consistency with earlier and later pronouncements, and all those factors which give it power to persuade, if lacking power to control."[175] *Skidmore* deference, according to these cases, attaches when the court concludes that Congress did not intend the type of agency determination in question to have "the force of law."[176] How the court is supposed to determine whether a particular agency decision should have the force of law is the subject of some confusion and considerable dispute.[177] The most important factor in establishing whether an agency action has the force of law, according to *Mead* and *Christensen*, is whether the agency decision was made pursuant to notice-and-comment rulemaking or formal adjudication.[178] But, those cases note, such formal procedures are not a necessary condition for *Chevron* deference.[179]

Nor should such formal procedures always be sufficient. Even though the RMRR exemption is being promulgated according to notice-and-comment rulemaking, with all the attendant safeguards, the RMRR rule involves derogation from the literal meaning of the language used by Congress. It may be sensible to infer an implicit congressional delegation of interpretive authority to an agency, subject only to reasonability review, when Congress has been silent or unclear. Although it is also sensible to infer congressional delegation to the agency of authority to create de minimis exemptions,[180] it is much less plausible to suppose that Congress would want the courts to apply to those exemptions a standard of review so deferential as to "manufacture for an agency a revisory power inconsistent with the clear intent of the relevant statute."[181] When an agency creates a de minimis exemption, it is not interpreting a statute that is silent or ambiguous—rather, the agency, as discussed above, is invoking the absurdity canon to escape an otherwise clear command. The invocation of that canon must be subject to

170. In *Ober*, the statutory question that the court had to decide was whether EPA could create a de minimis exemption in a federal implementation plan where the statute specified that implementation plans had to include provisions for implementation of "reasonably" available control technology, and also specified that plans that would not bring an area into compliance with the NAAQS by a statutory deadline had to show that such attainment would be "impracticable." *Ober*, 243 F.3d at 1194-95, 31 ELR at 20550-51 (citing 42 U.S.C. §§7513a(a)(1)(B)-(C), ELR STAT. CAA §§189(a)(1)(B)-(C)). The question in *Ober* thus involved interpretation of the open-ended phrases "reasonable" and "impracticable" to determine whether creation of the de minimis exemption was permissible. The Ninth Circuit's application of the *Chevron* standard is therefore entirely consistent with the first *Chevron* de minimis theory, but says little or nothing about the second.

171. *Chevron*, 467 U.S. at 837, 14 ELR at 20508.

172. 323 U.S. at 139.

173. 529 U.S. 576, 587 (2000).

174. 533 U.S. 215, 227-28 (2001).

175. *Skidmore*, 323 U.S. at 139. The revival of *Skidmore* in the *Christensen* and *Mead* cases is controversial. Justice Scalia, for example, characterized this revival as "an avulsive change in judicial review of federal administrative action," *Mead*, 533 U.S. at 239 (Scalia, J., dissenting) and dismissed *Skidmore* as an "anachronism." *Id.* at 250.

176. *Mead*, 533 U.S. at 226-27.

177. For representative examples of the competing scholarly perspectives on this question, see Thomas W. Merrill & Kathryn Tongue Watts, *Agency Rules With the Force of Law: The Original Convention*, 166 HARV. L. REV. 467 (2002); David J. Baron & Elena Kagan, Chevron*'s Nondelegation Doctrine*, 2001 SUP. CT. REV. 201.

178. *Chirstensen*, 529 U.S. at 587; *Mead*, 533 U.S. at 229-31.

179. *Mead*, 533 U.S. at 231.

180. *See* Ohio v. EPA, 997 F.2d 1520, 1535, 23 ELR 21157, 21164 (D.C. Cir. 1993) ("[T]he literal meaning of a statute need not be followed where the precise terms lead to absurd or futile results, or where failure to allow a *de minimis* exception is contrary to the primary legislative goal. . . . [To require a different result] is to adjudge Congress incompetent to fashion a rational legislative design."); *see also* Alabama Power Co. v. Costle, 636 F.2d 323, 360, 10 ELR 20001, 20011 (D.C. Cir. 1979); Environmental Defense Fund v. EPA, 82 F.3d 451, 466, 26 ELR 20968, 20975 (D.C. Cir. 1996).

181. Natural Resources Defense Council v. Costle, 568 F.2d 1369, 1377, 8 ELR 20028, 20031 (D.C. Cir. 1977).

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stricter judicial review, or else the crucial distinction between *Chevron* Step One and *Chevron* Step Two dissolves, and Congress' power to control agency action through clear statutory language erodes.

But, because the creation of a de minimis exemption involves an exercise of the agency's expertise and judgment, *Skidmore* respect is more appropriate than pure de novo review.[182] The fact that the creation or revision of the exemption is subject to notice-and-comment rulemaking, while not enough to entitle the agency to *Chevron* deference, is an additional reason to accord the determination particular weight. The notice-and-comment process gives interested parties an opportunity to attempt to demonstrate that the rule sweeps too broadly to be considered a de minimis exemption, and puts pressure on EPA to provide data and analysis to support its assertion that the rule is sufficiently tailored. As long as EPA can make that case persuasively, the court should be reluctant to second-guess the Agency's line-drawing choices. But, the heightened level of scrutiny provides a critical check on the Agency's power to scale back the scope of a broadly worded statute through the creation of categorical exemptions from the statute's reach.[183]

## Conclusion

The legal basis for EPA's proposed revisions to the rule exempting routine maintenance, repair, and replacement activities from the permitting requirements of the CAA is not clear. The exemption, and the proposed revision, might be upheld on one or the other of two legal theories. First, it may be that the creation of the exemption is a permissible exercise of the Agency's power to create "de minimis" exceptions to otherwise clear statutory commands. Alternatively, it might be argued that the exclusion of routine maintenance activities from the scope of the statute's permitting requirements is an exercise of the Agency's authority to interpret the purportedly ambiguous phrase "any physical change or change in the method of operation"—an interpretive decision which is allegedly entitled to *Chevron* deference. Earlier drafts of the proposed rule's preamble demonstrate that EPA understood these to be two distinct theories, but chose to blend them, de-emphasizing the de minimis theory as a distinct argument and instead stressing the applicability of the *Chevron* theory.

The emphasis on the *Chevron* theory at the expense of the de minimis theory is unwise and undesirable, given the strong arguments against the notion that the statutory provision at issue is sufficiently ambiguous to justify *Chevron* deference. Relying solely on a *Chevron* argument increases the risk that EPA will lose. More importantly, if EPA wins on the basis of such an argument, the decision would have the undesirable effect of eroding important checks on agency action built into current environmental and administrative law. The de minimis theory is more theoretically satisfying and avoids these substantive problems. EPA (and other agencies) should be allowed to create rule-like de minimis exemptions even to clear statutory commands, but the specific exemptions must be justified, by evidence and analysis, as sufficiently narrow and limited. EPA's showing on this score ought to be subject to intermediate *Skidmore* deference—a standard that properly balances the tension that arises, when carving out these sorts of exceptions, between the value of agency expertise and the need for congressional control.

182. Thus, although I generally agree with the *Mavo* court's analysis of the interaction between *Chevron* and the absurdity canon, *see supra* notes 117 & 165 and accompanying text, I do not accept the implication that the agency's interpretation of the proper scope of a de minimis exemption gets no special consideration whatsoever. *See also* Sunstein, *supra* note 119, at 11131 (stressing agency accountability and expertise as reasons for allowing agencies a freer hand in applying the absurdity canon to regulatory statutes than would be appropriate for courts).

183. Sunstein, *supra* note 119, at 11132, considers the possibility that "agencies will seek to exempt risks not because those risks are genuinely trivial, but because of political pressures, imposed by regulated industries with self-serving agendas," but he is optimistic that "the underlying risks are minimal" because "the usual pattern is one in which sensible regulators are attempting to counteract excessive generality or palpable unreasonableness, neither intended by Congress." I am less sanguine about the risks posed by agency capture, or by well-intentioned but mistaken deviation from a congressional command, which is why I endorse a more rigorous standard of review than Sunstein implies. Given that the de minimis exemption is only supposed to apply in cases where application of the statute would produce results that are patently absurd, *Skidmore* ought to be an effective filter. If the proposed exemption really does involve avoidance of an absurd result, making the requisite showing to convince a court of the propriety of the exemption ought to be relatively painless for the agency. At the same time, *Skidmore* is more likely than *Chevron* to deter agencies from pushing the boundaries or trying to stretch the exemption beyond its intended purpose. Whether I am correct in this assessment is obviously an empirical question that is difficult to assess ex ante.

*[Author's Note: On August 27, 2003, as this Article was about to go to press, EPA issued a final rule on its modifications to the RMRR exemption.* See *http://www.epa.gov/nsr/ERP_merged_8-27bh.pdf. EPA took no action on its proposal to create an annual maintenance allowance, but left open the possibility that the agency might take some action on that proposal at a future date. EPA did, however, adopt a version of the equipment replacement approach, under which such replacement is automatically considered to be RMRR, and therefore exempt from NSR and PSD permitting requirements, so long as: (1) the replacement components are identical to, or functionally equivalent to, the components being replaced; (2) the cost of the equipment replacement is less than 20% of the value of the process unit of which the replacement component is a part; (3) the replacement does not alter the process unit's "basic design parameters"; and (4) the process unit continues to meet other enforceable emission and operations limitations.*

*The most important feature of the preamble to the August 27 final rule, as it relates to the arguments advanced in this Article, is the extensive "legal basis" section. In place of the two relatively opaque paragraphs that appeared in the December 2002, preamble to the proposed rule, the preamble to the final rule contains a lengthy discussion and analysis that explicitly grounds the creation and modification of the RMRR exception in EPA's power to interpret the allegedly ambiguous phrase "physical change or change in the method of operation." The preamble expressly relies on this* Chevron *theory, quoting extensively from the* Chevron *opinion, elaborating the policy rationales for allowing agencies to define (and redefine) ambiguous statutory terms, and purporting to demonstrate that "change" as used in the CAA is sufficiently ambiguous that* Chevron *deference ought to apply to EPA's construction. Moreover, the preamble to the final rule expressly rejects the de minimis theory as the basis for the RMRR exemption, in spite of the position EPA admits it had taken in prior litigation and enforcement actions.*

*Thus, EPA has come down conclusively on the side of a* Chevron *theory and against a de minimis theory. It is conceivable, of course, that specific features of EPA's final rule—which adopted a relatively constrained version of the equipment replacement approach—make the* Chevron *argument more plausible than would have been the case if EPA endorsed the annual maintenance allowance or a broader version of the equipment replacement approach. Indeed, the August 27 preamble appeared to acknowledge that EPA imposed the requirement that the equipment replacement not alter the "basic design parameters" of the process unit precisely because any activity that did change basic design parameters would necessarily be a "change" under the CAA. However, the rejection of the de minimis theory in favor of the* Chevron *theory remains problematic, for all the reasons discussed in this Article. The RMRR exemption, for better or worse, involves derogation from broad statutory language that cannot, despite EPA's protestations, fairly be characterized as ambiguous. The de minimis theory is an adequate and sensible basis for allowing EPA to exempt truly minor repair and replacement activities, while at the same time preserving adequate constraints on agency discretion by subjecting the creation of the exemption to more searching judicial review.]*

## Routine Maintenance, Repair, Replacement Exclusion

- Clean Air Act Section 111 definition:
- The term “modification” means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted

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## Routine Maintenance, Repair, Replacement Exclusion

- The legal foundations (or theories) for RMRR
  - De-minimis theory – Certain activities are too insignificant to address
  - “Chevron” doctrine - Agency discretion since the phrase “any physical or operational change” is ambiguous
- Under the “de-minimis” theory, RMRR activities are, in fact, physical or operation changes – but clearly insignificant since “congress did not intend that trivial or routine activities would trigger NSR?”
- Under the Chevron doctrine, RMRR activities are NOT physical or operation changes. (The agency makes the case that the CAA definition “any physical change in or change in the method of operation of” is ambiguous.) Thus, EPA can exclude these activities
- It appears the EPA has never made a clear distinction between this two distinct theories when asserting its authority to write the RMRR exclusion into the rule

**Note: The Supreme Court overruled the Chevron doctrine in *Loper Bright Enterprises v. Raimondo* in June 2024, shifting power back to courts to decide legal questions independently.**

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## Routine Maintenance, Repair, Replacement Exclusion – Five Factor Test

- Does project qualify for routine maintenance, repair, replacement exemption?
  - Assess nature, extent, purpose, frequency, and cost of project

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## RMRR - Nature

- Will the activity/project add new tangible assets or leave existing tangible assets in better condition than new?
  - In contrast to an activity to prevent failure or maintain equipment in good working order
- Does the activity/project require extensive pre-planning (multiple years) and/or authorization from the [Capital Projects] department or Board of Directors?
- Does the activity or project require approval from another regulating agency?
- Will the activity or project require use of materials/equipment, or other resources that are not typically stored onsite or otherwise readily available?
- Is the activity or project designed to restore equipment that has been shut down?
  - Could the shutdown have been inferred by regulatory agencies as permanent?
  - Has the subject equipment been excluded from the State's emissions inventory)?
  - Have the permits for the equipment subject to this activity/project been surrendered/cancelled?

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## RMRR - Extent

- Does this activity/project involve the replacement of the entire emissions unit or a significant piece of mechanical equipment?
- Does this activity/project involve the replacement of major components or involve the replacement of a significant number of minor components?
- Are the components to be maintained, repaired or replaced of considerable size, function or importance relative to the operation of the equipment?
- Could the collection of all activities performed, (as a whole) to the equipment be considered non-routine
  - Is it common to perform all activities at the same time?
- Would the project/activity be considered the functional replacement of a piece of equipment or emissions unit?
- Will the time duration of the activity exceed the time duration of a *typical* maintenance time frame for a routine/planned or forced maintenance activity?
- Could the activity/project be interpreted as anything other than a regularly scheduled equipment outage to maintain the equipment in good operating condition?

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## RMRR - Purpose

- Does the project cause a change in the method of operation of the equipment or unit?
- For example: a change in operating conditions or provide a product/service that the equipment/unit was not previously capable of providing.
- Does the project allow a change in fuels or feedstocks that the unit/plant was previously incapable of accommodating?
- Will the project increase the operating hours (per year - reduce downtime) or throughput of the equipment or plant as a whole?
- Will the project reduce “wear and tear”(corrosion/erosion) or increase the duration between planned/scheduled maintenance activities?
- Does the project allow for the installation of enhanced or redesigned or upgraded equipment?
  - Rather than "like-kind" equipment replacements
- Will the project extend the useful life of the equipment/unit beyond its normally expected lifetime?
- Will the project increase efficiency, increase capacity, or restore lost capacity of the equipment/unit?

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## RMRR - Frequency

- Has the activity been characterized as "non-routine" in any internal documentation, proposals, RFPs, or vendor literature?
- Is the activity performed on an infrequent basis for this type of equipment/unit at this facility?
  - How often is this project/activity performed on this piece of equipment/unit during its lifetime?
- Is the activity performed on an infrequent basis for this type of equipment/unit on an industry-wide basis?
  - How often is this project/activity performed on this type of unit as an industry standard?
- Could the project/activity be considered "highly unusual" for the equipment/unit or plant?
  - A project of this type has never been done or is not typical for the equipment/unit.

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## RMRR - Cost

- Replacement value of the equipment or process unit based on any of the following:
  - An estimate of the fixed capital cost of constructing a new process unit, or
  - The current appraised value of the process unit, or
  - The insurance value (where the insurance value covers only complete replacement), or
  - The investment value adjusted for inflation, or
  - Another accounting procedure if such procedure is based on Generally Accepted Accounting Principles and acceptable to the reviewing authority.

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## RMRR - Cost

- Will the cost of the activity/project exceed the typical annual maintenance budget for the equipment/unit?
- Will the activity/project involve a significant capital cost (both in absolute terms and relative to the cost of a new piece of equipment/unit)?
- Will funding for the activity/project consume a large portion of, or exceed the Operation and Maintenance Department's annual budget?
- Will funding for the activity/project originate primarily from the Capital Projects budget?
  - Rather than the Operation and Maintenance budget.

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## Routine Maintenance, Repair, Replacement Exclusion

- Situations that probably DO NOT qualify for exemption
  - Adding new equipment
  - Changing process design or control technologies
  - Life extension projects
  - Changes that affect capacity
  - Changes that enable production of alternate product
  - Relatively high cost projects
  - Changes that have never been performed previously

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## RMRR Exclusion - Unfavorable Attributes

- Based on the various court decisions, EPA rulemakings and general EPA guidance, actions that tend to NOT favor the use of the RMRR exclusion are:
  1. Use of capital funds rather than funds from maintenance accounts;
  2. A purpose to increase the efficiency or extend the life of a unit nearing the end of its life expectancy, upgrading or modifying equipment to be replaced;
  3. Projects that require extended shut down periods,
  4. Using parts that are not stored on the site;
  5. Engaging independent contractors to perform work or design equipment;
  6. Extensive planning;
  7. Costs that exceed maintenance budgets,
  8. Expenditures that require the approval of corporate officers;
  9. Projects scheduled independent of routine maintenance projects, and
  10. Large physical size of units replaced.

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## RMRR Exclusion - Favorable Attributes

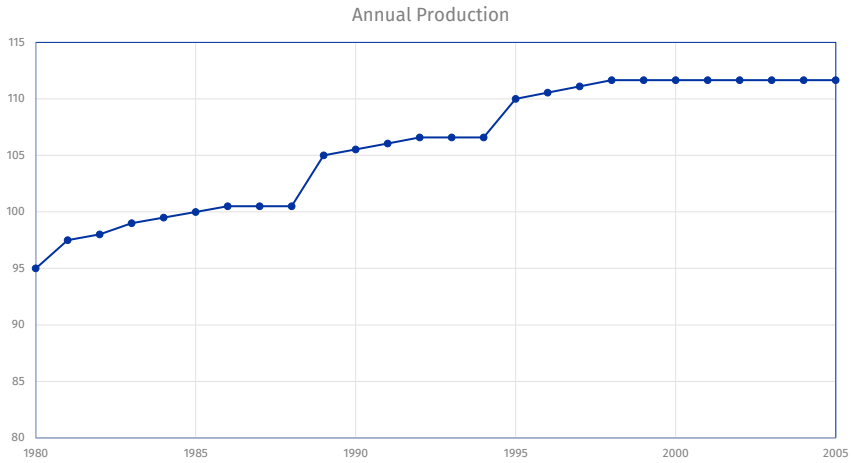
- Likewise, based on the various court decisions, EPA rulemakings and general EPA guidance, actions that tend to favor the use of the RMRR exclusion are:
  1. The purpose of the project is to correct unexpected outages,
  2. The project does not increase the capacity of the units,
  3. The project is repetitious, commonplace, performed according to established procedure;
  4. The project is frequent, inexpensive, necessary, regular, customary, and takes place over a short term period;
  5. Projects performed by in-house personnel;
  6. Projects performed during regular maintenance periods;
  7. Expenditures that require the approval of plant managers, and not corporate officers and
  8. Projects funded from maintenance accounts.

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# Annual Production




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# Selected Historical Interpretations of RMRR

- August 18, 1975. Weyerhaeuser – Request for Ruling - Springfield OR
- November 6, 1987. EPA Region IX “Howekamp letter” - Cypress Casa Grande Evaluation (Handout 2-CC)
- Various (including WEPCO) - Handouts 2-D, 2-V, 2-V1, and 2-V2
- January 1999. EPA Enforcement Alert Newsletter (Handout 2-F)
- April 1,1999 EPA Region II letter to NJ - Turbine maintenance (Handout 2-R)
- September 15, 2000. Tennessee Valley Authority – Final Order on Reconsideration – EAB (Handout 2-WW)
- May 23, 2000. EPA Region 5 “Lyons letter” - Detroit Edison Evaluation (Handout 2-G)
- September 13, 2000. EPA Region 4 “Neeley Letter” – PCA Evaluation (Handout 2-H)
- September 14, 2001. EPA Region4 letter to Barry R. Stephens, P.E. Tennessee Department of Environment and Conservation regarding PCA mill in Counce, Tennessee (Handout 2-NN)
- January 2002. New Source Review: An Analysis of the Consistency of Enforcement Actions with the Clean Air Act and Implementing Regulations - DOJ Interpretation (Appendix A2)
- August 6, 2002 – EPA Region 5 letter to Marathon Ashland Petroleum (Handout 2-OO)
- February 12, 2004. EPA Region 6 letter to Mr. Dawson Lasseter, P.E., CPG Oklahoma Department of Environmental Quality pertaining to a FCCU reactor cyclone system (Handout 2-MM)

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## Historical Court Cases Focusing on RMRR

- Wisconsin Electric Power Co. v. Reilly (7th Circuit Court of Appeals, January 19, 1990) – See Handout 2-V1
- U.S. v. Southern Indiana Gas and Elec. Co. (S.D. Ind. 2003)
- U.S. v. Ohio Edison Co. (S.D. Ohio 2003)
- U.S. v. Alabama Power Co. (N.D. Ala. 2005)
- New York v. American Electric Power Service Corp. (S.D. Ohio Feb. 15, 2007)
- Sierra Club v. Michael Morgan, Jay Ehrfurth, John Wiley and Kevin Reilly (W.D. Wisconsin November 7, 2007) – See Handout 2-P
- U.S. v. East Kentucky Power Cooperative, Inc. (E.D. Ky. Mar. 29, 2007)
- U.S. v. Cinergy Corp. (S.D. Ind. June 18, 2007)
- U.S. et al. v. Louisiana Generating (M.D. La., September 19, 2012) – See Handout 2-X
- Commonwealth of Pennsylvania Department of Environmental Protection v. Allegheny Energy, Inc. (W.D. Pa. February 6, 2014) – See Handout 2-Y
- U.S. et al. v. Duke Energy (M.D. NC., March 17, 2014) – See Handout 2-Z
- U.S. v. Ameren MISSOURI (E.D. Missouri, January 21, 2016) – See Handout 2-AA1
- U.S. v. AMEREN MISSOURI (E.D. Missouri, January 23, 2017) – See Handout 2-AA2

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## Weyerhaeuser - Springfield, Oregon (1975)

- EPA Region X (Region 10) NSPS RMRR Assessment
- Installation of pressure parts at a pulp mill boiler
- Not “routine maintenance” because the parts would increase the superheater surface
  - “EPA Region X determined that the upgrade of boilers at a pulp mill was non-routine under NSPS, in that it called for the addition of additional pressure parts previously not included in the boilers to increase the superheater surface of the boilers, even though the additional parts were contemplated under the original boiler design.”

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## Cyprus Casa Grande Corporation (1987)

- Copper processing facility that had been shut-down for about a decade (since 1977)
- New owner claimed the plant had been continuously maintained during the shutdown period
- An engineering report indicated work needed to re-start would cost about $900,000 – including "replacing of the thickener tanks in the roaster plant's Counter Current Decantation (CCD) circuit and repairing the "significantly" damaged foundation for the CCD thickener foundation"
- EPA Region IX noted that the group of otherwise "minor" or "moderate" work "if performed regularly as part of standard maintenance.....could be considered routine"
- But, when viewed "as a whole", the extent and nature could NOT be considered routine
- "The agency also noted that certain activities, although they would be routine "if performed regularly as part of standard maintenance procedure while the plant was functioning or in full working order," were being performed as part of an extensive rehabilitation project and, thus, were properly considered non-routine."
- See Handout 2-CC

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## WEPCO (1988)

- Restoring five individual units to original capacity to extend useful live
- Sought exclusion under RMRR
- EPA assessed "nature, extent, purpose, frequency, and cost of the work, as well as other findings to arrive at a common-sense finding"
- EPA ruled NOT routine based on
- Replacement of numerous major components (rear steam drum, air heaters, major mechanical and electrical auxiliary systems) over 4-year period (nature/extent)
- Work was characterized by WEPCO as "life extension" projects (purpose)
- This type of work rarely, if ever, performed at coal-fired electric plants (frequency)
- Cost of the work was substantial (cost)

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## EPA Region 5 - Detroit Edison (2000)

- Routineness determination from EPA Region V involving a project at Detroit Edison's Monroe Power Plant
- Basically a reiteration of WEPCO
- Dense Pack project considered a non-routine physical change by EPA

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## EPA Region 5 - Detroit Edison (2000)

- Nature and Extent Considerations
  - Replacement of the entire high-pressure section of two turbines allowed for use of a new type of turbine blade and reconfigured the design to improve efficiency
  - Enabled the units to produce more electricity with the same coal usage, boiler heat input and steam flow, and allowed operation of the units with less maintenance
  - The Dense Pack upgrade provided an economic incentive to increase operations at the plant by making operation of the affected units more efficient
  - The project could not be performed during the full functioning of the plant and instead required the affected units to be shut down
  - The project involved the addition of parts not previously used
  - The project was not be completed with parts typically stored on site
  - Detroit Edison had decided to capitalize 100% of the cost of the project

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## EPA Region 5 - Detroit Edison (2000)

- Purpose considerations
  - The Dense Pack project did not maintain the equipment at the current state – it enhanced the operation of the Monroe Power plant by recovering the accumulated lost efficiency, increased the efficiency over the original design, and decreased the rate of turbine blade deterioration in the high pressure section of the steam turbines
  - Efficiency enhancement and decrease in deterioration rate substantially enhanced the operational capabilities of the affected units, by providing an economic basis for increased utilization

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## EPA Region 5 - Detroit Edison (2000)

- Frequency considerations
  - Turbine upgrades like the Dense Pack project are performed rarely, if ever, in the course of a utility source's life
  - Central question to be asked - whether it is industry practice that a **typical** facility will frequently conduct the project in question

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## EPA Region 5 - Detroit Edison (2000)

- Cost Considerations
  - Although the relative cost of the Dense Pack project ($12 million), when compared with replacing the entire electric generating facility, was small, it was orders of magnitude larger than other blade maintenance activity Detroit Edison has conducted in the past
  - The company spent only $18,700, $33,100, and $7,900 to replace high-pressure rotors in three projects in 1981 and 1982.
  - The project was significantly more costly than simply replacing deteriorated blades (Detroit Edison acknowledged that the Dense Pack upgrade cost three times more than its alternative blade repair and replacement project – using older technology)

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## January 1999 EPA Enforcement Alert Newsletter

- Enforcing NSR/PSD a top priority for 1999
- "Routine maintenance" exemption meant for
  - "Frequent, traditional and comparatively inexpensive repairs to maintain existing equipment"

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## EPA Region 4 - PCA (2000)

- At issue was a proposed project involving a recovery furnace at a pulp and paper mill
- Letter identified the "maintenance, repair and replacement" actions scheduled for the unit
  - "In terms of nature, extent and frequency, our understanding is that the entire lower furnace wall water tube section, floor tube section, upper furnace wall tube section, and roof tube section in No. 1 Recovery Furnace have never been replaced simultaneously during a single maintenance project throughout the 48-year history of the furnace."
  - "We further understand that the upper furnace wall tube section and roof tube section in No. 1 Recovery Furnace have never been replaced previously."
- EPA Region 4 ruled actions did not qualify for PSD exclusion - cited WEPCO criteria

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## August 6, 2002 – EPA Region 5 letter to Marathon Ashland Petroleum (Handout 2-OO)

- EPA has determined that the FCCU air grid replacement project is not routine, and therefore this exemption does not apply. The WEPCO determination defines a routine maintenance, repair, and replacement project as one that is "a regular, customary or standard undertaking for the purposes of maintaining the plant in its present condition."
- In the March 15, 2002, letter MAP indicates that the current air grid has been in operation for nearly 30 years. Clearly, a project conducted once every 30 years is far from a regular, customary or standard undertaking.
- In addition, the May 18, 2002, letter highlights a number of major differences between the new proposed air grid and the existing air grid, including a significant decrease in the jet density and a higher pressure drop.
- It is apparent from these differences that the purpose of this project is not to maintain the plant in its present condition, but to change it from its present condition.

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## Sierra Club v. Michael Morgan, et. al. (2007)

- A case-by-case analysis of five projects undertaken at the Charter Street Heating Plant located at the University of Wisconsin (Madison) – Handout 2-P
- Non-routine maintenance included projects costing as little as $77,000
  - "Project 2 cost $77,000.00 and it was paid from a spending authorization and not from the CSHP's annual maintenance and operating budget. Although it cost less than Project 1, Project 2 was treated as a capital expenditure under GAAP. Accordingly, the capitalizing of the cost and how it was paid for weigh against Project 2 having been RMRR."

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## US vs. Louisiana Generating (2012)

- September 19, 2012 – US District Court, Middle District of Louisiana. See Handout 2-X.
- In 1998, Cajun Electric began replacing two primary reheaters on units 1 and 2. Stated purpose was to "significantly reduce the number of forced outages" caused by reheater tube failures.
- Court addressed all 5 WEPCo RMRR factors
- Cost was $4.5M for each reheater. At the time these were the most costly projects Cajun had ever undertaken on these two units.
- Summary Judgment on RMRR – Ruling in favor of US (EPA)

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## PA vs. Allegany Energy (2014)

- The Western District of PA found projects at three Allegheny Energy facilities met the RMRR exclusion. See Handout 2-Y.
- Allegheny analyzed the five "WEPCo" RMRR factors and presented results at trial.
  - Nature/Extent
    - "The replacement of waterwall tubes was performed regularly by operators in the electric utility industry and was performed regularly at the Allegheny plants at issue in this case."
    - "It is typical in the industry for utility companies to replace worn components with ones of upgraded material or design."
    - "Based upon FERC accounting requirements, it is typical throughout the utility industry to capitalize boiler component replacements."

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## PA vs. Allegany Energy (2014)

- Purpose
  - "The primary purpose of each of the projects was to improve the reliability and availability of the generating units."
  - "An additional purpose of the Hatfield Unit 1 secondary superheater outlet header project was to ensure employee safety."
- Frequency
  - Allegheny identified thousands of pressure part replacement projects that cost more than $100,000 at coal-fired power stations in the United States based upon the business records of utility companies and OEM suppliers, and concluded that the projects were typical of the kind performed frequently in the industry.

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## PA vs. Allegany Energy (2014)

- Cost
  - The projects at issue ranged from $626,402 for the 1994 Mitchell Unit 3 lower slope project to $6,387,013 for the 1996 Hatfield Unit 3 lower slope project.
  - The projects cost $2.50 to $12 per kilowatt, well below the normal low-end cost of $100 per kilowatt for utility life extension projects.
  - For comparison, the WEPCo Port Washington project, which the EPA found was "unprecedented" and not RMRR, cost $70,500,000, or $204 per kilowatt.

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## US EPA v. Ameren (2016/2017)

- Ameren operates boilers at its baseload utility plant in Rush Island, MO.
- Memorandum and Order (2/24/2016) and Memorandum Opinion and Order (1/23/17)
  - Ameren allegedly undertook major modifications at their Rush Island Plant without obtaining the requisite permits.
  - In 2015/2016, the court considered nine separate motions for partial summary judgment – most were denied. A trial followed in the US District Court Eastern District of Missouri. The issues were decided in January, 2017.
  - Two projects are at issue with EPA. Units 1 and 2 of the Rush Island Plant are coal-fired electric generating units that operate nearly continuously when available.
    - EPA alleges that Ameren performed major modifications on Unit 1 from approximately February 2007 to May 2007 ("2007 Project") when it replaced the Unit's economizer, reheater, lower slope tubes, and air preheater.
    - EPA also alleges that Ameren performed major modifications on Unit 2 from approximately January 2010 to April 2010 ("2010 Project") when it replaced the Unit's economizer, reheater, and air preheater.

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## US EPA v. Ameren (2016/2017)

- EPA alleges, for each project, that Ameren violated the PSD requirements in the CAA and the Missouri SIP because it:
  - (1) did not obtain a PSD permit for construction and operation of the modified unit;
  - (2) did not undergo a BACT determination;
  - (3) did not install BACT for control of $SO_2$ emissions;
  - (4) failed to operate BACT for control of $SO_2$ emissions;
  - (5) failed to operate in compliance with BACT emissions limitations;
  - (6) operated the units after undergoing an unpermitted major modification.
- EPA also alleges that Ameren violated Title V of the CAA because Ameren failed to submit an accurate and complete Title V permit application and by commencing major modifications at Units 1 and 2 without obtaining a PSD permit.

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## US EPA v. Ameren (2016/2017)

- The RMRR related motions present overlapping questions of law on three topics:
  - (1) What is the legal standard for determining whether work qualifies under the RMRR exemption?,
  - (2) Which party bears the burden of proof?,
  - (3) Should the challenged component replacements be considered part of one “project” for purposes of determining whether a project is RMRR, or must each replaced component be analyzed independently?

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## US EPA v. Ameren (2016/2017)

- Legal standard for RMRR
  - "I hold that the RMRR exemption is a narrow one and is generally limited to de *minimis* circumstances."
- Judge cites the 5 WEPCO factors
- Judge addressed the frequency/routineness question
  - "A three-part frequency analysis provides that the Court will consider all of the *WEPCO* factors, including frequency, taking into consideration
    - the work conducted at the particular unit,
    - the work conducted by others in the industry, and
    - the work conducted at other individual units within the industry."
  - "…I am persuaded that this three-part inquiry is consistent with *WEPCO* and the PSD requirements, I will adopt this as part of the standard."

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## US EPA v. Ameren (2016/2017)

- In evaluating frequency, the most relevant inquiry is how often similar projects have been undertaken **at particular units in the industry**, not how many similar projects have been implemented industry wide.
- "Based on the evidence presented at trial, I conclude that the projects cannot be considered routine maintenance under the law."
  - The Rush Island boiler refurbishments at issue were the most expensive boiler projects ever performed on an Ameren boiler.
  - They involved the redesign and replacement of major boiler components that were intended to improve the performance of the units and enable them to burn coal (type of coal) they were not originally intended to burn.
  - They were the first such replacements in the history of each unit, ***are rarely done at any unit in the industry, and the combination of boiler replacements has rarely, if ever, been done in the industry.***
- Under the appropriate legal standards, ***every factor of the routine maintenance test weighs heavily against classifying the work as routine maintenance, repair, and replacement."***

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# US EPA v. Ameren (2016/2017)

- Which party bears the burden of proof?
  - "…while EPA must demonstrate that it is entitled to summary judgment to prevail in its motion, Ameren ultimately bears the burden of proving that the RMRR applies to the projects at issue."
- Should the challenged component replacements be considered part of one "project" for purposes of determining whether a project is RMRR, or must each replaced component be analyzed independently?
  - "Most persuasive to me is EPA's interpretation of the exclusion, which, based on the determination letters EPA cites, indicates that EPA has consistently interpreted the RMRR exclusion as requiring review based on the "principle that a non-routine collection of activities, considered 'as a whole,' is not exempt under routine exclusion, even if individual activities could be characterized as routine.""
- In this case, the judge noted in 2017 for each project:
  - The work was planned together
  - The work was budgeted together
  - The work was performed at the same time
  - The work was undertaken for the same purpose
- In the opinion the judge details his use of the WEPCO five factors to assess the RMRR applicability for the two projects (see pages 160 to 163 in the 2017 opinion – Handout 2-AA2)
  - www.lawandenvironment.com/wp-content/uploads/sites/5/2017/01/US-v.-Ameren.pdf

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# Routine Maintenance, Repair, Replacement Exclusion

- Clearly the RMRR exclusion is in need of regulatory "repair"
  - Some reform options include:
  - Formalize a list of RMRR default activities (possibly by industry or process unit/type) – using the "de-minimis" legal basis
  - Reassess the "equipment replacement provision" (2003) to somehow make it legally defensible
  - Allow all projects that improve worker safety and will not cause any existing regulatory limits to be exceeded
  - Clarify the 5 RMRR factors to allow more "common sense" to prevail:
    - Allow all activities that are found during routine inspection that will not impact emissions or will actually lower emissions (per unit of production and/or on a absolute basis)
    - Allow all activities that are performed during the start-up phase for new processes/units (such that no existing permit conditions or other regulatory limits are violated) – allows for optimization "tweaks"
    - Allow all activities that increase efficiency or reduce fuel use (with appropriate caveats concerning possible emissions increases)
    - Allow all activities during the "early" life of a unit which do not increase the capacity of the unit and will not cause a permit limitation to be excessed anywhere at the site.
  - Refer to Summary: Interpreting "Routine Maintenance, Repair, and Replacement"

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# Interpreting "Routine Maintenance, Repair, and Replacement"

In the past, the U.S. Environmental Protection Agency (EPA) has communicated that it perceives widespread non-compliance with the Clean Air Act, and that it intends to aggressively pursue enforcement remedies. In a November 1999 landmark legal action against the utility industry, EPA and the Department of Justice alleged that 32 facilities, operated by seven utility companies and the Tennessee Valley Authority, made operational modifications that should have been subject to the New Source Review (NSR) Prevention of Significant Deterioration (PSD) regulations and the application of best available air pollution control technology. Industry's position is that, as a whole, the changes fit within the definition of routine maintenance, repair, and replacement, as interpreted by EPA over the last 20 years, and are thus exempt from permitting requirements. While the wheels of justice grind along toward resolution of the utility lawsuits, industrial facilities will continue to make similar operational changes that could be subject to scrutiny. Although it is premature to provide clear guidance on future EPA interpretations, it is worthwhile to review the basic issues.

The PSD regulations (40 CFR 52.21), initially promulgated on December 5, 1974, were designed to protect degradation of air quality in "clean air" areas. Facilities that are subject to the PSD provisions are required to: 1) demonstrate that the facility does not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) or consume more than the available air quality increment, and 2) ensure application of Best Available Control Technology (BACT). In addition to new sources, the regulation applies to existing facilities making a major modification. In August 7, 1980 amendments to the PSD regulations, a major modification was defined as "…any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act." Certain changes were explicitly exempted from being classified as a modification, namely routine maintenance, repair, and replacement; the use of alternative fuels under several scenarios; increased hours or rate of operation; and a change in ownership. Then came WEPCO.

## The WEPCO Ruling

During the mid-1980s, Wisconsin Electric Power Company (WEPCO) proposed renovations to its Port Washington power plant. The changes were designed to restore five individual units to original capacity and to extend their useful lives. WEPCO sought to be exempted from NSR and New Source Performance Standards (NSPS), claiming that the proposed changes qualified as routine maintenance, repair, and replacement. In a memo from Don R. Clay, Acting Assistant for EPA's Office of Air and Radiation, to David A. Kee, Director of Air and Radiation for Region V, Mr. Clay advised that the proposed renovations would probably not qualify for PSD and NSPS exclusions for routine maintenance, repair, and replacement, nor for the exclusions for increases in production rate or hours of operation.

In determining whether the changes constituted a modification, EPA considered two basic questions. Would the renovation constitute a "physical change in or change in the method of

operation of a major stationary source?" And, if so, would the change result in a significant net emissions increase of any pollutant subject to regulation under the Act?" In determining whether the project constituted a "physical change" and would qualify for the routine maintenance, repair, and replacement exclusion, EPA assessed the "nature, extent, purpose, frequency, and cost of the work, as well as other findings to arrive at a common-sense finding." In supporting its finding that the renovation was not routine, EPA cited these factors:

1. Replacement of numerous major components including the rear steam drums on the boilers, air heaters, and major mechanical and electrical auxiliary systems, that would take place over a four-year period

2. Characterization of the renovation as a life extension project, despite WEPCO's assertion that the steam drum replacement represented "routine correction of equipment problems"

3. The type of work called for in the proposed project is rarely, if ever, performed at coal-fired electric generating facilities

4. The cost of the work was substantial, representing approximately 15 percent of facility replacement cost

With respect to NSPS applicability (40 CFR Part 60, Subpart Da which applies to electric utility steam generating units), EPA examined similar issues.

In an October 14, 1988 follow-up letter from EPA's Lee M. Thomas to John Boston, WEPCO Vice President, Mr. Thomas made the final determination that, based on additional information provided by WEPCO, the PSD and NSPS provisions would apply to the proposed renovation. In revisiting the question of routineness, Mr. Thomas stated that in addition to the infrequency and costliness of the project, it would also "significantly enhance their present efficiency and capacity, and substantially extend their useful economic life." He also rejected WEPCO's argument that EPA's findings were inconsistent with prior similar cases, claiming that none of the cases cited by WEPCO were sufficiently similar to support a nonapplicability determination.

On Feb. 15, 1989, in a revised final determination letter to WEPCO, Mr. Clay addressed several issues raised by WEPCO since the October 14 letter. With respect to the issue of "routineness," EPA rejected WEPCO's arguments regarding alternative methods of analyzing whether capital expenditures were involved, relative to NSPS applicability. He also clarified that, for purposes of NSPS and PSD applicability, it would not be appropriate to separate the replacement of the heat transfer surface elements on an air heater from the life extension project, despite the routine nature of such a replacement. The only revisions to the applicability determination were to exempt two of the units from NSPS applicability based on capacity tests that indicated they would not perform beyond original design capacity.

Subsequently, WEPCO filed suit against EPA, contesting the applicability determinations (Wisconsin Electric Power Co. v. Reilly, 893 F.2d 901). The U.S. Court of Appeals for the Seventh

Circuit upheld all of EPA's findings except the method for comparing past to future emissions levels. As a result, EPA adopted an "actual" to "representative actual" emissions analysis methodology for modifications at utilities and included it in a July 21, 1992 rule (57 FR 32314).

The rule also modified the methodology for calculating the pre-change baseline emission rate for NSPS, provided a broad exclusion to electric utilities from NSR for pollution control projects, and modified regulations to accommodate provisions in the 1990 Clean Air Act Amendments (CAAA) pertaining to clean coal technology and repowering projects, and to "very clean" units.

## Related Guidance

In its essence, routine maintenance, repair, and replacement inherently refers to the regularly scheduled changes made to existing emissions units or other equipment and to the replacement of parts. Although WEPCO remains the leading case regarding the criteria for routine maintenance, repair, and replacement, there have been several other EPA rulings and legal cases that offer insight into the types of changes EPA considers routine.

### *Weyerhaeuser, Springfield, OR*

In August 1975, Weyerhaeuser requested a PSD and NSPS applicability determination regarding the installation of pressure parts in boilers at a pulp mill in Springfield, Oregon. Based on its analysis, EPA responded that these changes did not qualify as routine maintenance because the additional parts would increase the superheater surface of each boiler.

### *July 7, 1986 EPA Memorandum*

In a July 7, 1986 memo, Gerald A. Emison, EPA's Director of the Office of Air Quality Planning and Standards, addressed PSD applicability with respect to the replacement of wet scrubbers with baghouses. The issue in question was whether an exemption under NSPS automatically translated to a PSD exemption. Mr. Emison concluded that it did not and also rejected the owner's argument that the change constituted routine maintenance, repair, and replacement.

### *Cyprus Casa Grande Corporation, Casa Grande, AZ*

In 1987, Cyprus Casa Grande Corp. wanted to make an existing copper processing facility operational by undertaking rehabilitation work. According to EPA's analysis, certain aspects of the work were "minor," "moderate," and "if performed regularly as part of standard maintenance procedures while the plant was in function or in full working order, could be considered routine." However, when viewed "as a whole," the extent and nature of the work could not be considered routine.

### *Masonite Corporation, Ukiah, CA*

In 1992, Masonite Corporation added equipment to its Ukiah, California wood products facility that enabled it to add a new product line. Masonite argued that the emissions from the new equipment were below the PSD significance levels and that simultaneous changes to existing equipment were routine replacement and therefore exempt from consideration in the emissions change calculations. In a memo from John S. Seitz, Director of EPA's Office of Air Quality Planning and Standards, to David Howekamp, Director Air and Toxics, EPA Region IX, EPA rejected Masonite Corporation's claim, stating that because the facility was able to produce a

new product while still producing the previous product, the changes to the existing equipment could not be considered routine.

***Public Service Company of Colorado, Hayden, CO***

In 1995, the Sierra Club filed suit against Public Service Company (PSC) of Colorado and the other owners of a fossil fuel-fired electric generating facility near Hayden, Colorado. (This case is perhaps best known as a test of the admissibility of CEM data collected by the defendant as "credible evidence" to prove CAA violations related to opacity.) One of the allegations was that PSC made an unpermitted modification by operating with a half-functional electrostatic precipitator (ESP) for approximately 19 days. The court ruled that because the ESP was immediately removed upon discovery of the malfunction, sent for repair and replaced, returning the unit to previous conditions, the change did not constitute a "physical change" and could be considered routine replacement. Although not specifically cited by the court, this finding was consistent with the "nature, extent, purpose, frequency, and cost of the work" criteria set forth by WEPCO.

**POSSIBLE INDICATIONS OF "NON-ROUTINENESS"**

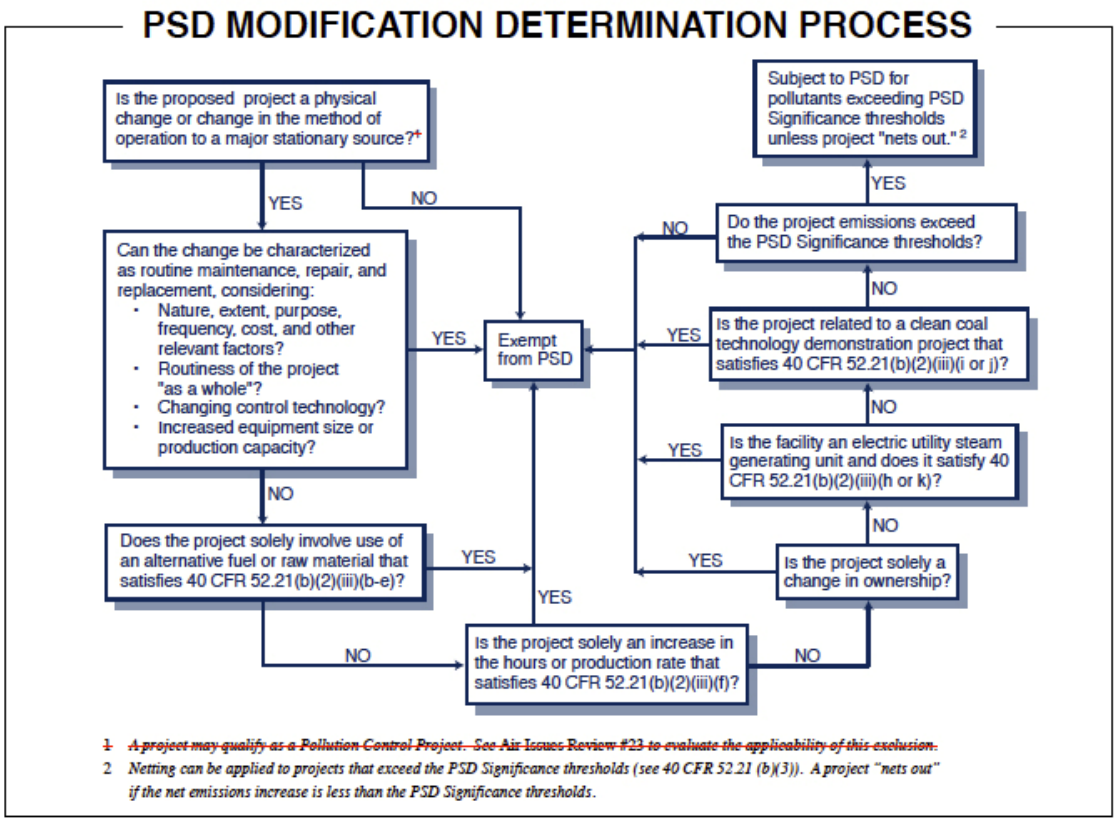
| | |
|---|---|
| • Component redesign results in increased emissions | *8/18/75 Ruling request regarding modifications at Weyerhaeuser's Springfield, OR facility* |
| • Change in control technology | *7/7/86 EPA memorandum (G.A. Emison to EPA Regional Air Directors)* |
| • Project "as a whole" is non-routine | *11/6/87 EPA letter (D. Howekamp to R. Connery, Esq.) re: Cyprus Casa Grande applicability determination* |
| • Change reduces the cost of production and increases utilization of equipment/process | *Puerto Rican Cement Co., Inc. v. US EPA, 889 F.2d 292 (1st Cir. 1989)* |
| • Replacement of major components<br>• Irregular event that extends the life of the emissions unit<br>• Project performance is time consuming<br>• Change is costly relative to total facility cost | *9/9/88 EPA memorandum (D. Clay to D. Kee) re: WEPCO applicability determination* |
| • Change enables production of an alternative product | *1992 EPA memorandum (J.S. Seitz and M.S. Alushin to D. Howekamp and N. Marvel) re: Masonite Corporation* |
| • Equipment size or capacity increase<br>• Routine change indirectly causes a consistent increase in fuel input or production capacity | *11/3/99 Electric utility lawsuits* |

## In Closing

In its January 1999 Enforcement Alert, EPA clearly indicated that it intends to make enforcement for noncompliance with NSR requirements a priority. EPA believes that noncompliance is widespread for these reasons: 1) the number of NSR permits have remained at about 200 per year compared to EPA's expectation of approximately 900 per year based on a change in the definition of "major source" and the expanding U.S. economy, 2) when individual

industry sectors are closely examined, noncompliance has occurred at a rate of 70-80 percent, and 3) other databases indicate capacity increases at existing facilities suggesting that unpermitted modifications are likely occurring. Topping the list for the types of "front-end" violations (those that lead to avoidance of NSR altogether) is the improper use of exemptions and the failure to recognize a change as a modification.

EPA has pursued legal action against the electric utility industry and several others. In today's regulatory climate, owner/operators that make operational changes must carefully examine whether claims of routine maintenance, repair and replacement are defensible.



# What is a “Significant Net Emissions Increase”

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## PSD Significant Emissions* (40 CFR 52.21(b)(23))

| Pollutant | Significant Emissions (tons/year) |
|---|---|
| Carbon monoxide | 100 |
| Nitrogen oxides (also $PM_{2.5}$) | 40 |
| Sulfur dioxide (also $PM_{2.5}$) | 40 |
| $PM_{10}$ | 15 |
| $PM_{2.5}$ (**40 tpy $SO_2$ or 40 tpy $NO_x$**) | 10 |
| VOCs | 40 |
| Lead | 0.6 |
| ***GHG ($CO_2e$ basis) | 75,000 |
| ***GHG (mass basis) | 0 |

***Only criteria pollutants and GHG presented here**

** The GHG thresholds are NOT (yet) defined at 40 CFR 52.21(b)(23). The “Subject to Regulation” thresholds apply (75,000 tpy and 0 tpy as shown above). EPA’s current proposal sets a GHG ($CO_2e$) SER value between 30,000 tpy and 75,000 tpy.

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## Basic PSD Applicability Example – Part 1

- Case:  Surface Coating Operation
- Current PTE:
  - 200 tpy VOC, 50 tpy $NO_x$
- Project:  Add a new surface coating line to the plant
  - PTE of new line:  40 tpy VOC
- Is project subject to PSD?

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## Basic PSD Applicability Example- Part 1

- What is the existing source status?
  - Is this source category on the list of 28?
  - What is the major source threshold?
- What is PSD triggering threshold in this case?

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## Basic PSD Applicability Example- Part 1 Answer

- Surface coating is not on the “List of 28” PSD source categories
- Major source threshold is 250 tpy of any regulated air pollutant
- Site is an “existing minor source”
- PSD triggered only for modifications that “are major in and of themselves” (i.e., > 250 tpy)
- Project does not trigger PSD review

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## Basic PSD Applicability Example- Part 2

- New PTE of source:
  - 240 tpy VOC, 50 tpy NOx
- Project:  Add a 3rd surface coating line to the plant
  - PTE of new line:  80 tpy VOC
- Is the project subject to PSD?

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## Basic PSD Applicability Example- Part 2

- What is the existing source status now?
- After project complete, PTE of VOC will be 320 tpy.  How does this affect applicability determination?
- What is the PSD triggering threshold in this case?

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## Basic PSD Applicability Example- Part 2 Answer

- Site still an “existing minor source”
- Fact that after project, source will be major has no bearing so long as existing synthetic minor limits are unaffected
- PSD triggered only for modifications that “are major in and of themselves” (i.e., > 250 tpy)
- Project does not trigger PSD review

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## Basic PSD Applicability Example- Part 3

- New PTE of source:
  - 320 tpy VOC, 50 tpy $NO_x$
- Project:  Add a new boiler
  - PTE of boiler:  50 tpy $NO_x$
- Is the project subject to PSD?

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## Basic PSD Applicability Example- Part 3

- What is existing source status now?
- Is the site “a major source of $NO_x$”?
- What is the PSD triggering threshold in this case?

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## Basic PSD Applicability Example- Part 3 Answer

- Site is an “existing major source”
- It does not matter what pollutant makes you a major source
- Significant Emission Rate for NOx is 40 tpy
- Project triggers need for PSD netting analysis

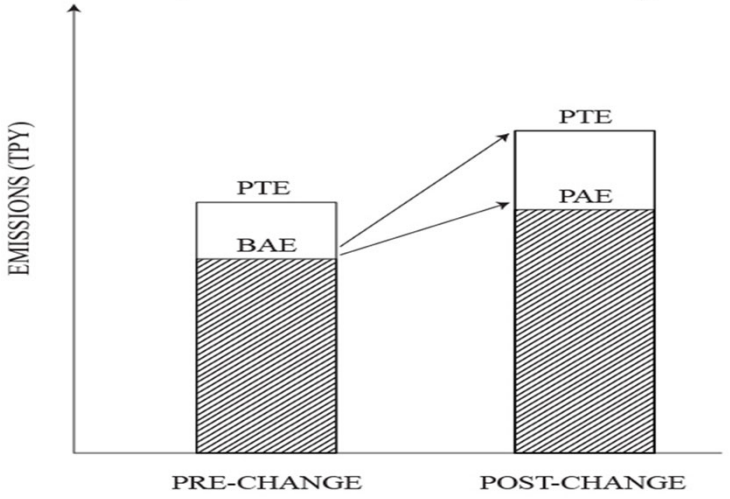
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# Methodology for Determining Emissions Increases

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## Emissions Change Calculations

Option 1: PTE - BAE = emissions change
Option 2: PAE - BAE = emissions change




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## Project Emission Increases (PEI)

- Project Emissions
  - New equipment (new emission/process units)
  - Modified emission units or changed processes
  - Other project impacted ("associated") emission units
- Does not include "Secondary" emissions
- Emissions netting discussed in next chapter

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## PSD Definitions - Secondary Emissions

- Emissions which occur as a result of the construction or operation of a source, but do not come from the source itself. For example:
  - Separately owned precipitated calcium carbonate plant supplying a paper mill expansion
  - Separately owned electric utility supplying electric power to a new facility
  - Emissions from ships or trains coming to or from the new or modified stationary source
  - 40 CFR 52.21(b)(18): "Secondary emissions do not include any emissions which come directly from a mobile source, such as emissions from the tailpipe of a motor vehicle, from a train, or from a vessel."
- Secondary emissions are NOT considered in PSD applicability assessments

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## Treatment of other project "Associated" Emissions (AKA Debottlenecking Projects)

- These emissions typically come from un-modified existing emission units (located at a major source that is undergoing a change). These emissions are expected to change as a result of construction/modification activities. For example:
  - increased emissions from an existing cement kiln associated with a raw feed mill expansion ("debottlenecking")
  - increased emissions from existing boilers associated with a new distillation column (an increase in boiler "utilization") – See Handouts 2-K and 2-L

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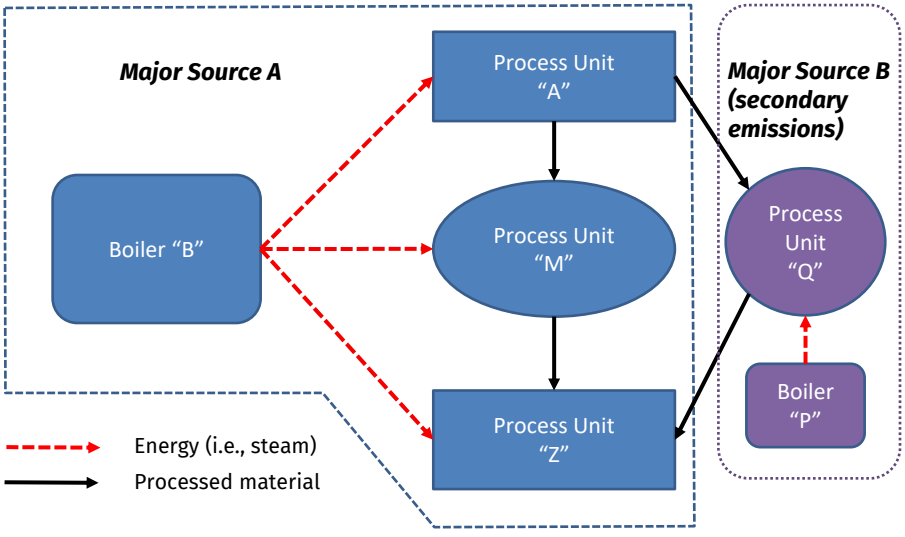
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## Projects that Debottleneck (1 of 2)

- A unit that limits the capacity of a process is termed a “bottleneck”
- Removal of a bottleneck “increases the capacity” of the source, affecting upstream and downstream units
- Increased emissions associated with the debottlenecking must be considered

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## Debottlenecking Illustration




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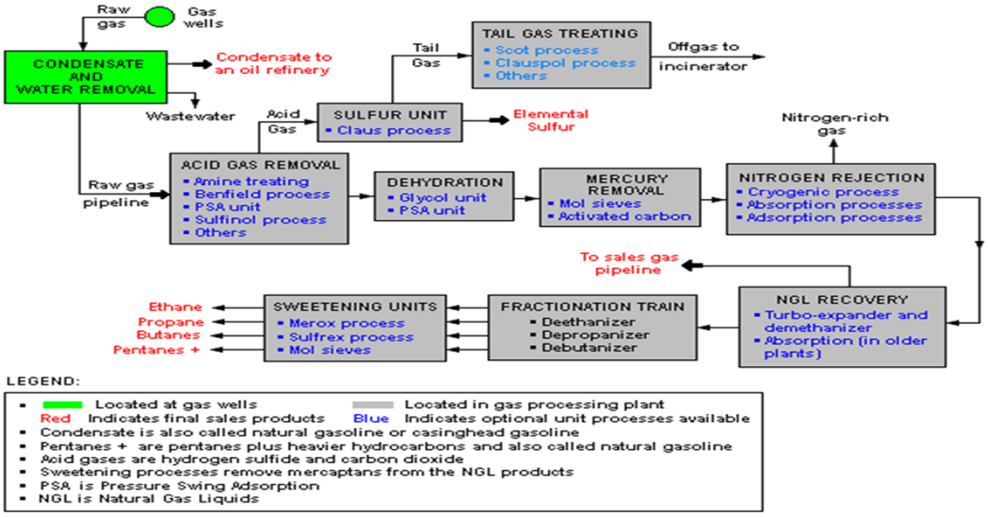
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## Projects that Debottleneck (2 of 2)

- Be careful of those projects that debottleneck a long, multi-unit process line
  - Examples:  Refineries, Pulp Mills, Cement Plants
  - These projects often have associated emissions increases, which may have been overlooked in the past

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## Natural Gas Processing Plant




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## Guidance – Affected Facility

- Although "affected facility" is not an official term used in the Major NSR rules, it is terminology that is commonly used to describe facilities that have been "debottlenecked" by a modification of a source.
- Major sources often consist of multiple pieces of equipment, both emitting (facilities) and non-emitting, that comprise integrated processes. As part of the operations of a source, various pieces of equipment at a source (both emitting and non-emitting) may provide input to or accept output from other pieces of equipment. It is possible that some pieces of equipment may constrain other pieces of equipment from operating at their full design or authorized capacity. Such constraining pieces of equipment are typically called "bottlenecks."
- When a constraining piece of equipment is changed to increase its capacity, another piece of equipment may increase its operations to provide input to the formerly constrained equipment, or to accept output from it. This is typically described as an upstream and/or downstream effect, and the EPA has historically referred to this scenario as "debottlenecking."
- The EPA defines a major modification as a modification in which a physical change or a change in the method of operation of a source results in a significant project emissions increase of a regulated NSR pollutant, and a significant net emissions increase of that pollutant. The total increase in emissions that are included in a Major NSR determination includes:
  - Increases in emissions occurring at all new or modified facilities, and
  - Any other increases at existing facilities that are not being modified, but are experiencing an emissions increase as a result of a change.
- The EPA has presumed that increases in emissions at debottlenecked units are caused by the project, or modification, and are therefore required to be included in determining Major NSR applicability for the project.

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## Special PSD Applicability Criteria – Class I Areas

- For major sources located within 10 kilometers of a Class I area, any emission rate which results in a 1 microgram per cubic meter (24-hour average) increase in modeled ambient pollutant concentrations.

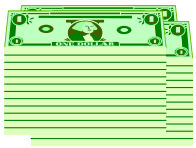
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# PSD Key Requirements (or Why You Want to Try to Avoid PSD)

- You can NOT begin construction before a permit issued! Refer to Summary: Construction Activities Prior to "Construction"
- Control Device Review (BACT)
- Air Quality Review
  - NAAQS analysis
  - PSD increment analysis
  - Air Toxics Review
- Preconstruction Monitoring Requirements
- Class I Areas
- Additional Impacts Analysis
  - Growth, Environmental Justice, etc.
  - Visibility
  - Soils, Vegetation, Animals





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# Construction Activities Prior to "Construction"

The US EPA is currently reviewing this policy. On March 25, 2020, the US EPA released a draft interpretive guidance memorandum for public comment and review. This document is currently available at:

www.epa.gov/sites/production/files/2020-03/documents/begin_actual_construction_032520_2.pdf

## Historical Approach

On December 18, 1975, EPA Assistant Administrator for Air and Waste Management, Roger Strelow, stressed that the purpose of the PSD regulations necessitated a focus on activities occurring at a facility's site.

*The purpose of the regulations to prevent significant deterioration is to ensure that a source is not located at a site which would result in emissions from that source violating the applicable increment. Thus the term "commencement of construction" as that term is used in the regulations to prevent significant deterioration, refers to on-site construction. Ordinarily therefore only significant and continuous site preparation work such as major clearing or excavation or placement, assembly, or installation of unique facilities or equipment at the site should be considered a "program of construction or modification"*[1]... (emphasis added)

Despite the stated importance of actual on-site activities, which was reiterated in his second memorandum[2], Mr. Strelow went on to discuss several situations where sources would be deemed to have commenced construction without having done any on-site work. First, he states that a source should be considered as having commenced construction if it is somehow irrevocably committed to a particular site even if no actual on-site work has commenced. The examples given are: 1) a source that is only a few days or weeks from commencing on-site construction, and 2) sources that are constructing (or have contracted to construct) unique site-specific equipment at an off-site location. Another example where a source would be deemed to have commenced construction without having done any on-site work is a source that "...has entered into a 'contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.'" According to Mr. Strelow, when reviewing such a situation, the "[f]actors that would be considered would include the question or whether or not the contract could be executed at another site or modified for the site in question and the amount of any additional costs of constructing at another site or of cancelling the contract."

While this early EPA guidance was specifically addressing an issue that is no longer valid, it did lay the foundation for answering the construction-prior-to-construction questions that are pertinent today.

## Perspective Shift

Since the 1970s, as PSD permit applications have become more and more complex, and as the timeline for regulatory review of those applications has been stretched to nearly two years (or even more) in some cases, industry has become understandably concerned about the repercussions of delaying construction – and inevitably delaying the start of operations for the proposed project – in anticipation of receiving a final PSD permit. So one of the questions that is important now is: what is allowed prior to

obtaining a PSD permit? The remainder of this article attempts to answer this question based on a review of EPA guidance, certain recent examples of letters approving specific activities for specific projects, and some recent interesting testimony on the subject.

One of the keystone guidance documents is a memo issued on February 13, 1978 by Edward E. Reich, EPA Director, Division of Stationary Source Enforcement. It provides the definition of "commenced" as follows:

*Commenced...means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification. This definition has been refined to apply to on-site construction...Therefore, only significant and continuous site preparation work such as major clearing or excavation or placement, assembly, or installation of unique facilities or equipment at the site should be considered a program of construction or modification*[3]...

This memo defends three specific actions taken by a company as <u>not</u> constituting commencement of construction:

- Purchasing a site
- Site clearing that had begun but then halted for more than two and a half years
- Signing a contract for site clearing capped at $250,000 (1978 basis)

Shortly after the February memo, Mr. Reich issued an additional memo addressing three fundamental questions:[4]

1. **What constitutes physical on-site construction?**
2. **What constitutes a contractual obligation to undertake a program of construction?**
3. **What constitutes reasonable time?**

The conclusions drawn from this memo are summarized below.

- Physical on-site construction refers to placement, assembly, or installation of materials, equipment, or facilities (including footings and pilings) that will make up part of the ultimate structure of the source. These activities must take place on-site or must be site specific.
- Erection of auxiliary buildings or construction sheds, unless there is clear evidence (through contracts or otherwise) that construction of the entire facility will definitely go forward in a continuous manner, is not construction.
- Site clearing and excavation work generally does not satisfy the commence construction requirements.
- To satisfy the commence construction requirements, a contractual obligation must be a site specific commitment.
- Contracts for non site specific equipment, such as boilers, typically do not satisfy the commence construction requirements, regardless of any penalty clauses contained in the contracts.
- A contractual obligation for purposes of commencing construction must be one that cannot be cancelled or modified without substantial loss. A loss that would exceed 10% of the total project cost will clearly be considered "substantial." Whether a loss of less than or equal to 10% of the total project cost will be considered substantial will be determined on a case by case basis.
- A break in construction of greater than 18 months or failure to commence construction within 18 months of PSD permit issuance will generally invalidate a source's PSD permit. The 18 month

period may be extended by the Administrator upon a satisfactory demonstration that an extension is justified.

In a third memo, Mr. Reich provided the following guidance addressing construction of a building that will house both PSD and non-PSD emission units:

*In general, a structure which is to house independent facilities, some of which are subject to PSD and some which are not, may be constructed before a PSD permit is issued only if the building is a necessary part of the PSD-exempt project and if it is no way modified to specifically accommodate the PSD-affected facilities.*[5]

Mr. Reich's fourth 1978 memo on the subject attempted to remove some ambiguity by clarifying that certain limited activities will be allowed in all cases (at the owner or operator's own risk).[6] These activities are planning, ordering of equipment and materials, site clearing, grading, and on-site storage of equipment and materials.

Eight years later, Mr. Reich issued his fifth and final memo on the subject of which construction activities are generally allowable prior to a PSD permit.[7] The primary discussion point of this memo centered around the definition of "emission unit." The memo states, "any part of a PSD source which would emit any pollutant subject to regulation...is considered an emission unit, even if that particular unit is not subject to PSD review," and "the emission unit would include any installations necessary to accommodate that unit." The ultimate conclusion is summarized as follows: *Construction is not allowed prior to issuance of a PSD permit on any emission unit or any installation designed to accommodate the emission unit.*

Two 1993 EPA memos reiterate this previous guidance, as shown in the following excerpts from the second memo.[8,9]

*Preconstruction review is a necessary precursor to engineering and public review processes. As a result of this process, the permitting authority may require installation of air pollution control or monitoring equipment that was not initially provided for in the design process. Thus, the pre-construction review process is mandated both to ensure that Clean Air Act requirements are met and to help sources avoid costly construction changes.*

*...certain limited activities that do not represent an irrevocable commitment to the project would be allowed, such as planning, ordering of equipment and materials, site clearing, grading, and on-site temporary storage of equipment and materials. Any of these activities, if undertaken prior to issuance of a permit, would be at the risk of the owner or operator.*

*...all on-site activities of a permanent nature aimed at completing construction or of the source including but not limited to installation of building supports and foundations, paving, laying of underground pipe work, construction of any permanent storage structure, and activities of a similar nature are prohibited until after the permit is issued and effective, under all circumstances.*

The last EPA document on this subject to be addressed in this article is from December 1995[10] and, on at least a few points, it is not completely consistent with the previous guidance. For example, it seems to make a general assertion (with no caveats) that an applicant can enter into binding agreements or contractual obligations prior to receiving a PSD permit. Also, it seems to indicate that EPA is willing to work with applicants who are facing extenuating circumstances such as construction timelines based on extreme weather. It carefully notes, however that, as always, such decisions are on a case-by-case basis.

Most of the discussion regarding preconstruction since the mid-90s has occurred between specific applicants and the states within which they operate. From the documents resulting from these discussions, the following is a list of certain activities that have been allowed prior to issuance of a PSD permit in various cases.

- Mobilization of construction equipment
- Mobilization of limited temporary office/break facilities, portable restrooms, etc. for initial site development work
- Installation of access roads into the site and on-site including drainage ditches, culverts, and temporary creek crossings
- Development of on-site concrete batch plant areas, including stockpiling aggregate materials and mobilizing batch plants
- Mobilization of some permanent construction materials (pilings, piping, rebar, conduit, etc.) to the site
- Relocation of an existing extraneous gas line that crosses the site
- Soil stabilization
- On-site storage of materials and equipment
- Construction of temporary buildings
- Excavation (not involving the blasting and removal of rock) of "shallow" pits for turbine foundations, and the pouring of mud mats in those pits

The first seven items in the list above were upheld as allowable by a U.S. District Court.[11] All of the items listed above are likely found in many letters from various states. One key letter is the January 22, 2002, letter from the Georgia Department of Natural Resources to Duke Energy North America, LLC.

Some states have issued guidance regarding construction activities that are allowed prior to issuance of a PSD permit, and in nearly all cases, this guidance uses the same or similar language as has been quoted above from EPA documents. Other states have issued guidance only for non-PSD permitting. In a few cases, the state guidance is more stringent than the federal guidance summarized above, but in most cases, the state guidance allows for more activities than does the federal guidance. The following are some notable examples of activities that may be allowed in a state-only permitting situation, but not allowed when going through PSD.

- Laying of underground piping or arbors
- Gravel base layout
- Receipt and storage of equipment on site provided no attempt is made to assemble the equipment or connect to any utilities
- Installation of all equipment in its final location as long as no utility connections are made
- All activities except hooking up the equipment to the exhaust stack or operating the equipment in any way that may emit any pollutant

To confirm what may be done in your specific situation, it is important to review your state guidance, talk with your state regulatory personnel, and discuss your situation as needed with legal/consulting advisors.

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[1] December 18, 1975 Memorandum from Roger Strelow, Assistant Administrator for Air and Waste Management (AW-443), to Regional Administrators, PSD Regulations – Interpretation of "Commencement of Construction"

[2] April 21, 1976 Memorandum from Roger Strelow, Assistant Administrator for Air and Waste Management (AW-443), to Regional Administrators, PSD Regulations – Interpretation of "Commencement of Construction"

[3] February 13, 1978 Memorandum from Edward E. Reich, Director Division of Stationary Source Enforcement, to Stephen A. Dvorkin, Chief General Enforcement Branch - Region II, PSD Applicability Determination

[4] July 1, 1978 Memorandum from Edward E. Reich, Director Division of Stationary Source Enforcement, to Dave Kee, Chief Air Enforcement Branch - Region V, Commence Construction under PSD

[5] October 10, 1978 Memorandum from Edward E. Reich, Director Division of Stationary Source Enforcement, to Thomas W. Devine, Chief Air Branch - Region I, Source Construction Prior to Issuance of PSD Permit

[6] December 18, 1978 Memorandum from Edward E. Reich, Director Division of Stationary Source Enforcement, to Enforcement Division Directors - Regions I-X, Interpretation of "Constructed" as it Applies to Activities Undertaken Prior to Issuance of a PSD Permit.

[7] March 28, 1986 Memorandum from Edward E Reich, Director Stationary Source Compliance Division OAQPS, to Robert R. DeSpain, Chief Air Programs Branch - Region VIII, Construction Activities Prior to Issuance of a PSD Permit with Respect to "Begin Actual Construction"

[8] May 13, 1993 Memorandum from John B. Rasnic, Director Stationary Source Compliance OAQPS, to Bernard E. Turlinski, Chief Air Enforcement Branch - Region III, Construction Activities at Georgia-Pacific.

[9] November 4, 1993 Memorandum from Dave Howekamp, Director Air and Toxics Division - Region IX, to All Region IX Air Agency Directors and All Region IX New Source Review Contacts, Preconstruction Review and Cons

[10] December 13, 1995 letter from John S. Seitz, Director OAQPS, to Charles W. Williams, Commissioner - Minnesota Pollution Control Agency.

[11] Hempstead County Hunting Club v. Southwestern Electric Power Company, Case No. 08-CV-4038, U.S. District Court, Western District of Arkansas, Texarkana Division, July 10, 2008.

## PSD Avoidance Permit Actions

- Restrictions proposed through permit application to synthetically limit project (or net) emission increases or facility potential
- Restrictions self defined
  - Emission limits
  - Process limitations
  - Operating hour limits
  - Material content limits

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## PSD Avoidance Permit Actions- Major Sources

- Existing major PSD sources can synthetically limit project (or net) emission increases to less than PSD Significant Emission Rates
  - Install technology necessary to limit emission increases voluntarily
  - Take restrictions on raw materials and/or fuels
  - Limitations can be tied to specific emission units, process line, or the entire site

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# PSD Avoidance Permit Actions

- Relaxation of existing PSD synthetic minor limits
  - 40 CFR 52.21(r)(4): At such time that a particular source or modification becomes a major stationary source or major modification solely by virtue of a relaxation in any enforceable limitation which was established after August 7, 1980, on the capacity of the source or modification otherwise to emit a pollutant, such as a restriction on hours of operation, then the requirements of paragraphs (j) through (s) of this section shall apply to the source or modification as though construction had not yet commenced on the source or modification.
  - See Handout 2-RR

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# New Developments in the Ongoing Saga for Major Source Determinations

By **LORI BOCCHINO,** *Managing Consultant* —Cheyenne, WY • **HARI KRISHNA BHARADWAJ,** *Senior Consultant* —Denver, CO

In the world of the Clean Air Act, being a major source is a big deal. You have to get a Title V operating permit. You probably have to comply with one or more National Emission Standards for Hazardous Air Pollutants (NESHAPs). You have to prepare annual emission inventories, semiannual reports, and compliance certifications—all of which senior management has to sign off on (and you might have to explain to them). And, if you want to make changes to your facility (or aren't currently "major" but want to grow past that threshold), you may need to tackle the highly complex preconstruction permit application process for Prevention of Significant Deterioration (PSD) or Nonattainment New Source Review (NNSR).

Because the stakes are high, it is important to understand the criteria used to determine when a facility is a major source.

In April of this year, the U.S. Environmental Protection Agency (EPA) published a letter that clearly defines its current point of view for one of the major source criteria: common control. It also reinforces the concept of cooperative federalism—a view that federal and state governments are partners in the exercise of governmental authority.

## Three-Factor Test

The term "stationary source" is defined in Section 111(a)(3) of the Clean Air Act as "any building, structure, facility, or installation which emits or may emit any air pollutant." In 1980, in part as a response to the Alabama Power court decision, EPA released final rules for NSR and PSD permitting. In these rules and the associated preamble, EPA defined how the term "stationary source" is used within those permit programs. From the preamble[1]:

> *Under today's rules, a PSD source is a grouping of all pollutant emitting activities at one location and owned or under the control of the same person or persons. This generally relates to the common notion of a plant… Therefore, today's rules continue to incorporate the 'dual definition' concept of source which requires consideration of overall emissions from a 'plant' and from each 'installation' within that plant.*

Later in the preamble, EPA further states:

> *In EPA's view, the December opinion of the court in Alabama Power sets the following boundaries on the definition for PSD purposes of the component terms of 'source': (1) it must carry out reasonably the purposes of PSD; (2) it must approximate a common sense notion of 'plant'; and (3) it must avoid aggregating pollutant-emitting activities that as a group would not fit within the ordinary meaning of 'building,' 'structure,' 'facility,' or 'installation.'*

This led to a definition of "stationary source" that includes a three-factor test. The boundaries of a major source, for purposes of air quality permitting, shall encompass all of the pollutant-emitting activities that meet all three of the following criteria:

(1) Belong to the same industrial grouping;
(2) Are located on contiguous or adjacent properties; AND
(3) Are under the control of the same person (or persons under common control).

This definition, with some variations and caveats, can be found in construction permitting regulations (40 CFR Parts 51 and 52); Title V operating permit regulations

[1] 45 FR 52680, 52695 (August 7, 1980)

(40 CFR Parts 70 and 71); and NESHAP regulations (40 CFR Part 63; the NESHAP regulations include some important differences – see §63.2). Once you figure out the appropriate group of pollutant-emitting activities (also called "aggregation"), you then compare the potential emissions of that group with a threshold, ranging from 10 to 250 tons depending on the pollutant, type of program, and location of the source. If potential emissions exceed the threshold, the facility is a major source and you're in the associated program.

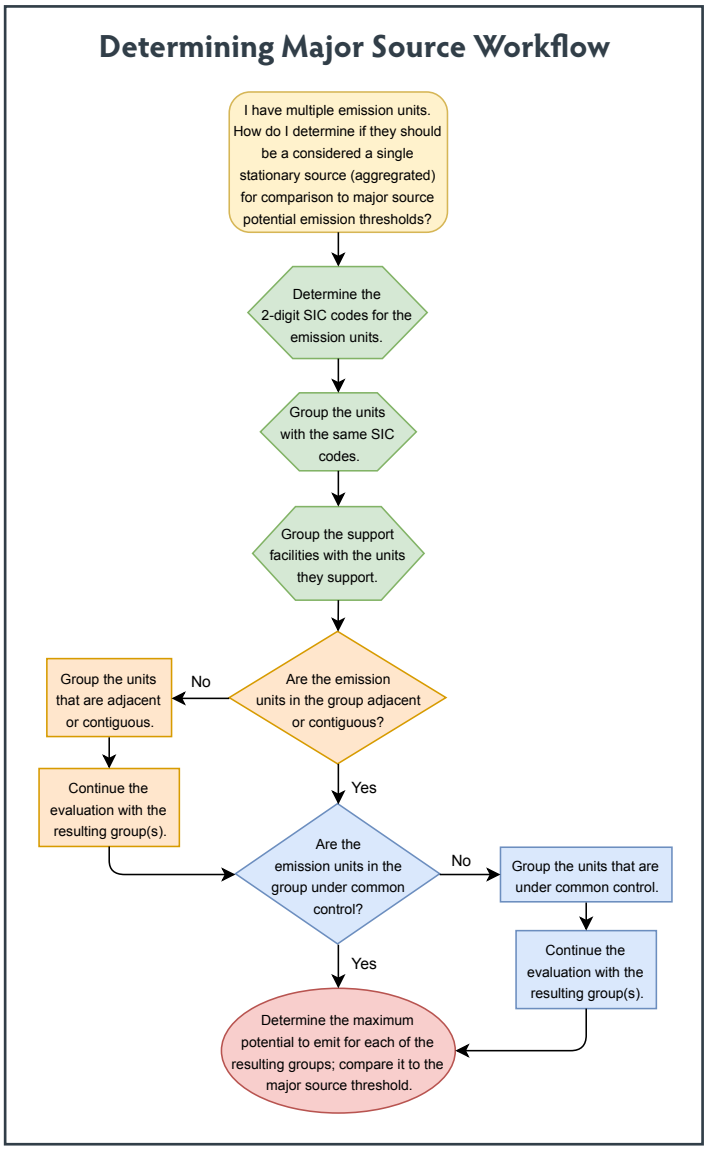
The interpretation of each of the three factors has been the subject of numerous EPA memos, petitions, and court cases over the years.

## Factor One - Industrial Grouping

This may be the easiest of the three factors to evaluate (although it has been interpreted in different ways). Sources meet this criterion if they have the same first two-digit code as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement (also known as the "SIC code"). EPA explained the reasoning for the use of this criterion in the 1980 NSR preamble[2]:

> In formulating a new definition of 'source,' EPA accepted the suggestion of one commenter that the Agency use a standard industrial classification code for distinguishing between sets of activities on the basis of their functional interrelationships. While EPA sought to distinguish between activities on that basis, it also sought to maximize the predictability of aggregating activities and to minimize the difficulty of administering the definition … A classification code…offers objectivity and relative simplicity.

Later in this section of the preamble, EPA notes that sources should be classified by their primary activity, such that support facilities (which, if operated by themselves, may have a different two-digit SIC code) are included with the primary activity for purposes of a source grouping. Support facilities convey, store, or otherwise assist in the production of the principal product. A common example is a boiler used to generate process steam for manufacturing operations. Source determination memos issued over the years (available on EPA's website at the **NSR Policy and Guidance Document Index** at *epa.gov/nsr/new-source-review-policy-and-guidance-document-index* and **Title V Operating Permit Policy and Guidance Document Index** at *epa.gov/title-v-operating-permits/title-v-operating-permit-policy-and-guidance-document-index*) have included discussions of operations that EPA considered to be support facilities, including those summarized below.




- In January 2012[3] , EPA Region III issued an opinion regarding a co-generation (co-gen) facility located on the property of a BASF site. While the facilities would have different two-digit SIC codes as stand-alone operations, the co-gen facility provided 100% of BASF's electrical and thermal energy, and BASF was obligated to purchase electrical and thermal energy from the co-gen facility and no other party. EPA considered the co-gen facility to be a support facility for BASF.

- In August 2007[4], EPA Region V issued a determination regarding a biodiesel facility co-located with a proposed oil seed extraction plant. While the facilities were planned to utilize some

[2] 45 FR 52695 (August 7, 1980)
[3] Letter from Kathleen Cox, Associate Director, Office of Permits & Air Toxics, EPA Region 3, to Troy Breathwaite, Air Permits Manager, Virginia Department of Environmental Quality (January 10, 2012)
[4] Letter from Pamela Blakley, Chief, Air Permits Section, EPA Region 5, to Don Smith, Supervisor, Minnesota Pollution Control Agency (August 14, 2007)




shared resources (including boiler capacity), they did not support each other and had different two-digit SIC codes. EPA deemed them to be separate sources for permitting purposes.

## Factor Two - Contiguous or Adjacent

The interpretation of this factor has been the subject of some interesting wrangling over the years. Some state and local agencies use the dictionary definition of the terms "contiguous" and "adjacent," whereas others have gone well beyond that. EPA has varied in its views on this. From the 1980 preamble[5]:

> *EPA is unable to say precisely at this point how far apart activities must be in order to be treated separately. The Agency can answer that question only through case-by-case determinations. One commenter asked, however, whether EPA would treat a surface coal mine and an electrical generator separated by 20 miles and linked by a railroad as one 'source,' if the mine, the generator, and the railroad were all under common control. EPA confirms that it would not. First, the mine and the generator would be too far apart.*

Contrast this with an EPA Region 8 letter[6] from 1999 that emphasized functional relationships among facilities over 35 miles apart:

> *…whether two facilities are 'adjacent' is based on the 'common sense' notion of a source and the functional interrelationship of the facilities, and is not simply a matter of the physical distance between two facilities… In the case of American Soda's Piceance and Parachute [Colorado] facilities, we believe that EPA's policy holds that these facilities need to be considered as a single stationary source. The two clearly will be functionally interdependent, as evidenced by the dedicated slurry pipeline and the spent brine return pipeline which will connect the two facilities. Additional evidence is that one facility (the mine) is to produce an intermediate product for processing at the other facility (the processing plant). Given the integral connectedness of these facilities, we believe that the distance alone does not preclude these two being considered adjacent for PSD permitting purposes.*

In 2007, then Acting EPA Assistant Administrator William Wehrum issued a memo[7] for the oil and gas industry that stated:

> *Notably, in 1980, we declined to add a specific 'functionality' criteria to the definition of source because we believed that 'assessments of functional interrelationships would be highly subjective' and 'embroil the Agency in fine-grained analysis'… for this industry, we do not believe determining whether two activities are operationally dependent drives the determination as to whether two properties are contiguous or adjacent, because it would embroil the Agency in precisely the fine-grained analysis we intended to avoid, and it would potentially lead to results which do not adhere to the common sense notion of a plant.…*

[5] 45 FR 52695 (August 7, 1980)
[6] Letter from Richard Long, Director, Air and Radiation Program, EPA Region 8, to Dennis Myers, Construction Permit Unit Leader, Colorado Department of Public Health and Environment (April 20, 1999)
[7] "Source Determination for Oil and Gas Industries", William Wehrum, EPA Acting Assistant Administrator, (January 12, 2007)

*After identifying the individual surface site, the permitting authority should consider aggregating pollutant-emitting activities at multiple surface sites, when the surface sites are under common control and located in close proximity to each other. A reviewing authority can consider two surface sites to be in close proximity if they are physically adjacent, or if they are separated by no more than a short distance (e.g. across a highway, separated by a city block or some similar distance).*

This memo was withdrawn in 2009[8], when EPA stated that "the simplified approach provided in the memorandum should not be relied upon by permitting authorities as a sufficient endpoint in the decision-making process." Further developments for this industry sector continued with the Summit Petroleum decision in October 2010, which aggregated several wells, a sweetening plant, and associated flares located within an area of approximately 43 square miles into a single source for Title V permitting. This decision was petitioned in 2011 and vacated in 2012. EPA's response to this vacature was a memo (sometimes referred to as the Summit Directive) issued in December 2012[9], which stated, in part:

*Because of the Court's decision… the EPA may no longer consider interrelatedness in determining adjacency when making source determination decisions in its title V or NSR permitting decisions in areas under the jurisdiction of the 6th Circuit…*

*Outside the 6th Circuit, at this time, the EPA does not intend to change its longstanding practice of considering interrelatedness in the EPA permitting actions in other jurisdictions.*

*In permitting actions occurring outside of the 6th Circuit, the EPA will continue to make source determinations on a case-by-case basis using the three factor test in the NSR and Title V regulations at 40 CFR 52.21(b)(6) and 71.2, respectively, and consistent with more than three decades of the EPA applicability determinations and guidance letters regarding application of those criteria, which have considered both proximity and interrelatedness in determining whether emission units are adjacent.*

This was appealed, and in May 2014 the D.C. Circuit struck down the Summit Directive. The decision was based on a determination that the Directive was contrary to EPA's own regulations, which require EPA to maintain national uniformity and to standardize criteria, procedures, and policies nationwide. Now the issue of how to aggregate sources expanded to the question of overall regulatory consistency. EPA amended its regional consistency regulations in July 2016[10]:

*These revisions introduce a narrow procedural exception under which an EPA regional office no longer needs to seek headquarters concurrence to diverge from national policy in geographic areas covered by such an adverse court decision. This exception will apply where Federal court decisions concerning the CAA have regional or local applicability.*

Not surprisingly, this was petitioned. In June 2018, the DC Appeals Court denied the petition and found EPA's amendments reflected a permissible solution to issues resulting from inter-circuit conflicts. The court determined EPA's construction of the statute to be "eminently reasonable"[11].

In parallel with the regional consistency rulemaking, EPA issued rule revisions in June 2016 to 40 CFR Parts 51, 52, 70, and 71 which changed the meaning of the term "adjacent" specifically for the oil and natural gas sector. From the revised definition of major source in §70.2:

*For onshore activities belonging to Standard Industrial Classification (SIC) Major Group 13: Oil and Gas Extraction, pollutant emitting activities shall be considered adjacent if they are located on the same surface site; or if they are located on surface sites that are located within 1/4 mile of one another (measured from the center of the equipment on the surface site) and they share equipment.*

Similar wording changes were made to parts 51, 52, and 71. It is critical to note, however, that EPA did **not** require state and local authorities with approved permitting programs to adopt these new definitions—and many have not done so.

## LATE BREAKING NEWS:

On September 4, EPA released draft guidance for review and comment on the interpretation of "adjacent" for Clean Air Act permitting. See *www.epa.gov/nsr/draft-guidance-interpreting-adjacent-new-source-review-and-title-v-source-determinations-all.*

[8] "Withdrawal of Source Determination for Oil and Gas Industries", Gina McCarthy, EPA Administrator (September 22, 2009)
[9] "Applicability of the Summit Decision to EPA Title V and NSR Source Determinations", Stephen D. Page, Director OAQPS (December 21, 2012)
[10] Fact Sheet, Amendments to Regional Consistency Regulations, EPA ( July 21, 2016)
[11] National Environmental Development Association's Clean Air Project v. EPA, Case No. 16-1344 (DC Circuit June 8, 2018)

## Factor Three - Common Control

The third factor is the subject of the latest line to be drawn in the sand regarding source aggregation.

On April 30, 2018, EPA published its current interpretation of the "common control" factor for source determinations. This policy decision was conveyed via letter from EPA to the Pennsylvania Department of Environmental Protection (PADEP) in response to a PADEP request for EPA review. The question was whether a biogas facility owned by Meadowbrook Energy, LLC (Meadowbrook) should be aggregated with an existing landfill owned by Keystone Sanitary Landfill Inc. (KSL) for air quality permitting purposes.

The letter focuses on the issue of common control and recognizes that determining control can be a difficult decision that must be made on a case-by-case basis. In prior source determinations, EPA identified a number of factors that should be considered, including shared workforces, management, administrative functions, equipment, or intermediates/byproducts, as well as dependency relationships[12]—an approach referred to as the "multi-factor" approach.

EPA has relied on the presence of support or dependency relationships to determine if a facility is wholly or partially dependent on another facility for operational or monetary reasons. These dependency relationships were typically characterized by contract agreements, which included both output contracts (contracts to purchase all or part of another entity's output) and requirement contracts (contracts to produce all or part of another entity's requirement). EPA has used these contracts as measures of the operational or economic influence of one entity on another. However, arguments have also been made that there can be a common control scenario where one facility is not entirely dependent on the other for operation and the facilities do not share workforces, management, administrative functions, equipment, or pollution control responsibilities.

During its review of the Meadowbrook case, EPA noted it was apparent that differing considerations have been used to evaluate control, which have resulted in inconsistent outcomes in source determinations and regulatory uncertainty. The April letter re-evaluates the concept of common control to better align it with a "common sense notion of a plant" and asserts that a greater sense of clarity can be applied to source determinations if the assessment of control is focused on "authority of one entity to dictate decisions of the other that could affect the applicability of, or compliance with, relevant air pollution regulatory requirements." There are three key points that EPA expounds on: "dictating decisions," "decisions that affect air pollution requirements," and "dependency does not always equate to common control."

***Dictating Decisions***

EPA emphasizes the distinction between "dictate" and "influence" in making assessments of common control: "this concept includes only the power to dictate a particular outcome and does not include the mere ability to influence." The letter defines "control" as "when one entity has the power or authority to restrict another entity's choices and effectively dictate a specific outcome, such that the controlled entity lacks autonomy to choose a different course of action." EPA also states that distinguishing "control" from merely the "ability to influence" will vary from case to case, and the focus of this evaluation is not on **how** control is established (ownership, contract, etc.), but on **whether** "control," as defined above, is established. The letter acknowledges that prior definitions of "control" included the ability to influence[13], but EPA currently believes that even if an entity is influenced or constrained by contractual relationships, that does not necessarily mean that it is controlled by those influences in making a given decision. Therefore, EPA asserts that interpreting the term "control" between two entities will require more than merely the "ability to influence."

***Decisions that Affect Air Pollution Requirements***

The focus on "control" for source determinations should be restricted to matters concerning air pollution and the ability to comply with permitting or compliance requirements. EPA states that since the very discussion of "control" is being made with reference to source determinations for NSR/Title V programs, it makes sense that it is directed towards air pollution emitting activities. An example is a facility where a responsible official from one entity cannot certify the completeness of a permit application for the entire composite facility, as he/she does not have authority over or knowledge of the other entity's portion of the composite facility. EPA also raises the issue of an inequitable scenario where two entities without "control" share a Title V permit; entity 1 could face liability for the actions of entity 2 in such a scenario, purely due to the negligence of entity 2.

EPA rounds off this discussion by stating that common control discussions should not focus on options that have no impact on air pollution permitting/compliance activities and that "control" should focus on power to direct decisions over air pollution related obligations.

[12] Many of these factors, as well as others—including responsibility for violations of air quality requirements—are discussed in a September 18, 1995 letter from William Spratlin, EPA Region VII, to Peter Hamlin, Iowa Department of Natural Resources. This letter includes a list of several previously issued letters and other references regarding common control.

[13] "Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs of the Clean Air Act", John Seitz, EPA OAQPS Director (August 2, 1996)

***Dependency Does Not Always Equate to Common Control***
In its April 2018 letter, EPA clarifies that common control determinations using dependency relationships should not be confused with the separate issue of whether one entity is a "support facility" for another entity. As stated earlier in this article, a support facility analysis is required as a part of the industrial grouping factor of the three-factor analysis. The letter reiterates that a dependency relationship should not be presumed to result in common control and that evaluations are needed to determine whether one entity has the power and authority to dictate decisions of another entity. Economic dependencies do not necessarily mean that an entity will have the power or authority to dictate decisions related to air permitting or compliance for the other entity.

The updated interpretation of common control presented in the April 2018 letter directs focus on the authority or power of one entity to dictate the specific outcome for the other entity for matters related to air permitting and compliance. This shift in the interpretation of common control could have a significant impact on interdependent facilities owned by separate entities, as in this case where EPA determined that there was no common control of the Meadowbrook biogas facility and Keystone landfill. Besides landfill/biogas, the oil and gas sector, power generation, chemicals, and other industries could be affected by this approach.

## Cooperative Federalism

EPA's April 2018 letter clearly assigns the responsibility and authority for making source determinations to Pennsylvania "given that Pennsylvania's Title V and NSR programs have been approved by EPA." The cover page frames EPA's memo as an explanation that "should be helpful to PADEP as it makes its final permitting decision." This is consistent with EPA's recent focus on cooperative federalism, considered to be a more collaborative partnership with states compared to past practices that some found to be more prescriptive in nature.

In a review of several source determination memos issued from 1981 forward, a cooperative approach prevailed with a few notable exceptions[14]. The Environmental Council of States (ECOS) has been strongly advocating for reframing the roles of state and federal regulators to make states the preferred implementing entities for national environmental programs.
Giving more discretion to states and other entities with approved implementation plans has mixed benefits, particularly for companies with operations in multiple locations around the country. It allows agencies to develop programs and systems that they believe best suit the circumstances they face in their jurisdiction, but it can also result in similar situations being handled differently in two different locations.

## What Does It All Mean?

As described throughout this article, there is significant variability in how this subject has been handled over the years. As national administrations change and air quality programs evolve, agency priorities and interpretations change and evolve as well. This can make it difficult for companies that seek regulatory certainty as they adapt and restructure operations in response to business needs. One element that has remained relatively constant is deference to the permit authority with an approved program. This is consistent with the direction of current EPA leadership.

When faced with an aggregation decision that will affect permitting, the following considerations are advisable:

- Learn your permit authority's position on source determinations in the past.
- If in doubt over the common control element of the three-factor test, take some time to look carefully at the April common control letter from EPA.
- Consider reviewing source determinations made in other parts of the country if they relate to your situation.
- Be prepared to give as much support as possible to your position, and expect to spend some time with your permit authority to understand its perspective. That authority has likely given this matter a great deal of consideration over the years, and you will be better able to negotiate with permitting staff if you have an appreciation of their approach and rationale. ❖

[14] In a May 11, 2009 EPA Region 2 letter to Manchester Renewable Power Corporation and Ocean County Landfill Corporation ("Common Control Determination for Ocean County Landfill and the Manchester Renewable Power Corp./LES"), EPA disagreed with the New Jersey Department of Environmental Protection's assessment that the two facilities were not under common control. EPA required that the NJDEP reopen and reissue the Title V permits for these facilities "to both companies as a single source." In a September 13, 2000 EPA Region 8 letter to the Colorado Department of Public Health and the Environment (CDPHE) ("EPA Review of Proposed Title V Operating Permit for TriGen-Colorado Energy Corporation"), EPA objected to the issuance of the Title V permit for a number of issues, including CDPHE's treatment of TriGen and Coors as separate entities for permitting. In an April 20, 1999 EPA Region 8 letter to CDPHE regarding proposed PSD construction permits for the American Soda Commercial Mine and processing plant, EPA disagreed with the state's determination that the facilities were separate for PSD permitting.

# Chapter 3

Emissions Netting

## Major Modification (under PSD)

*ANY physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase.*

*(unless meeting exclusion criteria…)*

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## Modifications – Netting Out of PSD

- A major modification occurs if there is a "significant emissions increase" and a "significant net emissions increase":
  - STEP 1: emissions changes specifically associated with project (PEI) > PSD major modification thresholds, AND
  - STEP 2: "net" emissions (within 5+ year time window) > PSD major modification thresholds
- Complex procedures allow netting out of PSD review if certain emissions decreases offset proposed emissions increases
- Netting ("contemporaneous") window is 5+ years
- Volumes of EPA guidance dedicated to the subject, lots of nuance

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## Emissions Netting (1 of 3)

- If project emissions increases (PEI) are greater than significance levels, can attempt to "net-out" of PSD review
- Reference documents for netting
  - EPA memo - Use of Netting Credits - December 29, 1989 (3-A)
  - EPA memo – Request for clarification of policy regarding the "Net Emissions Increase" - September 18, 1989 (3-C)
  - EPA memo - Crediting of MACT Emission Reductions for NSR Netting and Offsets - November 12, 1997 (3-B)
  - EPA Enforcement Alert - January 1999 (2-F)

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## Emissions Netting (2 of 3)

- Net emissions change (NEC or NEI) equals (40 CFR 52.21(b)(3)):

emission increases/decreases from proposed project/modification (PEI) – "Step 1"
minus
source-wide creditable contemporaneous decreases (CCD) – "Step 2"
plus
source-wide creditable contemporaneous increases (CCI) – "Step 2"

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## Emissions Netting (3 of 3)

- Project emissions increases (PEI) can be further evaluated as the sum of three components:
  - Modified unit(s) emissions increases/decreases - these units are being physically or operationally changed
  - Associated unit(s) emissions increases/decreases - these units are not physically changed as part of the project but are otherwise impacted by the project
  - New unit(s)

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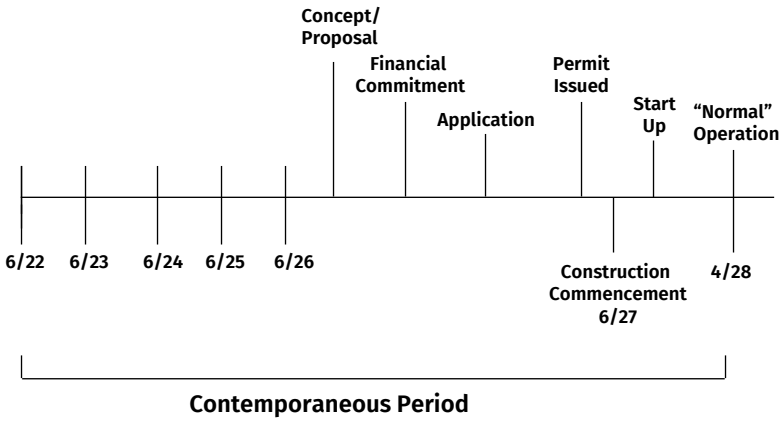
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## PSD Definitions - Contemporaneous

- The contemporaneous period is the period ranging from 5 years before construction commences on a particular project to the time normal operation commences for that change

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## PSD Definitions – Contemporaneous – 40 CFR 52.21(b)(3)(ii)




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## PSD Definitions – Creditable (1 of 2) – 40 CFR 52.21(b)(3)(iii)

- Contemporaneous emissions **decreases** associated with a particular change are considered creditable if they are federally enforceable (permitted) on and after the date construction on the proposed modification commences
- Generally, actual reductions must take place before the date the emissions increase from any of the new or modified emissions units occurs

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## PSD Definitions – Creditable (2 of 2)

- An increase or decrease in emissions is creditable (included in a project's netting calculation) if it was **NOT** previously "relied on" in issuing an enforceable **PSD permit** for the source (see handout 3-A)
  - Emissions changes associated with new units and modifications to existing units that have already been authorized in PSD permit are not creditable
  - EPA has interpreted this to mean all emissions changes (for a given pollutant) prior to the most recent PSD permit at the site are also not creditable
- Generally, otherwise creditable increases and decreases in emissions are included in current netting calculations if not the result of a project that triggered PSD for that pollutant and did not occur **prior** to a PSD project (even if the same emissions increases/decreases were considered in a netting calculation for a past project that did NOT trigger PSD)
- Generally, reductions due to installation of controls to comply with HAP rules (MACT, etc.) are creditable (see handout 3-B)

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## Netting Procedures (1 of 3)

1. Determine emissions increases (PEI). If significant, proceed
2. Determine contemporaneous period for project
3. Determine emission units with creditable increase or decrease in emissions during contemporaneous period

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## Netting Procedures (2 of 3)

4. Determine which emissions changes are creditable
5. For each pollutant, determine amount of each contemporaneous and creditable emissions increase and decrease (CCD + CCI)

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## Netting Procedures (3 of 3)

6. Sum all increases and decreases with increase from proposed modification to determine if net increase will occur

NEI = PEI - CCD + CCI

NEI = (MUEI + AUEI + New units) - CCD + CCI

We will explore the PEI calculations in more depth in Chapter 5.

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## Calculating Emissions Changes

- The actual pre-change emissions level for a modified source is the average rate (in tons per year measured over a 24-month period) at which the unit actually emitted during the “base-line” period (see Chapter 5)
- The rules allow a 10-year “look-back” for the highest 24-month period (see Chapter 5)

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## Calculating Emissions Changes – Fine Details

- A decrease in actual emissions is creditable only to the extent that it meets all the conditions below:
  - The pre-change level of actual emissions or the pre-change level of allowable emissions (whichever is lower) exceeds the post-change level of actual emissions (in other words, only the lesser of pre-change actual or allowable emissions is creditable as an emission decrease), and
  - The post-change level of emissions is enforceable as a practical matter at and after the time that actual construction on the particular change begins, and
  - Any decrease in emissions has approximately the same qualitative significance for public health and welfare as that attributed to the increase from the particular change (in other words, emission decreases must have approximately the same qualitative significance for public health and welfare as the emission increases).

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## Resources for PSD Applicability Questions

- Document resources
  - Clean Air Act
  - 40 CFR 52.21 (rule and preambles through history [e.g., August 1980])
  - Policy memos and guidance documents
    - EPA's PSD/NSR Manuals (1980 and 1990)
      - www.epa.gov/sites/production/files/2015-07/documents/1980wman.pdf
      - www.epa.gov/sites/production/files/2015-07/documents/1990wman.pdf
    - EPA's NSR websites (compendium of determinations and policy documents)
      - https://archive.epa.gov/airquality/ttnnsr01/web/html/psd_abs.html
      - www.epa.gov/nsr/new-source-review-policy-and-guidance-document-index
  - Various state and federal court decisions
  - Environmental Appeals Board (EAB) determinations
    https://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/8f612ee7fc725edd852570760071cb8e/26e637699cb1cc1685257b50004044f6/$FILE/Guide%20to%20the%20EAB%20March%202023.pdf
  - Existing permits files

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# Chapter 4

Class Exercises

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# Chapter 5

Calculating Baseline and Projected Emissions

## Calculating Project Emissions Increases (PEI)

- For existing units, actual-to-projected actual test – uses the difference between projected actual emissions (definition at 40 CFR 52.21(b)(41)) and baseline actual emissions (definition at 40 CFR 52.21(b)(48))
- For new units – actual-to-potential test (actual emissions equal zero (normally) or PTE (special case))
- See Handout GI-09c

Refer to Summary: U.S. Supreme Court – Vacating the 4th Circuit PSD Case

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# U.S. Supreme Court – Vacating the 4th Circuit PSD Case

On April 2, 2007, in *Environmental Defense*, *et al. v. Duke Energy Corp.*, the U.S. Supreme Court vacated the Fourth Circuit Court of Appeals June 15, 2005 ruling regarding Prevention of Significant Deterioration (PSD) violations at 30 Duke Energy coal-fired power units. The Supreme Court's ruling upholds EPA's definition of a "modification" as set forth in the PSD regulations, 40 CFR §51.166. EPA's definition of a "modification" in the PSD regulations is based on a comparison of past actual to future actual annual emissions.

## Background

The concept of a "modification" appears in both the 1970 Clean Air Act (CAA) and the 1977 Clean Air Act Amendments (CAAA). The 1970 CAA provides the legislative basis for establishing performance standards for new sources and stipulates that New Source Performance Standards (NSPS) are to be applied to new sources as well as modified sources. In response to the 1970 CAA, EPA promulgated NSPS regulations which included the definition of a "modification" in 40 CFR §60.14(a). Under this definition, a "modification" is "*any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies*." Furthermore, 40 CFR §60.14(b) states that emission rates shall be expressed in terms of "*kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable*." The 1977 CAAA stipulates that the PSD program be applied to the construction of major emitting facilities where the term "construction" specifically includes "modifications" to existing sources. In response to the 1977 CAAA, EPA promulgated the definition of a "modification" in regards to the PSD program in 40 CFR §51.166 as "*any physical change in or change in the method of operation of a major stationary source that would result in a significant emissions increase of a regulated NSR pollutant and a significant net emissions increase of that pollutant from the major stationary source…,*" where significant emissions increases are further defined in terms of actual ton per year changes on a pollutant-by-pollutant basis. The Supreme Court's opinion in the Duke case supports EPA's authority to define "modification" differently in NSPS and PSD regulations.

## Case History

Duke Energy operates 30 coal-fired power units at eight plants in North and South Carolina. Between 1988 and 2000, Duke Energy replaced or redesigned a number of steam tubes in the boilers associated with these power units. In 2000, the U.S. Department of Justice (DOJ) filed an action in U.S. Middle District Court of North Carolina asserting that the steam tube replacement projects qualified as a "modification" under the PSD regulations and that Duke Energy violated these regulations by failing to obtain the proper construction permits prior to undertaking the projects. Duke Energy argued that the replacement projects were not a "modification" under the PSD regulations because they did not result in a short-term (hourly) increase in air emissions. Part of Duke Energy's defense was an assertion that Congress intended the 1977 CAAA definition of "modification" under the PSD program to be identical to the definition of "modification" under the NSPS program. Consequently, Duke Energy reasoned that the past actual to future actual annual emissions comparison in the PSD regulations is not a valid approach to defining a "modification."

The District Court agreed with Duke Energy that the steam tube replacement projects were not a "modification" on the basis that the projects did not result in a short-term (hourly) increase in air emissions. On that narrow argument, the District Court entered a summary judgment for Duke Energy on all PSD issues. The case was appealed to the Fourth Circuit Court, which upheld the lower court's ruling.

Ultimately, the case was heard by the U.S. Supreme Court, which vacated the Fourth Circuit Court of Appeals' ruling. The Supreme Court issued the following opinion.[1]

1. The Fourth Circuit Court's decision to apply the NSPS definition of "modification" in 40 CFR §60.14 to the PSD regulations in 40 CFR §51.166 would essentially invalidate the PSD regulations. Furthermore, the CAA limits judicial review regarding the validity of EPA regulations to petitions in the DC Circuit Court of Appeals. Therefore, the Fourth District Court does not have the authority to apply the NSPS definition of "modification" to the PSD regulations.
2. Nothing in the text or legislative history supports the assertion that Congress did not intend for EPA to have discretion in interpreting and implementing a definition for "modification" differently under the PSD and NSPS programs.

The basis of the DOJ's original case against Duke Energy was that the steam tube replacement projects did not qualify under the Routine Maintenance, Repair, and Replacement (RMRR) exemption from modifications under the PSD program. It should be noted that the Supreme Court's opinion was limited to the narrow ruling on the definition of "modification" by the District Court and did not address Duke Energy's assertion that EPA has been inconsistent in its application of the definition of "modification," specifically in regards to the RMRR exemption over the 20+ year duration of the PSD program.

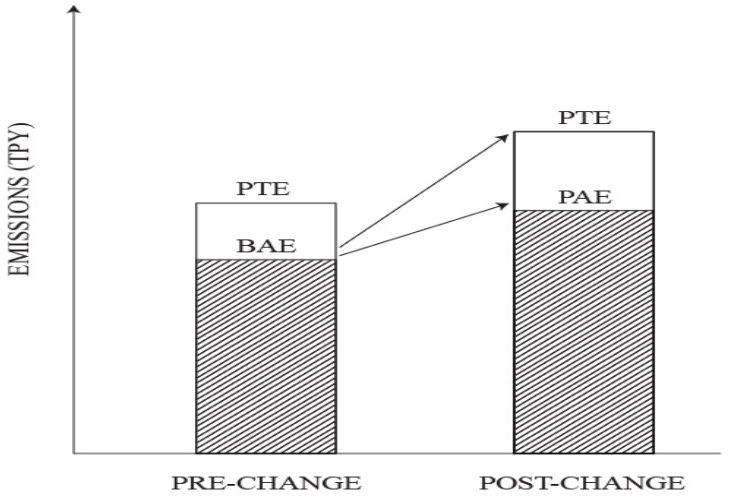
For more information, read the full Supreme Court ruling at http://www.supremecourtus.gov/opinions/06pdf/05-848.pdf.

……

[1] In a separate case addressing EPA's New Source Review reform regulations, the DC Circuit Court of Appeals reasoned that when Congress enacted the 1977 amendments to the CAA it distinguished between actual, potential, and allowable emissions. If Congress had intended for "increases" in emissions to be measured in terms of potential or allowable emissions, it would have added a reference to "potential to emit" or "emissions limitations." Therefore, a modification under the PSD program can only be defined in terms of an actual emissions increase, which in turn infers long-term (annual) versus short-term (hourly) evaluations.

## Emissions Change Calculations

Option 1: PTE - BAE = emissions change
Option 2: PAE - BAE = emissions change




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## More Definitions

- Types of Emission Units
  - New
  - Existing
  - "Replacement"
  - Electric Utility Steam Generating Unit (EUSGU)
  - "Reactivated"
- Baseline Actual Emissions (BAE)
- Projected Actual Emissions (PAE)
- "Could have accommodated" emissions
- "Unrelated to the project" emissions

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# New Versus Existing Units – 40 CFR 52.21(b)(7)

- **"Emissions unit"** means any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant and includes an EUSGU. There are two types of emissions units as described in paragraphs (A) and (B) below:
  - (A) A **new** emissions unit is any emissions unit that is (or will be) newly constructed and that has existed for less than 2 years from the date such emissions unit first operated.
  - (B) An **existing** emissions unit is any emissions unit that does not meet the requirements in paragraph (A) of this definition. A replacement unit is an existing emissions unit.
- Interesting sidelight – units that have not been operating (EPA's reactivation policy)
- **Note: "Electric utility steam generating unit"** or "**EUSGU**" means any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam-electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.
- Note: TCEQ Chapter 116.160(c)(3): **The term "facility" shall replace the words "emissions unit" in the referenced sections of the CFR.**

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# Replacement Unit (40 CFR 52.21(B)(33))

- A "replacement" unit is considered an existing unit under these conditions
  - The unit is a reconstructed unit within the meaning of 40 CFR 60.15(b)(1), or the facility replaces an existing facility.
  - The unit is identical to or functionally equivalent to the replaced facility.
  - The replacement does not alter the basic design parameters of the process unit.
  - The replaced unit is permanently removed from the major source, otherwise permanently disabled, or permanently barred from operation by a permit that is enforceable.
- If the replaced unit is brought back into operation, the unit will be considered to be a new unit.
- No creditable emission reductions are generated from shutting down the existing unit that is replaced.
- If the proposed project includes a replacement unit, the baseline emissions of the unit being replaced must be determined.
- A replacement unit is considered an existing unit for the purpose of determining federal new source review applicability. The baseline actual emissions for the unit being replaced become the baseline emissions for the replacement unit.
- See Handout 5-U and Handout 5-U1

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# Reactivation of Sources/Units – Historical Policy

- EPA historical policy on the reactivation of sources provides that a major stationary source that has been idled for 2 or more years is presumed to be permanently shut down. (See Handout 5-J)
- The policy states that if a source is permanently shut down, upon reactivation it is considered a "new" stationary source for purposes of PSD review.
- PSD applicability would be based on the reactivated source's potential to emit.
- The 2-year presumption is rebuttable.
- EPA will not consider the shutdown to have been permanent if the owner or operator of the source makes a demonstration that, at the time of the shutdown, and continuously throughout the shutdown period, they intended to restart the facility.
- Among the factors that EPA in the past has considered in evaluating the owner or operator's intent are:
  - Length of time the facility has been shut down and concrete plans for restart;
  - Statements by the owner or operator of intent;
  - The cause of the shutdown;
  - Status of permits, including but not limited to Clean Air Act operating permits, acid rain permits and other required permits, and emission inventory;
  - Maintenance and inspections during shutdown; and
  - Time and capital needed to restart
  - Reorganization of labor force

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# Reactivation of Sources/Units – Current Policy

- September 18, 2025 – EPA's policy change
  - "In response to the reading of the Clean Air Act reflected in the Third Circuit's decision, the agency will no longer apply any form of the Reactivation Policy in its NSR permitting determinations and enforcement proceedings, or in its oversight of state, local and tribal air permitting programs. EPA will continue to apply the modification provisions of the NSR program to shut down sources in accordance with the CAA and applicable EPA regulations. Thus, where an existing major stationary source that has been idle makes a change in order to enable it to resume operation, EPA will not require the source to obtain an NSR permit unless this change qualifies as a "major modification" under applicable regulations based on the nature of the change and the magnitude of any resulting increase in emissions."
  - See Handout 2-CC, Handout 5-T, Handout 5-T1, Handout 5-T2, and Handout 5-T3

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## Reactivation of Sources/Units

- Why was this an issue?
  - Consideration of past actual emissions (baseline actual emissions) may be the difference between triggering PSD and not triggering PSD for a project
  - New unit/source BACT vs. existing unit/source BACT
- Historical policy dates back to 1978
  - Reactivated source considered a new source if shutdown was permanent
  - Reactivated source considered existing source if shutdown was not permanent

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# Baseline Actual Emissions – 40 CFR 52.21(b)(48)

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## Baseline Actual Emissions (BAE) (EUSGU) (1/2)

"Rate of emissions, in tons per year, of a regulated NSR pollutant"

- Existing EUSGU: Average rate the unit actually emitted during any consecutive 24-month period, within a 5-year period, immediately preceding actual construction of the project. Administrator can allow alternative periods.

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## Baseline Actual Emissions (BAE) (EUSGU) (2/2)

- Includes average fugitive emissions, to the extent quantifiable, in selected 24-month period
- Includes average emissions associated with startups, shutdowns and malfunctions, in selected 24-month period
- If, during the 24-month period, unit did not meet an enforceable limit in effect at that time, average emissions in selected 24-month period get adjusted downward to exclude these non-compliant emissions

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## Baseline Actual Emissions (BAE) (non-EUSGU)(1/4)

- "Rate of emissions, in tons per year, of a regulated NSR pollutant"
  - Existing non-EUSGU:  Average rate the unit actually emitted during any consecutive 24-month period, within a 10-year period, immediately preceding actual construction of the project or the date an application is received, whichever is earlier.
  - No allowance for alternative periods for non-EUSGUs

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## Baseline Actual Emissions (BAE) (non-EUSGU)(2/4)

- Includes average fugitive emissions, to the extent quantifiable, in selected 24-month period
- Includes average emissions associated with startups, shutdowns and malfunctions, in selected 24-month period
- If, during the 24-month period, unit did not meet an enforceable limit in effect at that time, average emissions in selected 24-month period get adjusted downward to exclude these non-compliant emissions

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## Baseline Actual Emissions (BAE) (non-EUSGU)(3/4)

- For non-EUSGU's, average rate selected gets adjusted downward to exclude any emissions that would have exceeded an emission or limit or operating restriction which the source must NOW comply with:
  - A raw material/fuel previously used is now prohibited
  - A subsequent allowable emission rate change

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## Baseline Actual Emissions (BAE) (non-EUSGU)(4/4)

- However, if the subsequent limit is part of a proposed or promulgated MACT standard, adjust baseline actual emissions downward only if the State has taken credit for the MACT reductions in an attainment demonstration or maintenance plan

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## Baseline Actual Emissions (BAE) - Details

- If the project at hand involved multiple existing emission units, only one consecutive 24-month period is used to determine the baseline actual emissions for all emission units impacted by the project
- Can use different consecutive 24-month periods for each regulated NSR pollutant impacted by the project
- Can't use 24-month periods with "inadequate information"

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## Baseline Actual Emissions (BAE) - Fugitives

- When assessing the baseline actual emissions (BAE) and projected actual emissions (PAE), fugitive emissions are considered for ALL stationary source types (including the "unlisted" source categories).
- This is because certain clauses in the rule (40 CFR 52.21(b)(2)(v) and 40 CFR 52.21(b)(3)(iii)(c)) are currently stayed (see 76FR 17548). These stayed clauses exempt fugitive emissions (at unlisted source categories) from applicability assessments (emissions change calculations) for modifications.
  - Note: On October 14, 2022 (87FR 62322), EPA proposed to remove these currently stayed clauses - 40 CFR 52.21(b)(2)(v) and 40 CFR 52.21(b)(3)(iii)(c).
- However, there is broad requirements exemption for modifications undertaken at "unlisted" sources that would trigger major NSR (PSD), but only if fugitives ARE considered.
  - The requirements exemption is noted at 40 CFR 52.21(i)(1)(vii) for unlisted source types – See Handout 5-Z.
  - 52.21(i)(1): The requirements of paragraphs (j) through (r) of this section shall not apply to a particular major stationary source or major modification, if;
  - (vii) The source or modification would be a major stationary source or major modification only if fugitive emissions, to the extent quantifiable, are considered in calculating the potential to emit of the stationary source or modification and the source does not belong to any of the following categories:.....(the "listed" source categories).

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# Baseline Actual Emissions (1/3)

EXAMPLE #1 – Project proposed in 2026

| Year | VOC Emissions |
|---|---|
| 2016 | 75 tpy |
| 2017 | 85 tpy |
| 2018 | 95 tpy |
| 2019 | 80 tpy |
| 2020 | 60 tpy |
| 2021 | 50 tpy |
| 2022 | 50 tpy |
| 2023 | 40 tpy |
| 2024 | 25 tpy |
| 2025 | 35 tpy |

**Baseline actual emissions (company can select 24-month period within 10 year period preceding the change for BAE)**
**= 90 tpy**

**Current "actual emissions" (two-year period preceding the change) = 30 tpy**

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# Baseline Actual Emissions (2/3)

EXAMPLE #2 – Project proposed in 2026

| Year | VOC Emissions |
|---|---|
| 2016 | 750 tpy |
| 2017 | 850 tpy |
| 2018 | 950 tpy |
| 2019 | 800 tpy |
| 2020 | 60 tpy |
| 2021 | 50 tpy |
| 2022 | 50 tpy |
| 2023 | 40 tpy |
| 2024 | 25 tpy |
| 2025 | 35 tpy |

**Baseline actual emissions of 900 TPY not available for use since allowable emission rate was subsequently reduced.**

**New controls require 90% destruction efficiency, meaning the BAE are only 10% of the highest uncontrolled emission rate in previous 10 year period, or 90 tpy**

**Current "actual emissions" (two-year period preceding the change) = 30 tpy**

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# Baseline Actual Emissions (3/3)

EXAMPLE #3 (EUSGU) – Project proposed in 2026

| Year | $SO_2$ Emissions |
|---|---|
| 2021 | 150 tpy |
| 2022 | 165 tpy |
| 2023 | 175 tpy |
| 2023 | 150 tpy |
| 2025 | 145 tpy |

**BAE = 170 TPY; though alternative period can be allowed by Administrator if shown to be more representative of normal source operation**

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# Baseline Actual Emissions (BAE) for New Units?

- The baseline emissions for a BRAND new unit is zero (initial construction/operation)
- What is the BAE of a new unit if it's going to be modified post initial construction and operation?
- A unit remains a new unit for two years post initial operation. What is the baseline emission rate during the first two years (post construction/operation)?
  - BAE = PTE (pre-change)
  - See 40 CFR 52.21(b)(48)(iii): For a new emissions unit, the baseline actual emissions for purposes of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and thereafter, for all other purposes, shall equal the unit's potential to emit.

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# Projected Actual Emissions – 40 CFR 52.21(b)(41)

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## Projected Actual Emissions (PAE)

- Future side of equation – Remember PEI = PAE – BAE
- "the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant…" [40 CFR 52.21(b)(40)(i)]
  - Next 10 years if the project involves increasing the emission unit's design capacity or its potential-to-emit of that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source
  - Next 5 years otherwise

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## Projected Actual Emissions (PAE) - Calculation

- In determining projected actual emissions, the owner or operator…
  - Shall consider all relevant information, including but not limited to, historical operational data, the company's own representations, the company's expected business activity and the company's highest projections of business activity, the company's filings with the State or Federal regulatory authorities, and compliance plans under the approved plan; and
  - Shall include fugitive emissions to the extent quantifiable and emissions associated with startups, shutdowns, and malfunctions
  - [40 CFR 52.21(b)(40)(ii)(a) and (b)]

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## Projected Actual Emissions (PAE) - Calculation

- Preamble to 12/31/2002 rule (67 FR 80196):
- "Accordingly, you will calculate the unit's projected actual emissions as the product of:
  - (1) The hourly emission rate, which is based on the emission units operational capabilities following the change(s), taking into account legally enforceable restrictions that could affect the hourly emissions rate following the change, and
  - (2) the projected level of utilization, which is based on both the emissions unit's historical annual utilization rate and available information regarding the emission unit's likely post-change capacity utilization
  - …you should consider both the expected and the highest projections of the business activity that you expect could be achieved and that are consistent with information your company publishes for business-related purposes…"
- Projected Actual Emissions = Hourly Rate x Projected Utilization

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# Actual-to-Projected-Actual Applicability Example

A modified unit resumes normal operation in 2027 after a project was implemented in 2026. The unit's $NO_x$ PTE is calculated at 350 TPY since 2016.

| Year | Emissions (TPY) |
|---|---|
| 2016 | 100 |
| 2017 | 110 |
| 2018 | 95 |
| 2019 | 90 |
| 2020 | 90 |
| 2021 | 85 |
| 2022 | 90 |
| 2023 | 95 |
| 2024 | 100 |
| 2025 | 90 |
| 2026 | Project permit/cons |
| 2027 | 110 (projected) |
| 2028 | 120 (projected) |
| 2029 | 125 (projected) |
| 2030 | 130 (projected) |
| 2031 | 135 (projected) |

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**Potential-to-Emit of unit (before and after the 2026 project): 350 TPY**

# Actual-to-Projected-Actual Applicability Example

| Year | Emissions (TPY) |
|---|---|
| 2016 | 100 |
| 2017 | 110 |
| 2018 | 95 |
| 2019 | 90 |
| 2020 | 90 |
| 2021 | 85 |
| 2022 | 90 |
| 2023 | 95 |
| 2024 | 100 |
| 2025 | 90 |
| 2026 | Project permit/cons |
| 2027 | 110 (projected) |
| 2028 | 120 (projected) |
| 2029 | 125 (projected) |
| 2030 | 130 (projected) |
| 2031 | 135 (projected) |

NOX Potential to emit (after 2026 Project): 350 TPY

Baseline actual emissions (BAE) = 105 TPY

Projected actual emissions (PAE) = 135 TPY

Emissions increase (PEI) = **30 TPY**

MINOR MODIFICATION, not subject to PSD

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# Excluded Emissions – 40 CFR 52.21(b)(41)(ii)(C)

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## Emissions Excluded from the Estimated PAE

- The PSD rule allows the applicant to exclude part of the estimated future emissions
- These are emissions that would occur even if there was no project at or impacting upon an existing emissions unit
- These excluded emissions are often referred to as:
  - "Excluded emissions"
  - "Unrelated emissions"
  - "Demand growth emissions"
  - "Could have accommodated emissions"

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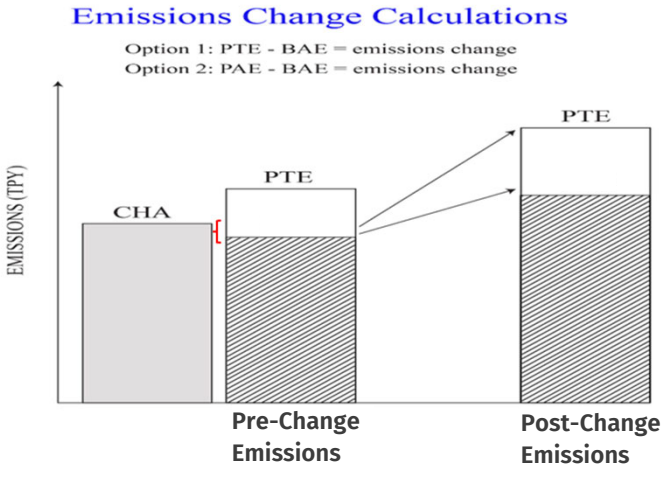
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## "Could Have Accommodated and Unrelated" Excluded Emissions

- Part of the "projected actual emissions" definition [40 CFR 52.21(b)(40)(ii)(c)]
- When estimating the PAE the applicant "shall exclude…that portion of the unit's emissions following the project that an existing unit
  - Could have accommodated (CHA) during the consecutive 24-month period used to establish the baseline actual emissions …; **and**
  - that are also unrelated to the particular project, including increased utilization due to product demand growth"
  - These are the two "prongs" of the excluded emissions provision

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## Could Have Accommodated (CHA)




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## "Could Have Accommodated and Unrelated" Excluded Emissions

- Part of the projected actual emissions (PAE) definition
- When estimating the PAE the applicant "shall exclude…that portion of the unit's emissions following the project that an existing unit
  - Could have accommodated (CHA) during the consecutive 24-month period used to establish the baseline actual emissions …; and
  - that are also unrelated to the particular project, including increased utilization due to product demand growth"
  - PAE = Highest expected post project annual emissions minus Excluded emissions (EE)
  - Where EE = Pre-project could have accommodated (CHA) emissions minus Baseline actual emissions (BAE)

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## "Could Have Accommodated and Unrelated" Excluded Emissions – Simple Example

- Plant project involves a boiler that is expected to increase utilization due to a plant expansion project.
  - Baseline actual emissions (BAE) = 100 TPY (average actual emissions during 24-month period sometime during the most recent 10 years)
  - Before the project, boiler could have accommodated (CHA) 10 tons per month (120 TPY) based on a review of the historical monthly emissions data
    - "Excluded" emissions (EE) = CHA-BAE = 20 TPY
  - Maximum expected post project emissions (annual) = 150 TPY
  - Projected Actual Emissions (PAE) = 150 TPY – 20 TPY = 130 TPY
  - Project Emissions Increase for boiler (PEI = PAE-BAE) = 130 TPY – 100 TPY = 30 TPY

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## "Could Have Accommodated and Unrelated" Excluded Emissions

- Often referred to as the "demand growth exclusion" but regulatory language is not specific to demand growth
- Potential to avoid PSD by limiting emission increase calculation (reducing PAE) to just the effect of the project itself
- Example:
  - Emission Unit A's BAE = 100 TPY (average 24 month actual)
  - During one of the 24 baseline months, Unit A's actual emissions = 10 Tons/mo (= 120 TPY annualized)
  - One can argue that 20 TPY (120–100) can be "excluded" from the emissions projection since the unit demonstrated this elevated level (during the chosen baseline period) at a time when the unit (and site as a whole) was clearly not influenced by the new (proposed) project.
  - Note: Regulators are not always satisfied with the assumption that an achieved level of emissions during the baseline period (one month max or similar) proves the same level of emissions are "unrelated to the project" after the change

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## Could have accommodated....

- Be careful not to overestimate the capacity that the emission unit is capable of accommodating
  - Averaging period is annual
    - Could unit have sustained operation at that capacity for a full year?
    - Did you adjust downward to account for required maintenance?
  - Think more broadly than just one emission unit
    - For a change to the boiler, can the plant actually handle the additional steam production?
    - Can it handle that steam year-round?

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## Unrelated to the particular project….

- Not so simple as it looks
  - Prior to the project, how accurate are engineering estimates of what increases the project will accomplish?
  - How will source be able to demonstrate that an increase in production is not the result of the project?
    - Regulatory agencies have allowed the use of historical (before the project and best if demonstrated during the 24-month baseline period) “peak” actual emissions to establish the amount “excludable” in the projected actual emissions calculation
- Overall, there is a relative void of EPA guidance for interpreting the rule language

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## 2002 Rule Preamble

- 67FR 80203 describes the excluded emissions:

“…even if the operation of an emissions unit to meet a particular level of demand could have been accomplished during the baseline period, but the increase is related to the changes made at the unit, then the emissions increases resulting from the increased operation must be attributed to the project, and cannot be subtracted from the projection of the projected actual emissions.”

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## “Could Have Accommodated and Unrelated” Excluded Emissions

- Increase utilization that follows increases in reliability, lower operating costs or improving other operational characteristics should be attributable to the change
- Any change that significantly alters the efficiency of a facility must be included in the projected emissions
- If efficiency improvements are the predominant cause of the emissions increase, then the exclusion does not apply
- The bottom-line: Although an emissions unit could have theoretically increased emissions without the project, other factors must be considered before these projected emissions are excluded – See Handouts 5-C, 5-E, and 5-F

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## Could Have Accommodated – EPA Region 3 Letter

- EPA Region 3 letter – April 20, 2010 – Northampton Generating Company – Handout 5-F
  - “...a facility is permitted to burn coal with a sulfur content up to two percent but actually burns coal with one percent sulfur during the baseline period. The company bases the projected actual emissions on continuing to burn one percent sulfur coal. Emissions that can be excluded would be limited to emissions associated with burning one percent coal, regardless of the limit that would allow them to burn a higher sulfur coal.”
  - “In other words, the emissions that "could have been accommodated" are not defined by all the many different operating conditions that could have occurred during the baseline period; rather emissions that may be excluded are limited by the proposed operating conditions used to project emissions into the future.”
  - www.epa.gov/sites/production/files/2015-07/documents/psdanalysis.pdf

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# "Could Have Accommodated and Unrelated" Exclusion (EPA and TCEQ Guidance)

- "Supporters of the demand growth provisions also argued that market factors independently cause an emissions increase absent a physical or operational change.... Several examples of this are: skyrocketing demand because the product becomes a fad; mishaps at a factory, causing production increases at remaining supplier sources; decrease in raw material prices; opening of new markets; and improved economic conditions." (EPA's Technical Support Document for the Prevention of Significant Deterioration (PSD) and Nonattainment Area New Source Review (NSR): Reconsideration – October 30, 2003 – Appendix U1)
  - Also See Handout 5-L (ADM Decatur West Soybean Plant – August 27, 2015)
- Excerpt from past Texas (TCEQ) guidance:
  - "...a demonstration would need to be made that the market conditions expected in the future are expected to be significantly different than any time in the past ten years and that if they had occurred in the baseline, they would have resulted in different operations. It is likely that this case would only be made in cases such as a prolonged outage at a major producer or a significant shift in market conditions."
- Also see TCEQ Example Number 21 in TCEQ Document "**Major NSR Applicability Examples Concepts and Calculations"**
  - **www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/fnsr_app_determ.pdf**

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# Could Have Accommodated – EPA Region 4 Letter

- EPA Region 4 letter – March 18, 2010 – GP Vortex Burner Project - Handout 5-E
  - "For PSD applicability purposes, the concept of emissions that "could have been accommodated" is relevant only in conjunction with the source's calculation of "projected actual emissions." That is, once the projected actual emissions from the source following the proposed project have been determined, the source may exclude from the projection "that portion of the unit's emissions following the project that an existing unit could have accommodated" during the baseline period, and "that are also unrelated to the particular project." See 40 CFR 52.21(b)(41)(ii)(c)."
  - "Accordingly, before any given emissions may be excluded under 40 CFR 52.21(b)(41)(ii)(c) on the basis that they result from future demand growth, those emissions must first be part of the project actual emissions based on "all relevant information" [see e.g., 40 CFR 52.21(b)(41)(ii0(a)] used to make the emission projection."

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## TCEQ – Example 21 – "Capable of Accommodating"

- "A modification is proposed that would allow for increased production at a cement kiln. The owner or operator has demonstrated that demand for cement is, and will likely continue to be, higher than experienced during any sustained period over the last ten years. They have identified the baseline period as the years 2008 and 2009. The owner or operator also indicates that the baseline actual emission rate does not include an adjustment for emissions that they were capable of accommodating during the baseline period."
- "The owner or operator proposes to determine what could have been accommodated by determining the highest production for a 30 day period (that's a 30 consecutive day time frame, not a few days here and a day or two there, added to obtain a 30 day value) during the baseline time frame, and verify that they have and will operate for 24 consecutive months without an extended shutdown. That annualized production rate represents what they could have produced during the baseline period."

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## US EPA v. Ameren (2016/2017)

- Ameren operates boilers at its baseload utility plant in Rush Island, MO.
- Memorandum and Order (2/24/2016) and Memorandum Opinion and Order (1/23/17)
  - Ameren allegedly undertook major modifications at their Rush Island Plant without obtaining the requisite permits.
  - In 2015/2016, the court considered nine separate motions for partial summary judgment – most were denied. A trial followed in the US District Court Eastern District of Missouri. The issues were decided in January, 2017.
  - Two projects are at issue with EPA. Units 1 and 2 of the Rush Island Plant are coal-fired electric generating units that operate nearly continuously when available.
    - EPA alleges that Ameren performed major modifications on Unit 1 from approximately February 2007 to May 2007 ("2007 Project") when it replaced the Unit's economizer, reheater, lower slope tubes, and air preheater.
    - EPA also alleges that Ameren performed major modifications on Unit 2 from approximately January 2010 to April 2010 ("2010 Project") when it replaced the Unit's economizer, reheater, and air preheater.

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## US EPA v. Ameren (2016/2017)

- EPA alleges, for each project, that Ameren violated the PSD requirements in the CAA and the Missouri SIP because it:
  - (1) did not obtain a PSD permit for construction and operation of the modified unit;
  - (2) did not undergo a BACT determination;
  - (3) did not install BACT for control of $SO_2$ emissions;
  - (4) failed to operate BACT for control of $SO_2$ emissions;
  - (5) failed to operate in compliance with BACT emissions limitations;
  - (6) operated the units after undergoing an unpermitted major modification.
- EPA also alleges that Ameren violated Title V of the CAA because Ameren failed to submit an accurate and complete Title V permit application and by commencing major modifications at Units 1 and 2 without obtaining a PSD permit.

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## US EPA v. Ameren (2016)

- Could Have Accommodated and Unrelated Exclusion - Legal Standard
  - "…Ameren argues that "unrelated" [to the project] means any emissions increases a unit could have accommodated at baseline."
  - "EPA argues that such an interpretation impermissibly collapses the two prongs of the demand growth exclusion into one and makes the entire second prong ("and that are also unrelated to the particular project, including any increased utilization due to product demand growth") superfluous."
  - Judge agreed with EPA writing:
    - The difference between the two prongs of the demand growth exclusion – and in particular how to determine if emissions increases are "related" to a project – can perhaps be best understood by looking at different fact scenarios.
    - (1) If Ameren ran its units more often after the projects just because demand grew, for example, then we can easily say that any increased emissions were unrelated to the projects.
    - (2) Likewise, if emissions increased because of changes in weather patterns or in the type of coal being used, those increased emissions would probably not be related to the projects.
    - (3) However, if emissions increase because a project enables the unit to meet previously unmet demand during peak hours, for example, those emissions increases are likely related to the project and therefore do not qualify for the demand growth exemption.

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## US EPA v. Ameren (2017)

- At the trial, the court focused its attention to the details of the modifications performed in 2007 and 2010 and how they would be expected to increase the unit availability factors
  - Ameren witnesses testified that the projects were justified (at least partially) based on unit availability issues they were experiencing.
    - "Ameren's project authorization for Unit 1 stated that "as a result" of the replacements, "Rush Island will eliminate forced outages due to reheater tube leaks for 20 years, eliminate 30 to 50 MW load reductions due to flyash pluggage of the current economizer, and reduce the number of tube leaks caused by slag falling on the furnace lower slopes."
    - "Further evidence of Ameren's expectation of availability improvements is found in Plaintiff's Exhibit 126, which was a presentation that Mr. Meiners made to senior executives at a business plan meeting. One of the purposes of the presentation was to discuss component replacements and the condition of the reheater, economizer, air preheater, and lower slopes. At the end of the presentation, Mr. Meiners presented a graph showing that Rush Island's availability would increase by almost 5%, from about 90% in 2005-2006 to 95% in the first year after both major boiler outages had been completed."

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## US EPA v. Ameren (2017)

- Ameren's emissions change calculations for both projects were flawed due (mainly) to the "un-relatedness" assumption – Ameren assumed all emissions above the baselines were/are unrelated to the activities performed in both projects.
  - At the trial, the Judge did not focus on the baseline assessments.
  - However, EPA's experts were able to prove that each project enhanced both the units' future availability (less annual down time) and capacity. Small efficiency improvements did not "offset" the emissions increases that should have been considered (and actually occurred) as a result of the increased availability and capacity of the units.
  - Ameren's "could have accommodated" flawed emissions justifications were based on measured short-term (95th percentile) emissions (prior to the projects) combined with unrealistic availability assumptions (prior to the projects).

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# Option to use PTE (as PAE) for Existing Units

- The rule allows the applicant to simplify the assessment of Projected Actual Emissions (PAE).
- PAE can be set equal to the existing emission unit's potential-to-emit (PTE). This is typically done by setting a new limit in the emission unit's permit – 40 CFR 52.21(b)(41)(ii)(D)
- The rule does NOT employ the concept of excluded emissions when setting PAE=PTE.

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# EPA and Startup, Shutdown, and Malfunction (SSM) Emissions

The EPA's stance on Startup, Shutdown, or Malfunction (SSM) emissions has varied over the years. This topic was brought to the forefront in 2011 when Sierra Club filed a petition that some State Implementation Plans (SIPs) violated provisions of the Clean Air Act (CAA), which require that emission sources continuously meet emission limitations. In 2013, EPA published a proposed rule in response to the 2011 Sierra Club petition and in September 2014, EPA further expanded their proposal on SSM emissions to eliminate all Affirmative Defense from SIPs for any CAA violation including malfunctions. On May 22, 2015 EPA administrator Gina McCarthy signed the final "SSM SIP Call" rule. In the final rule, EPA finds that SIP provisions in 36 states are substantially inadequate and require revision. This memo outlines current SSM items that industrial facilities should consider for air quality permitting and compliance and how the SSM SIP Call rule impacts industrial facilities.

## BACKGROUND

Air emissions are categorized into the following:

- **Normal Emissions** include production operation emissions and are permitted.
- **Planned startup and shutdown (Planned SS) Emissions** include operations that are predictable and planned, which may be permitted.
- **Unplanned SS/Malfunction/Emission Events** include emissions that are not authorized and result from accidents, malfunctions, unexpected emissions during SS, and non-compliant operations.

The term SSM refers to startup, shutdown or malfunction at a source. It does not include periods of maintenance at such a source. An SSM event is a period of startup, shutdown or malfunction during which there are exceedances of the applicable emission limitations and thus excess emissions.

In numerous guidance documents, EPA has stated the position that all excess emissions, regardless of cause should be treated as violations since any emissions above the permit allowable could contribute to a violation of the National Ambient Air Quality Standards (NAAQS).[1] Treatment of excess emissions as a violation is meant to provide sources with incentive to design their facilities properly in the first stance and to improve their operation and maintenance practices over time.[2] Due to the latter, EPA has allowed state and federal enforcement discretion for violations due to excess emissions that meet certain criteria including Affirmative Defense to monetary penalties under limited circumstances.[3] Currently

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[1] September 28. 1982, U.S. EPA Memo from Kathleen M. Bennett (Assistant Administrator for Air, Noise, and Radiation) To Regional Administrators, Region I – X, Re: *Policy on Excess Emissions During Startup, Shutdown, Maintenance, and Malfunctions*.

[2] February 4, 2013 Memorandum to Docket for rulemaking, "State Implementation Plans: Response to Petition for Rulemaking; Findings of Substantial Inadequacy; and SIP Calls to Amend Provisions Applying to Excess Emissions During Periods of Startup, Shutdown, and Malfunction" (EPA-HQ-OAR-2012-0322), Re: *Statutory, Regulatory, and Policy Context for this Rulemaking*.

[3] February 4, 2013 Memorandum to Docket for rulemaking, "State Implementation Plans: Response to Petition for Rulemaking; Findings of Substantial Inadequacy; and SIP Calls to Amend Provisions Applying to Excess

states may allow Affirmative Defense to shield a facility from penalties per each state's discretion.

In 2013, EPA published a proposed rule about SSM in response to the 2011 Sierra Club petition.[4] The proposed rule stated "planned" events of SS are considered normal operations and therefore, exceedances of emission limits during these periods are violations of the CAA. A provision to keep Affirmative Defense for malfunctions in SIPs was included in this 2013 proposed rule. 36 states were included in the SIP Call. In September 2014, EPA further ratcheted down their proposal on SSM to eliminate all Affirmative Defense from SIPs for any SSM event excess emissions including malfunctions. The final SSM SIP Call was signed on May 22, 2015. The pre-publication federal register notice includes both EPA's updated SSM SIP Policy as well as guidance to the states for consideration when establishing alternate limits.

**Summary of the Petition & EPA's Response**

| **Petitioners Request** | **EPA Final Action** |
|---|---|
| ***Remove Affirmative Defense***<br>Shield sources from monetary penalties when certain criteria are met (i.e., making repairs expeditiously, taking all possible steps to minimize emissions, and operating in a manner consistent with good practices for minimizing emissions). | ***Grant***<br>SIPs cannot include affirmative defense provisions that alter the jurisdiction of the courts to assess penalties in judicial enforcement proceedings. |
| ***Remove Automatic Exemptions and Discretionary Exemptions***<br>Exemptions that result in gaps in continuous emission limitation of a source (i.e., limits apply at all times other than startup, shutdown, or malfunction). | ***Grant (and partially deny for certain states)***<br>Emission limitations under the CAA are required to be continuous. Exemptions result in a gap in continuous limitation. Further, exemptions preclude EPA or public from pursuing penalties and injunctive relief. |
| ***Disapprove reliance on interpretive letters from state agencies***<br>Separate "letters of interpretation" from the state to the EPA to clarify ambiguity or perceived ambiguity in the provisions in a SIP submission. | ***Deny***<br>EPA believes that it has statutory authority to rely on interpretive letters to resolve ambiguity in a SIP submission so long as an appropriate process is followed to assure the record properly reflects this reliance. |

Emissions During Periods of Startup, Shutdown, and Malfunction" (EPA-HQ-OAR-2012-0322), Re: *Statutory, Regulatory, and Policy Context for this Rulemaking*.

[4] 78 FR 12459 (February 22, 2013).

**Timeline**

States have until November 22, 2016 to submit revised SIPs to EPA. States that miss this deadline may be subject to sanctions under CAA Section 179, such as a 2-to-1 emission offset requirement for all new and modified major sources subject to the nonattainment NSR program and restrictions on highway funding. A missed deadline will also trigger EPA to implement a FIP within 2 years.

**So what is an industrial facility to do now with the rule finalized?**

For now, industrial facilities should follow the rules of their applicable state for permitting and compliance. Companies should monitor and participate in the rulemaking process in their state(s) in the coming 18 months. Additionally, it is expected that enforcement of excess emissions during SSM will have increased enforcement by states and EPA including monetary penalties and/or injunctive relief. Trinity recommends companies take the following steps:

- Identify SSM events for existing sources;
- Quantify emissions to evaluate which have associated excess emissions;
- Implement SSM related recordkeeping;
- Evaluate strategies to comply with new SIPs including modifications to sources and/or addition of controls; and
- Consider the potential need to modify permit(s) based on new control strategies.

The key considerations for SSM related to Prevention of Significant Deterioration (PSD)/Nonattainment New Source Review (NNSR) permitting, Maximum Achievable Control Technology (MACT), and State Rules are summarized below as well as practical steps to evaluate and minimize upset events and associated emissions.

## SSM AND APPLICABILITY TO PSD/NNSR RULES

The federal PSD and NNSR pre-construction permitting programs are one of the major ways that EPA and states can control air quality. New major sources and major modifications to sources must be properly permitted under the PSD or NNSR program. The determination of what constitutes a "major new source" or "major modification" is based on the "potential to emit" (PTE) of the source. EPA has traditionally held that PTE is based on the facility's maximum hourly emission rate under normal operating conditions that apply to sources continuously. Continuous compliance can be difficult 100% of the time. Individuals that have worked at just about any industrial facility knows that things do not always go according to plan. Despite the best intentions of engineering and operating staff, process upsets will occur. These upsets can range from minor inconveniences to major malfunctions of the entire facility. Process upsets can cause a facility to emit higher than normal levels from sources such as flares controlling pressure relief valve emissions, spills of organic liquids, and control device bypasses. These extra emissions can create problems for facilities trying to demonstrate compliance with their air quality permits. While some permits and federal and state regulations specifically address upset emissions, most permits and rules are silent on the issue.

EPA's stance has been that startup and shutdown emissions are part of normal operations and therefore, must be included in all NSR requirements including PTE, Best Available Control

Technology (BACT) analyses, and air quality analyses.[5] "Planned" emissions historically were required to be included in NSR requirements; whereas, upsets (or emission events) were, by definition, not normal operating conditions, and therefore, have not been traditionally considered part of PTE. The PSD/NNSR rules, Clean Air Act, judicial decisions, and EPA guidance, for the most part, do not address upsets and PTE. In fact, certain interagency memos have gone so far as to suggest that the issue should not be addressed in PSD permits.[6]

With the 2013 SIP Call and 2015 SSM SIP call, the dilemma is how to include upset emissions when calculating PTE for purposes of PSD and NNSR. EPA has not provided a clear answer to this question. In the past, the agency indicated that each exceedance of a permit condition would be evaluated on a case-by-case basis, and that truly unavoidable exceedances could be excused. While this approach was desirable in that it considers the unique circumstances of each individual incident, it did not provide a facility with any certainty in understanding which upsets were acceptable. With the SSM SIP Call finalized, affirmative defense will no longer be available for SSM excess emissions. EPA is unsure at this time whether existing affirmative defense criteria could be converted into a work practice requirement to apply during malfunctions in place of an otherwise applicable emission limitation. However, states may elect to revise affirmative defense provisions to make them "enforcement discretion" provisions that apply to administrative enforcement by the state - so long as the rule is clear that there is no affirmative defense from judicial enforcement, EPA, or the public. To reduce the potential for violations, industrial facilities will want to ensure planned SS are authorized and malfunctions are minimized.

Under the reformed NSR rules (2002), facilities could determine the applicability of PSD and/or NNSR review by comparing past actual emissions to projected future actual emissions as shown in the below equation.

> Emissions Increase =
> Future PTE (or Projected Actual Emissions [PAE]) – Baseline Actual Emissions (BAE)

Where, the inputs to the equation include the following:

- **Baseline Actual Emissions (BAE)** include historic past actual emissions including historic SSM emissions adjusted downward to exclude any non-compliant emissions. If alternative operating scenarios are authorized, the emissions should be included.
- **Projected Actual Emissions (PAE)** (if used) include planned SS emissions. Alternative operating scenarios should be included. Malfunctions would be set equivalent to the baseline.

As a result, permit conditions can be limited based on "planned" SS. In addition to PTE calculations, SS emissions and Alternative Operating Scenarios must be addressed in the BACT and air quality impacts analysis. If SS emissions are greater than normal emissions, the BACT analysis may require a limit on the number of events or event duration. The air quality analysis

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[5] January 28, 1993, Memorandum from Mr. John B. Rasnic, Director, Stationary Source Compliance Division, Office of Air Quality Planning and Standards, U.S. EPA, to Ms. Linda M. Murphy Director, Air, Pesticides and Toxics Management Division, U.S. EPA Region 1, Re: Automatic or Blanket Exemptions for Excess Emissions During Startup, and Shutdowns Under PSD.

[6] December 31, 1997, letter from Edward Reich, Director, Division of Stationary Source Enforcement, EPA to G.T. Helms, Deputy Director Air and Hazardous Materials Division, EPA.

must include an assessment of SS versus normal operations and may also result in separate emission limits and/or permit conditions.

The question still persists how upsets should be considered in PTE when they are unpredictable and out of the control of an industrial facility. With the SSM SIP Call, states are now required to evaluate special emission limits, control measures, or control techniques to provide industrial facilities a means of compliance. In lieu of automatic/discretionary exemptions, EPA anticipates that a state may elect to create an alternative emission limitation that applies during startup and shutdown events. In this case, startup and shutdown emissions would not be exempt from compliance but rather would be subject to a different enforceable standard developed to the applicable requirement (i.e., Reasonably Available Control Technology [RACT] or Reasonably Available Control Measure [RACM]). A state would need to account for emissions attributable to these foreseen events in emissions inventories and modeling demonstrations should this be proposed for a SIP. Further, if a revised SIP will modify limit averaging times to account for higher startup and shutdown emissions, the state will need to demonstrate how the variability of emissions might affect NAAQS attainment/maintenance (ex., 30-day averaging period and an 8-hour NAAQS). Facilities, therefore, may need to make changes to physical equipment or operating practices to comply with emission limits and minimize malfunctions to limit potential enforcement exposure.

"Planned and predictable" excess emissions have been addressed by some states, including Texas. In January 2006, the Texas Commission of Environmental Quality (TCEQ) phased out affirmative defense for emissions from planned and predictable Maintenance, Startup, and Shutdown (MSS) activities and required these emissions to be permitted via a schedule developed by the TCEQ. This has greatly impacted Major and Minor NSR Permitting in Texas as outlined in the State Rules section of this memo.

## UPSETS AND MACT

Unlike the PSD and NNSR rules, historically the SSM provisions contained in the MACT rules of 40 CFR Part 63 contain specific requirements on upsets. Beginning in 1994, most MACT rules relied on the general SSM exemption in Subpart A [40 CFR 69.6(f)(1) and (h)(1)]. Affected facilities were required to develop a SSM plan to address what steps will be taken to minimize SSM emissions, make the plans available to EPA, report when the plan was not followed, and revise the SSM plan if the facility frequently experiences upsets and does not follow the plan. After a 2009 vacature of the general SSM exemption of Subpart A, EPA began including language allowing an affirmative defense to civil penalties for violations caused by malfunctions under circumstances entirely beyond the control of the source. SS emissions were addressed by either requiring compliance with the standard at all times or setting SS limits or SS work practice standards.

In 2014, a D.C. Circuit court decided that EPA lacked authority to include an affirmative defense provision in NESHAP.[7] As a result, EPA has recently proposed changes to specific MACT standards for the Petroleum Refinery Industry, whereby emissions limits established for normal operations would also apply during SSM events without including the affirmative defense

[7] Portland Cement NESHAP decision (Natural Resources Defense Council (NRDC) v. EPA, 749 F.3d 1055

provisions for periods of malfunction.[8] As comments are received and the final rule is adopted, impacts on industry may be extensive as design and operational changes may need to occur. Proposed changes to this MACT may then impact other MACT standards and how SSM are addressed for industries.

## STATE RULES

As one would expect, different states and local jurisdictions employ a variety of approaches for addressing SSM emissions. Based on the final SIP Call, EPA identified 36 states where SIPs included one or more of the following: automatic exemptions (i.e., excess emissions during SSM are permitted), discretionary exemptions (i.e., excess emissions during SSM are permitted based on a demonstration to the agency), or affirmative defense provisions. SIPs are required to be revised by November 2016. Some states, including Texas, have already addressed planned MSS emissions in rulemaking. The remainder of this section outlines EPA guidance to states as well as a detailed look at TCEQ's approach.

### EPA SIP Call Guidance to States

EPA provided guidance in the 1999 SSM Guidance providing recommendations to states regarding alternative emission limits and how limits could be established. This guidance was clarified in the SSM SIP Call. EPA recommends that states consider the seven clarified criteria when developing new alternative emission limitations to replace automatic or discretionary exemptions:

1. The revision is limited to specific, narrowly defined source categories using specific control strategies;
2. Use of the control strategy for this source category is technically infeasible during startup or shutdown periods;
3. The alternative emission limitation requires that the frequency and duration of operation in startup or shutdown mode are minimized to the greatest extent practicable;
4. As part of its justification of the SIP revision, the state analyzes the potential worst-case emissions that could occur during startup and shutdown based on the applicable alternative emission limitation;
5. The alternative emission limitation requires that all possible steps are taken to minimize the impact of emissions during startup and shutdown on ambient air quality;
6. The alternative emission limitation requires that, at all times, the facility is operated in a manner consistent with good practice for minimizing emissions and the source uses best efforts regarding planning, design, and operating procedures; and
7. The alternative emission limitation requires that the owner or operator's actions during startup and shutdown periods are documented by properly signed, contemporaneous operating logs or other relevant evidence

[8] 40 CFR Parts 60 and 63, EPA ID Docket No. EPA-HQ-OAR-2010-068, Petroleum Refinery MACT Risk and Technology Review and New Source Performance Standards.

In addition, the following EPA criteria should be considered by States as they are evaluating potential SIP revisions:

- Operation in startup or shutdown mode should be minimized to the greatest extent practicable;
- It may be appropriate to have a numerical emission limitation that has a higher numerical level applicable during specific modes of source operation, such as during startup and shutdown. These limits cannot be inappropriately high or an effectively unlimited or uncontrolled level of emissions (de facto exemption);
- It may be appropriate for the SIP emission limitation to include a specific technological control requirement or specific work practice requirement that applies during specified modes of source operation such as startup and shutdown;
- Need to meet the applicable overarching CAA requirements with respect to the SIP emission limitation at issue (i.e., RACT); and
- Generic clauses are not a valid substitute for more specific emission limitations (i.e., "general duty to minimize emissions" provision or an "exercise good engineering judgment".

**Texas MSS**

The TCEQ revised its upset rules to address planned MSS emissions in 2006. Texas facilities currently have three mechanisms through which to authorize emissions that are in excess of their traditional permitted limits:

1. Include an allocation for MSS emissions in their state minor new source, PSD, or NNSR permit;
2. Authorize the MSS emissions under a permit-by-rule (PBR) mechanism; or
3. Claim that the emissions were unavoidable ("upset" emissions).[9]

The first approach provides the greatest degree of certainty about whether the facility is in compliance with its permits. However, it presents a number of problems, including determining how to estimate the amount of "planned" MSS emissions to include in the permit. Including non-routine emissions in the facility's permits may increase the difference between actual and potential emissions, causing problems with PSD and NNSR applicability. In addition, if the facility is in a nonattainment area, questions arise regarding the potential need to purchase offsets for the non-routine emissions.

[9] Texas is part of the final SSM SIP call where affirmative defense will no longer be acceptable for upsets/malfunctions. In the June 12, 2015 final "SSM SIP Call" rule, EPA found that SIP provisions in 36 states were substantially inadequate and required revision, including Texas since Title 30 Texas Administrative Code (30 TAC) included Affirmative Defense in four (4) places for excess emissions that occur during upsets (30 TAC 101.222(b)), unplanned events (30 TAC 101.222(c)), upsets with respect to opacity limits (30 TAC 101.222(d), and unplanned events with respect to opacity limits (30 TAC 101.222(e)). On July 6, 2016, TCEQ approved proposed rulemaking for 30 TAC Chapter 101 *General Air Quality Rules* to add clarification of affirmative defense provisions through the addition of 30 TAC 101.222(k) to provide clarification that the affirmative defenses for excess emissions that occur during upsets, unplanned events, upsets with respect to opacity limits, and unplanned events with respect to opacity limits listed in §101.222(b) - (e) are not intended to limit the jurisdiction or discretion of federal courts, and 30 TAC 101.222(l) to provide a timeframe upon which subsection (k) will be applicable, i.e., not until all appeals regarding the EPA's SSM SIP Call are completed and the affirmative defense provisions in the listed subsections are prohibited. On October 14, 2016, these changes were approved by the Commission for Rulemaking Adoption. TCEQ anticipates the effective date will be November 24, 2016.

The second approach, authorizing non-routine emissions under permit-by-rule mechanisms, offers an attractive way to deal with small amounts of excess MSS emissions. This option requires notification of the emissions but minimizes the amount of attention generated by small emissions. TCEQ allows only "planned" emissions (i.e., emissions from planned startups, shutdowns, and maintenance) to be authorized using the permit-by-rule approach.

The third approach, claiming that the upset emissions were unavoidable, has been appealing because of its fairness. By excusing upsets that are unavoidable even when significant precautions are taken, this approach rewards facility operators who take extra steps to improve the reliability of their processes. Similarly, facilities that do not attempt to improve their process reliability must convince the agency that an upset was unavoidable. With the SSM SIP Call, this third option will be eliminated and TCEQ will be required to address upsets through special emission limits, control measures, or control techniques to minimize excess emissions. Industrial sites should watch TCEQ's proposed rulemaking regarding upset emissions to determine future implications.

## PRACTICAL STEPS

Environmental managers can minimize the impact of upset emissions to their facility's compliance by taking three basic steps:

- Understand your upset emissions;
- Identify and eliminate the causes of upsets; and
- Remove vague and unworkable permit language.

Facilities have long been required to quantify upset emissions. For example, the EPCRA/CERCLA regulations require facilities to report emergency releases of listed pollutants that are above the reportable quantity; however, releases that are within their permitted limits are not required to be reported under EPCRA/CERCLA. Because of requirements like these, environmental personnel should already have a good grasp on the quantity and frequency of their facilities' upset emissions.

Once environmental staff at a facility understands where upset emissions are coming from, they can explore the cause of the emissions. Many of the facilities that generate frequent upset emissions (such as refineries) are subject to the EPA Risk Management Program and/or OSHA Process Safety Management standards. These programs require facilities to, among other things, identify and correct process hazards through the Process Hazard Analysis. Such a rigorous, systematic approach could be applied to identify the causes of upset emissions and determine what steps, if any, could be taken to eliminate those emissions. No matter what technique is used, environmental personnel should work to determine the causes of upsets and eliminate them.

Many permits, particularly ones written prior to the early 1990s, often contain vague requirements related to the operation of emissions control devices and minimizing upset emissions. Examples of such terms include: "Permittee will operate control equipment in accordance with good air pollution control practices." It is likely that each person who reads this article will have a different interpretation of what constitutes "good air pollution control practices." Such vague language should be eliminated from permits when possible, typically on

permit renewal.

## Summary of Applicability Equations

- Net Emissions Increase/Change (NEI)
  - NEI = PEI-CCD+CCI
- Project Emissions Increase (PEI)
  - New Units (less than two years old)
    - PEI = PTE – 0
  - Existing/replacement Units (rule allows 2 calculation options)
    - PEI = PAE – BAE  OR
    - PEI = PTE (post modification) – BAE

PAE = Maximum projected annual post-project emissions minus emissions unrelated to change and "could have accommodated" during baseline period (excluded emissions)

BAE = Baseline Actual Emissions

PTE = Potential to Emit - Often set by permit

CCD = Contemporaneous Creditable Decreases

CCI = Contemporaneous Creditable Increases

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# Emissions Documentation/Source Obligation – 40 CFR 52.21(r)

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## Emissions Documentation

- When the US EPA amended the NSR rules in 2002 to include the PAE applicability element for existing units, it did so with the assumption the states would normally accept the applicants reasonable assessment of the projected emissions (and the excluded emissions)
  - Whether, and to what degree, the states and/or EPA should/can "second guess" the applicants emissions projections before construction commences has been hotly debated
- An actual compliance assessment can be made "after-the-fact" when the emissions from the modified units are known and rule mandated reports are submitted. This is a "project-and-report" process.
  - But not all projects are significant enough to require close monitoring of the post-project emissions. Therefore, the rule uses a "Reasonable Possibility Test" to determine which projects need to be tracked after construction is complete and the new level of emissions is occurring
  - Some states have included specific permit conditions to address this aspect of the NSR rules (for projects that trigger the "Reasonable Possibility Test")

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## Preamble on Emissions Documentation Requirements

- Key preamble provisions from 72 FR 72611 - December 21, 2007 ("Reasonable Possibility" rule):
  - "We [EPA] believe this pre-change recordkeeping requirement establishes an adequate paper trail to allow enforcement authorities to evaluate the source's claims concerning what amount of an emissions increase is related to the project and what amount is attributable to demand growth."
  - "…we recognize that for some limited types of projects, additional information may be required to determine whether a projected emissions increase is related to the change. The source must retain pre-change records that describe the project, identify the units that could be affected, describe the baseline actual emissions, the projected actual emissions, and the emissions excluded due to demand growth with an explanation as to why they were excluded."
  - "These records provide permitting authorities and enforcement officials sufficient information to determine whether the type of project undertaken could have a causal link to increases in emissions due to demand growth. With these records, enforcement authorities will have an adequate starting point to make further inquiries and to access other types of records…"

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## Reconsideration - Denied

- The state of New Jersey had long sought reconsideration of the NSR emissions documentation requirements
- On November 5, 2019, the EPA notified New Jersey that they were no longer reconsidering the 2007 "Reasonable Possibility" rule amendments (see Handout 5-BB)
  - "Because the EPA is now reaffirming that the Act does not mandate reconsideration of the 2007 rule, and because the EPA has further concluded that additional public comment is neither necessary nor warranted, I am notifying you that:
    - (1) the discretionary reconsideration proceeding announced in April 2009 has ended; and
    - (2) the EPA is not considering making any changes to the 2007 rule, nor is the agency soliciting additional public comment on the content of that rule."

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## Emissions Documentation (Records) (40 CFR 52.21(r)(6)(vi))

- Reasonable Possibility (RP) – Applies to modifications that do not trigger major NSR
- A project has a reasonable possibility to cause a significant emissions increase if:
  - Paragraph (A): If the "projected actual emissions increase" (PEI) equals or exceeds 50% of the applicable NSR significant emission rate (SER) – 40 CFR 52.21(r)(6)(vi)(a)
  - Paragraph (B): If the PEI + "excluded emissions" equals of exceeds 50% of the applicable NSR SER – 40 CFR 52.21(r)(6)(vi)(b)
- For PSD, the reasonable possibility triggers are PEI > 20 tpy for SO2, NO2, VOC, etc. (50% of the applicable SER)
- Above these emissions thresholds, additional recordkeeping burdens apply
- Note: The "projected actual emissions increase" should be interpreted as the PEI (i.e. PAE minus BAE for modified existing units, etc.)

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## Emissions Documentation – 40 CFR 52.21(r)(6)(i)

- EUSGUs - In circumstances where there is a reasonable possibility (Paragraph B alone triggers this requirement) that a project (not considered a major modification by the owner/applicant), may result in a significant emissions increase of a pollutant:
  - Before beginning actual construction, the owner or operator shall provide a copy of the information set out in paragraph 52.21(r)(6)(i) to the Administrator:
  - A description of the project
  - Emission units affected by the project
  - Applicability test used to determine the project is not a major modification
    - Baseline actual emissions
    - Projected actual emissions
    - Emissions excluded from the projected actual emissions
    - Any netting calculations
- Non-EUSGUs – Same as above but no submittal required (recordkeeping only)

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## Emissions Documentation (non-EUSGUs) – 40 CFR 52.21(r)(6)(iii)

- For non-EUSGUs, in circumstances where there is a reasonable possibility [when both Paragraph A and Paragraph B apply] that a project (not a major modification) may result in a significant emissions increase, owners must maintain records of actual emissions for five years after the proposed project; ten years if the project changes the design capacity or the potential to emit of a NSR regulated pollutant.

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## Emissions Documentation (EUSGUs) – 40 CFR 52.21(r)(6)(iv)

- For EUSGUs, in circumstances where there is a reasonable possibility [when both Paragraph A and Paragraph B apply] that a project (not part of a major modification) may result in a significant emissions increase, owners must submit within 60 days after the end of each year the actual post change emissions calculations. Submittals occur for five years after the proposed project; ten years if the project changes the design capacity or the potential to emit of a NSR regulated pollutant.

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## Emissions Documentation (non-EUSGUs) – 40 CFR 52.21(r)(6)(v)

- The PSD rules do not require a pre-construction submittal for non-EUSGUs engaging in minor NSR (local SIP pre-construction permitting procedures still must be followed – 40 CFR 52.21(r)(3))
- Assuming both Paragraph A and Paragraph B apply, records must be submitted to the permitting authority when the post change actual emissions exceed the baseline by a significant amount and the post change actual emissions exceed the original pre-construction projections (40 CFR 52.21(r)(6)(v)):
  - The name, address and telephone number of the major stationary source;
  - The annual emissions as calculated pursuant to paragraph (r)(6)(iii) (see prior slide) of this section; and
  - Any other information that the owner or operator wishes to include in the report (e.g., an explanation as to why the emissions differ from the preconstruction projection).
- What then? – Rule ends there, but:
  - See 72FR 72612 – "The project-specific records and reports created pursuant to this rule (see, e.g., 40 CFR 52.21(r)(6)) will provide an adequate paper trail for reviewing authorities and will be supplemented with records that are kept for other purposes for use by a reviewing agency in determining whether enforcement action is warranted."

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# Example Permit Language (Louisiana)

**SPECIFIC REQUIREMENTS**
**AI ID: 1432 - Graphic Packaging International LLC - West Monroe Mill #31**
**Activity Number: PER20240002**
**Permit Number: 2160-00001-V24**
**Air - Title V Regular Permit Minor Mod**

**GRP 0015 L02025/L02026 - Blow Tank CAP**

**Group Members: EQT 0126 EQT 0127**

| | |
|---|---|
| 994 [LAC 33:III.501.C.6] | Annual Throughput recordkeeping by electronic or hard copy monthly. Keep records of the total throughput each month, as well as the total annual throughput for the last twelve months. Make records available for inspection by DEQ personnel. |
| 995 [LAC 33:III.501.C.6] | Submit report : Due annually, by the 30th of April. Report the total annual throughput for the preceding calendar year to the Office of Environmental Compliance. This report can be combined with reports required under LAC 33:III.537 G.C. XI. Any written report submitted in advance of the time frame specified in this requirement, may serve to meet the reporting requirements of this Condition provided all information specified in Paragraph D of Louisiana General Condition XI is included. |

**GRP 0016 L05004/L05005 - Paper Machine Nos. 6 & 7 CAP**

**Group Members: EQT 0178 EQT 0180**

| | |
|---|---|
| 996 [LAC 33:III.501.C.6] | Annual Throughput <= 1,059,960 Air-dried tons pulp/yr. Noncompliance with this limitation is a reportable violation of the permit. Notify the Office of Environmental Compliance, if the annual throughput exceeds the maximum listed in this specific condition for any twelve consecutive month period. |
| 997 [LAC 33:III.501.C.6] | Annual Throughput monitored by technically sound method continuously.<br>Which Months: All Year Statistical Basis: None specified |
| 998 [LAC 33:III.501.C.6] | Annual Throughput recordkeeping by electronic or hard copy monthly. Keep records of the total throughput each month, as well as the total annual throughput for the last twelve months. Make records available for inspection by DEQ personnel. |
| 999 [LAC 33:III.501.C.6] | Submit report : Due annually, by the 30th of April. Report the total annual throughput for the preceding calendar year to the Office of Environmental Compliance. This report can be combined with reports required under LAC 33:III.535. |
| 1000 [LAC 33:III.509.R.6] | Before commencing the change in the method of operation associated with the Paper Machine Nos. 6 and 7 CAP (GRP0016, L05004/L05005) described in Permit No. 2160-00001-V21, the permittee shall document and maintain a record of the following information: 1) a description of the project; 2) the emissions units whose emissions of a regulated pollutant could be affected by the project; and 3) a description of the applicability test used to determine that the project is not a major modification for any regulated pollutant, including the baseline actual emissions, the projected actual emissions, the amount of emissions excluded from the projected actual emissions (the demand growth exclusion) and an explanation for why such amount was excluded. |

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# Example Permit Language (Lousiana)

**SPECIFIC REQUIREMENTS**
**AI ID: 2416 - CF Industries Nitrogen LLC - Donaldsonville Nitrogen Complex**
**Activity Number: PER20230004**
**Permit Number: 0180-00004-V23**
**Air - Title V Regular Permit Minor Mod**

**UNF 0001 CFInd - Donaldsonville Nitrogen Complex**

| | |
|---|---|
| 529 [LAC 33:III.509.R.6] | Before beginning actual construction of the project(s) proposed in the application dated July 13, 2016, permittee shall document and maintain a record of the following information: 1) a description of the project; 2) the emissions units whose emissions of a regulated pollutant could be affected by the project; and 3) a description of the applicability test used to determine that the project is not a major modification for any regulated pollutant, including the baseline actual emissions, the projected actual emissions, the amount of emissions excluded from the projected actual emissions (the demand growth exclusion) and an explanation for why such amount was excluded, and any netting calculations, if applicable. |
| 530 [LAC 33:III.509.R.6] | Permittee shall monitor NOx and CO emissions from the project(s) listed in the application dated July 13, 2016, and calculate and maintain a record of the annual emissions, in TPY on a calendar year basis, for a period of 10 years following resumption of regular operations. |
| 531 [LAC 33:III.509.R.6] | Permittee shall submit a report to LDEQ within 60 days after the end of the year if annual NOx and CO emissions, in TPY, from the project(s) described in the application dated July 13, 2016, exceed the baseline actual emissions by a "significant" (as defined in LAC 33: III.509.B) amount, and if such emissions differ from the preconstruction projection. This report shall contain the following: 1) the name, address, and telephone number of the major stationary source; 2) the annual emissions; and 3) any other information that the owner or operator wishes to include in the report (e.g., an explanation as to why the emissions differ from the preconstruction projection). |

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# Example Permit Language

- A reasonable possibility, as defined under paragraph (r)(6) of 40 CFR §52.21, exists for $H_2S$, $NO_x$, PM, $PM_{10}$, $PM_{2.5}$, and $SO_2$ due to the recovery furnace project requested in the PSD application for Permit 0271-AOP-R16.
  - The permittee shall monitor the emissions of any regulated NSR pollutant that could increase as a result of the Recovery Furnace (SN-02) upgrade project (as requested in the permit application for Permit 0271-AOP-R16) and that is emitted by any emissions unit identified in 40 CFR Part 52.21(r)(6)(i)(b); and calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of 10 years following resumption of regular operations after the change. The permittee shall demonstrate compliance with this condition by complying with Plantwide Conditions 13 through 24.
  - The permittee shall submit a report to the Administrator if the annual emissions, in tons per year, from the Recovery Furnace (SN-02) upgrade project (as requested in the permit application for Permit 0271-AOP-R16), exceed the baseline actual emissions (as documented and maintained pursuant to 40 CFR Part 52.21(r)(6)(i)(c)), by a significant amount (as defined in paragraph 40 CFR Part 52.21(b)(23)) for that regulated NSR pollutant, and if such emissions differ from the preconstruction projection as documented and maintained pursuant to 40 CFR Part 52.21(r)(6)(i)(c). Such report shall be submitted to the Administrator within 60 days after the end of such year. The report shall contain the following:
    - The name, address and telephone number of the major stationary source;
    - The annual emissions as calculated pursuant to 40 CFR Part 52.21(r)(6)(iii); and
    - Any other information that the owner or operator wishes to include in the report (e.g., an explanation as to why the emissions differ from the preconstruction projection).

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# Source Obligation (40 CFR 52.21(r)(6)) Example Permit Condition (Florida)

- 2. Administrative Requirements - Actual Emissions Reporting: This permit is based on an analysis that compared baseline actual emissions with projected actual emissions and avoided the requirements of subsection 62-212.400(4) through (12), F.A.C. for several pollutants. Therefore, pursuant to Rule 62-212.300(1)(e), F.A.C., the permittee is subject to the following monitoring, reporting and recordkeeping provisions.
  - a. The permittee shall monitor the emissions of any PSD pollutant that the Department identifies could increase as a result of the construction or modification and that is emitted by any emissions unit that could be affected; and, using the most reliable information available, calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of ten years following resumption of regular operations after the change. Emissions shall be computed in accordance with the provisions in Rule 62-210.370, F.A.C., which are provided in Appendix C of this permit.
- See Handout 5-Y

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## Source Obligation - Example Permit Condition (Michigan)

**VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall calculate the PM10, PM2.5, $NO_x$, $SO_2$, CO, and VOC emission rates from FGDDPANNUAL-S3 in tons per 12-month rolling time period as determined at the end of each calendar month, using a method acceptable to the AQD District Supervisor, considering the following. **(R 336.1201(3))**
   a) Fugitive emissions from all components that may leak, such as those addressed in leak detection and repair programs.

2. The permittee shall calculate and keep records of the annual emissions of $SO_2$ from FGDPPANNUAL-S3 described in Appendix A, in tons per calendar year. Calculations and recordkeeping shall begin following the resumption of regular operations after the change and shall continue for ten (10) years. Resumption of regular operations is the issuance date of this PTI. **(R 336.2902(6)(c))**

3. The permittee shall calculate and keep records of the annual emissions of NOx from FGDPPANNUAL-S3 described in Appendix B, in tons per calendar year. Calculations and recordkeeping shall begin following the resumption of regular operations after the change and shall continue for ten (10) years. Resumption of regular operations is the issuance date of this PTI. **(R 336.2818(3)(c))**

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## Source Obligation - Example Permit Condition (Michigan)

2. The permittee shall submit records of the annual emissions of NOx from FGDPPANNUAL-S3 described in Appendix B, in tons per calendar year, to the AQD District Supervisor and Permit Section Manager within 60 days following the end of each reporting year if both the following occur:
   a) The calendar year actual emission of NOx exceed the baseline actual emissions (BAE) for that pollutant by a significant amount, and
   b) The calendar year actual emissions differ from the pre-construction projection. (The pre-construction projection is the sum of the projected actual emissions from each existing emission unit included in the Actual to Projected Actual Applicability Test used for FGDPPANNUAL-S3.)

   The report shall contain the name, address, and telephone number of the facility; the annual emissions as calculated pursuant to SC VI.3, and any other information the owner or operator wishes to include (i.e., an explanation why emissions differ from the pre-construction projection). **(R 336.2818(3)(e))**

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## Emissions Documentation - Recordkeeping (52.21(r)(3))

- It's important to note than permitting authorities (states, districts, etc.) often go beyond the federal recordkeeping requirements as written into individual permits

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## Emissions Documentation – EPA November 2002 Documentation

- *In its response to the proposed rule comments, EPA noted the following:*
- "…for any project using the "actual-to-projected-actual" applicability test, when there is a reasonable possibility that the project may result in a significant emissions increase, the new rules require that a source's projection of post-change actual emissions must be tracked against a modified unit's emissions for 5 years following completion of the changes."
- "We will presume that any increases that occur after 5 years are not associated with a physical or operational changes."
- Also see 67FR 80197 (December 31, 2002)
- *"If, however, one of the effects of the physical or operational change(s) is to increase a unit's design capacity or potential to emit, such that a significant emissions increase could result, but the source does not believe that the new capacity or potential to emit will be fully utilized (so as not to cause a significant net emissions increase), the projection of post-change actual emissions must represent the maximum actual annual emissions rate that will result from the unit in any one of the 10 calendar years after the change. This extended period allows for the possibility that the increased capacity that was added via the physical or operational changes could be fully utilized during a normal business cycle."*

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## Emissions Documentation – Time Element

- So what happens after the Reasonable Possibility recordkeeping/reporting period lapses?
- Sixth Circuit Case (DTE I) – Decided on March 28, 2013
  - "While EPA does presume that emissions increases after five years are unrelated to the project (67FR 80,197), that presumption can be overcome, for example, by demonstrating that the preconstruction facility could not handle such an increase. Neither the statute nor the regulations create a time barrier. EPA can bring an enforcement action whenever emissions increase, so long as the increase is traceable to the construction. See 40 CFR 52.21(a)(2)(iv)(b)."

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## Emissions Documentation

- From an EPA enforcement perspective, what matters more? The legitimacy of the pre-construction projections or the amount of emissions that actually occur later on. Both?
- Sixth Circuit Case (DTE II) – Decided on January 10, 2017 (see Handout 5-N)
  - "In terms of the remand, it is important to note that the panel unanimously agrees — now that *DTE I* is the law of this case and of the circuit — that actual post-construction emissions have no bearing on the question of whether DTE's preconstruction projections complied with the regulations. *DTE I* foreclosed that question in holding that an operator who begins construction without making a projection in accordance with the regulations is subject to enforcement, no matter what post-construction data later shows. The district court erred initially and again on remand when it ruled that post-construction data could be used to show that a construction project was not a "major modification." Apparently, it is necessary to reiterate that the applicability of NSR must be determined *before construction commences* and that liability can attach if an operator proceeds to construction without complying with the preconstruction requirements in the regulations. Postconstruction emissions data cannot prevent the EPA from challenging DTE's failure to comply with NSR's preconstruction requirements."

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## Detroit Energy (DTE) District and Sixth Circuit Cases – Chronology (DTE I)

- DTE I
  - Eastern Michigan District Court – USA versus DTE Energy
    - Decided on August 23, 2011
    - Bernard A. Friedman (judge) granted summary judgement to DTE
  - US Court of Appeals (6th Circuit) – USA versus DTE Energy
    - Decided on March 28, 2013
    - Judges Batchelder, Daughtrey, and Rogers
    - District court order was reversed and remanded back to the district (2 to 1). Rogers wrote the court opinion and Daughtrey concured. Batchelder dissented.

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## Detroit Energy (DTE) District and Sixth Circuit Cases – Chronology (DTE II)

- DTE II
  - Eastern Michigan District Court – USA versus DTE Energy
    - Decided on August 3, 2014
    - Same court and district judge as in DTE I
    - Again - granted summary judgement to DTE!
  - US Court of Appeals (6th Circuit) – USA versus DTE Energy
    - Decided on January 10, 2017
    - Same panel as DTE I - Batchelder, Daughtrey, and Rogers
    - District court order was reversed (again) and remanded (again) back to the district (2 to 1).
    - Daughtrey wrote the court opinion
    - Batchelder wrote a separate opinion in concurrence with Daughtrey! Rogers wrote a separate dissenting opinion!

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## Detroit Energy (DTE) District and Sixth Circuit Cases – Chronology (DTE II)

- On December 11, 2017, the Supreme Court denied DTE's petition to review the 6th Circuit's DTE II decision.

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## Detroit Energy – DTE I

- What started the DTE enforcement effort?
  - In March, 2010, DTE began construction on Monroe Unit #2
  - DTE had performed the emissions change calculations and determined their would be an increase of 3,701 tpy (SO2) and 4,096 tpy (NOx)
  - DTE had determined that 100% of the calculated increases could be excluded based on projected demand growth
  - The US EPA issued a NOV on June 4, 2010, stating it was their belief the Unit #2 project constituted a major modification based on the emissions change calculations
  - Attempts to resolve the matter failed and the US EPA (USA) filed a complaint against DTE in the Eastern District of Michigan court (DTE 1 case)
  - The District Court granted summary judgement to DTE
    - DTE argued they had satisfied the pre-construction NSR requirements by making the emissions change projections which resulted in less than significant emissions increases
    - Any assessment of the post change emissions was pre-mature

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## Detroit Energy – DTE I – Eastern District of Michigan

- As a result of the 2002 NSR rules changes, the District court held,
  - "…if a source determines that its project does not constitute a major modification, it may commence its project without an NSR permit subject to certain post-project emissions monitoring requirements."
  - The court held that once a source submits post-project emissions projections and determines the project will not constitute a "modification," "it need not obtain an NSR permit before beginning construction."
  - After the project, "the operator must monitor emissions that could increase as a result of the project," and records of annual emissions must be kept for a period of five years.
  - A "modification" results if the project causes a significant emissions increase, "and the regulating authorities may pursue a post-project enforcement action … at that time."
- The US EPA subsequently appealed the District court's summary judgement to the 6th Circuit court of appeals

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## Detroit Energy - DTE I – Sixth Circuit Court

- The 6th Circuit DTE I appeals case was argued on November 27, 2012. Concerning DTE's actions prior to beginning the project on Unit 2, the opinion stated:
  - "The operator has to make projections according to the requirements for such projections contained in the regulations. If the operator does not do so, and proceeds to construction, it is subject to an enforcement proceeding. The district court in this case appears to have ruled, to the contrary, that no such proceeding is permitted until there is post-construction data. That is not correct."
  - "A project-and-report scheme is entirely compatible with the statute's intent, which, as the EPA stated at oral argument, is "to prevent increases in air pollution." If a company's projections are later proven incorrect, EPA can bring an enforcement action. See 40 C.F.R. § 52.21(a)(2)(iv)(b). An operator takes a major risk if it underestimates projected emissions. If post-construction emissions are higher than preconstruction emissions, and the increase does not fall under the demand growth exclusion, the operator faces large fines and will have to undertake another project at the source to install modern pollution-control technology."
- The 6th Circuit reversal of the district court's opinion did not fully endorse all of EPA's suggestions.
  - "A preconstruction projection is subject to an enforcement action by EPA to ensure that the projection is made pursuant to the requirements of the regulations. The district court having ruled to the contrary, we must reverse and remand. But we make no determination as to whether defendants (DTE) have complied with those projection regulations."

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# Detroit Energy – DTE II – Eastern District of Michigan

- DTE II - Back down at the district court level, Judge Friedman stated:
  - "In this case, EPA claims that defendants improperly applied the demand growth exclusion when they "expected pollution from . . . Unit 2 to go up by thousands of tons each year after the overhaul," and then discounted this entire emissions increase by attributing it to additional consumer demand. In other words, EPA does not contend that defendants violated any of the agency's regulations when they computed the preconstruction emission projections from Unit 2. Rather, EPA takes defendants to task over *the extent* to which they relied upon the demand growth exclusion to justify their projections. This is exactly what the Sixth Circuit envisioned when it precluded EPA from second-guessing "the making of [preconstruction emission] projections." Moreover, EPA does not point to any regulation requiring source operators to demonstrate the propriety of their demand growth exclusion calculations. And without adequate proof that defendants violated the regulations governing preconstruction emission projections, the instant action cannot withstand summary judgment."
- Judge Friedman again granted summary

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# Detroit Energy – DTE II – Sixth Circuit Court

- Again, the 6th Circuit heard the SAME case (DTE II)
  - Judge Daughtrey's opinion confirmed, once again, that EPA may bring a preconstruction enforcement action to challenge DTE's emission projections, but then explained further that EPA is not confined to a "cursory review" of a company's analysis.
  - Judge Daughtrey's opinion also criticized what she views as a woefully inadequate record to support DTE's emissions projection calculations, finding that DTE failed to explain or provide any support for why it applied the demand-growth exclusion to its entire projected emissions increase.
  - Judge Daughtrey also clarified that, while DTE was not required by NSR regulations to secure EPA approval of its emissions projections (or the project) before beginning construction, the company proceeded at its own risk by not first obtaining a permit.
  - Judge Batchelder concurred in the judgment only because of the holding in the court's prior (DTE I - 6th Circuit) decision in the case, from which she had dissented.
  - Judge Rogers, who had authored the DTE I 6th Circuit decision, dissented from the DTE II decision in an opinion that again explained why "second-guessing" a company's projections results in an unauthorized prior approval scheme.
- Key findings:
  - "In terms of the remand, it is important to note that the panel unanimously agrees — now that *DTE I* is the law of this case and of the circuit — that actual post-construction emissions have no bearing on the question of whether DTE's preconstruction projections complied with the regulations. *DTE I* foreclosed that question in holding that an operator who begins construction without making a projection in accordance with the regulations is subject to enforcement, no matter what post-construction data later shows."
  - "The district court erred initially and again on remand when it ruled that post-construction data could be used to show that a construction project was not a "major modification." Apparently, it is necessary to reiterate that the applicability of NSR must be determined *before construction commences* and that liability can attach if an operator proceeds to construction without complying with the preconstruction requirements in the regulations. Postconstruction emissions data cannot prevent the EPA from challenging DTE's failure to comply with NSR's preconstruction requirements."

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## DTE II Case Summary

- Judge Daughtrey authored the panel opinion in DTE II. She believes that EPA has the authority to second-guess DTE's estimates if they are not adequately explained.
- Judge Rogers disagreed and dissented. However, he agreed with Daughtrey in the DTE I case (he wrote the panel opinion in DTE I).
- Judge Batchelder also disagreed with Judge Daughtrey's views, pretty much in their entirety. However, Judge Batchelder concluded that she had already been outvoted once, in the first 6th Circuit review of this case and she felt bound to follow the decision in DTE I.

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## Emissions Documentation – DTE Cases and 2017 Pruitt (EPA) Memo

- December 7, 2017, Pruitt Memo (see Handout 5-M)
  - The December 7, 2017, Pruitt Memo "distances" EPA enforcement from the Sixth Circuit DTE opinions
  - Memo says that post-project data is a means to evaluate the pre-project conclusions drawn by the site and can be used to determine major modification applicability
  - Memo also says sites intending to "manage" (self-limit) post-project emissions can do so as a legitimate way of assessing the pre-construction emissions projections
  - On December 9, 2022, the EPA issued a memo titled: "New Source Review Preconstruction Permitting Requirements: Enforceability and Use of the Actual-to-Projected-Actual Applicability Test in Determining Major Modification Applicability: Rescission of 2017 Memorandum" (see Handout 5-M1)
  - On September 15, 2025, the EPA reinstated the 2017 Policy (see Handout 5-M2)

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# Emissions Documentation – DTE Cases and 2017 Pruitt (EPA) Memo

- Quotes from the Pruitt Memo
  - "Although the majority in the first DTE opinion held that the EPA may pursue enforcement of its projection regulation where a source owner or operator has failed to perform a required pre-project applicability analysis or has failed to follow the objective calculation requirements of the regulations regardless of the level of post-project emissions, the court decision does not compel the EPA to pursue enforcement in such situations."
  - "The EPA has substantial discretion regarding prosecution of violations of the CAA and the first DTE opinion does not limit the EPA's discretion to consider whether prosecution of other sources is warranted in similar circumstances. Thus, pending further review of these issues by the courts and the EPA, the agency does not intend to pursue new enforcement cases in circumstances such as those presented in the DTE matter."
  - "…the EPA intends to focus on the fact that it is the obligation of source owners or operators to perform pre-project NSR applicability analyses and document and maintain records of such analyses as required by the regulations."
  - "It also intends to focus on the fact that the post-project monitoring, recordkeeping and reporting requirements provide a means to evaluate a source's pre-project conclusion that NSR does not apply and that the NSR applicability procedures make clear that post-project actual emissions can ultimately be used to determine major modification applicability."
  - "One issue that has arisen with respect to determining projected actual emissions resulting from a proposed project is whether it is permissible under the regulations for an owner or operator to factor into the projection an intent to actively manage future emissions from the project on an ongoing basis to prevent a significant emissions increase or a significant net emissions increase from occurring. The EPA notes that the rule language specifically provides that "all relevant information" shall be considered in making a projection….Pending further review of the issues described above by the EPA, the EPA intends to apply the NSR regulations in accordance with this language such that the intent of an owner or operator to manage emissions from a unit in that manner after a project is completed represents relevant information in the context of projecting future actual emissions from that unit that could be considered along with other relevant information in making an emissions projection, as provided in the NSR regulations."
  - "…the EPA does not presently intend to initiate enforcement in such future situations unless post-project actual emissions data indicate that a significant emissions increase or a significant net emissions increase did in fact occur."

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# Projected Actual Emissions Recordkeeping (52.21(r)(3))

- Final reminder: States and individual permits often go beyond the federal recordkeeping requirements

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# Netting Details

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## Netting

- Netting was addressed in Chapter 3.
- If emissions increases associated with the project are a significant emissions increase, source can still attempt to “net-out” of PSD under the December 31, 2002 rule

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## Net Emissions Increase

- Net emissions change (NEC or NEI) equals:

emission increases/decreases from proposed project/modification (PEI) – "Step 1"

minus

source-wide creditable contemporaneous decreases (CCD) – "Step 2"

plus

source-wide creditable contemporaneous increases (CCI) – "Step 2"

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## Netting and "Baseline Actual Emissions" (1/2)

- For other projects that are contemporaneous with a given project, the "baseline actual emissions" definition applies
- "Any other increases and decreases in actual emissions at the major stationary source that are contemporaneous with the particular change and are otherwise creditable. Baseline actual emissions for calculating increases and decreases under this paragraph 40 CFR 52.21(b)(3)(i)(b) shall be determined as provided in paragraph 40 CFR 52.21(b)(48) of this section…."
- Paragraph (b)(48) contains the definition of "baseline actual emissions" for all types of projects

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## Netting and "Baseline Actual Emissions" (2/2)

- The "net emissions increase" definition uses the "baseline actual emissions" for projects in the contemporaneous period
- Each contemporaneous unit/pollutant can define uniquely the consecutive 24-month "baseline" period
- 10-year "look-back" period (non-EUSGUs) is allowed for establishing the actual emissions baseline for each contemporaneous change. Any emissions limitation imposed up to and just prior to the date the contemporaneous change occurred must be applied to the actual emissions baseline for the contemporaneous change (possibly resulting in a downward adjustment to the actual baseline for the contemporaneous change)

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## Netting and Projected Actual Emissions (PAE)?

- The rules do not specify how the PAE is determined for contemporaneous projects
- In at least one instance, the US EPA has determined that the post change (future) emissions for contemporaneous projects must be calculated using the potential-to-emit of the contemporaneous change (new AND modified existing units)
- Example state level guidance (TCEQ Guidance) says:
  - "Changes within the contemporaneous period (outside of the project undergoing review) are determined on a project by project basis, and are determined through a comparison of the baseline actual emission rate prior to the project and the PTE after the project."
- See Handout 5-H

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# GHG Tailoring Rule

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## GHG "Tailoring Rule"

- On October 27, 2009, (74 FR 55292) the EPA proposed the GHG Tailoring Rule
- Proposed to increase the permit applicability thresholds for GHGs effectively **"tailoring"** the PSD and Title V permit programs to target only "major" GHG sources and major modifications
- Without a higher applicability threshold, permitting agencies would be overwhelmed with PSD and Title V applications
- Regulation of 6 GHG compounds (GHG mass basis and as $CO_2e$):
  - $CO_2$, $CH_4$, $N_2O$, HFCs, PFCs, & $SF_6$
- EPA finalized the rule on May 13, 2010, and published it in the Federal Register on June 3, 2010, (75FR 31514). Rule effective on August 2, 2010. (see Appendix B4) Refer to Summary: PSD/Title V GHG Tailoring Rule
- EPA issued extensive guidance on rule applicability and GHG BACT on March 25, 2011 (See Appendix G-1)
- EPA issued the "Biogenic Deferral" on July 20, 2011 (76FR 43490) – temporarily excluded biogenic $CO_2$ emissions from the definition of "subject to regulation" – deferral expired on July 21, 2014 - Refer to Summary: GHG Permitting Deferral for Biogenic Sources
- EPA promulgated the "Step 3" tailoring rule on July 12, 2012.
- June 23, 2014 - UTILITY AIR REGULATORY GROUP *v.* ENVIRONMENTAL PROTECTION AGENCY ET AL. (see Appendix G2) – Refer to Summary: June 23, 2014 Supreme Court Opinion Regarding PSD and Title V
  - May 7, 2015 (80FR 26183) – PSD Permitting for Greenhouse Gases: Providing Option for Rescission of EPA-Issued Tailoring Rule Step 2 Prevention of Significant Deterioration Permits – Effective July 6, 2015
  - August 19, 2015 (80FR 50199) - Prevention of Significant Deterioration and Title V Permitting for Greenhouse Gases: Removal of Certain Vacated Elements
  - October 3, 2016 (81 FR 68110) - EPA proposed rule amendments formally add a "significant emission rate" (SER) threshold for GHG (Proposed rule) – NOT FINALIZED!

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# PSD/Title V GHG Tailoring Rule

After receiving nearly a half-million public comments on the subject, on May 13, 2010, EPA finalized an approach for tailoring Clean Air Act permitting programs to address greenhouse gas (GHG) emissions - the so-called PSD and Title V GHG Tailoring Rule. The final rule, published in the Federal Register on June 3rd (75 FR 31514), is intended to limit permitting requirements initially to only large utility and industrial sources that account for an estimated 70 percent of GHG emissions from all stationary sources. The regulation will be implemented in phases with the first phase beginning in January 2011.

## PSD Implications

Under "Step 1" of the rule implementation, after January 2, 2011, a new industrial source that is major for at least one non-GHG pollutant and that will emit or have the potential to emit 75,000 tpy CO2e or more will be subject to Prevention of Significant Deterioration (PSD) permitting requirements for GHGs [i.e., Best Available Control Technology (BACT) for GHGs]. An existing major industrial facility undertaking a modification that results in a PSD-significant emissions increase for at least one non-GHG pollutant and that will also result in an increase of GHG emissions of 75,000 tpy CO2e or more will also be subject to PSD permitting requirements for GHGs. Essentially, a facility must already be triggering PSD via non-GHG pollutants and also exceed the new 75,000 tpy CO2e threshold before PSD requirements for GHG pollutants can also be triggered. Guidance on the permitting process and PSD BACT requirements will be forthcoming from EPA.

~~Under "Step 2" of the rule implementation, after July 1, 2011, a new PSD major source threshold of 100,000 tpy CO2e will become effective. A new source with potential GHG emissions above 100,000 tpy CO2e will be subject to PSD permitting requirements for GHGs. Modifications to existing major sources (defined relative to the new 100,000 tpy threshold for CO2e or the 100/250 tpy threshold for traditional NSR regulated pollutants) that result in an increase of GHG emissions by 75,000 tpy CO2e or more will be subject to PSD permitting requirements for GHGs. So, unlike under Step 1, following July 1, 2011, PSD for GHG pollutants can be triggered regardless of whether PSD is also triggered for non-GHG pollutants.~~

For determining PSD (or Title V) major source or major modification applicability, the quantity of GHGs emitted must not only equal or exceed the new higher 100,000 tpy and 75,000 tpy thresholds on a CO2e basis, but the sum of emissions of each GHG pollutant not adjusted for their global warming potential must also exceed the applicable threshold for non-GHG regulated pollutants (i.e., 100 tpy for Title V or 100 tpy/250 tpy for PSD, depending on whether the source is on the list of 28 PSD categories).

## Title V Operating Permits

With respect to the Title V permitting program, beginning January 2, 2011, new or existing Title V major sources will also be subject to Title V requirements for GHGs. That means, for example, that existing major sources renewing their Title V permit after January 2, 2011 will have to address GHGs in their applications. However, until a facility actually triggers PSD for GHGs, there are no applicable requirements with respect to GHGs to incorporate into a Title V permit, so other than including GHG

emissions in Title V applications, little more would need to be done. There has been no guidance from EPA on what de minimis thresholds (e.g., for insignificant activities) would be applied relative to GHG emissions provided in Title V applications.

~~Beginning July 1, 2011, facilities with potential CO2e emissions of 100,000 tpy or more will be subject to Title V permitting requirements (i.e., even if they were previously not a major Title V source via comparison of non-GHG pollutants to traditional thresholds). If the facility was not previously subject to Title V at that time, a Title V permit application would need to be submitted in accordance with federal and/or state/local requirements, which is typically within one year of meeting the applicability criteria. Therefore, most non-Title V sources that become newly subject to Title V via the Tailoring Rule will need to submit initial applications by July 1, 2012 (or sooner depending on specific state program procedures).~~

## Future Reductions in Applicability Thresholds

By April 30, 2015, EPA must determine whether further reductions to levels below 50,000 tpy are warranted and, if so, EPA must promulgate reduced levels by April 30, 2016.

## Path Forward

This rule was the first permitting step by EPA in regulating GHG emissions via current mechanisms available through the CAA, following the December 2009 Endangerment Finding and the April 2010 Light Duty Vehicle rule. On June 24, 2014, the Supreme Court partially vacated the Tailoring Rule in response to a petition by several industry groups, the U.S. Chamber of Commerce, and several states, that EPA lacks the authority to require air quality permits from facilities based solely on their greenhouse gas emissions. EPA can, however, regulate GHG emissions from sources already subject to Prevention of Significant Deterioration and Title V permitting requirements due to their emissions of conventional criteria pollutants, including requiring the installation of Best Available Control Technology (BACT).

The ruling invalidated several key elements of EPA's PSD and Title V Tailoring Rule. The Court ruled that EPA could not change the major source thresholds legislated in the Clean Air Act as it had attempted to do in order to adapt the process to the inherently higher levels of GHG pollutants in the environment. However, the court upheld EPA's authority to establish a PSD de minimus increase trigger for sources otherwise subject to PSD regulations though EPA will be required to properly justify this level.

# GHG Permitting Deferral for Biogenic Sources – Expired on July 21, 2014

(This rule was vacated by the US Court of Appeals (DC Circuit) on July 12, 2013.)

On July 12, 2013, the US Court of Appeals for the District of Columbia (DC Circuit) vacated the 2011 EPA temporary deferral that exempted biogenic greenhouse gas (GHG) sources from requirements to obtain a permit for those GHG emissions under the Clean Air Act (CAA). The DC Circuit ruled that EPA did not have authority under the act to treat biogenic GHG emissions differently than other pollutant emissions for Prevention of Significant Deterioration (PSD) and Title V permitting. The EPA deferral had the two-part effect of a) delaying Title V permitting requirements for biogenic GHG emissions, and b) exempting sources from PSD permitting requirements for biogenic GHG emissions, until July 21, 2014.

**Background**

The path to this ruling is long and convoluted. EPA subjected stationary sources to regulation for GHG via an endangerment finding in 2009 which grouped six gases under the definition of GHG: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$).[1] After EPA's decision to regulate these new gases under the CAA, EPA issued the Tailoring Rule which limited the types of sources and projects that the CAA would regulate based on GHG emissions.[2]

Shortly after issuance of the Tailoring Rule, EPA issued a Call for Information (CFI) regarding biogenic sources and bioenergy (July 15, 2010), which was followed shortly by a petition for reconsideration from the National Alliance of Forest Owners (NAFO) specifically related to $CO_2$ emissions from biomass combustion. EPA granted the petition and proposed to defer applicability of the CAA to biogenic CO2 emissions for three years to allow further consideration of the issues surrounding biogenic CO2.[3] EPA then issued a final biogenic deferral.[4]

Between the proposed and final deferral rules, the Center for Biological Diversity (CBD) and other groups filed a challenge to EPA's granting of the NAFO petition for reconsideration. That CBD petition led to the July 2013 ruling vacating the biogenic deferral rules.



**The Deferral Rule**

The deferral rule is simple and quite short, impacting only one paragraph in each of the state and federal sections for the PSD and Title V programs (40 CFR 51, 52, 70, 71). Looking at 40 CFR 52 for example,

*For purposes of this paragraph, prior to July 21, 2014, the mass of the greenhouse gas carbon dioxide shall not include carbon dioxide emissions resulting from the combustion or decomposition of nonfossilized and biodegradable organic material originating from plants, animals, or micro-organisms including products, by-products, residues and waste from agriculture, forestry and related industries as well as the nonfossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material).*

For the three year period of deferral, biogenic emissions did not count for CAA purposes. The practical impact of this deferral is disputed, with varying claims in the court case regarding actual facilities where the deferral rule resulted in different requirements. The potential impact is clear. Consider two examples.

- **New 50 MW biomass power plant**. Traditional pollutant emissions are all less than 250 tpy, the site has a 250 tpy PSD major source threshold, and PSD would not be triggered but for potentially GHG. Biogenic GHG emissions would be approximately 500,000 tpy, which is well beyond the 100,000 tpy GHG trigger level for a new facility under the 2010 Tailoring Rule. With the biogenic deferral, the project does not trigger PSD for any pollutant. Without the deferral, the project would trigger PSD for GHG as well as CO, $NO_X$, PM/$PM_{10}$ / $PM_{2.5}$ at minimum (under the 2010 PSD Tailoring Rule). However, based on the June 23, 2014, Supreme Court decision pertaining to the Tailoring Rule, the site would unlikely trigger PSD for any pollutants even without the benefit of the biogenic deferral.
- **Existing pulp mill** undergoing an expansion project to increase liquor firing rate on the recovery boiler. With the deferral, any CO2 emissions from liquor firing are excluded, while without the deferral they must be counted towards the 75,000 tpy GHG trigger level for an existing facility under the 2010 Tailoring Rule.

Similar examples could be developed across a range of industries, from landfills with landfill gas emissions, to wood products industries, to bio-energy industries. The 2014 Supreme Court decision pertaining to the Tailoring Rule lessens the impact of the loss of the biogenic deferral on minor sources and all sources that do not trigger PSD for any of the "traditional" air pollutants.

**The July 12, 2013 Court Decision**

Despite the brevity of the actual rule, there were many challenges to and comments on the rule, as evident by the nearly 200 page *Summary of Public Comments and Responses* document issued June 28, 2011. The court ruling agreed with key adversarial comments in that document.

The 2-1 ruling rejected the legal doctrines upon which EPA issued the deferral rule.

1. *De minimis*
2. One-step-at-a-time
3. Administrative necessity
4. Absurd results

The latter three doctrines were also used for the Tailoring Rule. The Tailoring Rule was upheld, but without considering these doctrines on their merits. In this case, the court did consider each on the merits. EPA's one-step-at-a-time doctrine was vacated based on EPA's inability to explain in the rulemaking how the deferral rule was a step on the road to full compliance with the statutory mandate. The administrative necessity doctrine was rejected since EPA rejected a "middle ground option" arbitrarily and capriciously. The absurd result doctrine was rejected for relying upon the Tailoring Rule absurd results rationale, since the Tailoring Rule and deferral rule have different objectives.

[1] See http://epa.gov/climatechange/endangerment/

[2] 75 FR 31514, June 3, 2010.

[3] 76 FR 15246, March 21, 2011.

[4] 76 FR 43490, July 20, 2011.

## Before Proceeding: Mass basis vs $CO_2$ e

- GHG emissions measured two ways in the Tailoring Rule
  - Mass basis: $\sum_i^n \ GHG_i$ in tpy
  - $CO_2$e basis: $\sum_i^n \ (GHG_i \times GWP_i)$ in tpy

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## Global Warming Potentials – 40 CFR 52.21(b)(49)(ii)

- Potential emissions are weighted by the GWP of the six GHGs as codified under 40 CFR 98 (Table A-1):
  - Carbon Dioxide: 1
  - Methane: 28
  - Nitrous Oxide: 265
  - Sulfur Hexafluoride: 23,500
  - Others (HFCs, PFCs, etc.): 0.003 – 17,400

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## Subject to Regulation under the Act – 40 CFR 52.21(b)(49)

- Under the current rule, GHGs become regulated only when project based criteria and emissions thresholds are met
- GHGs subject to regulation thresholds (in steps) of Tailoring Rule:
  - Step 1:
    - 75,000 tpy $CO_2e$ increase for "PSD anyway" project
  - Step 2: (Effective July 6, 2015 – Step 2 was removed from the federal rule)
    - ~~Step 1 criteria OR,~~
    - ~~New Sources: PTE ≥ 100,000 tpy $CO_2e$, OR~~
    - ~~Existing Sources: Existing PTE ≥ 100,000 tpy $CO_2e$~~ **~~AND~~** ~~75,000 tpy $CO_2e$ emissions increase~~

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## Implications of Method Used to Modify PSD Regulations for Tailoring Rule

- **Unless** a project meets the $CO_2e$ emissions thresholds and "PSD anyway" criteria, GHGs are **not** "subject to regulation" for PSD purposes, and thus do not become a "regulated NSR pollutant" for that project

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## Tailoring Rule Applicability Summary

- GHGs Step 1 – Began on January 2, 2011.
  - New major source of at least one non-GHG regulated pollutant and a threshold level of 75,000 tpy of GHGs($CO_2e$) and >0 tpy (mass based)
  - Modification - Existing source of at least one non-GHG regulated pollutant and a net significant emissions increase of a non-GHG pollutant and at least 75,000 tpy ($CO_2e$) emissions/net emissions increase of GHGs and >0 tpy (mass based)
- Step 2 – Began on July 1, 2011 and ended on July 6, 2015.

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# Plantwide Applicability Limitations – 40 CFR 52.21(aa)

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## Plantwide Applicability Limitations (1/7)

- Allow source owners to make changes without obtaining a major NSR permit, provided their emissions do not exceed a plantwide cap
- 40 CFR 52.21 (aa)(1)(ii) - Any physical change in or change in the method of operation of a major stationary source that maintains its total source-wide emissions below the PAL level, meets all general PAL requirements, and PAL permit conditions -
  - Is not a major modification for the PAL pollutant
  - Does not have to be approved through the PSD program

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## Plantwide Applicability Limitations (2/7)

- Duration of the PAL
  - Valid for 10 years
  - Upon renewal, emissions level may (?) be reevaluated based on air quality needs, advances in technology, and control cost effectiveness considerations

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## Plantwide Applicability Limitations (3/6)

- Actuals PAL means a PAL based on the baseline actual emissions of all emissions units at the source that emit or have the potential to emit the PAL pollutant
- The actual PAL is set equal to the sum of the baseline actual emissions of all emission units at the source plus the applicable significant emissions increase level for the PAL pollutant
- See Handout 5-A – U.S. EPA Region 5 to Illinois EPA

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## Plantwide Applicability Limitations (4/7)

- Baseline actual emissions means the rate of emissions (in tons per year) of a regulated NSR pollutant averaged over a consecutive 24-month period and within the most recent 10 years (5 years for EGUs) – See Handout 5-D, Handout 5-V, and Handout 5-W (GHG PALs)
- Fugitive emissions (to the extent quantifiable) and emissions associated with start-up, shutdown, and malfunctions must be included in the baseline actual emissions
- Generally, actual emissions must be adjusted downward to exclude emissions that would have exceeded an emissions limitation with which the source must currently comply (emission reductions associated with Part 63 HAP requirements are generally not excluded from the baseline actual emissions calculation)

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## Plantwide Applicability Limitations (5/7)

- General requirements for PALs
  - PAL imposes an annual emission limitation in tons per year (a 12-month average, rolled monthly)
  - PAL must be established with public participation
  - PAL must be established in a permit with specific PAL conditions (including monitoring, recordkeeping, and reporting requirements)
  - PAL must include fugitive emissions

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## Plantwide Applicability Limitations (6/7)

- Monitoring requirements
  - Mass balance calculations for activities using coatings or solvents
  - Continuous Emissions Monitoring Systems (CEMS)
  - Continuous Parameter Monitoring Systems
  - Emission factors
- See Handout 5-CC

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# Plantwide Applicability Limitations (7/7)

- On August 4, 2020, EPA provided guidance for PALs (See Handout 5-CC. Topics addressed were:
  - PAL Permit Reopening
    - Reopening of a PAL permit is *required* to (1) Correct typographical or calculation errors made in setting the PAL or reflect a more accurate determination of emissions used to establish the PAL; (2) Reduce the PAL if the owner or operator of the major stationary source creates creditable emissions reductions for use as offsets...; and (3) Revise a PAL to reflect an increase in the PAL.
    - The reviewing authority has *discretion* to reopen a PAL to (1) Reduce the PAL to reflect newly applicable Federal requirements (for example, NSPS) with compliance dates after the PAL effective date; (2) Reduce the PAL consistent with any other requirement, that is enforceable as a practical matter, and that the State may impose on the major stationary source under the State Implementation Plan; and (3) Reduce the PAL if the reviewing authority determines that a reduction is necessary to avoid causing or contributing to a NAAQS or PSD increment violation, or to an adverse impact on an air quality related value that has been identified for a Federal Class I area...
  - PAL Expirations
  - PAL Renewals
  - PAL Terminations (prior to expiration)
  - PAL Monitoring Requirements (Emission factor adjustments, emission factor validations, and missing monitoring data)
  - PAL Baseline Actual Emissions for Replacement Units

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# Key PAL Definitions - 40CFR 52.21(aa)(2)

- **Major emissions unit** means:
  - Any emissions unit that emits or has the potential to emit 100 tons per year or more of the PAL pollutant in an attainment area; or
  - Any emissions unit that emits or has the potential to emit the PAL pollutant in an amount that is equal to or greater than the major source threshold for the PAL pollutant as defined by the Act for nonattainment areas.

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## Key PAL Definitions - 40CFR 52.21(aa)(2)

- **Small emissions unit** means an emissions unit that emits or has the potential to emit the PAL pollutant in an amount less than the significant level for that PAL pollutant

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## Key PAL Definitions - 40CFR 52.21(aa)(2)

- **Significant emissions unit** means an emissions unit that emits or has the potential to emit a PAL pollutant in an amount that is equal to or greater than the significant level for that PAL pollutant, but less than the amount that would qualify the unit as a major emissions unit.

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## PAL Permits – Increasing a PAL - 40CFR 52.21(aa)(11)

- A PAL may be increased only if the source complies with the following provisions:
  - (1) Submit a complete application to request an increase in the PAL limit for a PAL major modification. Application shall identify the emissions unit(s) contributing to the increase in emissions so as to cause the major stationary source's emissions to equal or exceed its PAL.
  - (2) Demonstration that the sum of the baseline actual emissions of the small emissions units, plus the sum of the baseline actual emissions of the significant and major emissions units **assuming application of BACT equivalent controls**, plus the sum of the allowable emissions of the new or modified emissions unit(s) exceeds the PAL. **The level of control that would result from BACT equivalent controls on each significant or major emissions unit shall be determined by conducting a new BACT analysis at the time the application is submitted, unless the emissions unit is currently required to comply with a BACT or LAER requirement that was established within the preceding 10 years** (the assumed control level for that emissions unit shall be equal to the level of BACT or LAER with which that emissions unit must currently comply).
  - (3) Source obtains a major NSR permit for all emissions unit(s) identified in paragraph (1) above, regardless of the magnitude of the emissions increase resulting from them (that is, no significant levels apply). These emissions unit(s) shall comply with any emissions requirements resulting from the major NSR process (for example, BACT), even though they have also become subject to the PAL or continue to be subject to the PAL.
  - (4) The PAL permit shall require that the increased PAL level shall be effective on the day any emissions unit that is part of the PAL major modification becomes operational and begins to emit the PAL pollutant.

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## PAL Permits – Increasing a PAL - 40CFR 52.21(aa)(11)

- The new PAL is the sum of the allowable emissions for each modified or new emissions unit, plus the sum of the baseline actual emissions of the significant and major emissions units (assuming application of BACT equivalent controls as determined in accordance with paragraph (2)), plus the sum of the baseline actual emissions of the small emissions units.
- The PAL permit is revised to reflect the increased PAL level pursuant to the public notice requirements.

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# Renewal of a PAL – Application - 40CFR 52.21(aa)(10)

- Application requirements. The application to renew a PAL permit contains the following information:
  - A list of all emissions units at the source designated as small, significant or major based on their potential to emit. In addition, the owner or operator of the source shall indicate which, if any, Federal or State applicable requirements, emission limitations, or work practices apply to each unit.
  - Calculations of the baseline actual emissions (with supporting documentation). Baseline actual emissions are to include emissions associated not only with operation of the unit, but also emissions associated with startup, shutdown, and malfunction.
  - The calculation procedures that the source owner or operator proposes to use to convert the monitoring system data to monthly emissions and annual emissions based on a 12-month rolling total for each month.
  - A proposed PAL level.
  - The sum of the potential to emit of all emissions units under the PAL (with supporting documentation).
  - Any other information the source wishes the Administrator to consider in determining the appropriate level for renewing the PAL.
- *Application deadline.* A source must submit a timely application to the Administrator to request renewal of a PAL. A timely application is one that is submitted at least 6 months prior to, but not earlier than 18 months from, the date of permit expiration.
  - If the source submits a complete application to renew the PAL within this time period, then the PAL shall continue to be effective until the revised permit with the renewed PAL is issued.

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# Renewal of a PAL – Adjustment - 40CFR 52.21(aa)(10)

- *PAL* adjustment. In determining whether and how to adjust the PAL, the Administrator shall consider the following options:
  - If the baseline emissions level is equal to or greater than 80 percent of the PAL level, the Administrator may renew the PAL at the same level without considering the following factors:
  - The Administrator may set the PAL at a level that he or she determines to be more representative of the source's baseline actual emissions, or that he or she determines to be more appropriate considering air quality needs, advances in control technology, anticipated economic growth in the area, desire to reward or encourage the source's voluntary emissions reductions, or other factors as specifically identified by the Administrator in his or her written rationale.
- Also:
  - If the potential to emit of the source is less than the PAL, the Administrator shall adjust the PAL to a level no greater than the potential to emit of the source; and
  - The Administrator shall not approve a renewed PAL level higher than the current PAL, unless the source has complied with the provisions of increasing a PAL.

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## Renewal of a PAL – Public Notice – 40CFR 52.21(aa)(5)

- The Administrator must follow the specified notice procedures in approving any request to renew a PAL.
  - Must provide both the proposed PAL level and a written rationale for the proposed PAL level to the public for review and comment.
  - Any person may propose a PAL level for the source for consideration by the Administrator.

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## Expiration of a PAL - 40CFR 52.21(aa)(9)

- Any PAL that is not renewed expires at the end of the 10 year period, and the requirements in paragraphs (1) through (5) apply:
  - (1) Each emissions unit (or each group of emissions units) that existed under the PAL must comply with an allowable emission limitation under a revised permit established according to the procedures below:
    - *(a)* The source must submit a proposed allowable emission limitation for each emissions unit (or each group of emissions units, if such a distribution is more appropriate) by distributing the PAL allowable emissions for the source among each of the emissions units that existed under the PAL. If the PAL had not yet been adjusted for an applicable requirement that became effective during the PAL effective period, the distribution must be made as if the PAL had been adjusted.
    - *(b)* The Administrator decides whether and how the PAL allowable emissions will be distributed and issue a revised permit incorporating allowable limits for each emissions unit, or each group of emissions units.
  - (2) Each emissions unit(s) must comply with the allowable emission limitation on a 12-month rolling basis. The Administrator may approve the use of monitoring systems (source testing, emission factors, etc.) other than CEMS, CERMS, PEMS, or CPMS to demonstrate compliance with the allowable emission limitation.

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## Expiration of a PAL - 40CFR 52.21(aa)(9)

- (3) Until the Administrator issues the revised permit incorporating allowable limits for each emissions unit, or each group of emissions units, the source must continue to comply with a source-wide, multi-unit emissions cap equivalent to the level of the PAL emission limitation.
- (4) Any physical change or change in the method of operation at the source will be subject to major NSR requirements if such change meets the definition of major modification.
- (5) The source must continue to comply with any State or Federal applicable requirements (BACT, RACT, NSPS, etc.) that may have applied either during the PAL effective period or prior to the PAL effective period except for those emission limitations that had been established pursuant to paragraph 40 CFR 52.21(r)(4), but were eliminated by the PAL.

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# Developments on Outstanding NSR Issues

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# Accounting for Reductions at the Project Level (in Step 1) – Project Emissions Accounting

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## Accounting for Reductions at the Project Level (in Step 1)

- Two situations are often addressed
  - A project (such a production increase) involves multiple emission units some (or all) will add additional pollution controls resulting in emissions decreases despite production increases
  - A project involves multiple emission units and at least one will be shut-down.
- The main question to be addressed is whether one can have a “negative” increase in the project emission increase (PEI) calculation on a unit-by-unit basis.

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## Accounting for Reductions at the Project Level (in Step 1)

- The "Project Netting" issues were addressed by EPA in 2006 (71 FR 54235) and again in 2009 (74 FR 2376). However, the 2009 document vacated the 2006 "guidance."
- Since 2009 (and arguably since the late 1980s) and until March 13, 2018, the general EPA guidance indicated "project netting" was not allowed (see Handout 5-S – EPA's 2010 assessment). This has been interpreted by many states as no unit (as part of an overall project) can exhibit a negative (less than zero) "increase" in the overall project PEI calculation. Any decreases had to be addressed in the netting (step 2 in the overall NEI calculation).
- On March 13, 2018, EPA issued a memo addressing the issue (Handout 5-R). This memo explains that, in fact, "project netting" is allowed as prescribed by EPA in their 2006 proposal addressing the issue.
- On November 24, 2020, EPA finalized rulemaking (Handout 5-AA) to clarify that "project" netting is allowed with caveats contained in the rulemaking.

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## EPA's 2006 Proposed Rule

- "Our 2002 rules, in 40 CFR 52.21(a)(2)(iv)(b), provide that the procedure for calculating a significant emissions increase depends on the type of emissions units involved in the project."
- "...for projects that only involve existing units, 40 CFR 52.21(a)(2)(iv)(c) provides that "[a] significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the projected actual emissions * * * and the baseline actual emissions * * * for each existing emissions unit, equals or exceeds the significant amount for that pollutant * * *" [emphasis added]."
- "Use of the phrase "sum of the difference" between projected and baseline emissions indicates that one must look at the difference between the projection and the baseline. That difference may either be a positive number (representing a projected increase) or a negative number (representing a projected decrease). In either case, the values must be taken into consideration in determining the overall increase, or decrease, in emissions resulting from the project.

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## EPA's 2006 Proposed Rule (cont.)

- When there are multiple types of emission units (new and existing units), the impact of the project is determined by 40 CFR 52.21(a)(2)(i)(f), titled "Hybrid test for projects that involve multiple types of emissions units." However, in this case, the phrase "sum of the emissions increases for each emissions unit" is used, which challenges whether an emissions increase at an individual emissions unit can be a negative number.
- Because we intend for Step 1 of the NSR applicability test to represent the true environmental impact of a project on all involved emissions units, and the current rules reference 40 CFR 52.21(a)(2)(iv)(c) which allows for project netting, it is reasonable to conclude that a source can perform project netting for hybrid units as well.
- The current rule, however, would not allow a source to include reductions from units that are part of the project until Step 2 of the calculation. Thus, we propose that all emissions changes (i.e., both increases and decreases) that occur within the scope of a project get counted in Step 1 of the NSR applicability test.

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## EPA's March 13, 2018, Memo

- On March 13, 2018, EPA reconsidered it's 2006 evaluation of the "hybrid test" (projects that involve new and existing units) -
  - "Based on the reconsideration of some previous conclusions and an examination of the regulations as a whole, the EPA now interprets the provisions set forth in 40 CFR § 52.21(a)(2)(iv)(c) through (iv)(j) as providing that any emissions *decreases* that may result from a given proposed project are to be considered when calculating at Step 1 whether the proposed project will result in a significant emissions increase."
  - "This interpretation is grounded in the principle that the "plain language of the CAA indicates that Congress intended to apply NSR to *changes that increase actual emissions." State of New York v. EPA,* 413 F.3d at 40 (emphasis added). Central to the CAA's definition of "modification" is that there must be a causal link between the physical or operational change at issue - i .e. the "project" - and any change in emissions that may ensue. In other words, it is necessary to account for the full and direct effect of the proposed change itself."
  - "Accordingly, at the very outset of the process for determining whether NSR may be triggered, the EPA should give attention to not only whether emissions may increase from those units that are part of the project but also whether emissions may at the same time decrease at other units that are also part of the project."

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## EPA's March 13, 2018, Memo

- The March 13th, 2018, memo goes on to confirm that project related emissions reductions do NOT have to be creditable or enforceable. (Creditability and enforceability are only considered in "netting" (Step 2)). These are the same considerations as the project related emissions increase assessments. The 2020 final rule confirmed EPA's position on creditability and enforceability of project related emissions reductions.
- However, in order to change (lower) the PTE of an emissions unit after a project, enforceable conditions are required.

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## EPA's March 13, 2018, Memo

- EPA's memo uses the 2005 DC Circuit court opinion (Appendix X1) as its main justification to allow decreases in actual emissions to count as long as there is a logical connection between the decreases and increases associated with a project.
- No "artificial grouping" of activities allowed such that NSR is circumvented by attaching unrelated emissions decrease projects with projects that increase emissions.

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## November 24, 2020 (85FR 74890) – Final Rule - Text

- Handout 5-AA:  Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Project Emissions Accounting (85FR 74890) – Final Rule
  - (f) Hybrid test for projects that involve multiple types of emissions units. A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference for all emissions units, using the method specified in paragraphs (a)(2)(iv)(c) through (d) of this section as applicable with respect to each emissions unit, equals or exceeds the significant amount for that pollutant (as defined in paragraph (b)(23) of this section).
  - (g) The "sum of the difference" as used in paragraphs (c), (d) and (f) of this section shall include both increases and decreases in emissions calculated in accordance with those paragraphs.

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## November 24, 2020 (85FR 74890) – Final Rule – Project Scope

- Grouping of activities into a single project
- The final rule cautions against "over aggregation" (arbitrary grouping) of activities into a single project in an effort to artificially avoid NSR
  - Under the EPA's 2018 final action on project aggregation interpretation and policy, sources continue to have discretion in defining the scope of the project based on their business needs, but at the same time should not arbitrarily group project activities for the purpose of avoiding the NSR major modification requirements. Rather, in accordance with the 2018 final action on project aggregation, sources should define a project to include all activities, and only those activities, that meet the "substantially related" test.

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## November 24, 2020 (85FR 74890) – Final Rule – Clarification to permitting authorities

- After reviewing the comments received on this matter, the EPA has determined that the revisions to the regulations at 40 CFR 52.21 adopted in this final rule apply to the EPA and reviewing authorities that have been delegated federal authority from the EPA to issue major NSR permits on behalf of the EPA.
- For state and local air agencies that implement the NSR program through EPA-approved SIPs, the EPA agrees with those commenters who argued that section 116 of the CAA allows these states and local air agencies to adopt more stringent SIP emission control requirements than required by the EPA's regulations.
- Thus, the EPA is concluding that reviewing authorities that do NOT allow for project emissions accounting have applicability requirements that are at least as stringent as those required by the Act or the EPA's implementing regulations and, therefore, are not required to submit SIP revisions or stringency determinations to the EPA as a result of this action.

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## November 24, 2020 (85FR 74890) – Final Rule – Litigation

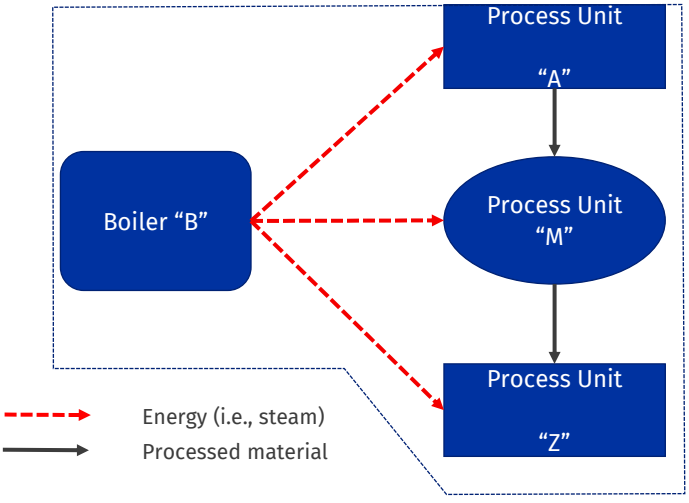
- The rule was under litigation. Oral arguments occurred on May 8, 2026. Case was decided on 7/28/26. **Unanimous decision (3-0) decision in favor of EPA. See Handout 5-PP**
- Case was decided in the United States Court of Appeals (DC) - Case No. 18-1149. Petitioners Environmental Defense Fund, et al., versus Respondents Environmental Protection Agency and Lee M. Zeldin. Judges: Justin Walker (Trump), Karen LeCraft Henderson (George H.W. Bush) and Bradley Garcia (Biden)
- Petitioners' briefs filed on November 14, 2025 (see Handout 5-HH)
- Respondents' brief filed on January 26, 2026 (see Handout 5-II)
- Briefs filed on March 27, 2026
  - PETITIONERS' OPENING BRIEF (see Handout 5-KK)
  - FINAL BRIEF FOR U.S. ENVIRONMENTAL PROTECTION AGENCY (see Handout 5-LL)
  - BRIEF OF INTERVENOR-RESPONDENTS AIR PERMITTING FORUM (see Handout 5-MM)
  - PETITIONERS' REPLY BRIEF (see Handout 5-NN)

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# Debottlenecking Projects

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## Debottlenecking Illustration




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## Debottlenecking Projects

- Problems
  - Complex projects (involving new/modified and unmodified units) result in complex PAE and "excluded" emissions (demand growth) calculations
  - In the past, the DC Circuit Court has ruled that PSD applicability is predicated on changes in actual emissions (when there is a physical or operational change). Therefore, emissions changes that occur at unmodified units (resulting from a "debottlenecking" project) must be evaluated (even if no existing permits limits are expected to be exceeded)
- Due to the legal uncertainties, EPA withdrew its 2006 proposal concerning debottlenecking -January 15, 2009 (74FR 2376)

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## Debottlenecking Projects

- Upstream and downstream "associated" emissions increases must be considered at the source when a modification occurs
- How are emissions increases or decreases addressed for the "associated" units?
  - Actual to future actual?
  - Actual to potential (allowable)?
  - Potential to potential (allowable)
  - Maximum "attributable" change?
  - Zero change unless permit limit is changed?
- See Handout 5-B and 5-DD

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## EPA's Withdrawn 2006 Proposal

- The 2006 proposal made legal (and other) arguments that, in effect, would have allowed unmodified emission units to be ignored, in the project emissions increase calculation, even if the project would "cause" increases in the actual emissions from these units
- Consistent with the June 24, 2005, NSR Reform Rule (DC Circuit) Court decision, EPA proposed that
  - "only those emissions increases at debottlenecked units that are "caused" by the physical change of change in the method of operation be included in the modification analysis"
- This is referred to as the "but for" causation requirement

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## EPA's Withdrawn 2006 Proposal (cont.)

- Without a change to the rule in 2009, the statement EPA made in the 2006 proposal remains in effect to this day (see 71FR 54238).
  - "The actual-to-projected-actual test in the 2002 rules for existing emissions units applies not only to the unit(s) undergoing the change but also to any other existing emissions unit(s) at the source that experiences a change in emissions related to the project. Thus, the current EPA rules permit emissions increases from debottlenecked units (and any other unit that increases its utilization as a result of the project) to be calculated using an "actual-to- projected-actual" test. We believe this represents a fair reading of our current regulatory text for "projected actual emissions" found at 40 CFR 52.21(b)(41)."
  - As a result, existing emission units that are not modified, but are otherwise impacted by a project (in terms of emissions), must be treated as if they are being modified (physically or operationally changed).

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## EPA Region 10 Letter – August 29, 2013

- Debottleneck example:
  - "From the process descriptions and flow diagram contained in Simplot's December 19, 2012 analysis, it is evident that increases in sulfuric acid production, whether from the #300 plant, the #400 plant, or from both plants, **could result in production increases in the downstream operations** - i.e., ammonium sulfate, phosphoric acid, superphosphoric acid, and granulation (1, 2 and 3) plants. Sulfuric acid is not only an intermediate product but a primary feedstock for all of the processes identified in the flow diagram."
  - "Simplot acknowledges that "some sulfuric acid produced after the project may be utilized for fertilizer production." However, Simplot states that "total fertilizer production capacity remains unaffected.""
  - "While this may be accurate, comparing the pre- and post-change *capacity* of a debottlenecked unit has no bearing on the emissions increase for PSD applicability purposes. **Thus, instead of applying a potential to emit (PTE)-to-PTE test, an actual-to-projected-actual (ATPA) emission test, or an actual-to-PTE test, as provided under the regulations, should be used to determine the amount of emission increases from downstream units.""**
  - www.epa.gov/sites/production/files/2015-07/documents/simplot.pdf

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# Project Aggregation

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## Project Aggregation

- Aggregation of Projects "Rule"
  - Originally proposed in 2006 (71FR 54235)
  - 40 CFR 52.21 (the codified rule) was never actually amended
  - A new rule preamble was finalized on January 15, 2009 (74FR 2376)
    - The effective date of the new preamble was "stayed" until November 15, 2018.
    - November 15, 2018 (83FR 57324) - Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Aggregation; Reconsideration – See Appendix E2

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## History of NSR Reform on Project Aggregation

- June 13, 1989 - EPA's "Sham Permitting" memo (Handout 2-B)
- June 17, 1993 - EPA's 3M Maplewood (Handout 2-N)
- June 13, 2002 - EPA's NSR Recommendations Fact Sheet
  - www.epa.gov/sites/default/files/2015-12/documents/20020613fs.pdf

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## Aggregation of Projects (1/3) – June 13, 1989

- June 13, 1989 U.S. EPA policy statement (Handout 2-B)
  - Sham [minor] Permits are not allowed under:
    - 40 CFR 52.21 (r)(4)
    - 40 CFR 52.21 (b)(4)
  - Evidence of a Sham Permit
    - Filing of a PSD permit application on or about the same time as a minor source application
    - Applications for funding
    - Reports on consumer demand and projected production levels
    - Statements of Authorized Representatives
    - EPA's assessment of the economic realities of multiple applications (projects) considered together

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## Aggregation of Projects (2/3)

- Simple examples
  - A manufacturing plant would like to expand a process line in two distinct steps or phases. Whether the second phase will be initiated and implemented depends on the success of the first phase.
    - Before permitting the first phase, does the plant need to consider emission increases associated with the second phase?
    - Does this constitute one project to two?
  - A manufacturing plant proposes and implements a minor modification using a new permit limit ("synthetic minor" limit) on the emissions from the process line. One year later, the plant proposes additional changes to the same process line and to relax the one year old permit limit to allow higher production levels.
    - Can the plant relax the existing (one year old) permit limit without retroactively triggering major NSR for that project?
    - Does this constitute one project or two?

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# 3M Maplewood Memo – Criteria (1/3) – June 17, 1993

**1. Filing of more than one minor source or minor modification application associated with emissions increases at a single plant within a short time period**

- If a source ***files more than one minor source permit application simultaneously or within a short time period of each other***, this may constitute strong evidence of an intent to circumvent the requirements of preconstruction review. Authorities should scrutinize applications that relate to the same process or units that the source ***files either before initial operation of the unit or after less than a year of operation***. The September 18, 1989 memorandum from John Calcagni to William Hathaway states that two or more related minor changes over a short time period should be studied for possible circumvention.

**2. Application of funding**

- Applications for commercial loans or, for public utilities, bond issues, should be scrutinized to see if the source has treated the projects as one modification for financial purposes. ***If the project would not be funded or if it would not be economically viable if operated on an extended basis (at least a year) without the other projects, this should be considered evidence of circumvention.***

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# 3M Maplewood Memo – Criteria (2/3) – June 17, 1993

**3. Reports of consumer demand and projected production levels**

- Stockholder reports, reports to the Securities and Exchange Commission, utility board reports, or business permit applications should be reviewed for projected operation or production levels. ***If reported levels are necessary to meet projected consumer demand but are higher than permitted levels, this is additional evidence of circumvention.***

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## 3M Maplewood Memo – Criteria (3/3) – June 17, 1993

**4. Statements of authorized representatives of the source regarding plans for operation**

- Statements by representatives of the source to EPA or to State or local permitting agencies about the source's ***plans for operation can be evidence to show intent to circumvent preconstruction review requirements***.

**5. EPA's own analysis of the economic realities of the projects considered together.**

- EPA may determine that it is reasonable to expect that company management would ***coordinate the planning and execution of projects considering their intrinsic relationship with each other*** (physical proximity, stages of production process, etc.) and their impact on economic viability of the plant (scheduling down time in light of production targets, economies of scale, etc.).

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## Aggregation of Projects (3/3) – June 2002

- U.S. EPA New Source Review: Recommendations (June 2002)
  - U.S. EPA to clarify the policy as follows – projects should generally be considered separate unless:
    - Project is dependent upon another project to be economically or technically viable
    - Project is intentionally split into multiple projects to avoid NSR
  - Defer to states for enforcement

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## Aggregation Discussion

- Activities which are “substantially related” should be aggregated
- Timing of projects **is NOT a decisive, stand-alone factor** to determine aggregation
- EPA clarified an element of the 3M decision (Handout 2-N) from 1993 as the basis for its policy – all activities which seek to advance the “basic purpose” of a plant are NOT automatically aggregated
- EPA wants consistency in determinations but understands the 2009 rule did not create the desired “bright line” between projects that should and should not be aggregated

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## Technical Dependence

- Indicators of technical dependence, per EPA (proposed and final rule preambles):
  - A project cannot operate within its maximum design rate for an extended period without the other project
  - A source cannot achieve its maximum production without implementation of both or multiple projects
  - When a project is needed to make a new product, absence of another project does not allow for full production of the new product
  - See EPA’s examples in final rule – 74FR pages 2378 and 2379

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## Economic Dependence

- Simply stated, the return on investment (ROI) associated with a project could not be realized without completion of another project(s)
- EPA not suggesting that all projects and activities at a plant are related
- And economic dependence is not as straightforward as technical dependence
- See EPA's examples in the preamble of the proposal (71FR - pages 54246 and 54247) – not really addressed in final rule

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## EPA's Aggregation – Time Frame – 2009/2018 Rule

- 2009/2018 Aggregation "rule"
  - EPA created a rebuttable presumption in the final rule that projects separated by **three years** are not "substantially related" and therefore not aggregated
  - There is no presumption for projects that occur less than three years apart
  - See Handout 5-T and Appendix E2

**See 2009 Project Aggregation Rule (November 15, 2018)**

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**2009 Project Aggregation Rule**
**November 15, 2018**

After review of the public comments the USEPA received on its proposal to revoke the 2009 New Source Review (NSR) Aggregation Action, the USEPA has now decided to not revoke this action. This 2009 action clarified implementation of the NSR permitting program under the Clean Air Act with respect to treating related physical or operational changes as a single "modification" for the purpose of determining NSR applicability at a stationary source. The action was originally published by the USEPA under the name "Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Aggregation and Project Netting." The proposal to revoke the ruling came on April 15, 2010 with a subsequent public comment period. This decision to not revoke the action was made effective on November 15, 2018.

There is a two-step process for determining NSR applicability for projects at stationary sources. "Step 1" takes into account emission increases from the project itself, also known as "project emissions accounting". "Step 2" considers emission increases at the source as a whole, taking into account emission increases and emission decreases attributable to other projects undertaken at the source within a specific time frame, also known as "contemporaneous netting." In order to be subject to NSR major requirements, the project must result in both a significant emissions increase in "Step 1" and a significant net emissions increase in "Step 2." Under this current action taken by the EPA, stationary sources are allowed to participate in "project aggregation"; this allows the sources to treat nominally-separate projects occurring at a source as a single project for NSR applicability purposes where it is unreasonable not to consider them a single project. This project aggregation of "substantially related" activities can occur at Step 1, thus allowing the source to assess whether the project is major before reaching Step 2, where one must consider all contemporaneous increases and decreases across the source.

Unfortunately, there is no pre-determined list of activities that should be aggregated for a given industry. Rather, determining what constitutes a "project" is done on a case-by-case basis by the USEPA. The USEPA has sought to clarify its policy on project aggregation through interpretations contained in USEPA letters and memoranda, with the most commonly cited being a 1993 memorandum providing guidance to a 3M facility in Minnesota. The USEPA has stated regarding what constitutes a single project, "it is not reasonable to imagine perfect clarity could ever be achieved." However, they do believe that in most cases a similar standard to the 2009 NSR Aggregation Action is already being implemented by state and local air agencies.

A link to this final action in the Federal Register can be found at 83FR 57324.

# Greenhouse Gases (Update)

## Greenhouse Gases
## Rise of Endangerment Finding and PSD Tailoring Rule

**1**

On April 2, 2007, the Supreme Court paved the way for EPA to issue the endangerment finding for greenhouse gases (GHG) and ultimately the PSD "Tailoring Rule."

**2**

MA v. EPA – 5 to 4 Supreme Court decision – Majority: Stevens, Kennedy, Souter, Ginsburg, and Breyer. Dissent: Roberts, Scalia, Thomas, and Alito. EPA lost this case.

**3**

On December 7, 2009, EPA (Obama) finalized its finding under Clean Air Act section 202(a) that GHGs endanger both the public health and the environment for current and future generations.

**4**

On June 3, 2010, EPA (Obama) finalized the PSD "Tailoring Rule" (75FR 31514).

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## Greenhouse Gases (Cont.)

- Endangerment Finding and Tailoring Rule survive early court decisions
  - June 26, 2012: DC Circuit opinion in COALITION FOR RESPONSIBLE REGULATION, INC., ET AL., PETITIONERS v. EPA
    - "…for the reasons set forth below, we conclude: 1) the **Endangerment Finding** and Tailpipe Rule are neither arbitrary nor capricious; 2) EPA's interpretation of the governing CAA provisions is unambiguously correct; and 3) no petitioner has standing to challenge the Timing and **Tailoring Rules**. We thus dismiss for lack of jurisdiction all petitions for review…"
  - On June 23, 2014, the Supreme Court supported the basic elements of the Tailoring Rule (UARG v. EPA) but significantly limited the applicability to "PSD Anyway" projects.
    - Judges Thomas and Alito highly critical of GHG BACT
  - On July 12, 2013, the D.C. Circuit issued a decision overturning the EPA regulation that deferred application of permitting programs to biogenic $CO_2$ emissions (Deferral Rule). Center for Biological Diversity v. EPA , 722 F.3d 421 (D.C. Cir. 2013 ).

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## Greenhouse Gases (Cont.)

- Four petitions to revise or repeal the Endangerment Finding, received by EPA between 2017 and 2019, were initially ignored by EPA and then ultimately denied by Michael Regan (Biden EPA) in 2022.
  - The DC Circuit Court (7/20/2023) and the Supreme Court (12/11/2023) refused to hear arguments to compel EPA to reconsider the Endangerment Finding.
- In 2022, the Inflation Reduction Act (IRA) embedded GHGs into the Clean Air Act by legislation.
  - Adds complexity to the arguments whether GHGs are to be generally regulated under the Clean Air Act.
  - EPA's Greenhouse Gas Reduction Fund – "**EPA Awards $27 Billion in Greenhouse Gas Reduction Fund Grants**"

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## Greenhouse Gases (Cont.)
### Trump EPA Response

- The EPA under Trump (1st term) was reluctant to address the Endangement Finding.
  - Legal doctrines of displacement and preemption.
  - These doctrines were introduced by the Supreme Court in 2011 (GHG common law case). The court held that the EPA's ability to regulate greenhouse gas emissions under the Clean Air Act effectively displaces federal common law, meaning that courts cannot apply it to federal common law cases.
- On February 18, 2026, the EPA finalized Reconsideration of 2009 Endangerment Finding and Greenhouse Gas Vehicle Standards (91FR 7686) – Handout 5-JJ – Repeal became effective on April 20, 2026.
  - This could impact rules that are based on the 2009 finding – such as the Tailoring Rule and other GHG regulations.
  - Several states, environmental groups, and others have filed lawsuits in the DC Circuit Court of Appeals.

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## Greenhouse Gases (Cont.)
### Trump EPA Response

- Reconsider the reconsideration?
  - Environmental Defense Fund, et. al. filed a reconsideration request to EPA on April 15, 2026. PETITION FOR RECONSIDERATION OF EPA'S FINAL RULE: RESCISSION OF THE GREENHOUSE GAS ENDANGERMENT FINDING AND MOTOR VEHICLE GREENHOUSE GAS EMISSION STANDARDS UNDER THE CLEAN AIR ACT (see Handout 5-OO)
  - Other entities similarly filed reconsideration requests to EPA in April.
  - In June, several entities issued a notice of intent to sue to compel EPA to respond to the April reconsideration requests.

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## Greenhouse Gases (Cont.)
### Trump EPA Response

- DC Circuit Court challenge - Plaintiffs in 2026 Endangerment Finding case (not a complete list of plaintiffs)
  - **American Public Health Association v. EPA (No. 26-1037) -** Includes, but not limited to: Environmental Defense Fund (EDF), Sierra Club, Earthjustice, Clean Air Task Force, Natural Resources Defense Council (NRDC), Union of Concerned Scientists, American Lung Association, Public Citizen, Center for Biological Diversity, and Conservation Law Foundation. The DC Circuit Court has consolidated these related cases under Case No. 26-1037.
  - **Venner v. EPA (No. 26-1038):** Elena Venner and 17 other youth plaintiffs (ages 1-22) in Venner v. EPA argue the repeal violates constitutional rights.
  - **Zero Emission Transportation Association v. EPA (No. 26-1039):**
  - **States & Cities:** Led by California (Attorney General Rob Bonta/Gov. Gavin Newsom) and including New York, Massachusetts, Connecticut, and roughly 20 other states, DC, the US Virgin Islands, and cities including New York, Boston, Chicago, Denver, and Los Angeles.

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# Begin Actual Construction – 40 CFR 52.21(b)(11)

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## Beginning Actual Construction

- **Section 165 of the Clean Air Act says:**
  - No major emitting facility on which construction is commenced after August 7, 1977, may be constructed in any area to which this part applies unless—
    - a permit has been issued for such proposed facility in accordance with this part setting forth emission limitations for such facility which conform to the requirements of this part;

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## Beginning Actual Construction (cont.)

- The PSD rules define the key terms as follows:
  - ***Begin actual construction*** means, in general, initiation of physical on-site construction activities on an emissions unit which are of a permanent nature. Such activities include, but are not limited to, installation of building supports and foundations, laying underground pipework and construction of permanent storage structures. With respect to a change in method of operations, this term refers to those on-site activities other than preparatory activities which mark the initiation of the change.
  - ***Construction*** means any physical change or change in the method of operation (including fabrication, erection, installation, demolition, or modification of an emissions unit) that would result in a change in emissions.

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## Beginning Actual Construction (cont.)

- When EPA first promulgated the term “begin actual construction” as part of the 1980 NSR rules, EPA did not discuss its purpose.
- The new term appeared for the first time, without explanation, in the final rule.

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## EPA’s 1978/1986 Foundational Guidance

- 1986 EPA memorandum from Edward Reich to Robert DeSpain – March 28, 1986
  - Reiterated an earlier (December 18, 1978) EPA guidance memorandum
  - The 1978 memorandum specified that certain limited activities would be allowed, such as planning, ordering of equipment and material, site-clearing, grading, and on-site storage of equipment and materials. Any of these activities, if undertaken prior to issuance of a PSD permit, would be at the risk of the owner or operator.
  - All on-site activities of a permanent nature aimed at completing a PSD source (including, but not limited to, installation of building supports and foundations, paving, laying of underground pipe work, construction of permanent storage structures, and activities of a similar nature) are prohibited until the permit is obtained, under all circumstances.

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## EPA's 1986 Foundational Guidance (cont.)

- The PSD rule specifies that a source may not begin actual construction (on an emissions unit) until a PSD permit is obtained by that source and "begin actual construction" refers to the emissions unit
- In 1980 "Emission unit" was defined at 52.21(b)(7) and refers not only to units which emit pollutants subject to review under PSD, but to any part of the source which emits a regulated NSR pollutant.
  - (b)(7) Emissions unit means any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant and includes an electric utility steam generating unit as defined in paragraph (b)(31) of this section.
- By definition, any part of a PSD source which would emit any regulated NSR pollutant is considered an emissions unit, even if that particular unit is not subject to PSD review.

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## EPA's 1986 Foundational Guidance (cont.)

- The emissions unit would include any installations necessary to accommodate that unit. Could be interpreted as expansively as the entire stationary source.
- Before issuance of the PSD permit, construction is prohibited on any emissions unit or on any installation designed to accommodate the emissions unit.
- If the emissions unit (including any accommodating installation) is an integral part of the source or modification, the PSD permit must be obtained before construction on the entire source commences.
- Also see 1995 letter from EPA to MPCA:
  - www.epa.gov/sites/default/files/2015-07/documents/19951213.pdf

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## Draft Guidance

- On March 25, 2020, EPA issued draft guidance on how the definition of "begin actual construction" should be interpreted.
  - See Handout 2-FF
- The 2020 draft guidance replaces the 1978/86 guidance.

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## Draft Guidance (cont.)

- The 2020 draft guidance narrows the focus to the emissions unit.
  - "Despite creating and acknowledging this distinction between a "major stationary source" on the one hand and an "emissions unit" on the other, EPA's 1986 Reich Memorandum adopted an overly broad reading of the term "emission unit.""
  - "The conclusion that such activities [construction of equipment that will not/do not emit NSR pollutants…] could not be permissibly undertaken prior to the issues of a PSD permit exemplifies how the approach to "begin actual construction" taken by the 1986 Reich Memorandum fails to give independent meaning to the term "emissions unit.""
  - "EPA focused here on the permanent nature of the activities without paying sufficient attention to whether these activities were "on an emissions unit." EPA appears to have precluded the activities not due to any demonstration that these activities were, in fact, part of an emissions unit, or that they would result in an emissions increase, but because EPA determined the activities to be permanent when considered in the context of the major stationary source subject to a permit."

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## Draft Guidance (cont.)

- After EPA had incorporated into its 1980 rules the term "begin actual construction," the EPA, in interpreting and applying that new regulatory term, continued to follow the policy set forth in the December 1978 Reich Memorandum. However, the 1978 PSD rules:
  - (i) did not contain the term "begin actual construction;"
  - (ii) did not employ the term "emissions unit;" and
  - (iii) did not "explicitly answer the question" of "where on the continuum from planning to operation of major emitting facility does a company or other entity violate the PSD regulations if it has not yet received a PSD permit."
  - In the 2020 draft guidance EPA wrote:
    - "As a consequence of not giving sufficient attention to these details, EPA adopted an interpretation of "begin actual construction" in 1986 that failed to give meaning to different parts of the regulatory text that was enacted in 1980 and that, as applied to specific situations, has resulted in the Agency's determining that activities that clearly do not involve construction "on an emissions unit" nevertheless constitute the "begin[ning of] actual construction.""

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## Draft Guidance (cont.)

- In addition, EPA is now less concerned about owner "equity" considerations. State/local agencies are less likely to be inappropriately influenced by owners who take financial risks before permits are issued.
  - "EPA no longer believes that its previous concerns over potential "equity" arguments provide sufficient justification for retaining such a restrictive policy on "begin actual construction," particularly given that … [the 1978/86] policy was predicated on an interpretation that reads the term "emissions unit" so expansively that it erases the distinction between the regulatory definition of an emissions unit and a stationary source."

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## Draft Guidance (cont.)

- EPA expects that sources will continue to work with their permitting authorities to determine the scope of an "emissions unit" for the purpose of evaluating whether a particular activity constitutes "construction . . . on an emissions unit" within the meaning of 40 CFR 52.21(b)(11). As illustrated above, the definition of "affected facility" and/or "process unit" under a relevant NSPS or NESHAP can occasionally provide useful direction for this analysis.

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## Draft Guidance (cont.)

- "While Congress intended the NSR program to function as a preconstruction permitting program – i.e., "No major emitting facility . . . may be constructed . . . unless a permit has been issued for such proposed facility" – as the Agency has long recognized, nothing in the CAA specifies "where on the continuum" from initial "planning" to ultimate "operation" a source owner or operator would run afoul of this statutory provision by acting to "construct" prior to receiving the required permit."
- "EPA has discretion to determine where on that "continuum" it should draw a reasonable line."

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## Beginning Actual Construction (cont.)

- The use of the phrase "begin actual construction" should NOT be confused with the term "commence" when used as "commence" construction.
- ***Commence*** as applied to construction of a major stationary source or major modification means that the owner or operator has all necessary preconstruction approvals or permits and either has:
  - Begun, or caused to begin, a continuous program of actual on-site construction of the source, to be completed within a reasonable time; or
  - Entered into binding agreements or contractual obligations, which cannot be cancelled or modified without substantial loss to the owner or operator, to undertake a program of actual construction of the source to be completed within a reasonable time.

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## Beginning Actual Construction (cont.)

- September 2, 2025, the EPA replied to a letter sent from the Maricopa County Air Quality Department (MCAQD) requesting clarification of EPA policy on "begin actual construction" (Handout 2-FF1)
- **"The EPA agrees with MCAQD's conclusion that requiring TSMC to obtain a permit before it starts building a structure that does not include an emission unit, or any component of an emission unit (including piping or a foundation specifically configured for an emissions unit) seems an overly broad reading of EPA's regulations and is supported by the reading of this regulation reflected in EPA's March 2020 Draft Guidance discussed in your August 1, 2025, letter, and in TSMC's July 15, 2025, letter."**
- On May 13, 2026, EPA proposed amendments to the federal rule (91FR 26958)
- www.govinfo.gov/content/pkg/FR-2026-05-13/pdf/2026-09524.pdf

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## Beginning Actual Construction – Proposal

- EPA is proposing to revise the current definition of "begin actual construction" and add a new definition of "pollutant-emitting activities" to identify which on-site construction activities an owner or operator of a stationary source of air pollution may lawfully undertake for purposes of the CAA before obtaining an NSR air permit.

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## Beginning Actual Construction – Proposal (cont.)

- Begin actual construction means, in general, initiation of physical on-site construction of pollutant-emitting activities on a stationary source. This does not include the following:
  - (1) Engineering and design planning;
  - (2) geotechnical investigation (surface and subsurface explorations);
  - (3) clearing vegetation, grading, surveying, soil compacting and stabilization (including associated pile driving), and excavating land (including blasting or other removal of hardrock);
  - (4) ordering of equipment and materials;
  - (5) storing of equipment or setting up temporary trailers to house construction management or staff and contractor personnel;
  - (6) paving surfaces.
  - The list is not intended to be exhaustive.
  - With respect to a change in method of operations, the term refers to those on-site activities (other than preparatory activities) which mark the initiation of the change.

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# Beginning Actual Construction – Proposal (cont.)

- Pollutant-emitting activities, as used in 40 CFR 52.21(b)(6)(i) and (b)(11), include any equipment or component in a process or operation that emits or has the potential to emit a regulated NSR pollutant. Pollutant- emitting activities do not include the following:
  - (1) office buildings;
  - (2) retail stores;
  - (3) buildings or structures designed for storage if the product or material to be stored therein is not capable of producing airborne vapors or particles;
  - (4) concrete pads and building foundations, walls, and roofs that are not closed in on the interior side and do not have design elements (e.g., piping, ductwork, wiring, anchor bolts) specifically and uniquely configured to serve or support any equipment or component in a process or operation that emits or has the potential to emit a regulated NSR pollutant;
  - (5) equipment or components whose sole purpose is heating ventilation and air conditioning for human workspaces or spaces within a building used to store supplies related to the habitation of the building;
  - (6) wiring, piping, and associated support structures that supply utility services (including electrical, water, wastewater, or telecommunications) to a property site or a building on a site;
  - (7) sealed junctions or tie-ins within one process that may serve equipment or components in another process constructed at a later time.
- The list is not intended to be exhaustive.
- EPA also notes the following - For purposes of this definition, classification as pollutant- emitting is based on emissions from a process or operation after construction, not emissions of pollutants during the construction process.

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# Chapter 6

Best Available Control Technology (BACT)

## Four Main Parts of a PSD Application

- 1. Control Technology Review (BACT)
- 2. Air Quality Analysis
  - NAAQS
  - PSD increments
- 3. Additional Impacts Analysis
- 4. Class I Area Analysis
- 5. Additional MEPA assessments may be required as dictated by the EAW review and potentially an EIS. May address the following federal acts (as well as others):
  - Endangered Species Act (ESA) – Biological evaluation for listed species and/or habitats (50 CFR Part 402)
  - National Historic Preservation Act (NHPA) – Historic properties within the source's "area of potential effect" (36 CFR Part 800, Section 106)

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## BACT Defined

"...an emissions limitation...based on the maximum degree of reduction for each pollutant... which the [permitting authority]...on a case-by-case basis, taking into account energy, environmental, and economic impacts...determines is achievable..."

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## BACT Defined – 40 CFR 52.21(j)

- BACT emission limits can not contribute to violation of NAAQS or PSD Increment
- BACT emission limits must be practically enforceable
  - Averaging time consistent with test method
  - Method of compliance delineated in permit (testing, monitoring, recordkeeping, and reporting)
  - Assumptions of BACT analysis incorporated into limits and/or compliance methods
  - Design, equipment, or work practice standards may be used in lieu of emission limits if compliance with emission limits infeasible

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## BACT Pollutant Applicability

- BACT applies to each pollutant subject to PSD review (i.e., for each pollutant regulated under the CAA for which there is a significant increase in emissions at the source and netting out failed)

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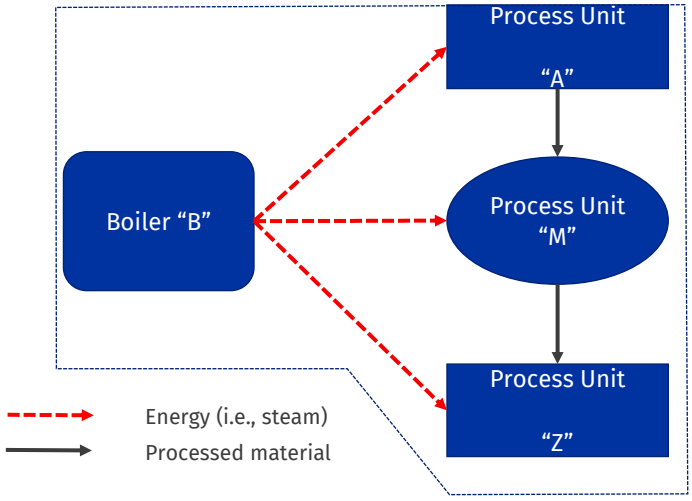
## BACT Emission Unit Applicability (1 of 4)

- Each new and/or modified “emissions unit” (aka Texas “facility”) at which a net emission increase occurs (NEI>0)
- See August 28, 1998 letter from EPA Region VII to Sunflower Electric Power Corporation (Handout 6-C)
- See Definition of “Emissions Unit” at 40 CFR 52.21(b)(7)
  - Emissions Unit: “Any part of a stationary source that emits….”
  - Handout 6-C1 and Handout 6-II: Use of NSPS and or NESHAP as guidance when attempting to determine the scope of an emissions unit

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## Debottlenecking Illustration




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## BACT Emission Unit Applicability (2 of 4)

- EPA Region 3 letter (November 30, 2000) – Judith M. Katz to John M. Daniel (Virginia Department of Environmental Quality) – Handout 6-C1
- "In order to determine how the "emissions unit" should be defined in this case, EPA would first look to the definition of "emissions unit" found at 40 CFR 51.165(a)(1)(vii)." "Here it defines "emissions unit" as "any part of a stationary source which emits or has the potential to emit any pollutant subject to regulation under the Act"."
- "For the purpose of defining an emission unit, air pollution control equipment can be considered as part of the operational design of the unit. Therefore, in defining what constitutes an emissions unit, EPA considers appropriate application of control technology to be an important criterion."
- An NSPS is one source of information that may be helpful in defining an emission unit for the purpose of evaluating control options.

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## BACT Emission Unit Applicability (3 of 4)

- Logical grouping of emissions units
  - EPA's Draft NSR Manual (1990) presupposes grouping emission units in some cases, as follows: "Each new or modified emission unit (or logical grouping of new or modified emission units) subject to PSD is required to undergo BACT review".
  - EPA's EAB has supported "logical grouping" of new and modified emission units for BACT purposes
    - General Motors, Inc., 10 EAD 360,383 (EAB 2002).
    - Masonite Corporation, 5 EAD 551, 557-8 (EAB 1994).
- Such grouping should be done on a reasonable case-by-case basis. Therefore, EPA has allowed for new and modified emission units to be grouped and for a BACT analysis to be performed for the group of new or modified units when proposed by the applicant.
- However, EPA has not historically applied this flexibility to include grouping of new or modified emissions units with existing emissions units that are not undergoing modification, so that controls could be applied to existing, unmodified emissions units.

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## BACT Emission Unit Applicability (4 of 4)

- Caution against "source redefinition" when defining emission units and "logical groupings" of emission units. EPA's EAB in Prairie State Generating Company - PSD Appeal NO. 05-05:
  - "In particular, IEPA observes that the NSR Manual states that "'[h]istorically, EPA has not considered the BACT requirement as a means to redefine the design of the source when considering available control alternatives.'" Id. (quoting the 1990 Draft NSR Manual at B.13)."
  - "IEPA notes that this policy **against** "redefining" the source through BACT has been endorsed by EAB and Administrator decisions."
    - Hillman Power Co., 10 E.A.D. 673, 692 (EAB 2002);
    - Haw. Commercial & Sugar Co., 4 E.A.D. 95, 99 (EAB 1992);
    - Old Dominion Elec. Coop., 3 E.A.D. 779, 794 (Adm'r 1992);
    - Pennsauken County, N.J., Res. Recovery Facility, 2 E.A.D. 667, 673 (Adm'r 1988)).

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## BACT Minimum Standards

- At a minimum, meet emission limitations contained in the State Implementation Plan
- At a minimum, meet the requirements of NSPS & NESHAPs (for the same or similar pollutants) – Includes both Part 61 and Part 63 NESHAPs. However, this provision does NOT generally make HAPs "regulated NSR pollutants."
- Whenever EPA develops a new NSPS, it conducts a "best system of emission reduction (BSER)" assessment.
- BSER assessments are useful in BACT reviews.

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## BACT – Phased Construction Projects

- BACT must be reviewed and modified for "phased" construction projects (i.e., BACT must be justified within 18 months of commencement of construction of each independent phase of a project)

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## PSD Permit Extension Requests

- Length of extension - 18 months
  - "We [EPA] believe that PSD permit extensions generally should be available for an additional 18-month period following the initial 18-month timeframe for commencing construction set forth in 40 CFR 52.21(r)(2), and should be based on adequate justification for the length of the permit extension. Permit extensions for shorter or longer time periods may be granted depending on the particular demonstration that an extension of the commencement of construction deadline is justified."
- How many extensions are possible?
- First extension request:
  - "the EPA believes that in order to give meaning to the extension provision in 40 CFR 52.21(r)(2), review or redo of substantive permit analyses such as BACT, air quality impacts analysis (AQIA) or PSD increment consumption analyses should generally not be necessary for a first permit extension request."

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## PSD Permit Extension Requests

- Second extension request:
  - "The EPA believes that in most cases a request for a second extension of the commencement of construction deadline should include a substantive re-analysis and update of PSD requirements."
- What if a new PSD requirement is now applicable (such as a new pollutant or new/amended NAAQS)?
  - "considering the extension language of 40 CFR 52.21 (r)(2) and the value of giving an extension meaning independent of a new permit application, the EPA believes that a permitting authority has the discretion to evaluate on a case-by-case basis whether and under what circumstances it would be justified to issue a PSD permit extension without requiring the source to meet a new requirement that took effect during the term of the initial permit."

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## PSD Permit Extension Requests

- What if the area becomes non-attainment for a pollutant addressed in the PSD permit?
- "the EPA believes that it is appropriate and consistent with the terms in 40 CFR 52.21(r)(2) to evaluate on a case-by-case basis whether an extension of the PSD permit is justified in situations where one or more pollutants have been redesignated nonattainment following PSD permit issuance **and the PSD permit contains other pollutants for which the area remains in attainment."**
- "However, for the pollutant(s) for which the area changed to nonattainment, these pollutant(s) should be evaluated by the appropriate permitting authority under the applicable nonattainment NSR permit requirements prior to commencing construction if construction will be delayed beyond the 18-month deadline."
- See Handout 6-S

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## BACT Analysis Procedure

- Case-by-case determination performed by the applicant in form of report and approved by agency through issuance of permit
- Emission limits achievable considering…
  - Economic impacts
  - Environmental and energy impacts

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## BACT Assessment Elements

- Review the proposed emission reduction options
  - Pollution Prevention Options
  - Equipment Specification/Monitoring
  - Add-on Abatement Equipment
  - Good Engineering Practice/Best Management Practice

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## BACT Assessment Elements

- The overall emission reduction performance level of a BACT proposal must be compared to the emission reduction performance levels that have been previously accepted as BACT in recent reviews for the same industry
- A specific BACT proposal may be different than those accepted as BACT in recent permit reviews
- Generally, the proposal must have an overall emission reduction performance that is at least equivalent to those previously accepted as BACT.
  - See Handout 6-TT

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## EPA's "Top Down" Approach

- Step 1 – Identify available control options
- Step 2 – Eliminate technically infeasible options
- Step 3 – Rank options by control effectiveness
- Step 4 – Evaluate most effective controls and emission limits achievable
- Step 5 – Select BACT

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## BACT Analysis Procedure

- Step 1. Identify all "available" control options
  - Available control technologies are those with a "practical potential" for application to the emission unit and regulated pollutant

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## BACT Analysis Procedure

- Available control technologies include:
  - Existing controls for source category
  - Technology transfer from similar source categories
  - Production process modifications
  - Combinations of control/process options
  - Non-U.S. technologies
  - LAER determinations

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## Information Resources

- U.S. EPA - RACT/BACT/LAER Clearinghouse (RBLC) - https://cdxoarapps.epa.gov/oar-rblc/?tabIndex=0
- Equipment vendors/consultants
- Permits and permit files from other (related) facilities
- Technical journals, books, conference proceedings
- Agency web sites/compilations
  - www.aqmd.gov/home/permits/bact/guidelines
  - ww2.arb.ca.gov/capp/cst/tch/bact-determinations-and-guidelines

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## RACT/BACT/LAER Clearinghouse

- RACT BACT LAER Clearinghouse (RBLC)
- Regulatory personnel enter control technology definition information into the database
- Data can be searched across a number of parameters (location, pollutant, emission unit/type, fuels, process type, etc.)
  - See Handout 6-Z for a listing of Process Type Codes
- Challenging to use due to data inconsistencies
  - Need to search creatively to find all relevant determinations (don't just depend on one search – try various alternative emission units/type names, fuels, process type codes, etc.

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## RACT/BACT/LAER Clearinghouse

- Process Types – Primary categories listed in RBLC (Handout 6-Z)
  - 10.000 FUEL COMBUSTION
  - 20.000 WASTE DISPOSAL
  - 30.000 WOOD PRODUCTS INDUSTRIES
  - 40.000 ORGANIC EVAPORATIVE LOSSES
  - 50.000 PETROLEUM/NATURAL GAS PRODUCTION AND REFINING
  - 60.000 CHEMICALS MANUFACTURING
  - 70.000 FOOD AND AGRICULTURAL PRODUCTS
  - 80.000 METALLURGICAL INDUSTRY
  - 90.000 MINERAL PRODUCTS
  - 99.000 MISCELLANEOUS SOURCES

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## RACT/BACT/LAER Clearinghouse

- Additional concerns
  - Some determinations not actually achieved in practice
    - Equipment never was built
    - Had to revise limit when initial limit was not achievable
    - RBLC often not updated in these cases
  - Many determinations never get into database
    - May need to supplement searches with state-specific databases

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## BACT Analysis Procedure

- Step 2. Eliminate technically infeasible control options
  - Is technology available?
    - Reached licensing and commercial development stage
  - Is technology applicable based on physical, chemical, and engineering principles?
  - Applicant may consider lower level of control (less stringent) if permitted levels have not been achieved

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## BACT Analysis Procedure

- Step 2 – Availability and Applicability
  - In the context of a technical feasibility analysis, the terms “availability” and “applicability” relate to the use of technology in a situation that appears similar even if it has not been used in the same industry.
  - EPA considers a technology to be “available” where it can be obtained through commercial channels or is otherwise available within the common meaning of the term.
  - EPA considers an available technology to be “applicable” if it can reasonably be installed and operated on the source type under consideration.
  - Where a control technology has been applied on one type of source, this is largely a question of the transferability of the technology to another source type. A control technique should remain under consideration if it has been applied to a pollutant-bearing gas stream with similar chemical and physical characteristics.
  - Chemical/physical stream characteristics
    - Temperature, pressure, pollutant concentration, other contaminants present, volume of the gas stream to be controlled, etc.

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## BACT Analysis Procedure

- A word about control technology guarantees
  - A vendor guarantee of a certain level of performance may be considered by the permitting authority later in the BACT process when proposing a specific emissions limit or level of performance in the PSD permit.
  - However, a control technology should not be eliminated in Step 2 of the top-down BACT process based solely on the inability to obtain a commercial guarantee from a vendor on the application of technology to a source type.

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## BACT Analysis Procedure

- Step 3. Rank remaining technologies
  - control efficiency (% control)
  - expected emission rate (tpy, lb/hr)
  - expected emissions reduction (tpy)
  - environmental impacts (non-air quality impacts and hazardous air pollutants)
  - energy impacts
  - economic impacts (cost effectiveness)

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## BACT Analysis Procedure

- Step 4. Evaluate most effective controls and emission limits achievable
  - Eliminate economically and environmentally infeasible control options
- Step 5. Evaluate best remaining control technologies, and select BACT

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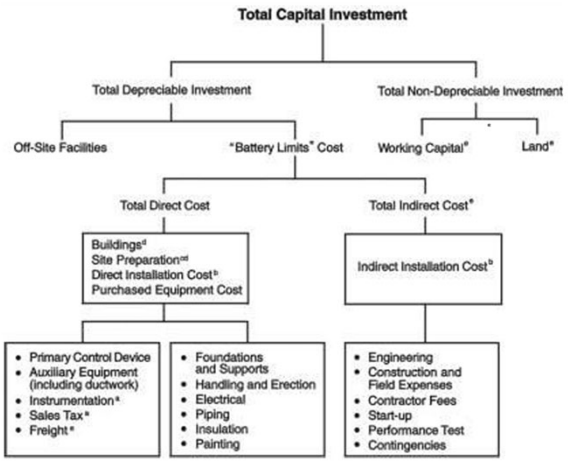
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# BACT Evaluation – Economic Analysis

- Procedures in OAQPS Control Cost Manual
  - Sixth Edition (2002)
  - Updates for Seventh Edition - www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution#cost%20manual
  - Annualized capital costs
    - Interest rate assumptions
    - Equipment life assumptions
  - Estimate annual operating costs
    - Consider costs of labor, materials, and utilities
    - Deviations allowed but must be justified
  - Individual chapters are being updated and made available in draft form.
    - See Handout 6-AA (9/24)
- www.epa.gov/system/files/documents/2024-10/epa_ccm_update_schedule_september_2024_public_summary_draft.pdf

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# Capital Investment Components

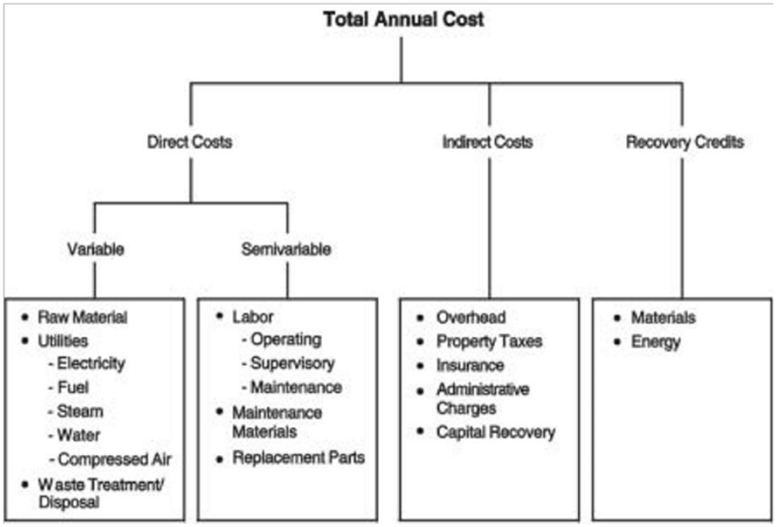



[a]Typically factored from the sum of the primary control device and auxiliary equipment costs.
[b]Typically factored from the purchases equipment cost.
[c]Usually required only at "grass roots" installations.
[d]Unlike the other direct and indirect costs, costs for these items usually are not factored from the purchased equipment cost. Rather, they are sized and costed separately.
[e]Normally not required with add-on control systems.

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## Annual Costs




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## BACT Evaluation - Economic Analysis

- Criteria to use are:
  - average cost effectiveness ($/ton)
  - incremental cost effectiveness ($/ton)
- Average cost effectiveness
  - Average CE = (total annualized costs of control)/(annual emission reductions)
- Incremental cost effectiveness
  - Incremental CE = [(total annualized cost of selected option)-(total annualized cost of next option)]/[(next option annual emission rate)-(selected option annual emission rate)]

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## BACT Evaluation - Economic Analysis

- Costs ($/ton removed) should be compared to costs of recent BACT decisions for that type of source
- An option can be eliminated if costs are disproportionately high compared to recent BACT determinations

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## BACT Evaluation - Energy Impacts Analysis

- Determine energy penalties or benefits
- Consider availability of fuels

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## BACT Evaluation - Environmental Impacts

- Determine impacts
  - will other emissions occur due to option?
  - will other effects occur?
- Concentrate on non-air quality impacts
  - water
  - solid and hazardous waste
  - visibility

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## BACT Selection

- Step 5 – Select BACT
  - The most effective control option not eliminated in Step 4 should be selected as BACT for the pollutant and emissions unit under review and included in the permit.
  - In setting the BACT limit, the permitting authority should look at the range of performance and determine a specific limit (or limits) to include in the final permit.
  - In setting BACT limits, permitting authorities have the discretion to select limits that do not necessarily reflect the highest possible control efficiencies but that will allow compliance on a consistent basis based on the particular circumstances of the technology and facility at issue, and thus may consider safety factors unique to those circumstances in setting the limits.
    - In some circumstances, it may be acceptable to establish BACT limits that can be adjusted or optimized as the performance of a technology becomes clearer after a period of operation.

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## BACT Selection

- Step 5 – Select BACT
  - The permitting authority is responsible for defining the form of the BACT limits and making them enforceable as a practical matter.
  - The permitting authority should consider issues such as averaging times and units of measurement. For example:
    - A final permit may include a limit based on pounds of emissions on a 24-hour rolling average or a limit representing a percentage of pollutant per weight allowed in the fuel.
- Concerning practical enforceability, the permitting authority must include information regarding the methods that will be used for determining compliance with the limits (such as operational parameters, timing, testing methods, etc.) and ensure that there is no ambiguity in the permit terms themselves.

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## BACT Selection

- Step 5 – Select BACT
  - The permitting authority also bears the responsibility in Step 5 to fully justify the BACT decision in the permit record.
  - Most important, it is the responsibility of the permitting authority to review the documentation and rationale presented in order to:
    - (1) ensure that the applicant has addressed all of the most effective control options that could be applied and;
    - (2) determine that the applicant has adequately demonstrated that energy, environmental, or economic impacts justify any proposal to eliminate the more effective control options.

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## BACT Selection

- Cost data relatively objective
- Other impact evaluations can be subjective
- Option selected cannot cause NAAQS or increment exceedance
- Other reading on PSD BACT
  - August 4, 2000, EPA draft consideration for Dry Low $NO_x$ Combined Cycle Natural Gas Turbines (Handout 6-A)
  - September 18, 2000, DOE letter to EPA (Handout 6-B)
  - November 12, 2002, IDEM letter to Jeffrey Holmstead (Handout 6-D)

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## BACT Evaluation – Choosing Emission Limits

- Express limits in terms of production to compare emissions for different size units
- For add-on controls that can achieve a range of control (depending on potentially many operating and non-operating variables), what performance level to choose?
  - Reasonable and customary designs
  - Vendor recommendations
  - Comparable to other recent permit actions

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## BACT Evaluation – Choosing Emission Limits for Complicated Operations and Emissions Units

- Multi-level (operating scenarios) BACT limits.
  - Normal Operations
  - Start-up (normally frequency/time and fuel use limitations). Examples:
    - Initial heating (unit and control device)
    - Refractory Soak and Seal Phase
    - Flame Stabilization Phase
  - Limit(s) During Malfunctions
  - Limit(s) During Maintenance
  - Limit(s) During Low Production Rates
  - Permitted work practices for shut-down procedures

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## EPA Approval of BACT

- EPA tends to issue comments to state agency before or during public comment
- EPA has questioned past BACT determinations and this has been a controversy in Title V permitting program
- Should EPA be able to overrule state agency in SIP-approved states?
  - 2004- Supreme Court Case (Alaska DEC v. EPA) - 5 to 4 in favor of EPA. www.oyez.org/cases/2003/02-658
  - 2011 - North Dakota District Court Case – North Dakota prevailed.

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## Revising existing BACT limits in permits?

- Three main criteria (all three must be met):
  - The source was constructed in conformity with the permit (see 40 CFR 52.21(r)(1))
  - The permitted BACT levels are inappropriate as a result of errors, faulty data, or incorrect assumptions contained in the permit application
  - The source investigated all available options to reduce emissions and demonstrated that compliance cannot be achieved.
  - See Handout 6-T

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# GHG BACT

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## GHG BACT

- EPA's Interim Phase I report – February 3, 2010 (see Handout 6-F)
- Phase II report dated August 5, 2010 (see Handout 6-G)

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## GHG BACT (cont.)

- Phase I work assumed EPA would continue to apply BACT in the same manner as other PSD regulated pollutants ("top down" approach)
- The workgroup agreed that GHG BACT should apply to new and modified emission units (undergoing PSD review and triggering for GHGs)

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## GHG BACT (cont.)

- The workgroup did NOT agree on whether BACT can (or should consider) changes to the basic design of a proposed project (alternative manufacturing processes, etc.) – Still a "battleground" particularly with respect to new sites.
- There was general consensus on the process for which technical feasibility would be addressed. However, the value of commercial guarantees (or lack thereof) in determining whether a BACT option is feasible remains contentious

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## EPA GHG BACT Guidance (1/2)

- Variety of guidance to clarify BACT process for GHG emissions from typical stationary sources
  - "PSD and Title V Permitting Guidance for GHGs" – See Appendix G1
    - www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases
    - www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases#GHG Control Measures White Papers
  - White Papers on GHG Control Measures
    - Electric Generating Units – See Appendix J1
    - Large Industrial/Commercial/Institutional Boilers
    - Pulp and Paper
    - Cement – See Appendix F1
    - Iron and Steel Industry
    - Refineries
    - Nitric Acid Plants
    - Landfills
- See Handouts 6-H and 6-I

Refer to Summary: Permitting Guidance for Greenhouse Gases

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# Permitting Guidance for Greenhouse Gases

Beginning January 2, 2011, Greenhouse Gas (GHG) emissions triggered substantial permitting actions by numerous facilities under the Clean Air Act. To assist permitting agencies and applicants with consistently interpreting the GHG requirements of the PSD and Title V permitting programs, EPA released a variety of GHG permitting guidance and resources on November 10, 2010:

- EPA's "PSD and Title V Permitting Guidance for GHGs," which provides general guidance for GHG permitting considerations including the evaluation of Best Available Control Technology (BACT) for GHG emissions
- White Papers on GHG Control Measures, which focus on sector-specific BACT considerations for industries with high GHG emissions
- Enhancements to the Control Technology Clearinghouse (i.e., the RBLC), which allows access to GHG control technology determinations issued by air permitting agencies
- GHG Mitigation Strategies Database, which includes performance and cost data on current and developing GHG control strategies
- GHG Permitting Action Team, which identifies members from each EPA region that serve as the primary contact for assisting permitting authorities with responding to GHG-related questions

## PSD and Title V Permitting Guidance for GHGs

EPA's "PSD and Title V Permitting Guidance for GHGs" presents a general overview of the PSD and Title V programs, identifies relevant guidance issued by EPA for other regulated air pollutants, and provides recommendations for meeting the permitting requirements for GHGs. This guidance document includes numerous examples regarding the applicability of the PSD and Title V programs and the assessment of BACT for GHG emissions.

In general, EPA's guidance focuses on the same five-step, top-down BACT evaluation process that has been used historically for other regulated air pollutants. In addition to typical emission unit-specific control technologies, EPA provides guidance on considering options that improve facility-wide energy efficiency as part of the BACT assessment. Additionally, EPA's guidance describes GHG-specific considerations for each step of the control technology evaluation. For example, EPA acknowledges that Carbon Capture and Sequestration (CCS) technology is unlikely to be an economically feasible BACT option, but that the combustion of biomass may be considered BACT after accounting for environmental, energy, and economic considerations (as well as government programs that promote the use of biomass).

Furthermore, various supporting materials are included in EPA's general guidance document. Flow charts are provided to illustrate the applicability of PSD permitting requirements for new and modified sources of GHGs, and technical resources are identified for estimating GHG emissions and evaluating GHG control technologies.

## White Papers on GHG Control Measures

White papers were issued for the following industrial sectors:

- Electric Generating Units
- Large Industrial/Commercial/Institutional Boilers
- Pulp and Paper
- Cement
- Iron and Steel Industry
- Refineries
- Nitric Acid Plants
- Landfills

The sector-specific white papers provide basic technical information about the industry's GHG emissions and identify available and emerging control technologies for reducing those emissions. Although these documents do not define BACT for a given industrial sector, the information provided for a given sector should be used by permitting agencies and applicants to perform the required case-by-case BACT assessments for the corresponding source categories.

## EPA GHG BACT Guidance (2/2)

- Guidance to clarify BACT process for GHG emissions from typical stationary sources
  - Enhancements to the Control Technology Clearinghouse https://cdxoarapps.epa.gov/oar-rblc/?tabIndex=0
  - Q&A Document:
  - www.epa.gov/nsr/nsr-implementing-ghg-permitting-questions-and-answers

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## EPA's "Top Down" Approach

- Step 1 – Identify available control options
- Step 2 – Eliminate technically infeasible options
- Step 3 – Rank options by control effectiveness
- Step 4 – Evaluate most effective controls and emission limits achievable
- Step 5 – Select BACT

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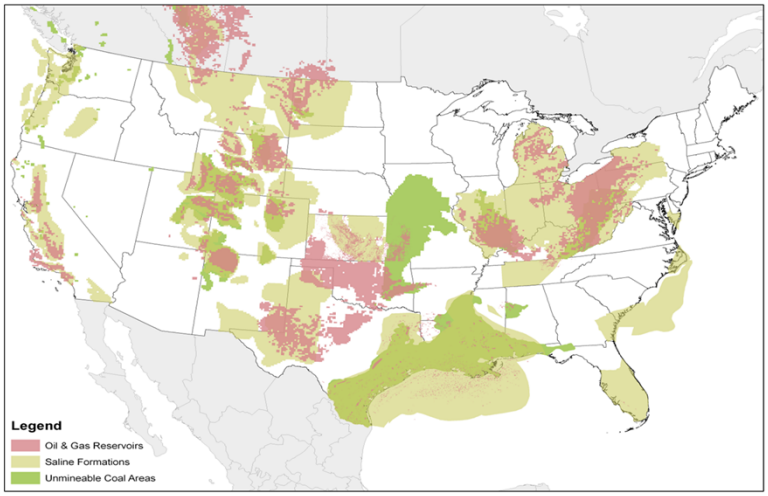
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## GHG BACT (cont.)

- Carbon Capture and Sequestration (CCS/CCUS)
  - General consensus among the committee concerning the details of feasibility
  - No consensus on whether a site should be forced to consider alternative locations (availability of sequestration capacity)
  - No consensus on the extent or degree of availability before CCS is considered “demonstrated”
  - No consensus on the degree to which CCS technology can be transferred from one source type to another
  - Subsequent industry specific white papers have clarified some of these issues.

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## Potential Sequestration Sites




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# Texas Petra Nova (CCUS) Site

- Began operations in January, 2017. Mothballed in May, 2020. Restarted in September, 2023.
- NRG's W.A. Parish power plant is one of the largest generation facilities in the United States with four coal-fired units totaling 2,475 MW (gross) and six gas-fired units totaling 1,270 MW (gross). The coal-fired units use over 30,000 tonnes per day of coal, sourced from Wyoming's Powder River Basin. The plant is located in rural Fort Bend County within the incorporated area of the town of Thompsons, Texas (southwest of Houston).
- Permitted in 2012, the project retrofits Unit 8 (coal fired) of the W. A. Parish plant with a post $CO_2$ capture system constructed within the existing site. Petra Nova is the world's largest post-combustion $CO_2$ capture system in operation.
- The capture facility uses an advanced amine-based absorption technology to capture at least 90 per cent (approximately 1.6M TPY) of $CO_2$ from a 240 MW flue gas slipstream of the 610 MW (net) pulverized coal-fired generating unit.
- The purity of the $CO_2$ put into the pipeline for transport is designed to be greater than 99 percent. The captured $CO_2$ is transported via a new 132 km (82 mile) long, 12-inch diameter underground pipeline to the West Ranch oil field, located near the city of Vanderbilt in Jackson County, Texas. Operations are highly dependent on the price of oil.
- The transported $CO_2$ is injected into the 98-A, 41-A, Glasscock and Greta sand units of the Frio Formation, approximately 1,640–2,066 meters below ground surface and where oil has been produced since 1938.
- Nine injection wells and 16 production wells are being used initially for EOR operations. As many as 130 injection wells and 130 production wells could be used over the 20-year span of the project.

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# Texas Petra Nova (CCUS) Site – Unit Level Details

| Unit name | Status | Fuel(s) | Capacity (MW) | Technology | CHP | Start year | Retired year |
|---|---|---|---|---|---|---|---|
| 1 | Operating[1] | fossil gas: natural gas[1] | 188[1] | steam turbine[1] | no[1] | 1958[1] | 2026 (planned)[2] |
| 2 | Operating[1] | fossil gas: natural gas[1] | 188[1] | steam turbine[1] | no[1] | 1958[1] | 2026 (planned)[2] |
| 3 | Operating[1] | fossil gas: natural gas[1] | 299[1] | steam turbine[1] | no[1] | 1961[1] | 2026 (planned)[2] |
| 4 | Operating[1] | fossil gas: natural gas[1] | 581[1] | steam turbine[1] | no[1] | 1968[1] | 2026 (planned)[2] |
| Unit 5 | Operating | coal: subbituminous | 734.1 | subcritical | – | 1977 | – |
| Unit 6 | Operating | coal: subbituminous | 734.1 | subcritical | – | 1978 | – |
| Unit 7 | Operating | coal: subbituminous | 614.6 | subcritical | – | 1980 | – |
| Unit 8 | Operating | coal: subbituminous | 614.6 | subcritical | – | 1982 | – |

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## ADM's ICCS Project

- The ADM Illinois ICCS project includes the design, construction, and demonstration of a $CO_2$ compression and dehydration facility as a precursor to $CO_2$ storage and subsequent monitoring, verification, and accounting of the $CO_2$.
- The injected $CO_2$ comes from the byproduct from processing corn into fuel-grade ethanol at ADM's biofuels plant adjacent to the storage site in Decatur, Illinois.
- The $CO_2$ is collected at atmospheric pressure from ADM's corn-to-ethanol fermentors. The fermentor outlet gas stream has high purity $CO_2$ (greater than 99% purity on a moisture free basis), but also contains some moisture (less than 3% by weight).
- Designed to collect/store approximately 1,000,000 TPY $CO_2$ at about 7,000 feet underground.  Mount Simon Sandstone formation.
- This gas stream is compressed and dehydrated to deliver supercritical $CO_2$ to the injection wellhead for storage. The injection operations are conducted on a 200-acre site adjacent to the ethanol plant, which is also owned by ADM.
- Began operations in April, 2017.

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## US Based Commercial CCS/CCUS Facilities (other than natural gas processing)

- Enid Fertilizer (Koch) - Operational 1982 (EOR)
- Great Plains Synfuels Plant and Weyburn-Midale - Synthetic Natural Gas (Coal Gasification) - Operational 2000 (EOR)
- Arkalon $CO_2$ – Ethanol Production – Operational 2009 (EOR)
- Bonanza BioEnergy/PetroSantander - Ethanol Production - Operational 2012 (EOR)
- Coffeyville Gasification Plant - Fertilizer Production – Operational 2013 (EOR)
- PCS Nitrogen – Fertilizer Production – Operational 2013 (EOR)
- Valero Port Arthur Refinery – Hydrogen Production via SMR – Operational 2013 (EOR)
- ADM - Illinois Industrial Carbon Capture and Storage – Ethanol Production - Operational 2017 (Geological Storage)

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## US Based Commercial CCS/CCUS Facilities (other than natural gas processing)

- Petra Nova Carbon Capture Project – Power Generation – Operational 2017 (EOR)
- Red Trail Energy CCS – Ethanol Production Facility - Operational 2022 (Geological Storage)
- Several facilities in advanced development or construction
  - Many more Ethanol Plants (Bioethanol)
    - Tallgrass Sequestration Hub - Wyoming
  - Power Generation
  - Hydrogen Production
  - Chemical (Methanol production)
  - Cement

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## US Based Commercial CCS/CCUS Facilities (other than natural gas processing)

- Selected US based facilities since 2023
  - Harvestone Blue Flint Ethanol in North Dakota – Saline Formation https://harvestonelcp.com/fccp-vision-carbon-zero-20261
  - Bantam Direct Air Capture (DAC) - www.capturepointllc.com/news/heimdal-launches-project-bantam-direct-air-capture-facility-capturepoints-oklahoma-carbon-hub
  - CF Industries in Donaldsonville, LA www.cfindustries.com/newsroom/2025/donaldsonvilleccs
  - Green Plains – Biorefineries in York, Wood River, Central City NE https://investor.gpreinc.com/news/news-details/2025/Green-Plains-Announces-Startup-of-Carbon-Capture-System-at-York-Facility/default.aspx
  - Stratos – DAC in Ector County, TX - 1PointFive technology - www.1pointfive.com
  - Trailblazer Pipeline and CO2 Sequestration Hub (Wyoming) – Partnership with ADM's Columbus Nebraska Ethanol Plant - https://tallgrass.com/energy-solutions/CO2
  - ExxonMobil Storage Project (southeast TX) - https://texas.exxonmobilpipeline.com/our-work/rose-project

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# DOE Initiative (RCSP)

The Regional Carbon Sequestration Partnership (RCSP) Initiative is an initiative implemented through the U.S. Department of Energy (DOE), Office of Fossil Energy and Carbon Management (FECM), and National Energy Technology Laboratory (NETL). The initiative supports research into the best regional approaches for permanently storing carbon dioxide ($CO_2$) in geologic formations through characterization and field projects. The partnerships include more than 400 distinct organizations, spanning 43 states and 4 Canadian provinces; have conducted 19 small-scale field projects building on research and are developing the framework needed to validate geologic carbon storage technologies. There are several large-scale $CO_2$ tests (tests injecting at least 1 million metric tons [MMT] of $CO_2$) currently being conducted or recently finished in the United States:

**Cranfield Project (SECARB) (Mississippi)**
**Citronelle Project (SECARB) (Alabama)**
**Illinois Basin Decatur $CO_2$ Project (MGSC)(Illinois) – ADM Ethanol**
**Bell Creek Field Project (PCOR Partnership)(Montana)**
**Farnsworth Unit, Ochiltree Project (SWP)(Texas)**
**Michigan Basin Project (MRCSP) (Michigan)**
**Kevin Dome Project (BSCSP) (Montana)**

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# Clean Fuels - Hydrogen Production

- Grey Hydrogen – Steam Methane Reforming (SMR) process without $CO_2$ capture. Generates about 10 kg CO2 per kg H2.
- Blue Hydrogen – SMR with $CO_2$ capture and storage. Generates between 2 and 4 kg CO2 per kg H2 (life cycle) depending on capture % and upstream methane leakage assumptions.
- Turquoise Hydrogen – Pyrolysis of methane – produces solid carbon. $CO_2$ intensity depends on how the thermal process is fueled. Can achieve negative carbon intensity if fueled (and powered) with biogas (renewable methane).
- Green Hydrogen – Electrolysis of water. Near zero carbon intensity with full life cycle assessment of wind derived power.
  - Pink (purple or red) – Electrolysis of water using nuclear power.
  - Yellow – Electrolysis of water using solar power (solar PV).
- Interesting note: If water is electrolyzed using fossil derived power (coal/gas plants), the carbon intensity quickly zooms up (~20 kg CO2 per kg H2).
- The 2021 IIJA bill requires the production of hydrogen at 2 kg $CO_2$ (at the site of production) per kg H2. “Clean Hydrogen”
- The DOE proposed (2022) a life cycle based “Clean Hydrogen Production Standard” equal to 4 kg $CO_2$ per kg H2.

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# EPA and Energy Efficiency (1/7)

- EPA stresses importance of energy efficiency in PSD BACT assessments
- For new sources, EPA calls for evaluating BACT on a facility-wide basis, including energy efficiency
  - 40 CFR 52.21(b)(7)
- For existing sources, EPA agrees that BACT applies to new or modified emissions units, and not necessarily to energy-consuming equipment

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# Climate Change - Phase II Report

On October 5, 2010, the EPA Clean Air Act Advisory Committee (CAAAC) Climate Change Work Group revealed a draft Phase II report that provides suggestions for conducting GHG Best Available Control Technology (BACT) Analyses. The report focused on how to factor in efficiency to the GHG BACT process and on the use of innovative controls. The report was presented at the full CAAAC meeting on October 6 and approved for EPA's consideration.

The Phase I CAAAC GHG BACT report released by this workgroup in February recommended the use of the traditional Prevention of Significant Deterioration (PSD) BACT process for GHGs. Following this report, the EPA Assistant Administrator (Gina McCarthy) asked the group to focus on energy efficiency and how a waiver for innovative control technology could be used or modified to promote new technologies to reduce GHGs. Although EPA has already submitted proposed guidance on how to set BACT for GHGs to the White House Office of Management & Budget last month, the Phase II report is expected to also have influenced on that guidance.

The Phase II report provides a guide for permit writers to incorporate energy efficient processes and technologies (EEPT) into the top-down BACT analysis, long used within the PSD program for criteria pollutants. For the first step, identification of available EEPT technologies, the group recommends reviewing the unit's energy performance with a benchmark technology already in use, mitigation options for specific industry sectors, and newly available EEPTs potentially built outside the United States. Sets of efficiency measures may be considered an available technology in the top-down analysis. The report recommends that the next steps – elimination of technically infeasible technologies, ranks of remaining technologies, evaluation of energy and environmental impact – should follow established EPA guidance and policy. In the last step of the BACT analysis, incorporation of the best remaining technology into the permit, the report suggests to consider the means of measuring and monitoring compliance with BACT emissions limits.

Examples of incorporation of EEPT and the BACT steps are provided for new units at an existing facility, modifications to existing units, replacement units, and greenfield facilities. The level of analysis is also discussed at length – whether it is appropriate to focus on the unit, process line, or the entire facility depending on whether it is a new, modified or replacement unit or greenfield application. The report also discussed incentives to "net out" of PSD applicability through energy efficiency measures so that there is no significant net increase in GHG emissions. There was disagreement within the workgroup as to whether this could be allowed under the PSD program. The CAAAC recommended that EPA determine how reductions made in grid-delivered power through efficiency measures could be considered in netting or other regulatory constructs to encourage GHG efficiency measures.

The report also discusses how the innovative control technology (ICT) waiver can be used to encourage innovative technologies that reduce GHG emissions. An ICT waiver determination is made on a case- by-case basis. In order for a technology to qualify for an ICT waiver it must meet both the provisions of 40 Code of Federal Regulations (CFR) 52.21(b)(19) and Agency policy or, where

appropriate, the applicable State Implementation Plan definition. "Innovative control technology" is defined as any system of air pollution control that has not been adequately demonstrated in practice, but would have a substantial likelihood of achieving greater continuous emissions reduction than any control system in current practice or of achieving at least comparable reductions at lower cost in terms of energy, economics, or non-air quality environmental impacts. If a stationary pollution source is using innovative technology, the CAA provides a waiver process to allow the source more time to meet new source performance standards (and BACT for PSD).

In order to encourage use of ICTs, CAAAC recommended that EPA restructure the past guidance and application of the ICT waiver. First, CAAAC recommended disavowing the 1991 Kamine Memorandum policy, which states that waivers could only be issued for the first application of an ICT, and not for subsequent applications. CAAAC further recommends reevaluating the maximum waiver length currently set as 7 years from permit issuance or 4 years after commencement of operation.

## EPA and Energy Efficiency (2/7)

"While energy efficiency can reduce emissions of all combustion-related emissions, it is a particularly important consideration for GHGs since the use of add-on controls to reduce GHG emissions is not as well-advanced as it is for most combustion-derived pollutants."

EPA guidance (Appendix D), p. 29

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## EPA and Energy Efficiency (3/7)

- Energy Efficiency
  - Should be considered in the BACT analysis as a factor in evaluating BACT alternatives and setting emission limits
  - Specific energy efficiency limits are difficult to quantify continuously
  - There has been no consensus on scope of the energy efficiency considerations. Opportunities for efficiency improvements (lower energy demand) at manufacturing sites are often associated with operations that do not directly emit GHGs.

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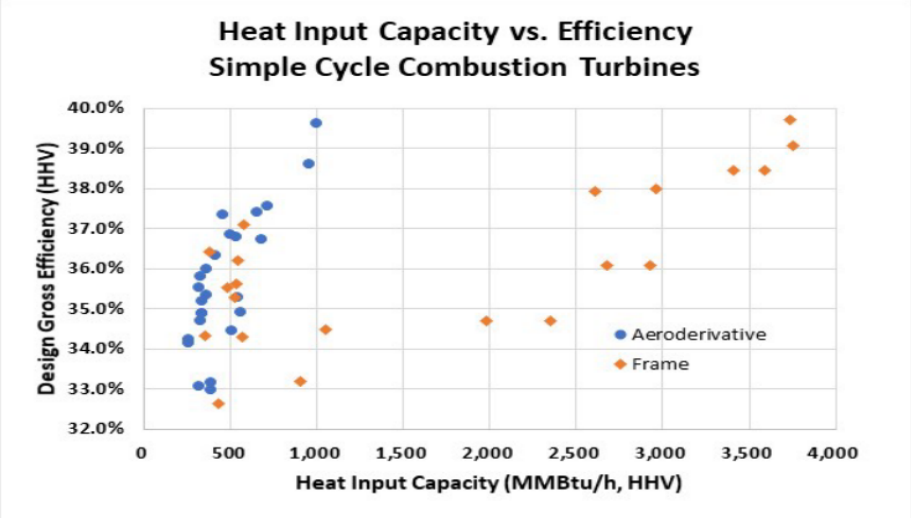
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# EPA and Energy Efficiency (4/7)

- Energy Efficiency – Power production
  - Approximately 3400 Btu's equals 1 Kwh (assuming 100% efficiency)
  - A new simple cycle gas turbine has a typical efficiency of about 38% (heat input to power output) – This equates to a "heat rate" of about 9000 Btu/Kwh (LHV)
  - A new combined cycle plant (gas and steam turbines) with heat recovery steam generation can operate with a thermal efficiency in the upper 50% range - Heat rate of approximately 6000 Btu/Kwh (LHV)

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**Exhibit 5-2. Design efficiency of simple cycle combustion turbines.**

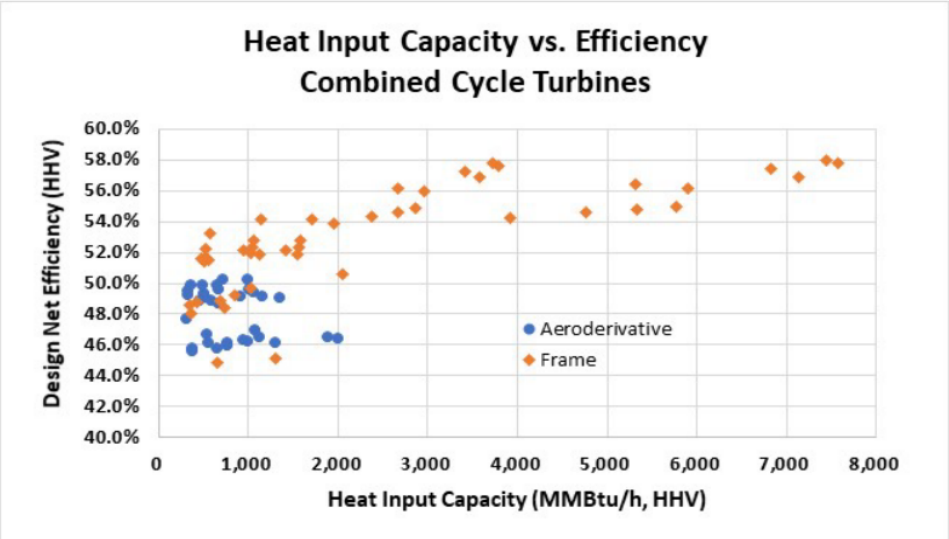



**See Handout 6-SS**

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**Exhibit 5-4. Combined cycle efficiency.**




Source: Gas Turbine World (2020)

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## EPA and Energy Efficiency (5/7)

- Energy Efficiency – Power production
  - A modern supercritical coal fired plant can achieve net plant efficiencies upwards of 41% (1100 F steam temperature, HHV basis)
  - Higher steam temperatures can (theoretically) produce higher efficiencies

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## EPA and Energy Efficiency (6/7)

- Boiler Efficiency – Steam production
  - 1 pound of 100 PSIG steam contains about 1,200 Btu.
  - A boiler operating at 80% efficiency will need about 1,500 Btu's to produce 1 pound of steam. At 85% efficiency, the energy "cost" is about 1,400 Btu/pound of steam (This is a "fuel-to-steam" energy efficiency calculation.)
  - New Number 2 oil fired boilers typically run between 80% and 89% efficient (LHV basis)
  - New gas fired boilers typically run between 75% and 85% efficient (LHV basis)

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## EPA and Energy Efficiency (7/7)

- Combined Heat and Power (CHP)
  - When there is a need to use the waste heat from the steam turbine, additional thermal efficiencies can be gained
  - Some manufacturing processes are ideally suited to use waste heat in the 250 F to 700 F temperature range
  - Overall thermal efficiencies of 80% or more are possible

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## Phase II Report on BACT for GHGs

- Work Group Phase II report - dated August 5, 2010 (made public October 5, 2010)
- Report details considerations for conducting five step "top down" BACT analysis and how to incorporate efficiency into this process
  - Energy Efficient Processes and Technologies (EEPT)
  - Considerations for possible level of analysis
    - Define part of facility subject to BACT review
    - Describe equipment/operations for which BACT limit or work practice standard must be developed
      - Equipment-level, production-level, and "source"-level
- Recommendations about how Innovative Control Technology (ICT) waiver can be used to encourage innovative technologies

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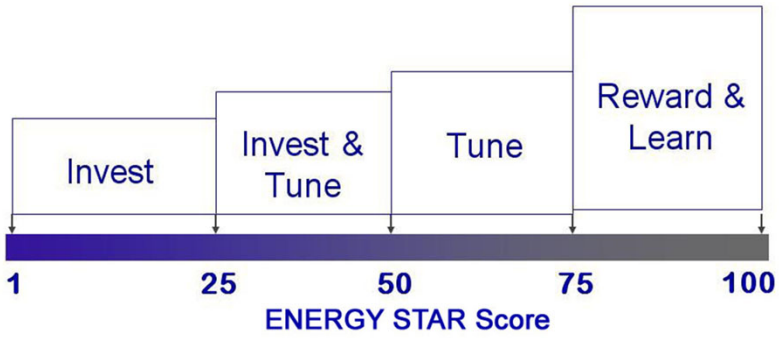
## Energy Performance Indicators

- ENERGY STAR plant Energy Performance Indicators (EPIs) are external, industry-specific benchmarks that score a manufacturing plant's energy performance and compare it to that of similar plants in the US.
- "EPA starts with an industry's confidential data on plant production and energy purchases as reported by U.S. manufacturing plants to the U.S. Census Bureau as part of its Census of Manufactures. Occasionally, additional datasets, if available, may be used to supplement Census data. EPA works closely with industry to understand and evaluate the impact of variables that may affect energy use in the plant, such as product mix, climate, inventory, etc. Variables that are found to be statistically significant are specifically accounted for in the model."
- The models are available in spreadsheet format.
- www.energystar.gov/industrial_plants/measure-track-and-benchmark/energy-star-energy

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## Energy Star EPI Scoring




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## Energy Performance Indicators

- EPIs are currently available for the following manufacturing plant types (as of 4/21/21)
  - Aluminum Casting Plant EPI
  - Automobile Assembly EPI
  - Automobile Engine Plant EPI
  - Automobile Transmission EPI
  - Cement Manufacturing EPI
  - Commercial Bread & Roll Bakery EPI
  - Container Glass Manufacturing EPI
  - Cookie and Cracker Bakery EPI
  - Flat Glass Manufacturing EPI
  - Fluid Milk Processing EPI
  - Frozen Fried Potato Processing EPI
  - Integrated Paper and Paperboard Manufacturing EPI
  - Integrated Steel Plant EPI
  - Iron Casting Plant EPI
  - Juice Processing EPI
  - Nitrogenous Fertilizer Plant EPI
  - Pharmaceutical Manufacturing EPI
  - Pulp Mill EPI
  - Wet Corn Milling EPI

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# Example Step 4: Economic Impacts (GHG BACT)

- Economic Impacts: Costs should be expressed on a $CO_2e$ basis, but no clear threshold has been established
- Example – 100 MMBtu/hr boiler. Fuel switch from natural gas to Hydrogen.

| | | |
|---|---|---|
| $2 | $/Kg (SMR) | Cost of Hydrogen Production (SMR) |
| 0.11 | MMBtu/Kg | Hydrogen combustion |
| 9.09 | Kg/MMBtu | Hydrogen combustion |
| $18.18 | $/MMBtu | $ per MMBtu |
| $1,818.18 | $/100MMBtu | $ per 100MMBtu |
| $13,636,363.64 | $/year | Annual cost of H2 per year (7500 hours) |
| | | |
| $5 | $/MMBtu | Cost of Natural Gas |
| $3,750,000 | $/year | Annual cost of gas per year (7500 hours) |
| $9,886,363.64 | $/year | Incremental cost of H2 per year |
| | | |
| 117.0 | Lbs/MMBtu | $CO_2$ EF for Natural gas |
| 0.059 | Tons/MMBtu | $CO_2$ EF for Natural gas |
| 5.85 | Tons/100MMBtu | $CO_2$ EF for Natural gas |
| 43875.00 | Tons/year | Annual $CO_2$ emissions (7500 hours of operation) |
| | | |
| $225.33 | $/ton | |

- Note: The US DOE's "Hydrogen Shot" (2021) seeks to lower the cost of "clean" hydrogen production to $1/Kg in a decade (= $7.40/MMBtu).

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# Step 4: "Top Down" Evaluation of Controls

- Environmental Impacts
  - In determining how to value or weigh any trade-offs in emissions for regulated pollutants (including GHGs), permitting authorities should continue to focus on "significant or unusual environmental impacts that have the potential to affect the selection or elimination of a control alternative."
  - Relatively small collateral increases of another pollutant need not be of concern, unless even that small increase would be significant, such as a situation where an area is close to exceeding a NAAQS or PSD increment and the additional increase could push the area into nonattainment.
  - When a trade-off is present, permitting authorities may limit their consideration of environmental impacts to only to those control options in which the comparison of GHG emissions to other regulated NSR pollutants might actually lead to a different selection of BACT for that facility.
  - But, the permitting authorities need not consider every possible environmental endpoint impact of every technology considered at Step 4.

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## Step 4: "Top Down" Evaluation of Controls

- Energy Impacts
  - With respect to energy impacts in a BACT analysis for GHGs, the relative energy demands of the options under consideration for reducing emissions from the facility obtaining a permit should be considered when weighing options for reducing direct emissions of GHGs in Step 4 of the analysis, regardless of the location where the thermal or electrical energy for the facility is produced.
  - This analysis should include an assessment of how particular control options for GHGs may impact the amount of energy that must be produced at an offsite location to support the operation of the facility obtaining the permit. Given the potential emissions from generation of electricity, such impacts may also be considered in the context of environmental impacts.

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## Step 4: "Top Down" Evaluation of Controls – EAB Case

- EXXONMOBIL CHEMICAL COMPANY (BOP) – PSD permitting for a modified ethylene plant located in Baytown, Texas
  - The GHG emission sources governed by the final permit included eight steam cracking furnaces and recovery equipment, furnace decoking equipment, a flare system, and engines (for backup generators and firewater booster pump).
- Case decided on May 14, 2014 – Handout 6-EE

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## Step 4: "Top Down" Evaluation of Controls – EAB Case

- ExxonMobil and the Region (EPA Region 6) eliminated CCS on economic grounds
  - "The record demonstrates that Exxon provided, and the Region reviewed, cost-effectiveness data showing a cost-effectiveness figure for CCS for the proposed project of $253/ton $CO_2$."
  - "Given the lack of relevant comparable facilities, the Region then looked at the total cost of installing CCS and considered its impact on this Facility. The Region reviewed and accepted cost data provided by Exxon showing that construction and operation of CCS would result in a 25% increase in the project's capital costs. According to Exxon, this increase would render the project economically unviable."
  - "The Region states that it reviewed cost estimates provided by Exxon and concluded that they "adequately approximate the costs of a CCS control for this project and demonstrate those costs are prohibitive in relation to the overall cost of the proposed project.""
  - "The Region also found that implementing CCS would result in as much as an 11% increase in the emissions of other regulated air pollutants from the proposed Facility, including nitrogen oxides ("NOx") and volatile organic compounds ("VOCs"), in an area which is already in nonattainment for ozone (a pollutant for which $NO_x$ and VOCs are precursors). The Region determined that it would "not be a beneficial outcome" to increase emissions of NOx and VOCs in order to reduce further the emissions of GHGs."

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## Step 4 – GHG BACT CCS Cost Estimates

- Carbon Capture and Storage (CCS)
  - Primary distinction between traditional BACT and GHG BACT
  - CCS should be considered in Step 1 for large $CO_2$ emitters and sources with high-purity $CO_2$ streams emitted to the atmosphere as well as other sources triggering GHG BACT
    - Hydrogen production
    - Ammonia production
    - Natural gas processing
    - Ethanol production
    - Ethylene oxide production
    - Cement production
    - Iron and steel manufacturing
- EPA Interagency CCS Task Force Report (August 2010) - www.epa.gov/sites/production/files/2016-08/documents/es-ccs-task-force-report-2010.pdf

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# Example GHG BACT Permits

- Christian County Generation (12/29/11) – EPA Region 5 – Handout 6-E
- Universal Cement (11/18/11) – EPA Region 5 – Handout 6-J
- US Nitrogen (8/8/11) – EPA Region 4 – Handout 6-K
- Austin Energy (8/14) - Natural gas fired combined cycle electric generating unit– EPA Region 6 - Handout 6-L
- C3 Petrochemicals (6/12/14) – EPA Region 6 – Handout 6-M
- Garrison Energy Center LLC (8/7/12) – EPA Region 3 – Handout 6-N
- Gateway Cogeneration 1 (8/7/12) – EPA Region 3 – Handout 6-O
- Gibson County Generation (10/10/12) – EPA Region 4 – Handout 6-P
- La Paloma Energy Center (11/6/13) – EPA Region 6 – Handout 6-Q
- Flint Hills Resources (5/23/14) – EPA Region 6 – Handout 6-U
- Virginia Power (6/17/16) – EPA Region 3 – Handout 6-W
- DTE Electric Company (7/16/18) – EPA Region 5 – Handout 6-CC
- Novi Energy C4GT LLC (4/26/18) – EPA Region 3 – Handout 6-DD
- PTTGCA Petrochemical Complex (12/21/18) – EPA Region 5 – Handout 6-GG
- Eastern Generation New Covert (4/18/19) – EPA Region 5 – Handout 6-FF
- Westlake Vinyls, Calvert City, KY (11/13/20) – EPA Region 4 – Handout 6-JJ
- Nucor Steel Gallatin, LLC, Ghent, KY (4/19/21) – EPA Region 4 – Handout 6-KK
- Nucor Steel, Arkansas, Blytheville, AR (10/5/21) – EPA Region 6 – Handout 6-PP
- Midwest Fertilizer Company LLC, Mt. Vernon, Indiana (5/6/22) – EPA Region 5 – Handout 6-OO

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# Example GHG BACT Permits

- Valero Refining, New Orleans, LA (10/24/23) – EPA Region 6 - Handout 6-VV
- Marathon Petroleum, Garyville, LA (12/4/23) – EPA Region 6 - Handout 6-WW
- Cronus Chemicals (Ammonia Plant), Tuscola, IL (12/21/23) – EPA Region 5 – Handout-XX
- Calpine Corporation (Peaking plant), Fairfield, TX (7/6/24) – EPA Region 6 - Handout 6-YY
- Freestone Peakers Plant (Peaking plant), Fairfield, TX (6/12/24) – EPA Region 6 – Handout 6-AAA
- Shintech Louisiana Plaquemine, LA (12/16/24) – EPA Region 6 – Handout 6-BBB
- Luminant Generation Company LLC, Monahans, TX (9/24/25) – EPA Region 6 – Handout 6-CCC
- Dominion Energy, Chester, VA (12/19/25) – EPA Region 3 – Handout 6-DDD
- SL Energy Power Plant, Lexington, TX (10/30/25) – EPA Region 6 – Handout 6-EEE
- Rayburn Country Electric Cooperative, Sherman, TX (2/11/26) – EPA Region 6 – Handout 6-FFF
- Pecos Power Plant, Pecos, TX (3/27/26) – EPA Region 6 – Handout 6-GGG
- MPH BASTROP PEAKERS, Cedar Creek, TX (3/25/26) – EPA Region 6 – Handout 6-HHH

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## Cronus Chemicals GHG BACT - 12/2023

2.1.2-3 Control Technology Determination - BACT:
Limits for GHG from the $CO_2$ Vent in the Ammonia Plant, the Reformer Furnace and the Boilers

a. The GHG emissions, as carbon dioxide equivalents ($CO_2e$), of the combination of the affected $CO_2$ vent in the ammonia plant, the reformer furnace and the boilers, on an annual average basis, rolled monthly, shall not exceed 1.84 tons/ton ammonia produced.

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## Marathon Petroleum GHG BACT – 12/2023

"Based on the preceding discussion, the use of clean burning fuel (i.e., refinery fuel gas) and energy efficient design and operation are the only available control technologies identified for GHG BACT for the heaters. Use of clean burning fuel and energy efficient operation (good combustion practices) are considered baseline control options and are not ranked with regard to control efficiencies. Further, neither option is eliminated as technically infeasible or due to cost or other heaters are subject to 40 CFR 63 Subpart DDDDD, which for these heaters requires the work practice standard of periodic tune-ups to achieve and maintain proper equipment operation and good combustion practices. Therefore, use of clean burning fuels and compliance with the applicable work practice standards of 40 CFR 63 Subpart DDDDD are determined as BACT for GHG emissions."

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## Example GHG BACT Limits

- $CO_2e$-based BACT limits - primarily in terms of TPY (12-mo rolling)
  - Reformer- 117 lb/MMBtu (refinery)
  - Fluidized bed boiler – 2.1 lb/kW-hr (12-mo rolling)
  - Dual fuel combustions turbines – 1,330 lb/MW-hr; 1,890 lb/MW- hr (both on 30-day rolling average basis)
  - Combined cycle combustion turbine (CCCT) with heat recovery steam generation (HRSG) – 954 lb/MW-hr
  - CCCT with HRSG – 794 lb/MW-hr (2018 permit)
  - CCCT with HRSG - 6,625 Btu/kWh net HHV output and 883 lb/MW-hr (2018 permit)
  - Cement kiln – 1,860 lb/ton clinker

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## Example GHG BACT Limits (cont.)

- $CO_2e$-based BACT limits
  - Aux boiler – 117 lb/MMBtu (12-mo avg)
  - Boiler (EGU) – 117 lb/MMBtu (8-hr rolling)
  - Wood furnace – 1.29 lb/ODT
  - 4-stroke lean burn coal bed methane RICE – 1,100 lb/MW-hr (3-hr avg)
  - Emergency generator – 1.55 g/kW-hr
  - Emergency generator – 163 lb/MMBtu

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## Example GHG BACT Limits (cont.)

- $CO_2e$-based BACT limits
  - 230 lbs per 1,000 lbs steam produced (12-month rolling average) – RFG fired (340 MMBtu/hr)
  - 189 lbs per 1,000 lbs steam produced (12-month rolling average) – RFG fired (340 MMBtu/hr
  - Combustion Turbine (21,765 bhp) – 1.01 lb/hp-hr (pipeline quality NG)

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## Clean Energy Future – Lordstown, Ohio

- Two combined cycle combustion turbines (2,725 mmBtu/hr heat input turbine at ISO conditions and 179 mmBtu/hr heat input duct burner) with dry low $NO_x$ combustors, selective catalytic reduction (SCR), and catalytic oxidizer. Permit issued 8/11/2020. Renewed 3/3/2026. See Handout 6-III
  - $CO_2e$ emissions shall not exceed 833 lb/MWhr gross energy output (at full load ISO conditions without duct firing) and 369,700 lbs/hr (maximum under any condition with duct firing – each turbine).
  - 450 kilograms (kg) of $CO_2$ per megawatt*hour (MW*hour) of gross energy output (1,000 lb $CO_2$/MW*hour), calculated per rolling, 12-month period
    - [40 CFR 60.5520(a), (b), and Table 2] – NSPS Subpart TTTT
  - 1,555,243.8 TPY (all operating modes – each turbine) rolling 12-month basis

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## Eastern Generation – Covert - Michigan

- Three (3) combined-cycle combustion turbine (CT) / heat recovery steam generator (HRSG) trains. Each CT is a natural gas fired Mitsubishi model 501G, equipped with dry low NOx combustor and inlet air evaporative cooling. Each HRSG includes a natural gas fired duct burner with a 256 MMBtu/hr heat input capacity and a dry low $NO_x$ burner.
- Total capacity = 1230.00 MW
- $CO_2e$ limit = 1,425,081 tpy - EACH CT/HRSG TRAIN; 12-MO ROLL AVG (monthly)
- CCS was estimated to cost over $75 per ton of $CO_2$ removed, with an estimated annual cost of over $321 million to remove 4.24 million tons per year. Thus, this option was ruled out as economically infeasible.
- See Handout 6-FF

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## $CO_2e$ BACT Limits (cont.)

- Virginia Electric and Power – Greensville Power Station (June 17, 2016) - 1558 MW combined cycle gas plant with three turbine generators and associated HRSGs (heat rates without duct firing).
- Btu/kWh net (HHV) output
- Initial Test 6,457
  - Year 6 6,583
  - Year 12 6,709
  - Year 18 6,835
  - Year 24 6,961
  - Year 30 7,087
  - Year 31 and later 7,212
- Compliance based on periodic testing.

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## $CO_2e$ BACT Limits (cont.)

- Virginia Electric and Power – Greensville Power Station (June 17, 2016) - 1558 MW combined cycle gas plant with three turbine generators and associated HRSGs.

| Degradation Period | lb $CO_2$ e/MWh net output |
|---|---|
| Years 1-6 | 812 |
| Years 7-12 | 828 |
| Years 13-18 | 843 |
| Years 19-24 | 859 |
| Years 25-30 | 875 |
| Years 31 and later | 890 |

- Monthly compliance on rolling 12-month basis.

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## GHG BACT Comments in June 23, 2014 SC Opinion

- Did the 2014 SC opinion limit EPA's GHG BACT options?
  - "Assuming without deciding that BACT may be used to force some improvements in energy efficiency, there are important limitations on BACT that may work to mitigate petitioners' concerns about "unbounded" regulatory authority."
  - "BACT is based on "control technology" for the applicant's "proposed facility,"§7475(a)(4); therefore, it has long been held that BACT cannot be used to order a fundamental redesign of the facility. See, e.g., Sierra Club v. EPA, 499 F. 3d 653, 654– 655 (CA7 2007); In re Pennsauken Cty., N. J., Resource Recovery Facility, 2 E. A. D. 667, 673 (EAB 1988). "
  - "EPA has long interpreted BACT as required only for pollutants that the source itself emits, accordingly, EPA acknowledges that BACT may not be used to require "reductions in a facility's demand for energy from the electric grid.""
  - "EPA's guidance suggests that BACT should not require every conceivable change that could result in minor improvements in energy efficiency.... The guidance explains that permitting authorities should instead consider whether a proposed regulatory burden outweighs any reduction in emissions to be achieved, and should concentrate on the facility's equipment that uses the largest amounts of energy."

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## GHG BACT Comments in June 23, 2014 SC Opinion

- Finally:
  - "We acknowledge the potential for greenhouse-gas BACT to lead to an unreasonable and unanticipated degree of regulation, and our decision should not be taken as an endorsement of all aspects of EPA's current approach, nor as a free rein for any future regulatory application of BACT in this distinct context. **Our narrow holding is that nothing in the statute categorically prohibits EPA from interpreting the BACT provision to apply to greenhouse gases emitted by "anyway" sources.**

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# Greenhouse Gas BACT Assessments

Beginning in 2011, major sources of greenhouse gas (GHG) emissions that trigger Prevention of Significant Deterioration (PSD) permitting must implement Best Available Control Technology (BACT) for GHG emissions from new and modified sources. EPA has issued a variety of guidance in an attempt to clarify the BACT determination process for GHG emissions from common stationary sources:[1]

- EPA's "PSD and Title V Permitting Guidance for GHGs," which provides general guidance for the evaluation of BACT for GHG emissions
- White Papers on GHG Control Measures which focus on sector-specific BACT considerations for industries with high GHG emissions
- Enhancements to the Control Technology Clearinghouse (i.e., the RBLC), which allows access to GHG control technology determinations issued by air permitting agencies
- GHG Mitigation Strategies Database, which includes performance and cost data on current and developing GHG control strategies
- GHG permit training materials, including archived video of prior webcasts covering EPA's general guidance on GHG BACT determinations and BACT examples for certain source types

While EPA's guidance recommends using the standard five-step top-down BACT evaluation process, which has traditionally been used within the PSD program for criteria pollutants, the guidance also identifies several considerations that are specific to evaluating BACT for GHG emissions. The following paragraphs summarize EPA's guidance to date on each of the five steps of the BACT evaluation process for GHGs.

**Step 1 – Identify All Control Technologies**

As with a traditional BACT assessment for criteria air pollutants, Step 1 of the analysis should identify all control technologies that are available to the GHG emissions source under consideration, including inherently lower-emitting processes and designs, add-on technologies, and control methods applied at similar emissions sources (available through technology transfer). Furthermore, a BACT assessment must consider feasible combinations of those technologies.

According to EPA's GHG BACT guidance issued to date, the control technologies identified in Step 1 need not consider options that would fundamentally redefine the nature of the source or, for a modification, fundamentally redefine the project that is under review. However, EPA has not issued clear guidance to identify control technologies that would redefine the nature of the source. Rather, this determination is left to the discretion of the permitting authority.
Based on recent guidance, a permittee preparing a GHG BACT assessment as part of a permit application should begin by considering the fundamental business purpose of the project, as

described in the permit application. For example, EPA's guidance indicates that cleaner versions of the primary fuel used in a source should be considered an available BACT option in Step 1. Increased usage of secondary fuel in a source should also be included in the BACT assessment. Alternatively, the use of an alternative fuel for which the source is not already configured may fundamentally redefine the source and is not part of the BACT evaluation.

***Biofuels***

EPA has received numerous questions regarding whether the use of biofuels should be considered as a GHG control option in Step 1 of a BACT assessment.

On January 12, 2011, EPA announced plans to defer PSD permitting requirements for biomass and other biogenic $CO_2$ emissions for three years (ending in 2014). Following an evaluation to consider the technical issues associated with biogenic $CO_2$ emissions during the three-year deferral period, EPA expected to issue a second rulemaking to address the manner by which GHG emissions associated with biomass combustion and other biogenic sources should be addressed in the PSD permitting program.

While EPA's 2011 announcement clarified BACT expectations for proposed biomass combustion sources, it did not address whether biomass should be identified as a GHG control option in a BACT assessment for a proposed fossil-fuel fired combustion source. In the absence of new guidance, it is assumed that the biomass considerations in EPA's BACT guidance remain valid. According to this guidance, since $CO_2$ emission rates from biofuels are similar to fossil fuels at the facility level (i.e., based on current guidance, $CO_2$ emissions from the combustion of biofuels are not considered carbon neutral), and because Step 1 of a BACT assessment does not consider off-site impacts, the biofuel must result in an emissions reduction at the facility level to be considered a viable GHG BACT control option in Step 1.

On April 23, 2018, EPA announced its policy in forthcoming regulatory actions will be to treat biogenic CO2 emissions resulting from the combustion of biomass from managed forests at stationary sources for energy production as carbon neutral. Although this policy announcement does not itself alter sources' obligations with regard to GHGs and CO2 in any particular regulatory program, the Agency is committed to addressing regulatory uncertainty about how it treats biogenic CO2 emissions in forthcoming actions under various EPA programs.

***Energy Efficiency Improvements***

Improved energy efficiency is expected to be the primary control technology option for combustion-related GHGs. Because combustion efficiency is frequently improved through numerous small energy saving measures, which are impractical to evaluate individually as BACT options, it may be necessary to evaluate these measures collectively by benchmarking the efficiency of new units of a similar design. If the unit under consideration is a poor performer

relative to the benchmark, then the analysis would highlight the need to determine whether additional energy efficiency measures are achievable.

EPA's guidance references a variety of resources to support a benchmarking analysis, including EPA's ENERGY STAR program. For example, ENERGY STAR developed sector-specific "Energy Guides" for a number of industrial sectors that detail processes and technologies to improve efficiency. Additionally, it established sector-specific benchmarking tools, called Energy Performance Indicators (EPIs), which assist with evaluating the energy performance of an entire facility. For a new facility that will generate its own energy (thermal or electric), the GHG BACT assessment should consider energy efficiency improvements, even in the design and operation of non-emitting energy-consuming units, as these considerations reduce overall facility emissions.

***Carbon Capture and Storage***

One of the primary distinctions between a traditional criteria pollutant BACT assessment and a GHG BACT assessment is the consideration of carbon capture and storage (CCS) technology as a viable control option. According to EPA's guidance, CCS should be considered in Step 1 of a BACT assessment for certain source categories that are considered large $CO_2$ emitters and sources with high-purity $CO_2$ streams emitted to the atmosphere such as "hydrogen production, ammonia production, natural gas processing, ethanol production, ethylene oxide production, cement production, and iron and steel manufacturing."

***Sector-Specific White Papers***

EPA issued white papers that identify available and emerging control technologies for reducing GHG emissions, for the following industrial sectors:

- Electric Generating Units
- Large Industrial/Commercial/Institutional Boilers
- Pulp and Paper
- Cement
- Iron and Steel Industry
- Refineries
- Nitric Acid Plants
- Landfills

Although these documents do not define BACT for a given industrial sector, the information provided for a given sector should be considered in identification of control technologies in Step 1 of a case-by-case BACT assessment for the corresponding source categories.

**Step 2 – Eliminate Technically Infeasible Options**

EPA's guidance indicates that a control option is considered technically feasible if it has been successfully demonstrated in practice at the same type and size of facility, or at a facility with similar process streams. The absence of a commercial guarantee for GHG emissions is not considered sufficient justification to identify a control technology as infeasible.

To determine whether CCS is technically feasible, the assessment must consider all three aspects of the control technology (i.e., capture, transport, and storage). If any of these aspects is infeasible for the facility, then CCS technology may be considered technically infeasible and eliminated from further consideration. A permittee should demonstrate the difference between CCS considerations at its facility (e.g., space, right-of-ways, access to storage reservoir, etc.) and technologies already demonstrated at other sources in order to eliminate CCS technology from further consideration.

**Step 3 – Rank Remaining Control Technologies by Control Effectiveness**

In Step 3 of the GHG BACT assessment, the metric used for ranking of the remaining control technologies by effectiveness may vary. For example, this analysis may be presented as percent pollutant removal, emission rate, or reduction in emissions over time. The appropriate basis should depend on case-specific considerations. If plant-wide efficiency measures are considered (e.g., for a new facility that generates its own thermal or electric energy), it may be preferable to rank the technologies by the overall net emissions impact of alternative measures. It should also be noted that Step 3 must include the ranking of logical combinations of the technologies (but not every possible variation).

**Step 4 – Evaluate Most Effective Controls and Document Results**

Step 4 of a BACT assessment may consider the economic, environmental, and energy-related impacts of a control technology. While this step is typically focused on economic considerations, EPA's guidance indicates that other collateral impacts are expected to play an increasing role in a permitting authority's GHG BACT determination process.

***Economic Considerations***

According to EPA's guidance, the economic impacts of a control technology should be evaluated on a "per ton" of $CO_2$ equivalent ($CO_2e$) emissions basis, rather than per ton of individual GHGs. The Step 4 evaluation should consider both the average cost effectiveness of the control technology as well as the incremental cost of adding another compatible control technology to the original option.

EPA's recent guidance fails to provide specific guidance on a cost effectiveness threshold ($/ton $CO_2e$ removed) above which a technology or combination of technologies should be considered economically infeasible. Available guidance on this issue is limited to the *Interim*

*Phase I Report of the Climate Change Work Group*, which identifies a range of cost effectiveness recommendations from $3 to $150 per ton $CO_2e$. Furthermore, a control option may be considered economically infeasible if the cost of a control technology is high relative to the project cost, if the control strategy would impact the resulting product's cost, or if the control option would cause local job losses.

***Other Considerations***

An applicant **may** evaluate the impact of a control technology on both direct (e.g., combustion sources) and indirect (e.g., purchased electricity) energy usage. Additionally, the on-site and off-site environmental implications of control options should be considered. For CCS technology, Step 4 should consider energy use associated with the high parasitic load and related emissions (on-site and off-site, GHGs and criteria pollutants). Although it does not affect the Step 1 evaluation, the carbon neutrality of biofuels may be considered as an off-site impact in Step 4 of the assessment for a control option involving the use of biofuels.

**Step 5 – Select BACT**

BACT is selected based on the most efficient control option or combination of options identified in Step 3 that was not eliminated in Step 4 of the evaluation process. The basis for a permitted BACT standard varies and may include but is not limited to emission limits and averaging time periods, equipment specifications, and work practices, as well as associated monitoring, recordkeeping, and reporting provisions.

For GHGs, it may be preferable to express BACT limits on an output basis to reflect numerous energy efficiency measures. In addition to an output-based numerical limit, the permit may include conditions that require the implementation of certain work practices such as an Environmental Management System (EMS) focused on energy efficiency. EPA's ENERGY STAR program provides guidance and recommendations for an EMS. According to EPA's guidance, one outcome of a BACT assessment might be all suggested efficiency improvement measures identified by the EMS that result in a net energy savings be implemented.

EPA guidance states that longer averaging periods may be appropriate to address GHG emissions and the load variations inherent in certain combustion equipment. The guidance also provides a variety of GHG BACT assessment and determination examples for sources including a new municipal solid waste (MSW) landfill, a new natural gas-fired boiler at an existing major source, the addition of a new hydrogen plant at an existing petroleum refinery, a Greenfield coal-fired electricity generating facility, a new kiln at a cement plant, the expansion of a natural gas compressor station (new compressors and associated engines installed), and a Greenfield gas-fired combined cycle power plant. The table below summarizes several of EPA's example BACT assessments.

Permittees undergoing GHG BACT evaluations should be familiar with relevant EPA guidance including example BACT assessments, sector-specific white papers, and guidance from EPA's ENERGY STAR program on energy efficient control strategies.

[1] http://www.epa.gov/nsr/ghgpermitting.html

[2] *PSD and Title V Permitting Guidance for Greenhouse Gases*, EPA's Office of Air and Radiation, November 2010

# GHG Industry-Specific BACT Examples

| Source/Facility Type | | |
|---|---|---|
| **Natural Gas-Fired Boiler** | **Coal-Fired Electricity Generating Plant** | **Gas Turbine Electricity Generating Plant** |
| New 250 MMBtu/hr natural gas (NG)-fired boiler at existing PSD major source | New Greenfield 500 MW NG-fired combined cycle power plant with combustion turbines, heat recovery steam generators (HRSGs) with supplemental firing and steam turbines | New Greenfield subbituminous coal boiler and steam turbine facility (design includes economizer, steam reheater, air preheater, feed water heater, and condensate recovery/reuse) |
| **Step 1 – Identify All Control Technologies** | | |
| **Natural Gas-Fired Boiler** | **Coal-Fired Electricity Generating Plant** | **Gas Turbine Electricity Generating Plant** |
| • Permit applicant identifies four GHG control options: 1) Oxygen Trim, 2) Economizer, 3) Blowdown Heat Recovery (HR), 4) Steam Recovery<br>• Agency requests consideration of Air Preheater<br>• Public comment requests evaluation of Combined Cycle Gas Turbine (CCGT), but agency rules this would redefine source, so not included in Step 1 (i.e., turbine would not satisfy two primary business purposes of boiler: Generating steam (not electricity) and varying steam demand). | • Permit applicant identifies two GHG control options: 1) High Thermal Efficiency System Design, and 2) Carbon Capture and Storage (CCS)<br>• Public comment requests evaluation of biofuels but agency agrees that this would redefine source, so not included in Step 1<br>• Based on benchmarking assessment, agency requests evaluation of other turbines, and varying rates of gas/steam turbine power generation | • Permit applicant identifies the following GHG control options: 1) Supercritical Boiler and Turbine Design; 2) Coal Drying; 3) Optimized Combustion with Continuous Control; and 4) CCS<br>• Public comment requests evaluation of natural gas as fuel, but agency agrees that this would redefine the source<br>• Agency requests assessment of 5) Ultra Supercritical Design; 6) Integrated Gasification Combined Cycle (IGCC) system; and 7) Motor Efficiency Improvements (e.g., variable speed motors) |
| **Step 2 – Eliminate Technically Infeasible Options** | | |
| **Natural Gas-Fired Boiler** | **Coal-Fired Electricity Generating Plant** | **Gas Turbine Electricity Generating Plant** |
| All technologies identified in Step 1 (except for CCGT) are demonstrated, available, and applicable. | Applicant demonstrates that CCS is not "commercially available" for a gas turbine, and that an appropriate sequestration site not demonstrated. Agency agrees. | All options identified by Step 1 are considered technically feasible and available |
| **Step 3 – Rank Remaining Control Technologies by Control Effectiveness** | | |
| **Natural Gas-Fired Boiler** | **Coal-Fired Electricity Generating Plant** | **Gas Turbine Electricity Generating Plant** |
| Technologies ranked by their impact o boiler's thermal efficiency. Analysis indicates:<br>• Oxygen Trim - most effective single control<br>• Most effective combination of controls - Oxygen Trim + Economizer + Condensate HR + Blowdown HR<br>• Economizer more efficient than Air Preheater in exhaust heat recovery | Technologies ranked based on "$CO_2e$/MWh". Analysis shows that alternative gas turbine will provide higher overall efficiency, but that varying rates of gas/steam turbine power generation do not impact efficiency over range of operational conditions considered. | Applicant proposed to rank technologies based on $CO_2e$ emissions per unit fuel, but agency required that ranking be based on $CO_2e$ emissions on a net output basis. The most effective combination of controls identified was either Ultra Supercritical Design with CCS or IGCC with CSS, where Coal Drying and Motor Efficiency Improvements were included in both design options. |
| **Step 4 – Evaluate Most Effective Controls and Document Results (considering costs, expressed as "$/ton $CO_2e$ reduced")** | | |
| **Natural Gas-Fired Boiler** | **Coal-Fired Electricity Generating Plant** | **Gas Turbine Electricity Generating Plant** |
| • Blowdown HR not cost effective because of facility size/layout<br>• Recovery and reuse of condensate has several environmental benefits (reduces use of feedwater treatment chemicals, reduces generation of wastewater and other related wastes) | • CCS technically infeasible<br>• Permittee committed to higher efficiency turbine design (only technically feasible option), so no further analysis of costs and collateral impacts is required | Economic considerations associated with CCS include $CO_2$ capture, construction and operation of a $CO_2$ pipeline, security rights for the geologic reservoir, and operation of a $CO_2$ sequestration facility. CCS eliminated from consideration under Step 4 because of cost per ton controlled GHG, cost of CCS as a percentage of the project costs, and the impact cost of CCS on the economic viability of the project. Without CCS, Ultra Supercritical Design better than IGCC for $CO_2$ control. |
| **Step 5 – Select BACT** | | |
| **Natural Gas-Fired Boiler** | **Coal-Fired Electricity Generating Plant** | **Gas Turbine Electricity Generating Plant** |
| • BACT identified as Oxygen Trim + Economizer + Condensate HR (Blowdown HR eliminated under Step 4)<br>• Emission limit expressed as "lbs $CO_2e$/lbs steam produced (30-day rolling average)"<br>• Related BACT conditions include: a) Calculate emissions using standard EFs and fuel consumption rate; b) Use gauge to monitor steam production; c) Install boiler as described in permit application (design std); d) Perform preventative maintenance on air-to-fuel ratio controller; and e) periodically calibrate gas meter and steam flow analyzer. | • BACT determination includes: a) Mass emission limit for $CO_2e$ emissions on 30-day rolling average; b) Efficiency limit in terms of "Btu/kWh"; and c) annual compliance test | • Ultra Supercritical Design with a high efficiency steam turbine is selected as BACT, along with all the energy efficiency measures identified (e.g., control of boiler air to fuel ratio, coal dryer uses low grade waste heat, and high efficiency variable speed motors for electricity drivers). |

# Chapter 7

Air Quality Analysis

## Four Main Parts of a PSD Application

- 1. Control Technology Review (BACT)
- 2. Air Quality Analysis
  - NAAQS
  - PSD increments
- 3. Additional Impacts Analysis
- 4. Class I Area Analysis
- 5. Additional MEPA assessments may be required as dictated by the EAW review and potentially an EIS. May address the following federal acts (as well as others):
  - Endangered Species Act (ESA) – Biological evaluation for listed species and/or habitats (50 CFR Part 402)
  - National Historic Preservation Act (NHPA) – Historic properties within the source's "area of potential effect" (36 CFR Part 800, Section 106)

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## What is Ambient Air?

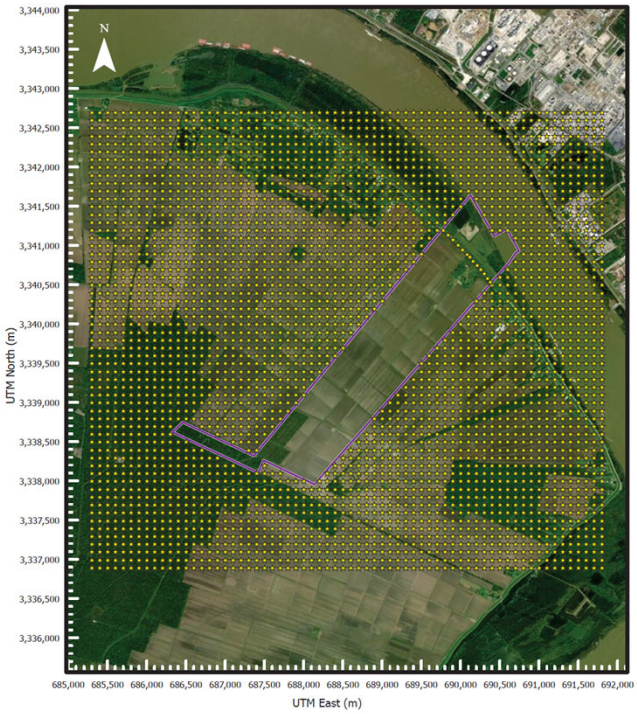
- Means that portion of the atmosphere, external to buildings, to which the general public has access (40 CFR Part 50.1 (e)) (Handouts 6-BB, 7-A, 7-A1, 7-A2)
- Standards attainment demonstrated through dispersion modeling and ambient monitoring

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## Ambient Air - Grid and Receptor Placement -

***Refer to Summary – Coordinate System, Treatment of Terrain, Receptor Grids, and Building Downwash***

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# COORDINATE SYSTEM, TREATMENT OF TERRAIN, RECEPTOR GRIDS, AND BUILDING DOWNWASH

## COORDINATE SYSTEM

The location of emission sources, structures, and receptors are represented in the Universal Transverse Mercator (UTM) coordinate system. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 kilometers [km]). The datum is based on North American Datum 1983 (NAD 83).

## TREATMENT OF TERRAIN

A designation of terrain at a particular receptor is source-dependent, since it depends on an individual source's effective plume height. AERMOD is capable of estimating impacts in both simple and complex terrain. A single base elevation will be used in the model data files for all sources within the proposed facility boundary, because this area of the proposed facility will be graded.

Receptor elevations and base elevations for NAAQS and PSD Increment inventory sources required by AERMOD are determined using the AERMAP terrain preprocessor. AERMAP also calculates receptor hill height parameters required by AERMOD. As suggested in the *AERMOD Implementation Guide*, terrain elevations from the USGS NED data are used for the AERMAP processing of receptors and regional inventory sources.[1] The resolution of NED data (e.g., 1 arcsecond vs 1/3 arcsecond) will depend on the complexity of terrain of the area. NED data files are no longer supported on the USGS Seamless server but may be similar data can be obtained and converted from the *National Map.*[2]

## RECEPTOR GRIDS

Ground-level concentrations are calculated within three nested Cartesian receptor grids to determine the location of the maximum estimated impact at a resolution of 100-meter grid spacing. The three Cartesian grids cover a region extending from all edges of the proposed facility's property boundary to the point where impacts from the project are no longer expected to be significant. An explanation of each receptor grid used in the modeling analysis is provided below.

1. **Fence Line Grids:** "Fence line" grids consisting of evenly-spaced receptors 25-100 meters apart (depending on state guidance) placed along the main property boundaries for the proposed facility.

2. **Fine Cartesian Grid:** A "fine" grid containing 100-meter spaced receptors extending approximately 5 km from the center of the property but beyond the fence line,

[1] Section 4.3 of the March 19, 2009 version of U.S. EPA's *AERMOD Implementation Guide* recommends that AERMOD users transition from the use of DEM data to NED data in AERMAP as soon as practicable.

[2] https://apps.nationalmap.gov/downloader/#/

3. **Medium Cartesian Grid:** A "medium" grid containing 500-meter spaced receptors extending from 5 km to 10 km from the center of the facility, exclusive of receptors on the fine grid, and

4. **Coarse Cartesian Grid:** A "coarse grid" containing 1,000-meter spaced receptors extending from 10 km to 20 km from the center of the facility, exclusive of receptors on the fine and medium grids.[3]

The full NAAQS and PSD Increment analyses are conducted using only receptor locations at which impacts predicted in the Significance Analysis exceeded the SILs. In addition, for nearby regional sources that cause on-site exceedances of the NAAQS or PSD Increment due solely to impacts from sources on their property, these on-site receptors are often excluded, if necessary, as ambient air after first proving that the combined impacts from sources at the proposed site and all other regional sources do not cause exceedances on the property of the regional source in question.

As compliance with NAAQS and PSD Increment is only required in areas regulated as "ambient air," in developing the receptor grid for the modeling analysis, excluded are all company owned property to which public access is restricted at the proposed facility because it will be fenced and/or monitored will not be considered "ambient air."

## BUILDING DOWNWASH

The *Guideline* requires the evaluation of the potential for physical structures to affect the dispersion of emissions from stack sources. The exhaust from stacks that are located within specified distances of buildings and whose physical heights are below specified levels may be subject to "aerodynamic building downwash" under certain meteorological conditions. This determination is made by comparing actual stack height to the Good Engineering Practice (GEP) stack height. The modeled emission units at the proposed facility will be evaluated in terms of their proximity to nearby structures.

An emission point is assumed to be subject to the effects of downwash if the release height is less than the minimum GEP stack height, which is defined by the following formula:

$H_{GEP} = H + 1.5L$, where:

$H_{GEP}$ = minimum GEP stack height,
H = structure height, and
L = lesser dimension of the structure (height or projected width).

This equation is limited to stacks located within 5L of a structure. Stacks located at a distance greater than 5L are not subject to the wake effects of the structure.

Direction-specific equivalent building dimensions used as input to the AERMOD model to simulate the impacts of downwash will be calculated using the U.S. EPA-sanctioned Building Profile Input Program (BPIP-PRIME). BPIP-PRIME is designed to incorporate the concepts and procedures expressed in the

[3] Note that if additional receptors are required to define the significant impact area for any pollutants or averaging periods in this analysis, additional receptors will be included in the analysis up to a 50 km distant from the proposed facility.

GEP Technical Support document, the Building Downwash Guidance document, and other related documents and has been adapted to incorporate the PRIME downwash algorithms.[4]

A GEP analysis of all modeled point sources at the proposed facility in relation to each building will be performed to evaluate which building has the greatest influence on the dispersion of each stack's emissions. The GEP height for each stack calculated using the dominant structure's height and maximum projected width will also be determined. The actual release heights of all stacks are expected to be less than the calculated GEP value, and therefore, all stacks will be represented in the modeling at their actual release heights and will be subject to downwash effects.

[4] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, *Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations) (Revised),* Research Triangle Park, North Carolina, EPA 450/4-80-023R, June 1985.

## Ambient Air Guidance

- December 2, 2019, guidance from EPA
  - Does not change the definition of ambient air in 40 CFR 50.1(e)
  - Largely addresses (vaguely) whether physical barriers are needed to divide ambient space from non-ambient space
  - "...the EPA 's revised ambient air policy, consistent with its discretion available under the regulatory definition of ambient air, is that the atmosphere over land owned or controlled by the stationary source may be excluded from ambient air where the source employs measures which may include physical barriers that are effective in precluding access to the land by the general public."

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## Ambient Air Guidance (cont.)

- Concerning the use of shorelines as a relevant ambient air barrier
  - "The EPA believes the revised policy would not necessarily result in different conclusions depending on the facts presented. Relevant factors for an air agency to determine whether an unfenced shoreline is a sufficient barrier to preclude public access across the border of a source property may include: the ability of users of the water body (e.g. boaters) to access the shore in that location, whether the general public has access to the water body, and whether the source uses any additional measures (such as signage and video surveillance). Regarding a highway or river, the revised policy makes no change."

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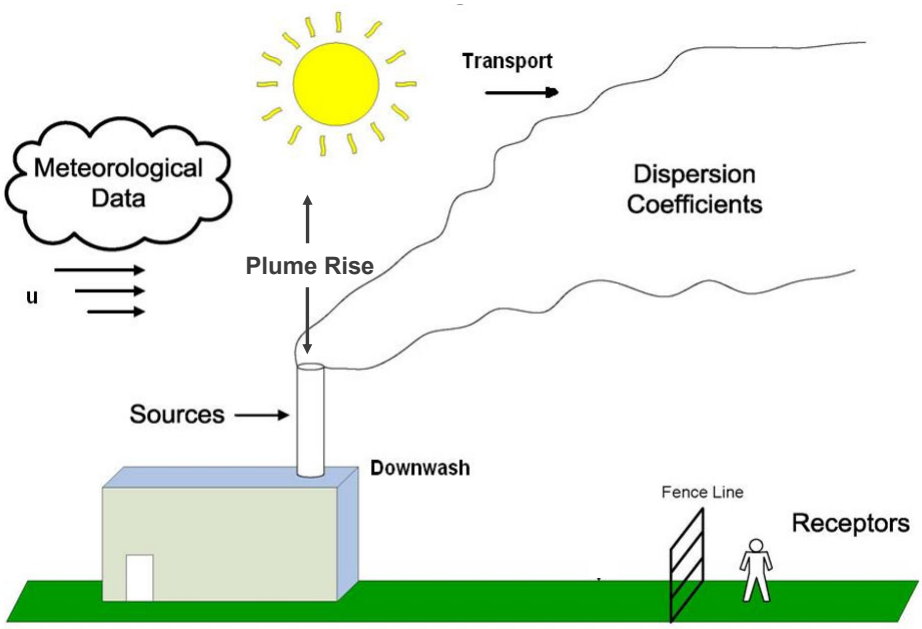
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# What is Modeling?

**Modeling – a definition**

Modeling is the combined mathematical simulation of atmospheric processes which gives a convenient and physically meaningful way of relating sources/emissions to ambient air impacts.

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## PSD Increment Limits

- Increment limits specify the maximum increase in pollutant concentration over the “baseline concentration” that is allowed in a Class I or II area

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## Air Quality Area Classifications

- Class II Area: areas of the country protected under the Clean Air Act, but identified for somewhat less stringent protection from air pollution damage than a Class I area, except in specified cases.
- Class I Area: as defined in Section 162 of the Clean Air Act, the following areas that were in existence as of August 7, 1977: national parks over 6,000 acres, national wilderness areas and national memorial parks over 5,000 acres, and international parks.

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## PSD Increments

- Only PM (now PM-10/2.5), $SO_2$, and $NO_2$ have established increment limits
- Emissions units that have been modified (or added as a new unit) **since** the baseline date may have an effect on the increment and must be addressed in the PSD application (under the increment analysis section)
- The baseline date for emissions units located at major sources is the same everywhere and is only dependent upon the pollutant (1/6/75 for $PM_{10}$ and $SO_2$; 2/8/88 for $NO_2$, 10/20/10 for $PM_{2.5}$)

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## PSD Increments

- Problem: The baseline date for emission units located at minor sources varies by location. The minor source baseline date is the first date (after the "trigger" date) in which the first complete PSD **application** is/was submitted in the local baseline area. This first PSD application sets the baseline area and concentration.
- The time period between the major source baseline date and the minor source baseline date can be many years!!! At a minimum, it is 2.5 years for PM-10 and $SO_2$ (the difference between the MSBD and the Trigger date).

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## Baseline Concentration/Baseline Date

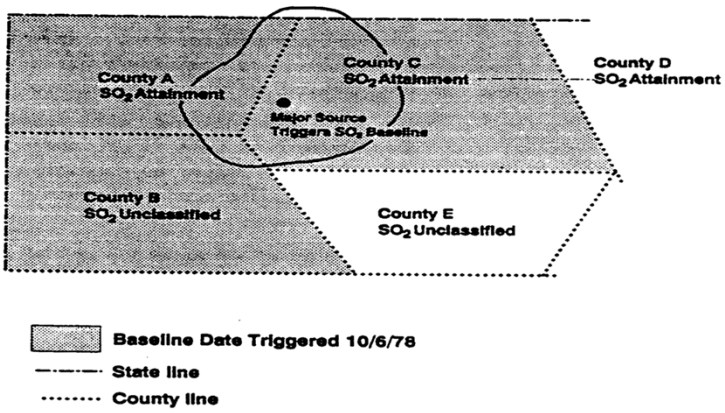
| Pollutant | Major Source Baseline Date | Trigger Date | Minor Source Baseline Date |
|---|---|---|---|
| $PM_{10}$ | 1/6/75 | 8/7/77 | * |
| $PM_{2.5}$ | 10/20/10 | 10/20/11 | * |
| $SO_2$ | 1/6/75 | 8/7/77 | * |
| $NO_2$ | 2/8/88 | 2/8/88 | * |

*The earliest date (after the trigger date) on which the first complete PSD application is submitted.

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## Baseline Area




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## Baseline Concentration Includes (40 CFR 52.21 (b)(13))

- **(i)** ***Baseline concentration*** means that ambient concentration level that exists in the baseline area at the time of the applicable minor source baseline date. A baseline concentration is determined for each pollutant for which a minor source baseline date is established and shall include:
  - ***(a)*** The actual emissions representative of sources in existence on the applicable minor source baseline date, except as provided in paragraph (b)(13)(ii) (next slide); and
  - ***(b)*** The allowable emissions of major stationary sources that commenced construction before the major source baseline date, but were not in operation by the applicable minor source baseline date.

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## Baseline Concentration Includes (40 CFR 52.21 (b)(13))

- **(ii)** The following will NOT be included in the baseline concentration and will affect the applicable maximum allowable increase(s):
  - ***(a)*** Actual emissions from any major stationary source on which construction commenced after the major source baseline date; and
  - ***(b)*** Actual emissions increases and decreases at any stationary source occurring after the minor source baseline date.

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## Increment Consumption

- The following modifications consume increment:
  - actual emissions from major sources commencing **construction** after the major source baseline date
  - actual emission **increases** at **any** stationary source occurring after the minor source baseline date (must include secondary sources)

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## Increment Expansion/Creation

- The following modifications create increment:
  - reductions in emissions from sources included in the baseline concentration
  - physical changes that reduce ground-level impacts (i.e., stack height increases)

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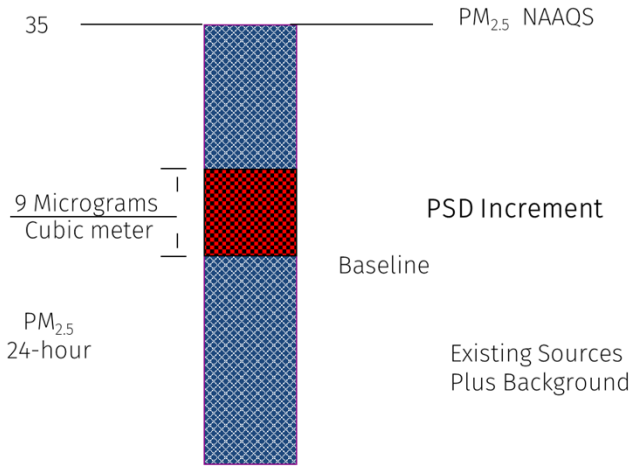
## Increment Summary

- In general, units emitting $SO_2$, PM (including $PM_{10}$ and $PM_{2.5}$), and/or $NO_x$ are either “in the baseline” sources (constructed/operated prior to the baseline date) or “increment consuming” sources (constructed/operated after the baseline date).
- Changes at emission units (emissions and/or structural elements such as buildings and stack heights) since the baseline date can complicate the increment assessment.

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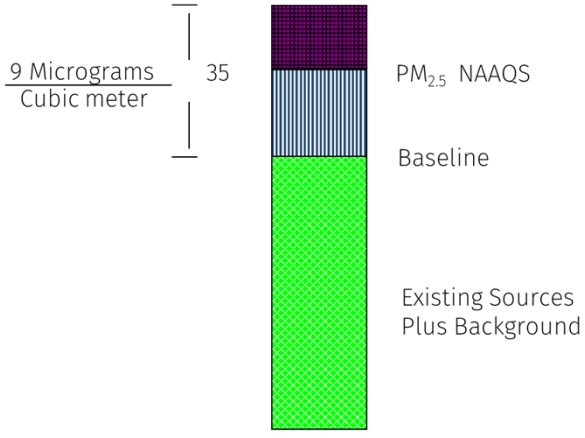
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## PSD Increment Limited




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## NAAQS Limited




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# Ambient Air Quality Analysis

- Modeling is required to determine:
  - Is pre-construction monitoring required?
  - Compliance with the NAAQS and PSD increments*
- Modeling must conform to EPA's "Guideline on Air Quality Models" (40 CFR 51, Appendix W) – AERMOD Model

*Note that formation of secondary pollutants (ozone and secondary $PM_{2.5}$) are addressed in 40 CFR 51 Appendix W. These generally do not require source-specific modeling. More discussion on this later.

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PSD Significant Emission Rates (SERs), Significant Monitoring Concentrations (SMCs), Significant Impact Levels (SILs), PSD Increments and National Ambient Air Quality Standards (NAAQS) – Page 1 of 2

| Pollutant | Averaging Period | PSD Significant Emission Rates (SERs)[a] (tons/year) | Significant Monitoring Concentrations (SMCs) (µg/m³) | Class II Significant Impact Levels (SILs) (µg/m³) | PSD Increments (µg/m³) Class I | PSD Increments (µg/m³) Class II | National Ambient Air Quality Standards (NAAQS)[b] Primary (µg/m³) | Primary (ppm) | Secondary (µg/m³) | Secondary (ppm) | Form (i.e., How Standard is Applied) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $PM_{10}$ | Annual | 15[c] | -- | 1 | 4 | 17 | ~~50~~[d] | --[d] | ~~50~~[d] | --[d] | ~~Annual arithmetic mean, averaged over 3 years~~[d] |
| | 24-hour | | 10 | 5 | 8 | 30 | 150 | -- | 150 | -- | Not to be exceeded more than once per year on average over 3 years |
| $PM_{2.5}$ | Annual | 10 of $PM_{2.5}$<br>40 of $SO_2$<br>40 of $NO_x$[e] | -- | 0.13[f] | 1 | 4 | 9.0 | -- | 15.0 | -- | Annual arithmetic mean from single or multiple monitors, averaged over 3 years |
| | 24-hour | | 0[g] | 1.2[f] | 2 | 9 | 35 | -- | 35 | -- | 98th percentile of concentrations in a given year, averaged over 3 years |
| $SO_2$[h,i] | Annual | 40 | -- | 1 | 2 | 20 | ~~(80)~~ | ~~0.03~~ | (26) | 0.010 | Annual arithmetic mean, averaged over 3 years |
| | 24-hour | | 13 | 5 | 5 | 91 | ~~(365)~~ | ~~0.14~~ | -- | -- | ~~Not to be exceeded more than once per calendar year~~ |
| | 3-hour | | -- | 25 | 25 | 512 | -- | -- | (1,300) | 0.5 | Not to be exceeded more than once per calendar year |
| | 1-hour | | [j] | [j] | [j] | [j] | (196) | 0.075 | -- | -- | 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour concentrations |
| $NO_2$ | Annual | 40 of $NO_x$ | 14 | 1 | 2.5 | 25 | (100) | 0.053 | (100) | 0.053 | Annual arithmetic mean |
| | 1-hour | | [j] | [j] | [j] | [j] | (188) | 0.1 | -- | -- | 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour concentrations |
| Ozone | 8-hour | 40 of VOC or $NO_x$ | VOC or $NO_x$ emissions increase > 100 tpy | 1 ppb | -- | -- | (137) | 0.070 | (137) | 0.070 | 3-year average of annual 4th highest daily maximum 8-hour concentrations |
| CO | 8-hour | 100 | 575 | 500 | -- | -- | (10,000) | 9 | -- | -- | Not to be exceeded more than once per calendar year |
| | 1-hour | | -- | 2,000 | -- | -- | (40,000) | 35 | -- | -- | Not to be exceeded more than once per calendar year |
| Lead[k] | Rolling 3-month avg. | 0.6 | 0.1 | -- | -- | -- | 0.15 | -- | 0.15 | -- | Maximum arithmetic mean |

a. Lower SERs apply in certain nonattainment areas for nonattainment new source review. Sources within 10 km of Class I areas can trigger PSD if impacts exceed 1 µg/m³ (24-hour average).

b. The NAAQS are expressed in the Code of Federal Regulations in µg/m³ for particulate matter and lead and in ppm or ppb for other pollutants. For reference, any standard expressed in ppm or ppb has its corresponding equivalent standard at 25°F and 760 mm Hg shown in parentheses. The equivalent standards were calculated by multiplying the concentration in ppm by the molecular weight divided by 0.02447.

c. In addition to $PM_{10}$, there is a PSD SER for Total Suspended Particulate (TSP) of 25 tpy.

d. EPA revoked the $PM_{10}$ annual standard effective December 18, 2006. See 71 FR 61144 for additional details.

e. $NO_x$ emissions regulated unless demonstrated not to be a $PM_{2.5}$ precursor. Ammonia and VOC emissions are presumed not to be precursors. See 73 FR 28321 for additional details.

f. EPA allows states to use alternate SILs if properly justified, but does not allow a value higher than 0.3 ug/m³ (Annual) or 1.2 ug/m³ (24-hour). For more information see the "Supplement to Guidance for Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program" memo from Richard Wayland and Scott Mathias on April 30, 2024.

g. On January 22, 2013, the U.S. DC Court of Appeals vacated the $PM_{2.5}$ SMC of 4 µg/m3.

h. The existing annual and 24-hour $SO_2$ NAAQS will be revoked one year after the effective date in areas with a designated status for the revised $SO_2$ NAAQS, per 40 CFR §50.4(e).

i. EPA issued memoranda explaining that permit applicants and authorities may use a demonstration of compliance with the 1-hr primary $SO_2$ NAAQS as an alternative demonstration approach to demonstrate compliance with both the 3-hr and annual secondary $SO_2$ NAAQS.

j. PSD Increments, Significant Impact Levels, and Significant Monitoring Concentration levels for the 1-hour $SO_2$ and $NO_2$ standards have not yet been proposed. However, interim Significant Impact Levels of 3 ppb (~7.8 µg/m³) for $SO_2$ and 4 ppb (~7.5 µg/m³) for $NO_2$ were provided by EPA in general guidance implementation memos dated August 23, 2010 and June 28, 2010, respectively.

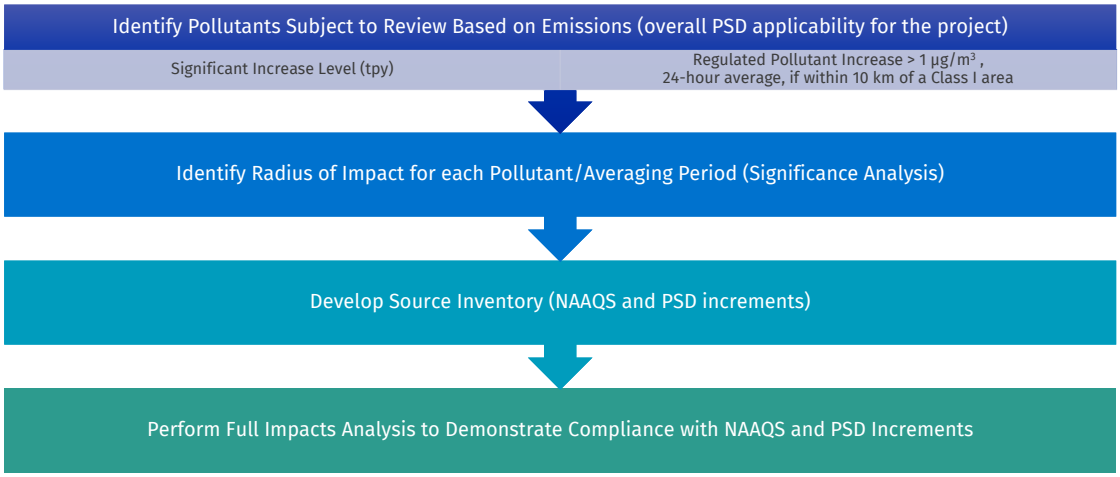
k. The calendar quarter standard of 1.5 µg/m³ is no longer in effect for areas designated on November 18, 2010 or November 8, 2011 but will remain in effect until implementation plans to attain or maintain the 2008 standard are approved for areas designated nonattainment for the 1978 standard.

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## Four Basic Steps - PSD Modeling Analysis




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## Modeling Protocol

- The state/local regulatory authorities typically recommend all PSD applicants provide a detailed modeling protocol prior to submitting the permit application.
- This protocol should describe all proposed models, methods, and procedures that will be used to complete the air quality analysis.
- It should provide complete information related to the modeled emissions inventory and any correspondence with US EPA.

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# Representative Meteorological Data

- Representative data is necessary for all modeling!
  - Off-site National Weather Service (NWS) data - 5 years
  - On-site, PSD quality, data - 1 year
  - Prognostic (weather model) data – 3 years
- Complex terrain (terrain above stack height) generally requires on-site data
  - Or possibly weather forecast model generated data using the Mesoscale Meteorological InterFace (MMIF)
- Clarify meteorological data requirements with applicant in pre-application meeting and modeling protocol

Refer to Summary – Meteorological Data

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# METEOROLOGICAL DATA

Site-specific dispersion models require a sequential hourly record of dispersion meteorology representative of the region within which the source is located. In the absence of site-specific measurements, the *Guideline* requires five years of reliable, quality assured, and representative meteorological data to be used in regulatory modeling analyses. The representativeness of a particular observation site should be evaluated with respect to four factors: (1) the proximity of the meteorological monitoring site to the area under consideration; (2) the complexity of the terrain; (3) the exposure of the meteorological monitoring site; and (4) the period of time during which data are collected.

Regulatory air quality modeling using AERMOD requires five years of quality-assured NWS meteorological data or at least one year of site-specific meteorological data that includes hourly records of the following parameters:

- Wind speed
- Wind direction
- Air temperature
- Micrometeorological parameters (e.g., friction velocity, Monin-Obukhov length)
- Mechanical mixing height
- Convective mixing height

The first three of these parameters are directly measured by monitoring equipment located at typical surface observation stations. The friction velocity, Monin-Obukhov length, and mixing heights are derived from characteristic micrometeorological parameters and from observed and correlated values of cloud cover, solar insolation, time of day and year, and latitude of the surface observation station. Surface observation stations form a relatively dense network, are almost always found at airports, and are typically operated by the NWS. There are fewer upper air stations than surface observing points since the upper atmosphere is less vulnerable to local effects caused by terrain or other land influences and is therefore less variable. The NWS operates virtually all available upper air measurement stations in the United States.

The U.S. EPA recommends that regulatory dispersion modeling analyses use AERMOD-ready meteorological data sets processed by the applicant. For a proposed facility, the five most recent, available years of data collected at nearby NWS stations (surface and upper air) or one year of site specific meteorological data collected from a nearby non-NWS meteorological station (if an appropriate site specific meteorological dataset is identified) and an appropriate upper air station is recommended. U.S. EPA has also indicated that three years of representative prognostic (i.e., weather forecast model) data may be used if justified and shown to be representative.

## REPRESENTATIVENESS ANALYSIS

In their *AERMOD Implementation Guide* U.S. EPA suggests the completion of a meteorological data representativeness evaluation. The typical analysis recommended by the

*AERMOD Implementation Guideline* includes a comparison of the surface characteristics (based on land use) at the meteorological observation site and the plant site to prove that the characteristics at the plant site are representative of the observation site. The following discussion highlights the method by which the surface characteristics for the surface observation site and proposed project site are calculated to complete this comparison.

To define the land use characteristics and micrometeorological parameters in the areas of interest, a version of the AERSURFACE utility is employed to perform a digital mapping of land use and cover in accordance with the procedures identified in the *AERMOD Implementation Guideline* and the *AERSURFACE User's Guide*.[1] Using publicly available digital land cover datasets and lookup tables of surface characteristics that vary by season and land cover type, the AERSURFACE tool can generate realistic and reproducible surface characteristics for any site of interest that can then be directly imported into AERMET for generating AERMOD-ready meteorological datasets. As recommended by the *AERSURFACE User's Guide*, the land use analysis is prepared using digital land use and cover (LULC) data developed by the Multi-Resolution Land Characteristics Consortium (MRLC). One of the objectives of the MRLC, a partnership of the U.S. EPA, NASA, NOAA, USGS, and U.S. Forest Service among other federal agencies, was the production of land cover data derived from images acquired by Landsat's Thematic Mapper (TM) sensor. Various versions of the National Land Cover Dataset (NLCD) are provided for public download as geo-referenced images on the MRLC website.[2] The USGS NLCD data utilized by AERSURFACE provides land cover with a spatial resolution of 30 meters based on the classification scheme shown in Table 1 below. AERSURFACE uses a set of seasonal surface characteristics for each of the categories which were derived from literature as documented in Appendix A of the *AERSURFACE User's Guide*. NLCD data for the two areas of interest will be obtained from the MRLC Viewer[3] and fed to AERSURFACE to generate the surface characteristics surrounding the plant site.

As Bowen ratio and albedo do not vary significantly over the area immediately surrounding a meteorological observation or plant site, AERSURFACE uses a simple unweighted geometric mean for a default domain defined by a 10 km by 10 km area centered on the site of interest. On the other hand, based on the method for constructing realistic planetary boundary layer (PBL) similarity profiles in AERMOD and the heterogeneity of land use typical to areas surrounding an observation site at an airport or an industrial facility, accurately characterizing the surface roughness length, the key parameter in characterizing the mechanical turbulence in the approach wind flow, is the most important consideration in the AERSURFACE analysis. As such, AERSURFACE determines the surface roughness length based on an inverse distance weighted geometric mean (which can be varied by sector to account for consistent variations in the land cover near the site of interest provided the sector widths are no smaller than 30 degrees) for a default upwind distance of 1 km.

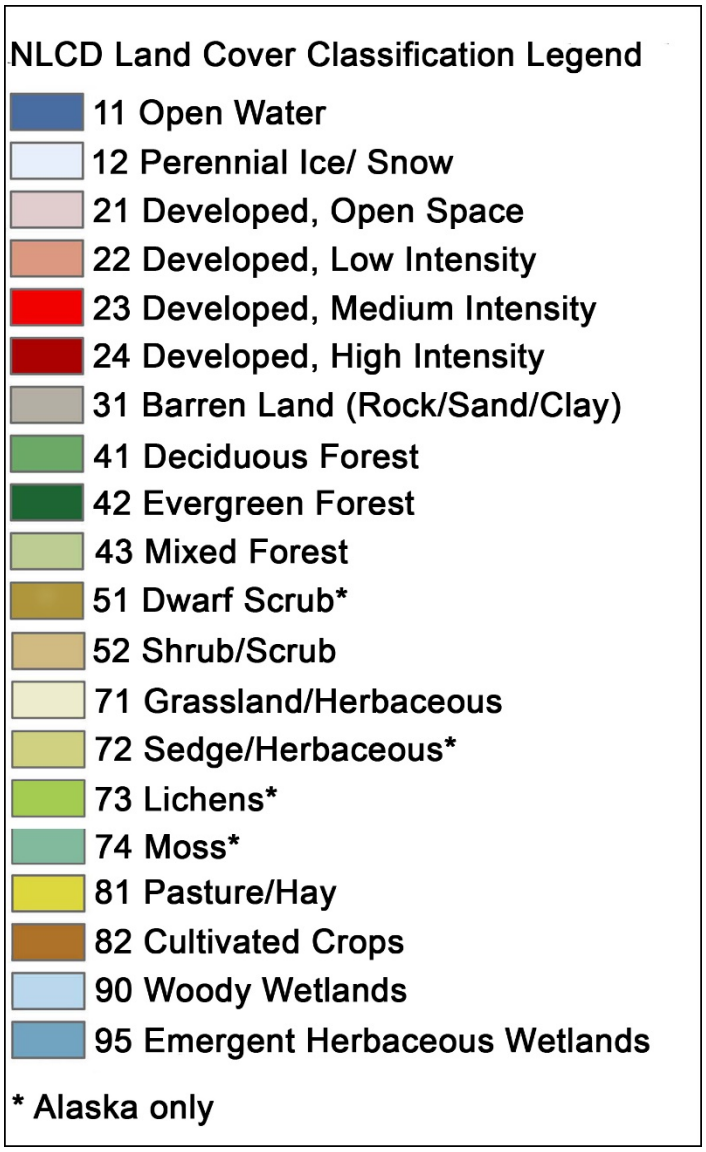
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[1] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *User's Guide for AERSURFACE Tool*. EPA 454/B-24-003. Research Triangle Park, North Carolina. November 2024.

[2] https://www.mrlc.gov/viewer/

[3] https://www.mrlc.gov/viewer/

**TABLE 1. USGS NLCD LAND USE CLASSIFICATION SCHEME**



## Representative Meteorological Data

- The U.S. EPA Guideline states:
  - *The meteorological data … should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern.*

  - ***The representativeness of the data is dependent on:***
    - *(1) the proximity of the meteorological monitoring site to the area under consideration;*
    - *(2) the complexity of the terrain;*
    - *(3) the exposure of the meteorological monitoring site; and*
    - *(4) the period of time during which data are collected.*
  - *The spatial representativeness of the data can be adversely affected by large distances between the source and receptors of interest and the complex topographic characteristics of the area.*

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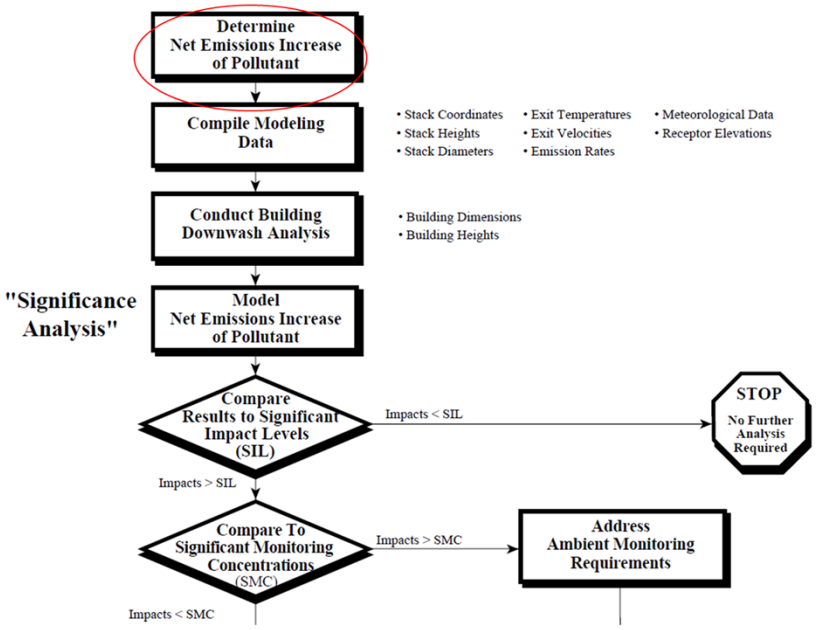
## Meteorological Data

- Pre-processed meteorological data is often available on-line
- AERMOD implementation guidance stresses the importance of using a meteorological data set that is representative. Based on:
  - Both the meteorological characteristics and;
  - The surface characteristics of the proposed location.

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# PSD Overview




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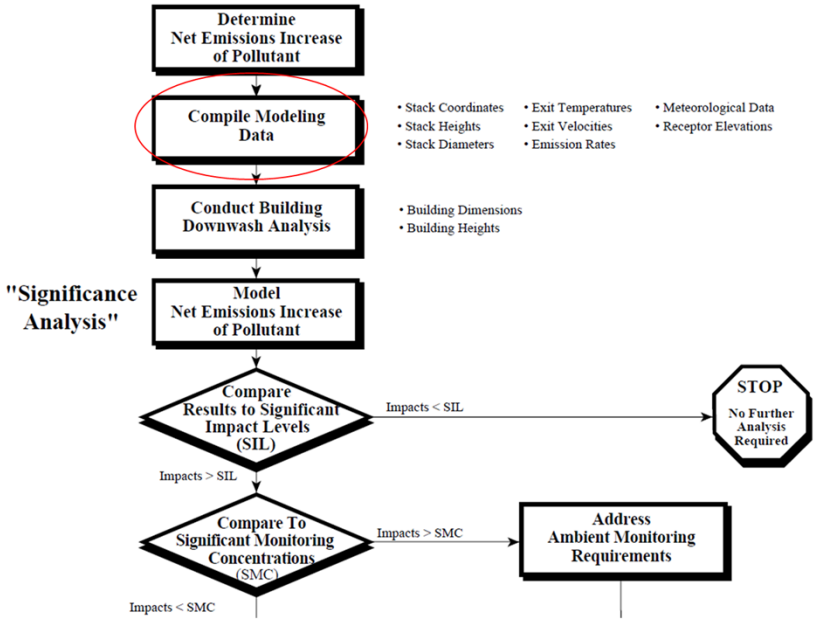
# PSD Modeling – PSD Applicability Analysis

- Perform modeling for all pollutants that exceed the PSD significant emission rates (i.e. all pollutants that trigger PSD permitting)
- The first step in the modeling is to perform “net emissions increase” calculations for each pollutant.

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# PSD Overview




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# Compile Modeling Data

**Information Needed:**

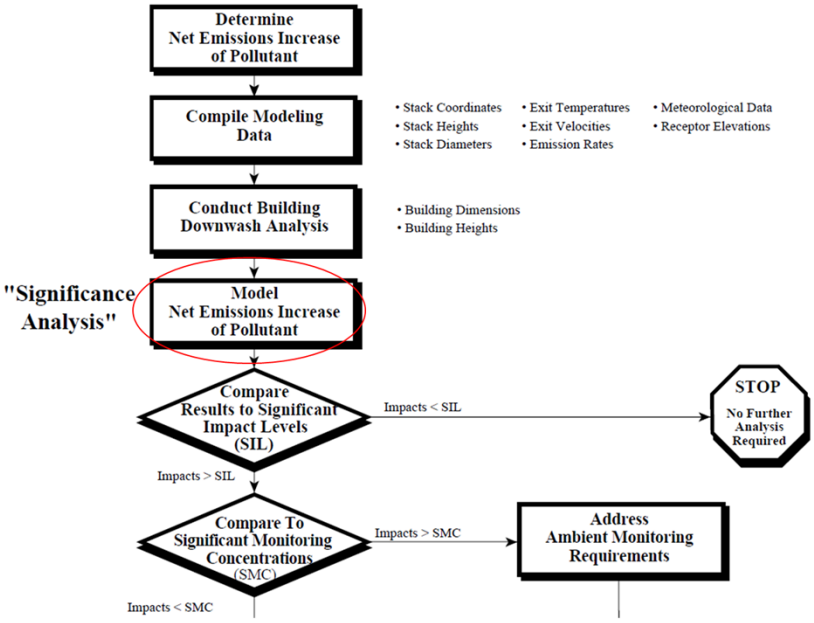
- Stack Coordinates
- Stack Heights
- Stack Diameters
- Exit Temperatures
- Volume Source Parameters
- Area Source Parameters
- Exit Velocities
- Emission Rates
- Meteorological Data (5 years if using airport data)
- Digital Elevation Data
- Fenceline/Property Boundary
- Building Dimensions and Locations

*Verify that the elevations and source parameters are based in the same coordinate system (i.e. NAD 27, NAD 83)

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# PSD Overview




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# Conduct "Significance Analysis"

- Conducted to determine whether the net emissions change associated with a proposed project would cause a significant impact upon the area surrounding the facility.
- Model the "net emissions increase" for each pollutant that exceeds the PSD significant emission rate. Referred to as Significant Impact Levels (SIL) models.
- The emission rate can take into account proposed limits and control equipment.
- See Handout 7-H (dated April 17, 2018)

Refer to Summary – PSD Significance Analysis

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# PSD SIGNIFICANCE ANALYSIS

The PSD Significance Analysis is conducted to determine whether the net emissions change associated with the proposed project would cause a significant impact upon the area surrounding the facility. "Significant" impacts are defined by ambient concentration thresholds commonly referred to as the Significant Impact Levels (SILs). Table 1 lists the SIL, NAAQS, and PSD Increments for all relevant NSR regulated pollutants for this project.

As shown in Figure 1, if the highest modeled ambient concentrations for a pollutant for all averaging periods are less than the applicable SILs when the emissions increases from the project are modeled, then further analyses (NAAQS and PSD Increment) are not required for that pollutant.[1] If, however, modeled impacts are equal to or exceed the SIL for any averaging period, a full NAAQS and PSD Increment analysis is required for that pollutant to demonstrate that the project neither causes nor contributes to any exceedances. The geographic extent to which significant impacts occur is used to define the significant impact area (SIA) within which compliance with the NAAQS and PSD Increments must be demonstrated.

[1] In general, the highest modeled ambient impact from any of the years modeled must be below the SIL to preclude further analysis. However, in accordance with recent U.S. EPA guidance, the highest modeled concentrations may be averaged over the five years modeled for comparison with the 1-hour $NO_2$, 1-hour $SO_2$, and 24-hour/annual $PM_{2.5}$ SILs.

**TABLE 1. SIGNIFICANT IMPACT LEVELS, NAAQS, PSD CLASS I AND II INCREMENTS, AND MONITORING *DE MINIMIS* CONCENTRATIONS FOR RELEVANT NSR REGULATED POLLUTANTS**

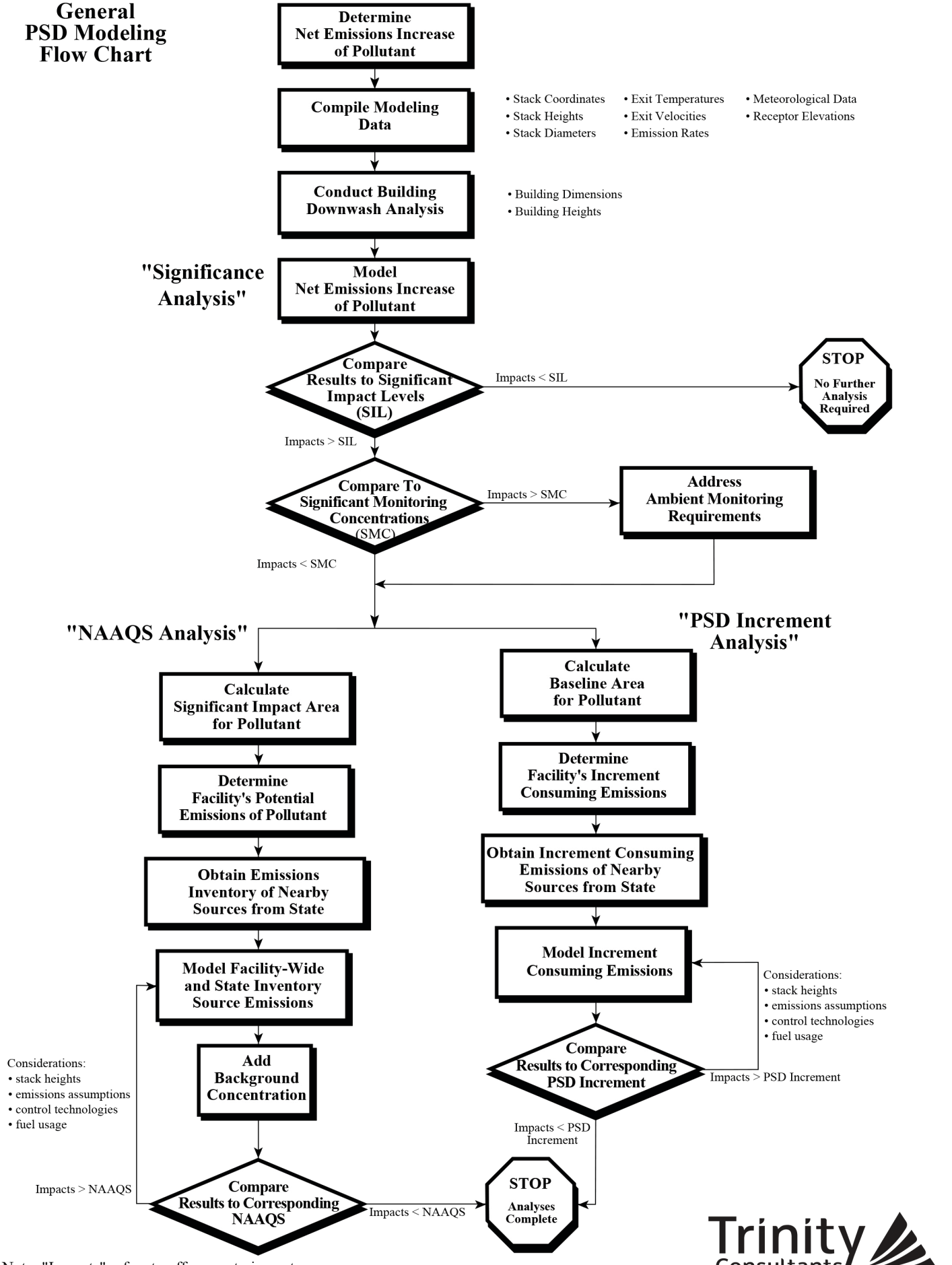
| Pollutant | Averaging Period | PSD SIL ($\mu g/m^3$) | Primary and Secondary NAAQS ($\mu g/m^3$) | Class I PSD Increment ($\mu g/m^3$ | Class II PSD Increment ($\mu g/m^3$) | Monitoring *De Minimis* Concentration ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| $SO_2$ | 1-hour | 7.8 | 196 (0.075 ppm)[a] | -- | -- | -- |
| | 3-hour | 25 | -- | 25 | 512 | -- |
| | 24-hour | 5 | -- | 5 | 91 | 13 |
| | Annual | 1 | 26 (0.01 ppm)[c] | 2 | 20 | -- |
| $NO_2$ | 1-hour | 7.5 | 188 (0.1 ppm)[d] | -- | -- | -- |
| | Annual | 1 | 100 (0.053 ppm)[c] | 2.5 | 25 | 14 |
| $PM_{10}$ | 24-hour | 5 | 150[e] | 8 | 30 | 10 |
| | Annual | 1 | -- | 4 | 17 | -- |
| $PM_{2.5}$ | 24-hour | 1.2[h] | 35[f] | 2 | 9 | 0 |
| | Annual | 0.13[h] | 9[g] | 1 | 4 | -- |
| CO | 1-hour | 2,000 | 40,000 (35 ppm)[b] | -- | -- | -- |
| | 8-hour | 500 | 10,000 (9 ppm)[b] | -- | -- | 575 |
| Ozone | 8-hour | 1.96 (1ppb)[h] | 137 (70 ppb) | -- | -- | -- |

a 3-year average of 99th percentile of annual distribution of daily maximum 1-hour concentrations.
b Not to be exceeded more than once per year.
c Annual arithmetic average.
d 3-year average of 98th percentile of annual distribution of daily maximum 1-hour concentrations.
e Not to be exceeded more than three times in 3 consecutive years.
f 3-year average of the 98th percentile of 24-hour concentrations.
g 3-year average of weighted annual mean concentrations must not exceed standard.
h. Values in "Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program," USEPA, April 30, 2024.

## FIGURE 1. GENERAL PSD MODELING FLOWCHART

[PLACEHOLDER PAGE for modeling flowchart, Figure 1]

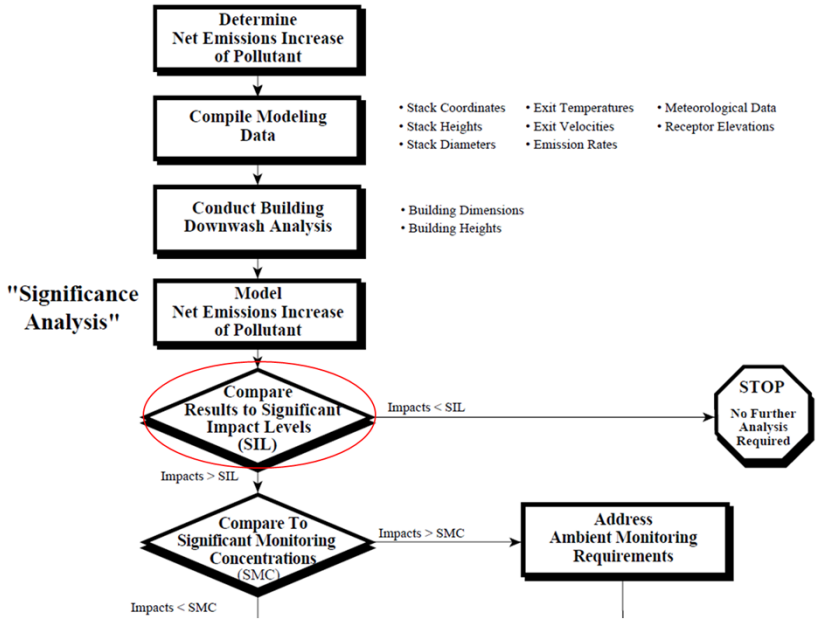
# General PSD Modeling Flow Chart




Note: "Impacts" refers to off-property impacts.

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# PSD Overview




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# Conduct "Significance Analysis" Class II Modeling (Project Only)

- Compare modeled results to the SILs

| Pollutant | Annual SIL (µg/m³) | 24-hour SIL (µg/m³) | 8-hour SIL (µg/m³) | 3-hour SIL (µg/m³) | 1-hour SIL (µg/m³) |
|---|---|---|---|---|---|
| $PM_{2.5}$ | 0.3** | 1.2 | ----- | ----- | ----- |
| O3 | ----- | ----- | 1.96*** | ----- | ----- |
| $PM_{10}$ | 1 | 5 | ----- | ----- | ----- |
| $SO_2$ | 1 | 5 | ----- | 25 | 7.86* |
| $NO_2$ | 1 | ----- | ----- | ----- | 7.52* |
| CO | ----- | ----- | 500 | ----- | 2,000 |

* Interim values
** EPA allows states to use alternate SILs if properly justified. Does not allow a value higher than 0.3 µg/m3 (Annual) or 1.2 µg/m3 (24-hour). See Handout 7-L.
*** 1.0 ppb. See Handout 7-H and 7-L.

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## Conduct "Significance Analysis" Class I (inside Class I areas)

- Compare results to the Significant Impact Levels (SIL)

| Pollutant | Annual SIL (µg/m³) | 24-hour SIL (µg/m³) | 8-hour SIL (µg/m³) | 3-hour SIL (µg/m³) | 1-hour SIL (µg/m³) |
|---|---|---|---|---|---|
| $PM_{2.5}$ | 0.03 | 0.27 | ----- | ----- | ----- |
| $PM_{10}$ | 0.2 | 0.3 | ----- | ----- | ----- |
| $SO_2$ | 0.1 | 0.2 | ----- | 1 | ----- |
| $NO_2$ | 0.1 | ----- | ----- | ----- | ----- |

**Class I SILs for pollutants/averaging periods with increment standards only. NAAQS compliance is assumed in Class I areas if demonstrated near the proposed plant site. $PM_{2.5}$ SILs of 0.27 µg/m³ (24-hour) and 0.03 µg/m³ (annual) recommended by EPA on April 30, 2024 (See Handout 7-L).**

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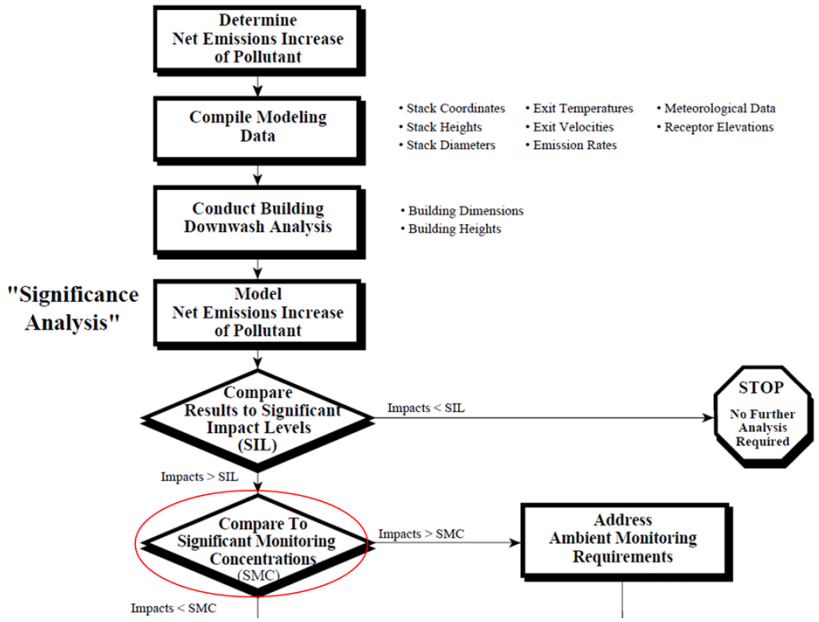
## Significance Modeling Results

- If modeled impacts < SIL, modeling is normally complete.
  - If NAAQS minus background monitor concentration is less than SIL, additional justification for use of SIL may be needed.
- If modeled impacts > SIL, compare results to Monitoring De Minimis Concentrations (also known as Significant Monitoring Concentrations - SMC)
- The SIL results are analyzed on a pollutant-by-pollutant and averaging period-by-averaging period basis.

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# Significant Monitoring Concentration (SMC)

**Table B-1. Criteria Pollutants**

| Pollutant | Averaging Time | SIL (µg/m³) | SMC (µg/m³) | Primary NAAQS (µg/m³) | Secondary NAAQS (µg/m³) | Class II Increment (µg/m³) | Class I Increment (µg/m³) |
|---|---|---|---|---|---|---|---|
| Carbon Monoxide | 1-Hour | 2,000 | - | 40,000 | - | - | - |
| Carbon Monoxide | 8-Hour | 500 | 575 | 10,000 | - | - | - |
| Lead | Rolling 3-month average | - | 0.1[a] | 0.15 | 0.15 | - | - |
| Nitrogen Dioxide | 1-Hour | 7.5[b] | - | 188 | - | - | - |
| Nitrogen Dioxide | Annual | 1 | 14 | 100 | 100 | 25 | 2.5 |
| Ozone | 8-Hour | 1.96 (1 ppb)[c] | - | 137 (70 ppb) | 137 (70 ppb) | - | - |
| Particulate Matter ($PM_{10}$) | 24-Hour | 5 | 10 | 150 | 150 | 30 | 8 |
| Particulate Matter ($PM_{10}$) | Annual | 1 | - | - | - | 17 | 4 |
| Particulate Matter ($PM_{2.5}$) | 24-Hour | 1.2[c] | - | 35 | 35 | 9 | 2 |
| Particulate Matter ($PM_{2.5}$) | Annual | 0.2[c] | - | 12 | 15 | 4 | 1 |
| Sulfur Dioxide | 1-Hour | 7.8[b] | - | 196 | - | - | - |
| Sulfur Dioxide | 3-Hour | 25 | - | - | 1,300 | 512 | 25 |
| Sulfur Dioxide | 24-Hour | 5 | 13 | 365[d] | - | 91 | 5 |
| Sulfur Dioxide | Annual | 1 | - | 80[d] | - | 20 | 2 |

a - The SMC for lead is based on a 3-month average and not a rolling 3-month average
b - Interim SIL (www.tceq.texas.gov/assets/public/permitting/air/memos/guidance_1hr_no2naaqs.pdf for 1-hour $NO_2$ and www.tceq.texas.gov/assets/public/permitting/air/memos/appwso2.pdf for 1-hour $SO_2$)
c - Recommended SIL
d - EPA revoked both the existing 24-hour and annual standards; however, they will remain in effect until one year after the effective date of the 1-hour $SO_2$ designations. Refer to 40 CFR 81.344 for 1-hour $SO_2$ designations.

- SMC for $PM_{2.5}$ is zero; therefore, any project triggering PSD effectively exceeds the SMC for $PM_{2.5}$!

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# Significant Monitoring Concentration (SMC)

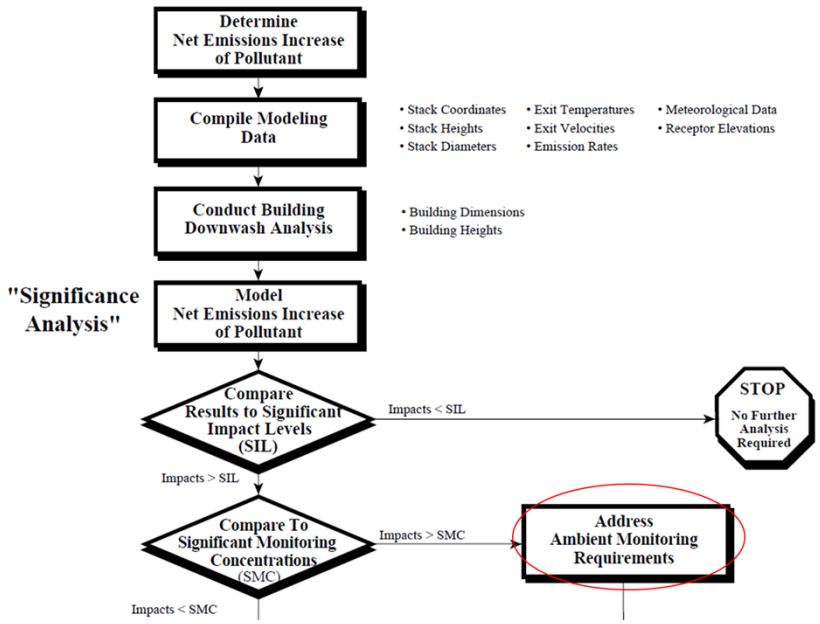
**Non-Criteria Pollutants with a Significant Monitoring Concentration**

| Pollutant | Averaging Time | SMC (µg/m³) |
|---|---|---|
| Fluorides [a] | 24-Hour | 0.25 |
| Hydrogen Sulfide | 1-Hour | 0.2 |
| Reduced Sulfur Compounds | 1-Hour | 10 |
| Total Reduced Sulfur | 1-Hour | 10 |

**a-Fluorides does not include hydrogen fluoride**

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## Ambient Monitoring Requirements (1/4)

- If modeled impacts > SMC Levels, ambient monitoring is required, unless sufficiently representative background data available
- EPA's 1987 guideline – Ambient Monitoring Guidelines for PSD
- EPA's 2007 guidance – Analytical Techniques for Technical Assessment of Ambient Air Monitoring Networks

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## Ambient Monitoring Requirements (2/4)

- Generally, the pollutant monitor(s) should be located not more than 10 kilometers from the source
  - The monitor(s) should be located to identify:
    - The location of the maximum concentration increase (proposed source(s))
    - The location of the maximum concentration due to existing sources
    - The maximum impact area considering both new (proposed) and existing sources
    - Siting justification through dispersion modeling

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# Ambient Monitoring Requirements (3/4)

- **Monitoring duration:**
  - Normally one (1) year
  - A minimum of four (4) months is required
- A monitoring plan should be prepared by the source and submitted for approval prior to locating the monitor(s)
- Monitoring Quality Assurance guidance is available from EPA.

Refer to Summary – Ambient Monitoring Requirements

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## AMBIENT MONITORING REQUIREMENTS

In addition to determining whether the applicant can forego further modeling analyses, the PSD Significance Analysis is also used to determine whether the applicant is exempt from pre-construction ambient monitoring requirements. To determine whether pre-construction monitoring should be considered, the maximum impacts attributable to the emissions increases from the project are assessed against monitoring *de minimis* levels. These levels for the applicable averaging periods for $SO_2$, $NO_X$, $PM_{10}$, $PM_{2.5}$, and CO are provided in 40 CFR 52.21 and are listed in Table 1. A pre-construction air quality analysis using continuous monitoring data can be required for pollutants subject to PSD review. If either the predicted modeled impact from an emissions increase or the existing ambient concentration is less than the monitoring *de minimis* concentration, an applicant is exempt from pre-construction ambient monitoring. When not explicitly exempt through either method, U.S. EPA has indicated that an applicant may provide existing data representative of ambient air quality in the affected area or, if such data are not available, collect background air quality data.[1]

**TABLE 1. SIGNIFICANT IMPACT LEVELS, NAAQS, PSD CLASS I AND II INCREMENTS, AND MONITORING *DE MINIMIS* CONCENTRATIONS FOR RELEVANT NSR REGULATED POLLUTANTS**

| Pollutant | Averaging Period | PSD SIL (µg/m³) | Primary and Secondary NAAQS (µg/m³) | Class I PSD Increment (µg/m³) | Class II PSD Increment (µg/m³) | Monitoring *De Minimis* Concentration (µg/m³) |
|---|---|---|---|---|---|---|
| $SO_2$ | 1-hour | 7.8 | 196 (0.075 ppm)[a] | -- | -- | -- |
| | 3-hour | 25 | -- | 25 | 512 | -- |
| | 24-hour | 5 | -- | 5 | 91 | 13 |
| | Annual | 1 | 26 (0.01 ppm)[c] | 2 | 20 | -- |
| $NO_2$ | 1-hour | 7.5 | 188 (0.1 ppm)[d] | -- | -- | -- |
| | Annual | 1 | 100 (0.053 ppm)[c] | 2.5 | 25 | 14 |
| $PM_{10}$ | 24-hour | 5 | 150[e] | 8 | 30 | 10 |
| | Annual | 1 | -- | 4 | 17 | -- |
| $PM_{2.5}$ | 24-hour | 1.2[h] | 35[f] | 2 | 9 | 0 |
| | Annual | 0.13[h] | 9[g] | 1 | 4 | -- |
| CO | 1-hour | 2,000 | 40,000 (35 ppm)[b] | -- | -- | -- |
| | 8-hour | 500 | 10,000 (9 ppm)[b] | -- | -- | 575 |

a 3-year average of 99th percentile of annual distribution of daily maximum 1-hour concentrations.
b Not to be exceeded more than once per year.
c Annual arithmetic mean, averaged over three years.
d 3-year average of 98th percentile of annual distribution of daily maximum 1-hour concentrations.
e Not to be exceeded more than three times in 3 consecutive years.
f 3-year average of the 98th percentile of 24-hour concentrations.
g 3-year average of weighted annual mean concentrations must not exceed standard.
h. Values in "Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program," USEPA, April 30, 2024.

[1] U.S. EPA New Source Review Workshop Manual (Draft, 1990), pages C.18–19.

## Ambient Monitoring Requirements (4/4)

- **Minimum Elements of the Ambient Monitoring Plan:**
  - Local Source Environment (within 2 km of the site)
  - Sampling Program Description
  - Monitor Site Description
  - Monitor Description
  - Data Reporting
  - Quality Assurance Program

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## Additional Modeling Analysis

- When modeled impacts are > SIL, the following two additional analyses are required:
  - **National Ambient Air Quality Standards (NAAQS) Analysis**
  - **PSD Increment Analysis**

- Normally, no additional modeling is required when the modeled impacts are < SIL. However, in some circumstances, the NAAQS and PSD Increment analyses may be required.

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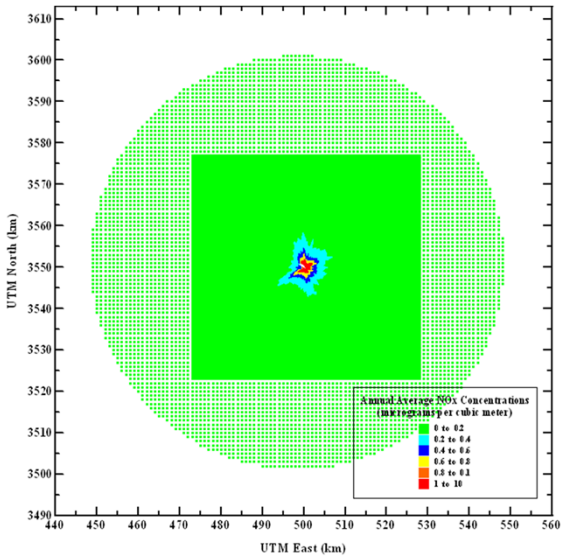
## NAAQS/Increment Modeling

- NAAQS and Increment modeling required for each pollutant that exceeds SIL.
- **Need to develop a regional offsite inventory**
- From the significance modeling, determine the Significant Impact Area (SIA), also called Radius of Influence (ROI)
  - Maximum distance at which the pollutant exceeds the SIL
  - Can have a different ROI for each pollutant.

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## NAAQS/Increment Modeling

- Determining the Radius of Influence (ROI)
- $NO_2$ Annual SIL Threshold: 1 µg/m$^3$

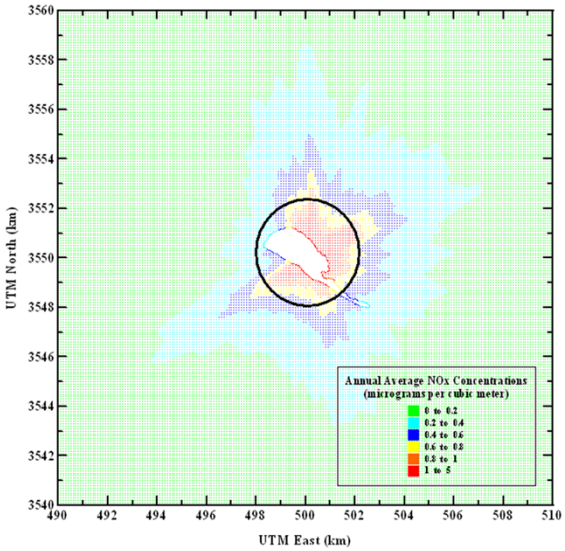



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## NAAQS/Increment Modeling

- Determining the Radius of Influence (ROI)
- $NO_2$ Annual SIL Threshold: 1 µg/m³




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## NAAQS/Increment Modeling

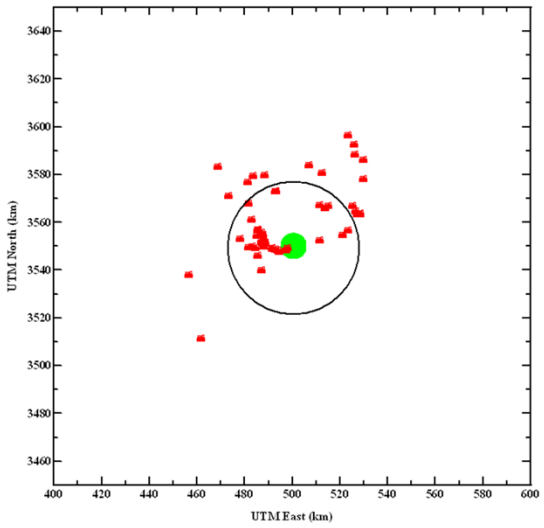
- SIA (or ROI) is used to determine the inventory of sources to include for NAAQS/Increment cumulative impact analysis (CIA) modeling
- Need to include inventory sources that are expected to have an overlapping impact with the source

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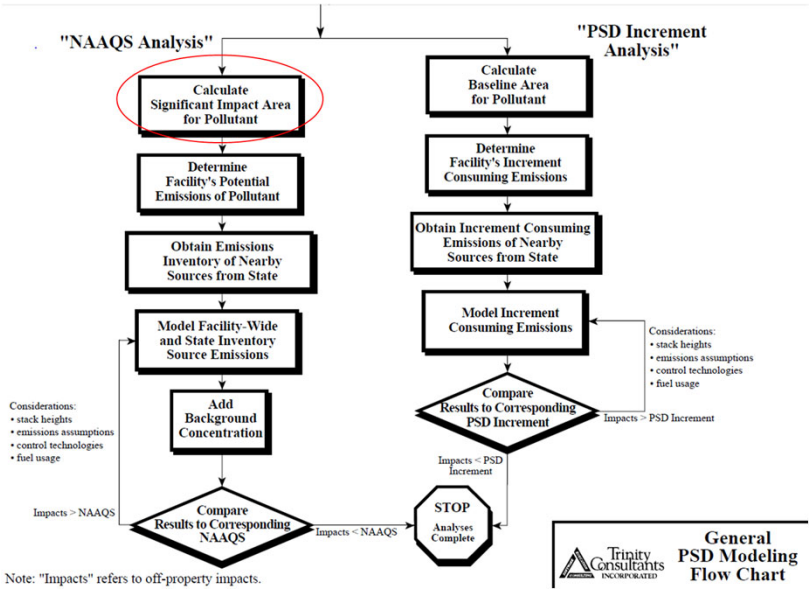
# NAAQS/Increment Modeling

- Regional Source Inventory




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## NAAQS Analysis (Class II Area)

- NAAQS analysis is based on the total estimated air quality – the sum of ambient estimates resulting from existing sources

- **Consists of the following:**
  - Existing modeled sources
  - Measured background concentrations
  - Modeled ambient impact of proposed source emissions increase
  - Regional offsite inventory (“nearby” sources)

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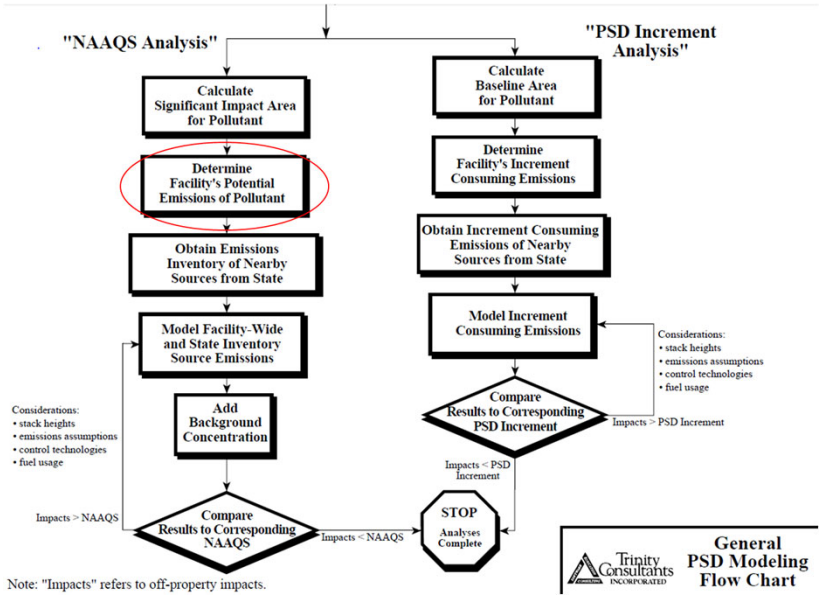
## NAAQS Analysis

- NAAQS modeling:
  - Determine the Radius of Impact (ROI) for each pollutant that exceeded SIL (may be different for each averaging period)
    - Impact area is a circular area with a radius extending from the source to the most distant receptor where a significant impact will occur (impact > SIL)
  - Modeling domain for NAAQS and Increment modeling will be defined by Radius of Impact or 50 km, whichever is less (Appendix W Section 8.1)

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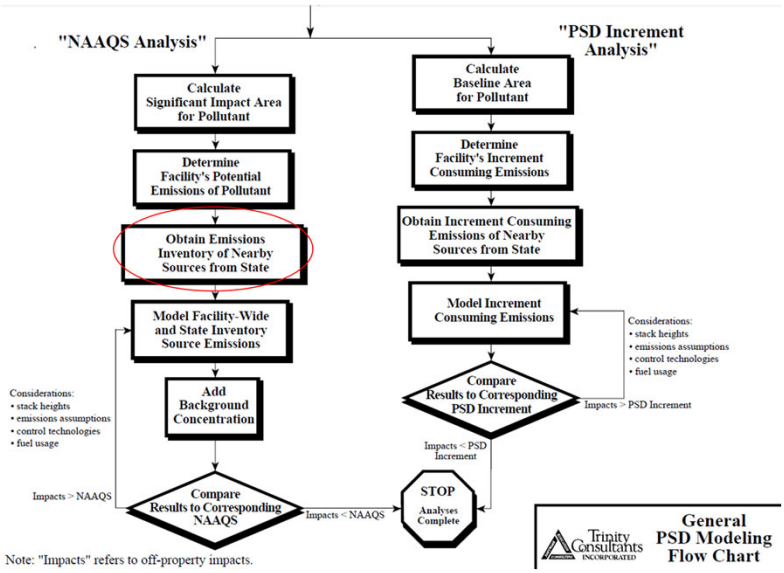
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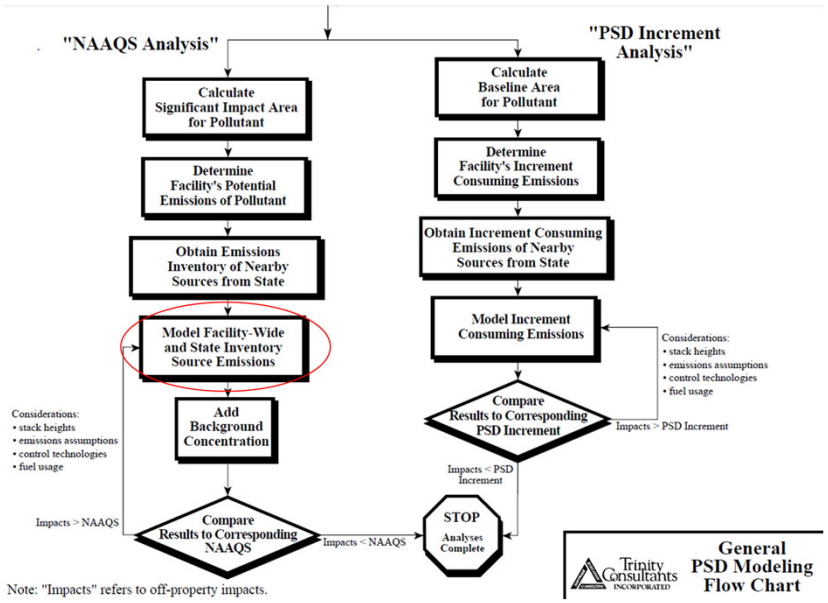
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## NAAQS Analysis

- Obtain emission source inventories from “nearby sources” (Appendix W Section 8.3.3)
  - Should include sources not included in “background” concentration
  - In most cases, the few nearby sources will be located within first 10 to 20 km from source(s) under consideration (Appendix W Section 8.3.3(b)(iii)
- It is the applicant’s responsibility to obtain the appropriate inventory of sources

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# NAAQS Analysis

- Model the potential emissions from project emission sources and the inventory of "nearby" sources of emissions.
  - **"Nearby" sources** – model potential emissions or emissions based on allowable emission factor and actual operating factor from past 2 years of operations where available.
- "Nearby" sources are modeled. These are sources which are deemed to cause a significant "concentration gradient" inside the proposed facility's area of significance.
  - This requires professional judgment unless all sources (radius of impact + 50 km) are modeled.
    - Sources at the facility for which a modification is proposed are considered "nearby" if emissions from existing sources will not be affected by the modification.
  - Note that EPA guidance cautions against using too many regional sources in a cumulative analysis

Refer to Summary – Significant Impact Area and Regional Source Inventories

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## SIGNIFICANT IMPACT AREA AND REGIONAL SOURCE INVENTORIES

For any off-site pollutant impact calculated in the PSD Significance Analysis that exceeds the SIL, an SIA is determined. The SIA encompasses a circle centered on the proposed facility with a radius extending out to either: (1) the farthest location where the emissions increase of a pollutant from the project causes a significant ambient impact (called the radius of influence [ROI]), or (2) a distance of 50 km, whichever is less. The modeling domain (i.e., receptor grid) for the NAAQS and PSD Increment analyses is defined by the ROI.[1]

An often used technique for defining regional sources of the pollutant in question also uses the ROI,[2] although EPA has recently provided guidance that the number of regional sources modeled in a NAAQS or PSD Increment analysis should be few and should be focused within 10 to 20 km of the sources being permitted.[3] More recent EPA guidance expands on the concept of limiting the number of nearby sources explicitly modeled and recommends a qualitative and quantitative assessment of background monitors and potential nearby sources with an emphasis on explicitly modeling "few" sources and relying on the background monitor to the extent possible to characterize background air quality.[4] Using the NSR Workshop Manual method, all regional sources of the pollutant in question within the SIA plus an additional 50 km are assumed to potentially contribute to ground-level concentrations and are evaluated for possible inclusion in the NAAQS and PSD Increment analyses. Using either method, separate regional source inventories are used for the NAAQS and PSD Increment analyses.

Source locations, stack parameters, and allowable emission rates for all sources in the state and neighboring states (if the regional source inventory includes facilities into other states) must be obtained from the state agency and other appropriate regulatory agencies.

---

[1] 40 CFR 51, Appendix W, Section 8.1, January 17, 2017.
[2] U.S. EPA New Source Review Workshop Manual (Draft, 1990), page C.32.
[3] 40 CFR 51, Appendix W, Section 8.3.3(b)(iii), January 17, 2017.
[4] Guidance on Developing Background Concentrations for Use in Modeling Demonstrations, EPA-454/R-24-003, U.S. EPA, November 2024.

## Appendix W Guidance (Nearby Sources)

Appendix W gives modelers flexibility, allowing them to focus detailed modeling on areas most likely to affect air quality while using judgment to streamline less critical parts.

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b. ***Nearby sources:*** All sources in the vicinity of the source(s) under consideration for emissions limits that are not adequately represented by ambient monitoring data should be explicitly modeled. The EPA's recommended framework for determining an appropriate background concentration[96] should be applied to identify such sources and accurately account for their ambient impacts through explicit modeling.

i. The determination of nearby sources relies on the selection of adequately representative ambient monitoring data (section 8.3.2). The EPA recommends determining the representativeness of the monitoring data through a visual assessment of the modeling domain considering any relevant nearby sources and their respective air quality data. The visual assessment should consider any relevant air quality data such as the proximity of nearby sources to the project source and the ambient monitor, the nearby source's level of emissions with respect to the ambient data, and the dispersion environment (*i.e.*, meteorological patterns, terrain, etc.) of the modeling domain.

ii. Nearby sources not adequately represented by the ambient monitor through visual assessment should undergo further qualitative and quantitative analysis before being explicitly modeled. The EPA recommends evaluating any modeling, monitoring, or emissions data that may be available for the identified nearby sources with respect to possible violations to the NAAQS.

iii. The number of nearby sources to be explicitly modeled in the air quality analysis is expected to be few except in unusual situations. The determination of nearby sources through the application of the EPA's recommended framework calls for the exercise of professional judgment by the appropriate reviewing authority (paragraph 3.0(b)) and should be consistent with appropriate EPA modeling guidance.[6396] This guidance is not intended to alter the exercise of that judgment or to comprehensively prescribe which sources should be included as nearby sources.

## Modeling Significant Nearby Sites and Ambient Air

**Mitsubishi Approach -** This method evaluates air quality at all significant receptors while excluding a site's own emissions at its property.

- **Step 1**: Model all sources and receptors, except receptors on select off-site properties.
- **Step 2**: For each off-site property, model its receptors but exclude emissions from sources on that property.

**Purpose**: Combines results to cover the full domain and fairly assess each facility's impact on surrounding areas.

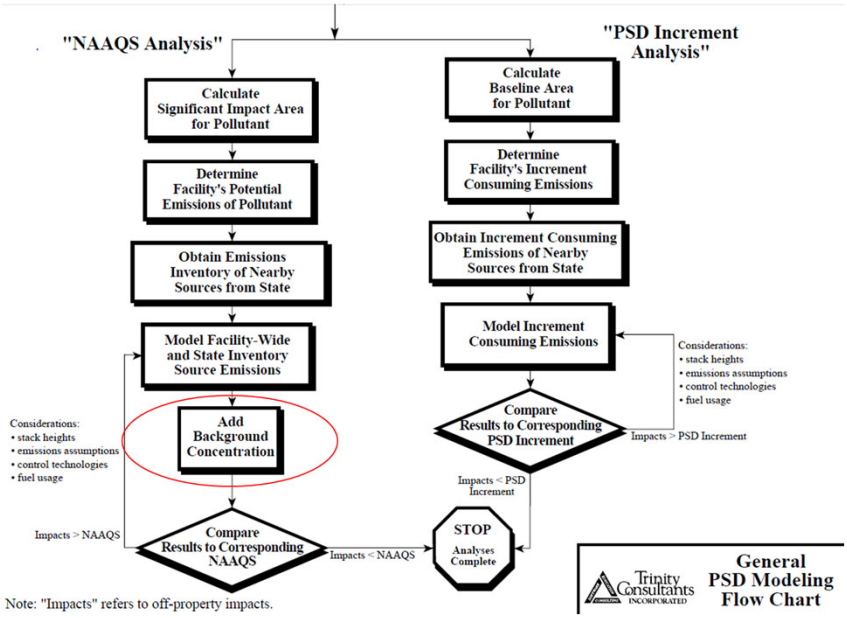
See EPA Memo Dated 10/17/89 (Mitsubishi Approach):

www.epa.gov/sites/default/files/2015-07/documents/ambiet2.pdf

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# PSD Overview




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# NAAQS Analysis

- Run the models and obtain the results
- Add the modeled concentration to the background concentration

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# Background Concentrations for NAAQS Analysis

- Monitored background concentrations should be based on accurate monitored results (data) obtained from a monitor that is located in an area that is representative of the proposed facility's location.
- **Primary criteria are:**
  - Monitor location (similar "upwind" characteristics) – Option to use the pollutant specific design values at representative monitor(s)
  - Quality of the data
  - Recentness of the data
  - The monitor objective accounting for the purpose and representative measurement scale (i.e., a few city blocks to greater than 10 kilometers).

Refer to Summary – Background Concentrations

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## BACKGROUND CONCENTRATIONS

If a NAAQS analysis is necessary, maximum modeled impacts from the proposed facility and nearby regional sources will be combined with background concentrations, which represent the air quality concentrations due to sources that are not explicitly modeled (e.g., mobile sources, small but local stationary sources, fugitive sources, and large but distant sources). As per the March 1, 2011 memorandum from EPA[1] regarding modeling of $NO_2$ and $SO_2$, "The goal of the cumulative impact assessment should be to demonstrate with an adequate degree of confidence in the result that the proposed new or modified emissions will not cause or contribute to violations of the NAAQS". To this end, the identification of nearby sources (within 10km) to include in the modeling versus more distant regional sources versus background concentrations which include all sources not modeled as well as natural background is very important. This guidance can be thought to be applicable across all pollutants. The challenge of cumulative assessment of air quality impacts arises from the best strategy to combine monitored and modeled contributions without double counting nearby and regional sources. Addressing the applicability of background concentrations requires an assessment of the spatial and temporal representativeness of the background monitored concentrations. EPA's guidance indicates that several tiers of adding background concentrations are possible:

- Add the overall highest value (conservative)
- Add the design value (form of the applicable NAAQS)

Therefore, selection of existing $SO_2$, $NO_X$, $PM_{10}$, $PM_{2.5}$, and CO monitoring stations that are deemed "representative" of the ambient air quality in the area surrounding the proposed facility must be weighed with regard to their characterization of nearby and regional sources. Three criteria are identified in the *NSR Workshop Manual:* (1) monitor location, (2) quality of the data, and (3) currentness of the data.[2] Further specification is made in the *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*[3] document which describes 1) an isolated source and the use of a regional monitor to represent background, 2) a source located in flat terrain in an area of other sources and the use of a nearby monitor within 10km, and 3) a source located in complex terrain and the use of a monitor at the points of maximum modeled impacts. More recent guidance has also been released by EPA that recommends a qualitative and quantitative assessment of background monitors and potential nearby sources with an emphasis on explicitly modeling "few" sources and relying on the background monitor to the extent possible to characterize background air quality.[4] Careful determination of the representativeness of a background monitor for the given situation must be considered before adding the background concentration to the modeled estimates.

In accordance with U.S. EPA guidance, background concentrations may be provided in the forms shown in Table 1.

---

[1] *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour $NO_2$ National Ambient Air Quality Standard*, memo from Tyler Fox to Regional Air Division Directors, Air Quality Modeling Group, Research Triangle Park, NC, March 1, 2011.

[2] Guidance Concerning the Implementation of the 1-hour $NO_2$ NAAQS for the Prevention of Significant Deterioration Program", U.S.EPA, June 29, 2010.

[3] U.S. EPA New Source Review Workshop Manual (Draft, 1990), page C.19.

[4] Guidance on Developing Background Concentrations for Use in Modeling Demonstrations, EPA-454/R-24-003, U.S. EPA, November 2024.

**TABLE 1. CALCULATING BACKGROUND CONCENTRATIONS**

| Pollutant | Averaging Period | Procedure |
|---|---|---|
| $SO_2$ | 1-hour | Highest hourly value over the 3 year period[a] (First Tier) |
| | 1-hour | Monitored design value, 99th percentile of the annual distribution of daily maximum 1-hour values over 3 year period (less conservative First Tier)[b] |
| | 3-hour | Take the average of the 2nd high for all 3 years |
| | 24-hour | Take the average of the 2nd high for all 3 years |
| | Annual | Highest annual value over the 3 year period |
| $NO_2$ | 1-hour | Highest hourly value over the 3 year period[c] |
| | 1-hour | Monitored design value, 98th percentile of the annual distribution of daily maximum 1-hour values over 3 year period (less conservative First Tier)[b] |
| | Annual | Highest annual value over the 3 year period |
| $PM_{10}$ | 24-hour | Take the average of the 2nd high for all 3 years |
| $PM_{2.5}$ | 24-hour | Take the average of the 98th percentile over all 3 years |
| | Annual | Take the average of the annual concentrations over all 3 years[d] |
| CO | 1-hour | Take the average of the 2nd high for all 3 years |
| | 8-hour | Take the average of the 2nd high for all 3 years |

a Per U.S. EPA's August 23, 2010 "Guidance Concerning the Implementation of the 1-hour $SO_2$ NAAQS for the Prevention of Significant Deterioration Program".

b *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-Hour $NO_2$ National Ambient Air Quality Standard*, memo from Tyler Fox to Regional Air Division Directors, Air Quality Modeling Group, Research Triangle Park, NC, March 1, 2011.

c Per U.S.EPA's June 29, 2010 "Guidance Concerning the Implementation of the 1-hour $NO_2$ NAAQS for the Prevention of Significant Deterioration Program".

d Per U.S. EPA's March 23, 2010 "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS".

The applicant may review other alternative procedures for determining background concentrations. If deemed feasible, the applicant may prepare a background determination procedure for regulatory review. For example, as noted in Table 1, the "first tier" approach to combined modeled ambient concentrations and monitored background concentrations in a cumulative NAAQS modeling analysis for 1-hour $NO_2$ and $SO_2$ is to combine the modeled ambient concentration in the form of the standard with the overall highest hourly background concentration.[5,6] As described above and in the table, U.S. EPA suggests an additional, less conservative "first tier" approach to background using the monitor design value. In the 2010 guidance, EPA suggests that they will consider an even less conservative approach that is based on some level of temporal pairing (by season and hour of day but not hour by hour over whole year) of modeled and monitored values that may be considered on a case-by-case basis. At this time, this more refined approach to pairing modeled and monitored values is not accepted by EPA and may be difficult to obtain approval for the proposed project. If such an approach is to be considered, justification for and documentation of the proposed method will be provided in a more detailed dispersion modeling protocol to be submitted prior to the PSD permit application for the proposed facility.

[5] Guidance Concerning the Implementation of the 1-hour $NO_2$ NAAQS for the Prevention of Significant Deterioration Program", U.S.EPA, June 29, 2010.

[6] Guidance Concerning the Implementation of the 1-hour $SO_2$ NAAQS for the Prevention of Significant Deterioration Program", U.S.EPA, August 23, 2010.

## Background Concentrations for NAAQS Analysis – Single Monitor Site

- Supporting Information (supplied by applicant)
  - A description of monitoring data proposed as representative of the project area. The description should include: 1) the statistics of the data set; and, 2) the quality control/assurance measures conducted for the data.
  - A discussion of the similarity between the monitor location and the project area.
  - A *detailed assessment* of the relationship between the meteorology of the project area and the area where monitoring data was obtained.
  - The distance between the monitor and the source under review. As a working assumption, ambient air quality monitors closer to the project will likely have concentrations most similar to those observed at or near the source under review. It is important to note that if more than one monitor is available for a modeling demonstration, preference should be given to the closest representative monitor.
  - The approach used to edit explicitly modeled source contributions from monitored ambient air data, consistent with the definition of background concentration under 40 CFR 51 Appendix W. This procedure is necessary to avoid "double counting" ambient air concentrations. See 40 CFR 51 Appendix W Section 8.3.3 (b).

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## Background Concentration Guidance

- In November 2024, EPA released guidance on determining appropriate background concentration from monitor data and sources explicitly modeled in AERMOD.
  - Removes term "significant concentration gradient" from Guideline discussion of identifying nearby sources to model.
  - Guidance document:
    - Suggests graphical review of ambient monitors in vicinity of project location and emission sources near project and ambient monitors
    - Focus on explicit modeling for "few" sources not characterized by monitored concentrations
  - See Handout 7-K

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## Coupling Background and Modeled Concentrations

- Background in the form of the standard is coupled with modeled concentrations in the form of the standard
- Background addressed in Appendix W Section 8.3:
  - EPA recommends against trying to pair hourly or daily background concentrations with hourly or daily modeled concentrations
  - Can develop variable background concentrations based on seasonal variability or hour of day variability if background concentrations can be shown to vary in such a manner

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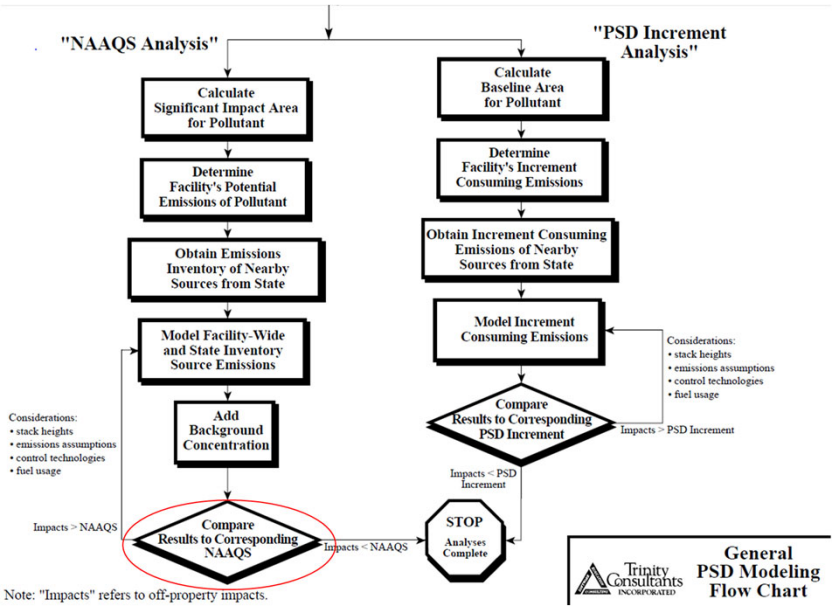
## "Default" Background Concentrations (from Iowa DNR)

| Pollutant | Averaging period | Concentation (ug/m3) |
|---|---|---|
| PM10 | 24-hour | 55 |
| PM2.5 | 24-hour | 18 |
| | Annual | 7.8 |
| NO2 | 1-hour | Urban: 58; Rural: 13 |
| | Annual | Urban:11; Rural: 4 |
| SO2 | 1-hour | 47 |
| | 3-hour | 47 |
| | Annual | 1 |
| CO | 1-hour | 7,600 |
| | 8-hour | 3,300 |
| Pb | Rolling 3-month average | 0 |

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# PSD Overview




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# NAAQS Analysis

- Compare the results to the NAAQS standards:
  - **Primary NAAQS** – Established to protect the health of sensitive populations such as asthmatics, children, and the elderly.
  - **Secondary NAAQS** – Established to protect the environment, including visibility, crops, vegetation, and buildings.

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# Primary NAAQS

| Pollutant | Calendar Quarter (µg/m³) | Annual (µg/m³) | 24-hour (µg/m³) | 8-hour (µg/m³) | 3-hour (µg/m³) | 1-hour (µg/m³) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | ----- | ~~50~~ | 150 | ----- | ----- | ----- |
| $PM_{2.5}$ | ----- | 9 | 35 | ----- | ----- | ----- |
| $SO_2$ | ----- | ~~80~~ | ~~365~~ | ----- | ----- | 196 |
| $NO_2$ | ----- | 100 | ----- | ----- | ----- | 188 |
| CO | ----- | ----- | ----- | 10,000 | ----- | 40,000 |
| Lead | 0.15 | ----- | ----- | ----- | ----- | ----- |
| Ozone | ----- | ----- | ----- | 137 | ----- | ~~235~~ |

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# Secondary NAAQS

| Pollutant | Calendar Quarter (µg/m³) | Annual (µg/m³) | 24-hour (µg/m³) | 8-hour (µg/m³) | 3-hour (µg/m³) | 1-hour (µg/m³) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | ----- | ~~50~~ | 150 | ----- | ----- | ----- |
| $PM_{2.5}$ | ----- | 15 | 35 | ----- | ----- | ----- |
| $SO_2$ | ----- | 26 | ----- | ----- | 1300 | ----- |
| $NO_2$ | ----- | 100 | ----- | ----- | ----- | ----- |
| CO | ----- | ----- | ----- | ----- | ----- | ----- |
| Lead | 0.15 | ----- | ----- | ----- | ----- | ----- |
| Ozone | ----- | ----- | ----- | 137 | ----- | ~~235~~ |

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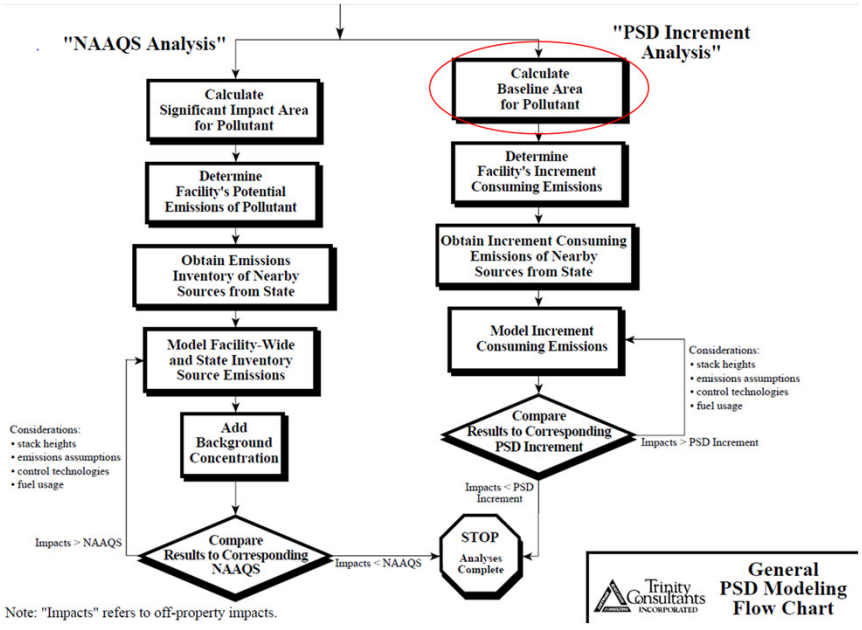
# Model Refinements

- If modeled impacts < NAAQS, the NAAQS analysis is complete!

- If modeled impacts > NAAQS, refine the model:
  - Conduct “cause or contribute” analysis
  - **Troubleshoot inputs such as:**
    - Stack heights
    - Emissions assumptions
    - Control technologies
    - Fuel usage

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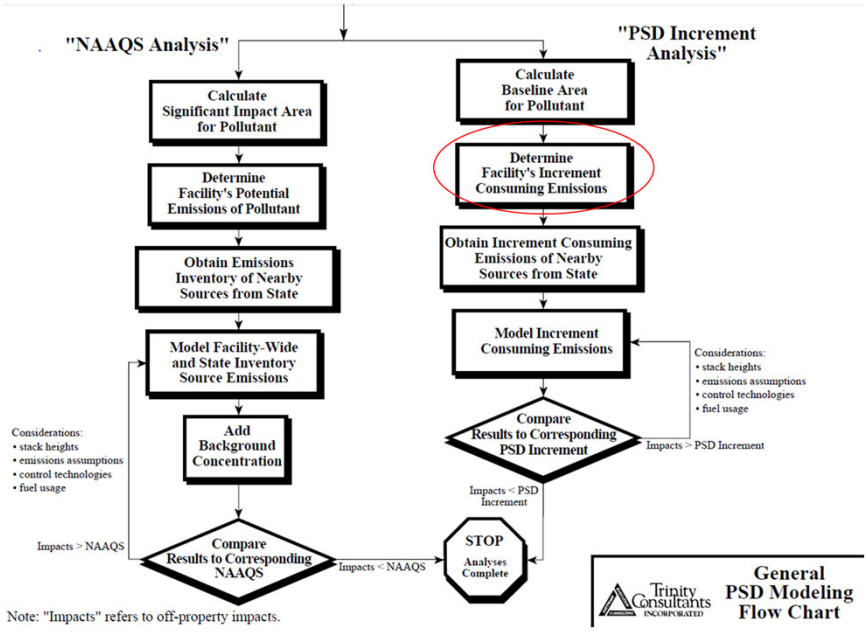
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# PSD Increment Analysis (Class I and II areas)

- PSD Increment is the maximum allowable increase in concentration that is allowed to occur above a baseline concentration.
  - **Class II –** Use procedure similar to NAAQS inventory guidance to develop inventory of nearby PSD increment affecting sources
  - **Class I –** Could include sources within 100s of kilometers
- Determine the baseline date
- Baseline concentrations are defined for each pollutant and averaging period

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# PSD Increment Analysis

- Calculate the facility's increment consuming emissions
- These sources include:

**After the *major* source baseline date:**

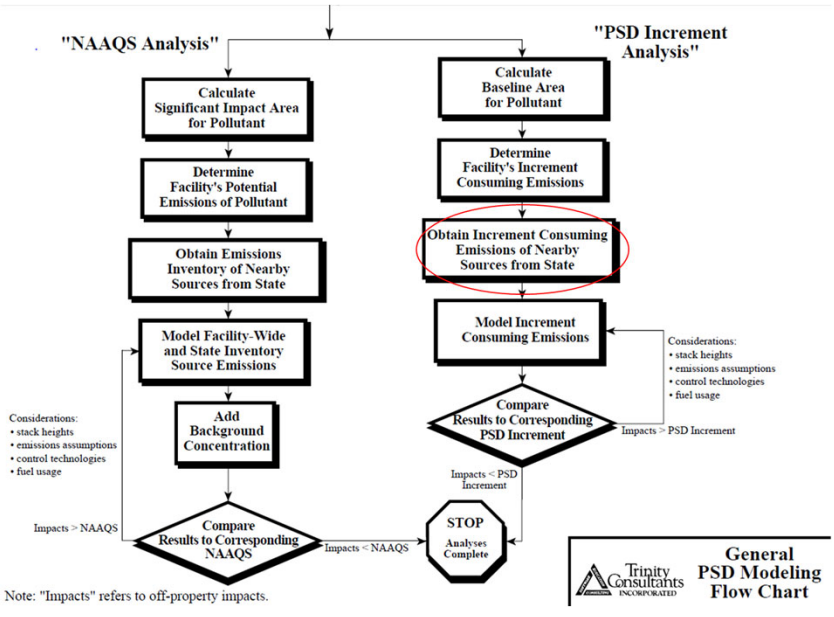
- Existing major sources that have undergone a physical change or change in the method of operation
- New major stationary sources

**After the *minor* source baseline date:**

- Existing stationary sources having undergone a physical change or change in their method of operation
- Existing stationary sources that have increased their hours of operation or capacity utilization
- New stationary sources

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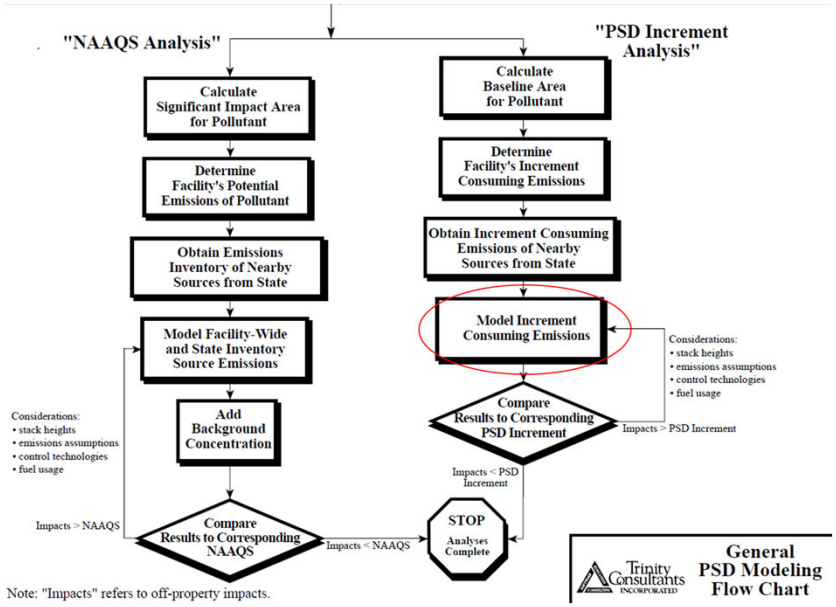
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## PSD Increment Analysis

- The responsible state agency may provide the emissions data for the increment consuming sources
- Data will likely need to be scrutinized and potentially updated
- Applicant may need to collect the data from scratch which can be a lengthy process

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## PSD Overview




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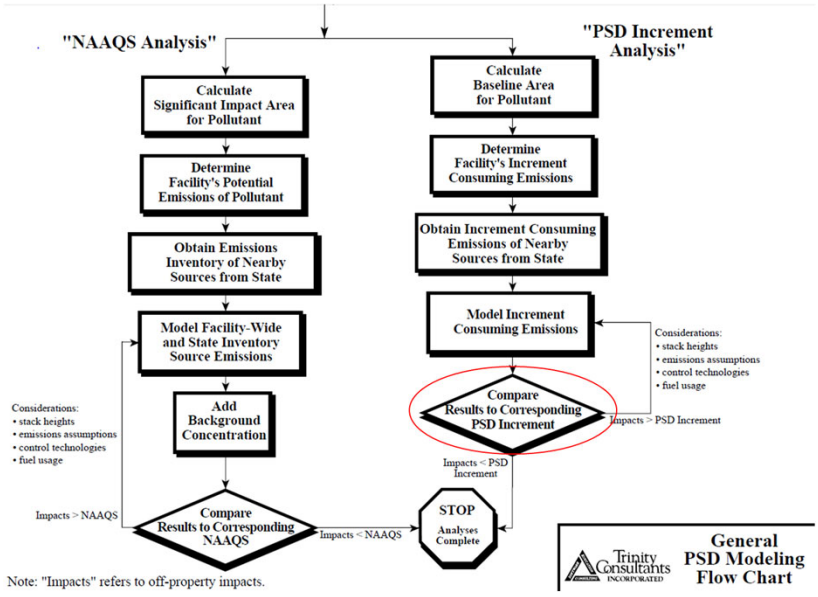
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## PSD Increment

- Model the increment consuming sources provided by the state along with the modified facility's increment consuming sources
- Typically model "nearby" increment consuming sources (similar to the full impact NAAQS modeling approach).

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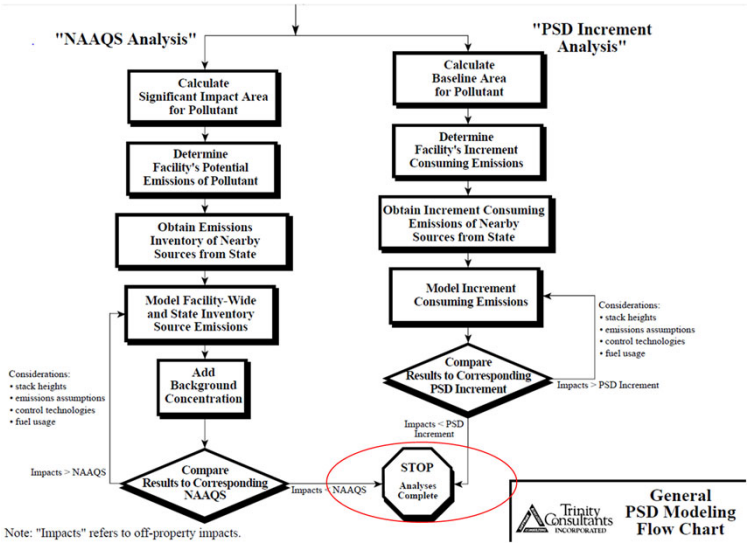
# PSD Increment Analysis

- Compare to the PSD Increment Thresholds:

| Pollutant | Annual ($\mu g/m^3$) | 24-hour ($\mu g/m^3$) | 3-hour ($\mu g/m^3$) |
|---|---|---|---|
| **$PM_{10}$**<br>Class I<br>Class II | <br>4<br>17 | <br>8<br>30 | <br>----- |
| **$PM_{2.5}$**<br>Class I<br>Class II | <br>1<br>4 | <br>2<br>9 | <br>----- |
| **$SO_2$**<br>Class I<br>Class II | <br>2<br>20 | <br>5<br>91 | <br>25<br>512 |
| **$NO_2$**<br>Class I<br>Class II | <br>2.5<br>25 | <br>----- | <br>----- |

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## NAAQS Modeling Challenges

- **$PM_{2.5}$ Standard**
  - 24-hr Standard is 3-year average of the 98th percentile of 24-hour $PM_{2.5}$ concentrations in a year
  - Annual Standard is 3-year average of the annual mean $PM_{2.5}$ concentrations
  - Complex chemical transformation mechanisms (poorly understood)
- **$NO_2$ Standard**
  - Added a 1-hour form of the standard in 2010 which is 3-year average of 98th percentile of annual distribution of daily maximum 1-hour concentrations
- **$SO_2$ Standard**
  - Added a 1-hour form of the standard in 2010 which is 3-year average of 99th percentile of annual distribution of daily maximum 1-hour concentrations

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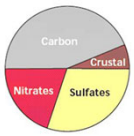
## The Guideline on Air Quality Models

- Published in FR on November 29, 2024
  - See Appendix W – Revised Guidance
  - Effective Date – 3/21/2025
- Incorporate most broad concepts from previous guidance into regulation
  - Adds some new options to AERMOD for specific cases ($NO_2$ modeling, overwater dispersion, roadway line sources)
  - Continues to reference Secondary $PM_{2.5}$ and $O_3$ model guidance
  - Continues to rely on guidance documents to fill in the details
- Also see Handout 7-C “Guidance on the use of models for assessing the impacts of emissions from single sources on the secondarily formed pollutants: ozone and $PM_{2.5}$” (Dec 2016)

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# Overview and Recent History of $PM_{2.5}$

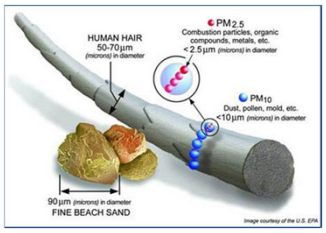
**$PM_{2.5}$ = Particulate Matter < 2.5 µm**




"Primary" $PM_{2.5}$ emissions

"Secondary" $PM_{2.5}$ emissions

- $NO_X$ and $SO_2$ reactions with ammonia
- Sulfur, Nitrogen, and Carbon containing species (sulfates, nitrates, and "SOA") are formed in the atmosphere as micron size and smaller particles
- Form nitrate and sulfate salts



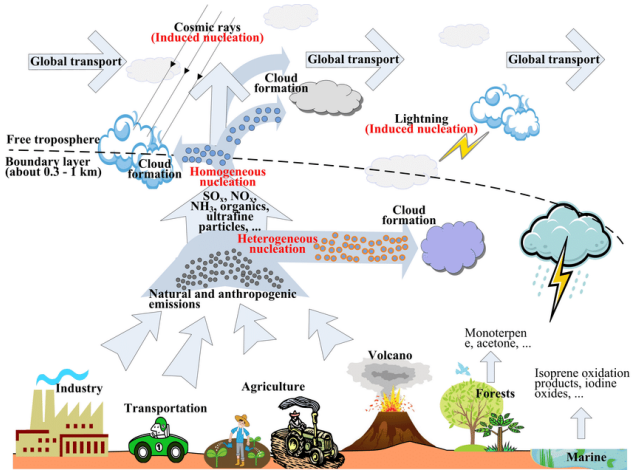







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# Secondary Formation of Fine Particles




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## $PM_{2.5}$ Modeling Guidance

- Numerous guidance documents have been released by EPA addressing $PM_{2.5}$ modeling requirements since 2010
- Primary (Direct) $PM_{2.5}$ Guidance
  - Appendix W, Section 4.2.3.5
  - Model consistent with other inert pollutants using AERMOD
- Secondary $PM_{2.5}$ Guidance
  - Appendix W, Section 5.0
  - Sets general framework, but defers to other guidance documents for details
- Guidance on the Use of Models for Assessing the Impacts of Emissions from Single Sources on the Secondarily Formed Pollutants: Ozone and PM2.5 (Handout 7-C) - December 2016

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## $PM_{2.5}$ Modeling Guidance

- EPA issued Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program (Handout 7-L) – April 30, 2024
- Guidance for Ozone and Fine Particulate Matter Permit Modeling (Handout 7-D) - July 29, 2022
- Guidance on Significant Impact Levels for Ozone and Fine Particulates in the Prevention of Significant Deterioration Permitting Program (Handout 7-H) – April 17, 2018
- Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (Handout 7-E) – April 30, 2019; Clarification issued on April 30, 2024 (Handout 7-P)
- Fine Particulate Matter ($PM_{2.5}$) Precursor Demonstration Guidance (Handout 7-I) – May 30, 2019
  - Technical guidance for regulatory agencies to demonstrate that one or more $PM_{2.5}$ precursors ($NO_X$, $SO_2$, VOC, and $NH_3$) are insignificant for a nonattainment area and should not be considered in SIP development
  - More discussion in Chapter 9 to follow

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## Secondary $PM_{2.5}$ Guidance

- EPA recommends two-tiered approach:
  - **Tier 1** – Use existing technically credible and appropriate relationships between emissions and impacts developed from previous modeling
    - MERPs will establish a relationship between project emissions increases and ambient impacts of secondary $PM_{2.5}$
    - Estimated secondary impacts will be added to modeled primary $PM_{2.5}$ impacts prior to comparison with SIL, NAAQS, and Increment
  - **Tier 2** – More sophisticated case-specific modeling analyses
    - Photochemical modeling

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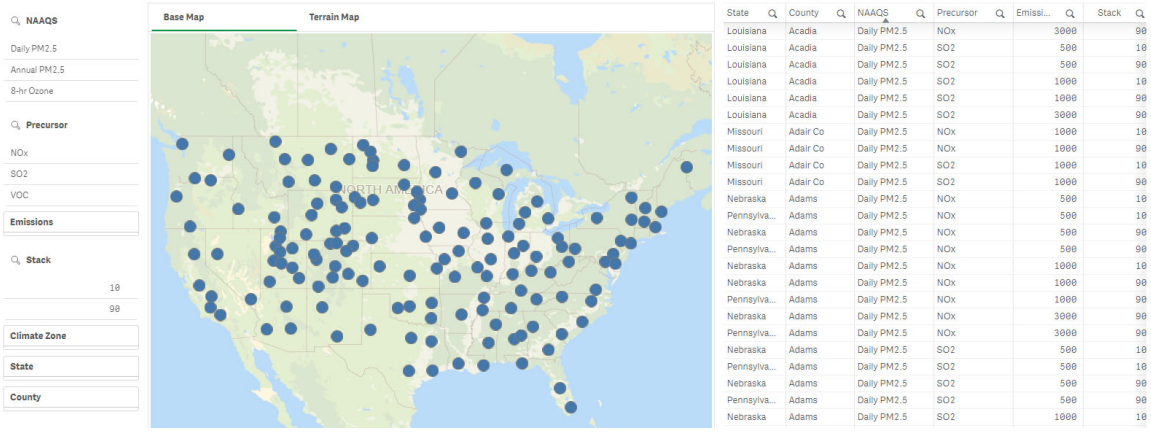
## Two-Tiered Assessment Guidance

- First Tier Assessment:
  - Use existing empirical relationships between precursors and secondary impacts based on modeling systems appropriate for this purpose
  - Screening approach based on information derived from the full science chemical transport modeling system
  - Use of pre-existing credible technical information or a screening model for the purpose of estimating single source secondary impacts on a case-by-case basis
  - See "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier l Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program" (Handout 7-E); Clarification issued in April 2024 to address changes to $PM_{2.5}$ SILs (Handout 7-P)

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# MERPs View Qlik




| State | County | NAAQS | Precursor | Emissi... | Stack |
|---|---|---|---|---|---|
| Louisiana | Acadia | Daily PM2.5 | NOx | 3000 | 90 |
| Louisiana | Acadia | Daily PM2.5 | SO2 | 500 | 10 |
| Louisiana | Acadia | Daily PM2.5 | SO2 | 500 | 90 |
| Louisiana | Acadia | Daily PM2.5 | SO2 | 1000 | 10 |
| Louisiana | Acadia | Daily PM2.5 | SO2 | 1000 | 90 |
| Louisiana | Acadia | Daily PM2.5 | SO2 | 3000 | 90 |
| Missouri | Adair Co | Daily PM2.5 | NOx | 1000 | 10 |
| Missouri | Adair Co | Daily PM2.5 | NOx | 1000 | 90 |
| Missouri | Adair Co | Daily PM2.5 | SO2 | 1000 | 10 |
| Missouri | Adair Co | Daily PM2.5 | SO2 | 1000 | 90 |
| Nebraska | Adams | Daily PM2.5 | NOx | 500 | 10 |
| Pennsylva... | Adams | Daily PM2.5 | NOx | 500 | 10 |
| Nebraska | Adams | Daily PM2.5 | NOx | 500 | 90 |
| Pennsylva... | Adams | Daily PM2.5 | NOx | 500 | 90 |
| Nebraska | Adams | Daily PM2.5 | NOx | 1000 | 10 |
| Nebraska | Adams | Daily PM2.5 | NOx | 1000 | 90 |
| Pennsylva... | Adams | Daily PM2.5 | NOx | 1000 | 90 |
| Nebraska | Adams | Daily PM2.5 | NOx | 3000 | 90 |
| Pennsylva... | Adams | Daily PM2.5 | NOx | 3000 | 90 |
| Nebraska | Adams | Daily PM2.5 | SO2 | 500 | 10 |
| Pennsylva... | Adams | Daily PM2.5 | SO2 | 500 | 10 |
| Nebraska | Adams | Daily PM2.5 | SO2 | 500 | 90 |
| Pennsylva... | Adams | Daily PM2.5 | SO2 | 500 | 90 |
| Nebraska | Adams | Daily PM2.5 | SO2 | 1000 | 10 |

https://www.epa.gov/scram/merps-view-qlik

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# MERPs - National

| | 8-hr $O_3$ from $NO_x$ | | | 8-hr $O_3$ from VOC | | |
|---|---|---|---|---|---|---|
| Climate Zone | Lowest | Median | Highest | Lowest | Median | Highest |
| Northeast | 209 | 495 | 5,773 | 2,068 | 3,887 | 15,616 |
| Southeast | 170 | 272 | 659 | 1,936 | 7,896 | 42,964 |
| Ohio Valley | 126 | 340 | 1,346 | 1,159 | 3,802 | 13,595 |
| Upper Midwest | 125 | 362 | 4,775 | 1,560 | 2,153 | 30,857 |
| Rockies/Plains | 184 | 400 | 3,860 | 1,067 | 2,425 | 12,788 |
| South | 190 | 417 | 1,075 | 2,307 | 4,759 | 30,381 |
| Southwest | 204 | 422 | 1,179 | 1,097 | 10,030 | 144,744 |
| West | 218 | 429 | 936 | 1,094 | 1,681 | 17,086 |
| Northwest | 199 | 373 | 4,031 | 1,049 | 2,399 | 15,929 |

| | Daily PM2.5 from $NO_x$ | | | Daily PM2.5 from $SO_2$ | | |
|---|---|---|---|---|---|---|
| Climate Zone | Lowest | Median | Highest | Lowest | Median | Highest |
| Northeast | 2,218 | 15,080 | 34,307 | 623 | 3,955 | 8,994 |
| Southeast | 1,943 | 8,233 | 23,043 | 367 | 2,475 | 5,685 |
| Ohio Valley | 2,570 | 10,119 | 32,257 | 348 | 3,070 | 16,463 |
| Upper Midwest | 2,963 | 10,043 | 29,547 | 454 | 2,482 | 6,096 |
| Rockies/Plains | 1,740 | 9,389 | 31,263 | 251 | 2,587 | 19,208 |
| South | 1,881 | 8,079 | 24,521 | 274 | 1,511 | 10,112 |
| Southwest | 6,514 | 26,322 | 101,456 | 1,508 | 8,730 | 27,219 |
| West | 1,073 | 8,570 | 34,279 | 188 | 2,236 | 24,596 |
| Northwest | 3,003 | 11,943 | 20,716 | 1,203 | 3,319 | 8,418 |

| | Annual PM2.5 from $NO_x$ | | | Annual PM2.5 from $SO_2$ | | |
|---|---|---|---|---|---|---|
| Climate Zone | Lowest | Median | Highest | Lowest | Median | Highest |
| Northeast | 10,142 | 47,396 | 137,596 | 4,014 | 21,353 | 41,231 |
| Southeast | 5,679 | 45,076 | 137,516 | 859 | 14,447 | 25,433 |
| Ohio Valley | 7,625 | 31,931 | 150,868 | 3,098 | 23,420 | 58,355 |
| Upper Midwest | 10,011 | 33,497 | 139,184 | 2,522 | 17,997 | 45,113 |
| Rockies/Plains | 9,220 | 39,819 | 203,546 | 2,263 | 16,939 | 106,147 |
| South | 7,453 | 41,577 | 110,478 | 1,781 | 11,890 | 58,612 |
| Southwest | 11,960 | 128,564 | 779,117 | 10,884 | 38,937 | 105,417 |
| West | 3,182 | 29,779 | 103,000 | 2,331 | 11,977 | 66,773 |
| Northwest | 7,942 | 21,928 | 71,569 | 11,276 | 15,507 | 18,263 |

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# Two-Tiered Assessment Guidance

- First Tier Assessment:
  - EPA provided framework for development of regional MERPs based on photochemical modeling results
    - Essentially provides estimate of project impact of $PM_{2.5}$ or $O_3$ from precursor emissions. Project emissions are scaled by ratio of hypothetical source concentration to hypothetical source emission rate.

$$\textbf{Eq 1.} \quad \text{Project Air Quality Impact} = \text{Project emission rate} \times \frac{\text{Modeled air quality impact from hypothetical source}}{\text{Modeled emission rate from hypothetical source}}$$

  - Secondary concentrations for $PM_{2.5}$ are then added to modeled concentration for SIL, NAAQS, or PSD increment analysis
  - Secondary concentrations for O3 are compared with SIL
    - If over SIL, added to a representative background and compared with NAAQS

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# EPA's Recommended Protocol

- The EPA recommends that the permit applicant follow a three-step process.
  - 1) Identify a representative hypothetical source (or group of sources for an area) from EPA's modeling. If a representative hypothetical source is not available, then consider whether an EPA derived MERP value available for the broader geographic area of the project source may be adequately representative and thus appropriate to use. The permit applicant should provide the appropriate permitting authority with a technically credible justification that the source characteristics (e.g., stack height, emissions rate) of the specific project source described in a permit application and the chemical and physical environment (e.g., meteorology, background pollutant concentrations, and regional/local emissions) near that project source are adequately represented by the selected hypothetical source(s).
  - 2) Acquire the source characteristics and associated modeling results for the hypothetical source(s). Access these data from EPA's MERPs View Qlik website.
    - https://www.epa.gov/scram/merps-view-qlik (file takes time to load)
  - 3) Apply the source characteristics and photochemical modeling results from Step 2 to the MERP equation (Equation 1) with the project emissions to assess the project source impacts.

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## MERPs

- EPA's multi-tiered approach through MERP provides opportunities to screen out or perform semi-quantitative assessment before refined photochemical grid modeling is required
  - Latest guidance opens options to using distance-varying MERPs values
- MERP values and its form (i.e., regional, state or local) not established by EPA
  - Individual states may have established recommended hypothetical sources

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## Two-Tiered Assessment Guidance

- Second Tier Assessments:
  - Chemical transport models such as Lagrangian puff models (CALPUFF, SCICHEM) or Eulerian grid models (CAMx, CMAQ) are recommended for estimating single source Ozone and $PM_{2.5}$ impacts
  - Flexibility to compare to both the SIL and NAAQS based on the complexity of model application
  - Emphasis on use of chemical transport models only needed in very rare cases

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## Latest $PM_{2.5}$ and Ozone Permit Modeling Guidance

- July 22, 2022 EPA guidance (Handout 7-D) recommends "holistic" approach for secondary formation analyses
  - If trigger PSD for direct $PM_{2.5}$ or $PM_{2.5}$ precursor ($NO_X$ or $SO_2$) need to address impacts for all components
  - If trigger PSD for either ozone precursor (VOC or $NO_X$) need to address impacts for all components
- Implication is that a project that triggers PSD for just a $PM_{2.5}$ precursor (e.g., $NO_X$) would require modeling using AERMOD for direct $PM_{2.5}$ and concentration estimates using MERPs for $NO_X$ and $SO_2$

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## Latest $PM_{2.5}$ Developments

- Primary annual $PM_{2.5}$ standard lowered from 12.0 to 9.0 $\mu g/m^3$
  - Final rule published March 6, 2024, effective May 6, 2024
  - Annual $PM_{2.5}$ SIL lowered from 0.2 $\mu g/m^3$ to 0.13 $\mu g/m^3$, effective April 30, 2024
- Group of states and other industry groups immediately filed petitions for judicial review in the D.C. Circuit, requesting the court to vacate EPA's rule lowering the $PM_{2.5}$ NAAQS
  - Petitioners claimed that EPA did not have the authority to discretionarily revise the NAAQS
  - That EPA failed to consider relevant factors, including costs, in making its decision
- Oral argument was held on December 16, 2024

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## Latest $PM_{2.5}$ Developments (continued)

- February 25, 2025 – the D.C. Circuit granted EPA's motion to hold the case in abeyance (60 days) to allow new EPA leadership to review the $PM_{2.5}$ NAAQS
- March 12, 2025 – EPA announced plans to reconsider the $PM_{2.5}$ NAAQS and will initiate a new notice and comment process on the rule
  - The announcement also stated that EPA will soon release guidance to increase flexibility on NAAQS implementation, reforms to New Source Review, and direction on permitting obligations
- May 23, 2025 – EPA granted motion to continue $PM_{2.5}$ DC Circuit Court case in abeyance for 30 additional days
  - September 5, 2025 - Court granted motion to continue to pause a further 45 days
- November 2025 – EPA asked court to vacate reduced $PM_{2.5}$ NAAQS by February 2026 (see Handout 7-Q)
- June 26, 2026 – the D.C. Circuit denied EPA's request to vacate the 2024 $PM_{2.5}$ NAAQS (see Handout 7-R)

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## Nitrogen Dioxide Standards

| Pollutant | Primary Standards | | Secondary Standards | |
|---|---|---|---|---|
| | Level | Averaging Time | Level | Averaging Time |
| Nitrogen Dioxide | 53 ppb (100 **µg/m³**) | Annual | 53 ppb (100 **µg/m³**) | Annual |
| | 100 ppb (188 **µg/m³**) | 1-hour | | |

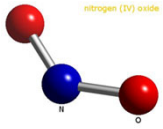
**ENV-10-38**

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## 1-hr $NO_2$ Modeling Realities...

- Any project with net emissions increases > SER triggers modeling analysis
- Very stringent 1-hour-average standard (February 2010)
  - 188 µg/m3 (100 ppb)
  - About 5 times more stringent than annual standard based on typical ratios of 1-hr and annual average impacts
- Very small interim SIL
  - 7.5 µg/m3 for 1-hour standard
- All $NO_X$ emissions are not $NO_2$
- Conversion of NO to $NO_2$ in atmosphere
- 3 tiers of modeling assumptions to consider




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## Hypothetical Case...

- Typical facility footprint and building configuration
- Stack parameters:

| | |
|---|---|
| Building Height | 80 ft |
| Stack Height | 10, 20, and 30 ft above roof |
| Stack Diameter | 5 ft |
| Exit Temperature | 500 °F |
| Exit Velocity | 40 ft/s (≈ 26,000 scfm) |
| Vertically Unobstructed Release | |

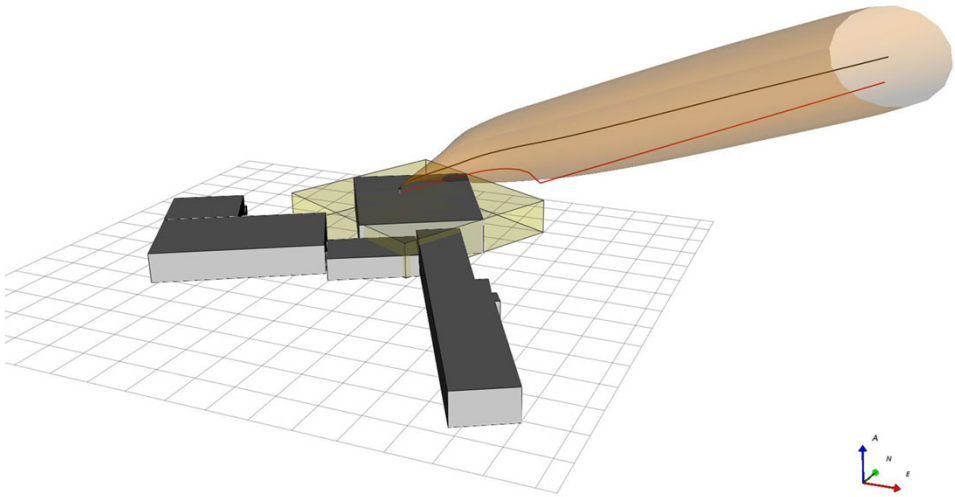
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# Hypothetical Case...

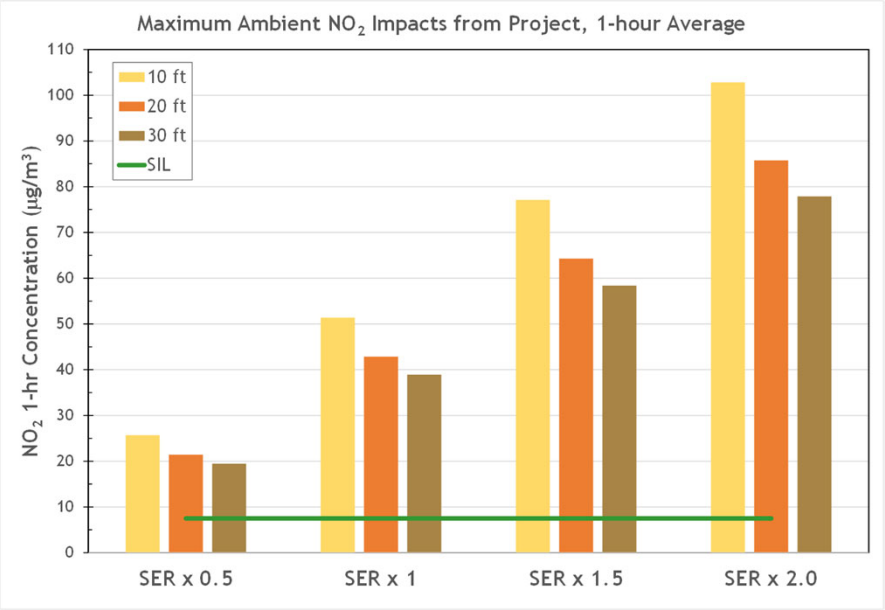
- Project at existing plant involving new combustion or process source
- Consider 4 project emission increase scenarios:
  - 0.5x SER 20 tpy
  - 1x SER 40 tpy
  - 1.5x SER 60 tpy
  - 2x SER 80 tpy

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**Color bars are results at different stack heights (height above building roof)**

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# $NO_2$ Modeling – 3 Tiers (1/2)

- **Tier 1**: Full $NO_x$ to $NO_2$ conversion (most conservative)
- **Tier 2**: Conversion of $NO_x$ to $NO_2$ based on ambient ratios (ARM and ARM2)
  - ARM applies to both 1-hour and annual modeling assessments
  - ARM default $NO_2/NO_x$ factor: 0.8 – 1-hour, 0.75 – Annual
  - Revised Ambient Ratio Method 2 (ARM2) – $NO_x$ to $NO_2$ conversion a function of $NO_2/NO_X$ ambient ratio – Became regulatory option in AERMOD upon 2017 Appendix W finalization. Applies to 1-hour assessments
  - Modeled NO2 = (Modeled $NO_x$ ) X ($NO_2/NO_x$ )
  - ARM2 includes default upper and lower limits on the ambient ratio applied to the modeled $NO_x$ concentration of 0.9 and 0.5, respectively.

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# $NO_2$ Modeling – 3 Tiers (2/2)

- **Tier 3**: Conversion of $NO_x$ to NO2 based on limited ozone
  Plume Volume Molar Ratio (PVMRM), Ozone Limiting (OLM) methods, Generic Reaction Set Method (GRSM)
  - GRSM was added as default in November 2024 Appendix W revision
- Appendix W make Tier 3 options regulatory default, assuming approval of source-specific variables:
  - In stack $NO_2/NO_x$ ratio (default – 0.5 – Handout 7-F) - 0.2 for "nearby" sources (greater than 1 - 3 km distance from applicant's source)
  - Equilibrium ratio downwind (default – 0.9)
  - Background ozone (all methods) and $NO_X/NO_2$ for GRSM
- OLM, PVMRM, and GRSM require the specification of an in-stack ratio (ISR) for NO2/ $NO_x$, either for all modeled $NO_2$ sources or for each source individually. When an individual source ISR is specified, it will override the default ISR, if any.
- When possible, source-specific ISRs should be used. Supporting data should be provided with the modeling analysis to justify a source's anticipated $NO_2/NO_X$ in-stack ratios, such as manufacturer test data, state or local agency guidance, peer reviewed literature, and/or the EPA's $NO_2/NO_X$ ratio database.
- In the absence of this information, the default ISR of 0.50 should be used. The default ambient equilibrium ratio is 0.9, but with justification may be overridden. Additionally, OLM, PVMRM, and GRSM require the inclusion of ozone background. The state may provide hourly background ozone data.

Refer to Summary – Tiered $NO_2$ Dispersion Modeling Methodology

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## TIERED $NO_2$ DISPERSION MODELING METHODOLOGY

In the "Models for Nitrogen Dioxide" section of the latest *Guideline* (Section 4.2.3.4), U.S. EPA recommends a tiered screening approach for estimating 1-hour and annual $NO_2$ impacts from point sources in PSD modeling analyses.[1] The approach used in each of the three tiers is described briefly below.

1. Under the initial and most conservative Tier 1 screening level, all $NO_X$ emitted is modeled as $NO_2$ which assumes total conversion of NO (main chemical form of $NO_X$) to $NO_2$.
2. For the Tier 2 screening level, U.S. EPA recommends the use of the Ambient Ratio Method 2 (ARM2) methodology. ARM2 has been built into AERMOD beginning with the version released in December 2013 (version 13350). The ARM2 method replaces the previous ARM method in which Tier 1 AERMOD results were multiplied by an empirically derived national annual average default $NO_2/NO_X$ ambient equilibrium ratio. ARM2 applies a varying $NO_2/NO_X$ ratio to concentrations output by AERMOD. The ratio varies as a function of the modeled $NO_X$ concentration at the time and location where the ratio is applied, with the relationship between $NO_X$ concentration and $NO_2/NO_X$ ratio developed based on U.S. EPA's Air Quality System ambient air quality data.
3. Since the impact of an individual $NO_X$ source on ambient $NO_2$ depends on the chemical environment into which the source's plume is emitted, modeling techniques that account for this atmospheric chemistry such as the Ozone Limiting Method (OLM), the Plume Volume Molar Ratio Method (PVMRM), or the Generic Reaction Set Method (GRSM) can be considered under the most accurate and refined Tier 3 approach identified by U.S. EPA. Additional model inputs required for the use of OLM or PVMRM could include source-specific in-stack $NO_2/NO_X$ ratios, ambient equilibrium $NO_2/NO_X$ ratios, and background ozone concentrations. GRSM also allows input of background $NO_X$ and $NO_2$ concentrations. Use of a default in-stack $NO_2/NO_X$ ratio of 0.50 has been recommended by U.S. EPA in cases where unit-specific data are not available. An alternate default in-stack $NO_2/NO_X$ ratio of 0.2 is recommended by U.S. EPA for "nearby sources" (i.e., those $NO_X$ emission units not located at the primary facility for which permit modeling is being conducted and at least 1 – 3 km distant from the primary facility).[2]

If the ARM2 or Tier 3 approaches are chosen, case-specific justification and approval by the EPA Regional Office for use of these methods are no longer required. However, in Section 4.2.3.4(e) of the 2024 version of the *Guideline*, EPA recommends consultation with the EPA Regional Office in addition to the appropriate reviewing authority due to the additional input data requirements and complexities associated with the Tier 3 options. Therefore, submittal of a modeling protocol specifying the proposed inputs for the Tier 3 methods for the reviewing agency to share with EPA is suggested.

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[1] 89 FR 95034, November 29, 2024.

[2] "Technical Support Document (TSD) for NO2-Releated AERMOD Modifications", Section 4.2, U.S. EPA, December 2015.

## Sulfur Dioxide

| Pollutant | Primary Standard | | Secondary Standards | |
|---|---|---|---|---|
| | Level | Averaging Time | Level | Averaging Time |
| Sulfur Dioxide | ~~0.03 ppm~~ | ~~Annual~~ | 0.5 ppm (1300 µg/m³) | 3-hour |
| | ~~0.14 ppm~~ | ~~24-hour~~ | | |
| | 0.075 ppm (196 µg/m³) | 1-hour | 0.01 ppm (26 µg/m³) | Annual |

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## $SO_2$ NAAQS

- 1-hour Standard
  - The 3-year average of the 99th percentile of the annual distribution daily maximum 1-hour average concentration in a year, or (in other words)
  - The 3-year average of the 4th highest daily maximum 1-hour average concentration in a year
- See EPA guidance on how to analyze this standard in permitting (Handout 7-G)
- Secondary Standards
  - A compliance demonstration with the primary 1-hour $SO_2$ NAAQS is deemed compliance with the secondary 3-hour and annual standard. See Handout 7-N and Handout 7-N1.

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## $SO_2$ NAAQS

- Analysis of the 1-hour standard is similar to the one-hour $NO_2$ standard
  - 4th highest daily high value (one hour value) is used in the analysis instead of the 8th high one-hour daily high value
  - Standard is challenging for any source that emits $SO_2$ in significant amounts regardless of fuel
- States and EPA are using additional monitoring and/or modeling to discern contributing sources and attainment status for certain unclassifiable areas
  - Thresholds of 2,000 tpy of $SO_2$ emissions specified in final Data Requirements Rule (August 21, 2015)
  - Some states (e.g., PA) pulled in sources with < 2,000 tpy if in "cluster"
  - See 2025 EPA memo on the initial area designation process for the 2024 secondary annual NAAQS – Handout 7-O

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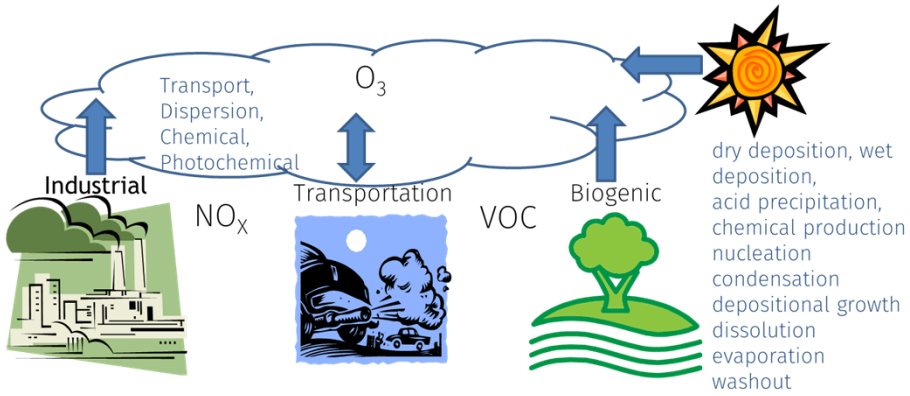
## Common Modeling Problems

- Worst case emissions and meteorology
- Regulatory default = no deposition
- Low wind speed issues
- Consideration of atmospheric conversion (mainly NO to $NO_2$ reactions with atmospheric oxidants)
- Ongoing downwash issues (related to GEP)
- Dealing with background concentration issues (NAAQS)
- Intermittent source (e.g., emergency engines, flares) modeling
  - See Handout 7-G1: Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $NO_2$ NAAQS. Note that this guidance also applies to 1-hour $SO_2$ modeling.

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## Secondary Formation of Ozone




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## Ozone Impact Analysis

- Required for PSD projects with a net emission increase of triggering PSD for VOC or $NO_X$ (precursors of ozone)
- Approaches may vary:
  - **Tier 1:** screening using exiting modeling or empirical relationships
  - **Tier 2:** Photochemical grid modeling
- Significant impact level of 1.0 ppb for ozone recommended in EPA Guidance dated April 17, 2018 (See Handout 7-H)
- Modeled Emission Rates for Precursors (MERPs) can be used as a Tier 1 tool to assess project specific ozone impacts
  - Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier l Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (Handout 7-E); Clarification issued in April 2024 to address changes to $PM_{2.5}$ SILs (Handout 7-P)

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# Ozone Impact Analysis

- More details on EPA's recommendations for ozone permit modeling demonstrations were released on July 29, 2022.
  - Guidance for Ozone and Fine Particulate Matter Permit Modeling (Handout 7-D)

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# Chapter 8

Additional Impacts and Class I Area Analyses

## Four Main Parts of a PSD Application

- 1. Control Technology Review (BACT)
- 2. Air Quality Analysis
  - NAAQS
  - PSD increments
- 3. Additional Impacts Analysis
- 4. Class I Area Analysis
- 5. Additional MEPA assessments may be required as dictated by the EAW review and potentially an EIS. May address the following federal acts (as well as others):
  - Endangered Species Act (ESA) – Biological evaluation for listed species and/or habitats (50 CFR Part 402)
  - National Historic Preservation Act (NHPA) – Historic properties within the source's "area of potential effect" (36 CFR Part 800, Section 106)

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## Additional Impacts Analysis

- Required in all PSD applications
- The permitting authority should determine scope of analyses depending on sensitivities in the area around the proposed new source or modification
- Analysis tends to be qualitative (in most applications)
  - Potential adverse impacts can often be discerned against secondary NAAQS (public welfare, including environment)
  - Non-air quality assessments can be considered

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## Additional Impacts Analysis

- Analyzes impairment to visibility, soils, and vegetation that occurs as a result of:
  - The new source or modification
  - General commercial, residential, industrial, or other growth associated with the source or modification
- **Growth Analysis:** This analysis is an estimate of the projected residential, commercial, and industrial growth that will occur as a result of the PSD project and an estimate of the air emissions associated with this growth. Air emissions associated with any new growth predicted to result from the proposed project and the air emissions from the proposed PSD project are considered together. The applicable background values are added to the resulting modeled concentrations and the results compared with the applicable NAAQS and PSD increments.
  - Often the new residential, commercial, and industrial growth estimated to occur as a result of the PSD project is negligible. In this case, further modeling analyses for growth is not necessary.

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## Additional Impacts Analysis

- Analyzes effects of growth on
  - Visibility (near-field) – Handout 8-R
    - Perform VISCREEN/PLUVUE modeling
    - Long-term monitoring may be required
  - Soils
    - Effect of acidic deposition on soils
    - Toxic compounds can be ingested by animals

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## Additional Impacts Analysis

- Analyzes effects of growth on
  - Vegetation
    - Any known effects on vegetation with significant commercial/recreational value
    - Sensitive plant species should be specifically addressed
      - Potentially sensitive vegetation species (such as soybeans) may require a careful examination.
      - Some species may be harmed by long-term exposure to low concentrations of pollutants.
      - The analysis should evaluate predicted concentrations for the averaging periods associated with the averaging periods addressed in the applicable vegetation impact studies.
      - Since multiple pollutants may impact soils and vegetation synergistically, the combined impacts of $NO_x$ and $SO_2$ (if applicable) should be evaluated.
      - Specific Guidance for $NO_2$:
        - Information on the relative sensitivities of plants to NO2 is **Table 9-6** of EPA's "Air Quality Criteria for Oxides of Nitrogen, Summary of Vegetation Impacts" Volume II, August 1993 (EPA 600/8-91/049bF)
        - Handout 8-Q

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## “Air Quality Criteria for Oxides of Nitrogen, Summary of Vegetation Impacts” Volume II

TABLE 9-6. RELATIVE SENSITIVITIES OF PLANTS TO NITROGEN DIOXIDE[a]

| Sensitive | Intermediate | Tolerant |
|---|---|---|
| | **Conifers** | |
| European larch | Colorado blue spruce | Austrian pine |
| | Nikko fir | English yew |
| | White fir | Hinoki cypress |
| | White spruce | Japanese black pine |
| | | Loblolly pine |
| | | Pitch pine |
| | | Virginia pine |
| | **Trees and Shrubs** | |
| European white birch | Japanese maple | Beech |
| | Japanese zelkova | Black locust |
| | Little-leaf linden | Black poplar |
| | Norway maple | Elder |
| | | English oak |
| | | European hornbeam |
| | | Ginkgo (Maidenhair tree) |
| | | Green ash |
| | | Scotch elm |
| | | Sweetgum |
| | | White ash |
| | | White oak |
| | **Field Crops and Grasses** | |
| Alfalfa (lucerne) | Annual bluegrass | Kentucky bluegrass |
| Barley | Potato | |
| Oats | Rye | |
| Red clover | Sweet corn | |
| Spring clover | Wheat | |
| Spring vetch | | |
| Tobacco | | |
| | **Fruit Trees and Shrubs** | |
| Apple (wild) | Crabapple | |
| Pear (wild) | Grapefruit | |
| | Japanese pear | |
| | Orange | |
| | Tangelo | |
| | **Garden Crops** | |
| Carrot[b] | Bush bean[b] | Asparagus |
| Celery[b] | Celery[b] | Bush bean[b] |
| Leek | Tomato | Cabbage |
| Lettuce | | Carrot[b] |
| Parsley | | Kohlrabi |
| Pea | | Onion |
| Pinto bean | | |
| Rhubarb | | |

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## “Air Quality Criteria for Oxides of Nitrogen, Summary of Vegetation Impacts” Volume II

TABLE 9-6 (cont'd). RELATIVE SENSITIVITIES OF PLANTS TO NITROGEN DIOXIDE[a]

| Sensitive | Intermediate | Tolerant |
|---|---|---|
| | **Ornamental Shrubs and Flowers** | |
| Azalea | Cape jasmine | Carissa |
| Bougainvillea | Catawba rhododendron | Croton |
| Chinese hibiscus | Common zinnia | Daisy |
| Common petunia | Dahlia | Gladiolus |
| Oleander | Flossflower | Japanese morning glory |
| Pyracantha | Fuchsia | Lily-of-the-valley |
| Rose[b] | Gardenia | Plantain lily |
| Snapdragon | Ixora | Rose[b] |
| Sweet pea | Japanese pittosporum | Shore juniper |
| Tuberous begonia | Ligustrum | Spring heath |
| | Oleander | |
| | Paperbark tree | |
| | Petunia | |
| | **Weeds** | |
| Common mugwort | Cheeseweed | Lamb's-quarters |
| Common plantain | Chickweed | Nettle-leaved goosefoot |
| Horseweed | Common chickweed | Pigweed |
| Mustard | Dandelion | Red root |
| Sunflower | | |
| | **Desert Species** | |
| Creosote bush | Brittle bush | Alfilaria |
| | Desert willow | Burro weed |
| | | Chasenactus (CN) |
| | | Desert marigold |
| | | Four-wing saltbush |
| | | Scorpion weed |

[a]Compiled from Benedict and Breen (1955), Czech and Nothdurft (1952), Kress and Skelly (1982), MacLean et al (1968), Matsushima (1977), Taylor and MacLean (1970), Thompson et al (1980), Van Haut and Stratmann (1967)
[b]Different investigators reported different susceptibilities

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## Additional Impacts Analysis

- 1989 Forest Service Guidance - A Screening Procedure to Evaluate Air Pollution Effects on Class I Wilderness Areas – Handout 8-O
- 1980 EPA Guidance – A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals – Handout 8-P
  - Contains a seven-step approach for the screening of impacts
  - Focus is on plants and soils

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## Additional Impacts Analysis

- Seven Step Screening Approach (1980 EPA Guidance)
  - 1) Estimating Maximum Concentrations
  - 2) Screening for Direct Impacts
    - Applies only to "Table 3.1" compounds – $SO_2$, Ozone, $NO_2$, CO, H2S, Ethylene, Fluorine, Beryllium, and Lead
  - 3) Calculating Deposited Soil Concentrations
  - 4) Calculate Increase over Endogenous Soil Concentration
  - 5) Calculate Potential Concentrations in Plant Tissue
  - 6) Screen for Potential Adverse Impacts from Trace Elements
  - 7) Consider Effects of Solubilities
- Guidance has a number of useful tables indicating various screening and sensitivity thresholds for a variety of plant and pollutant interactions. This guidance is not necessarily considered current or complete by EPA or state agencies

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# Class I Areas

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## Class I Area Analysis

**Mandatory Class I Areas**

- International Parks (in existence on 8/7/77)
- National Wilderness Areas (including certain national wildlife refuges)
- National Memorial Parks (> 5000 acres)
- National Parks (> 6000 acres)
- These areas cannot be reclassified

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https://floridadep.gov/air/air-business-planning/content/class-i-areas-map

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# Class I Area Analysis

## Additional Class I Areas

- Additional Class I areas can be created by states or tribal entities
  - Flathead Indian Reservation (MT)
  - Forest County Potawatomi Reservation (WI)
  - Fort Peck Indian Reservation (MT)
  - Northern Cheyenne Indian Reservation (MT)
  - Spokane Indian Reservation (WA)
  - Yavapai-Apache Indian Reservation (AZ)

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## Class I Area Analysis

- The PSD rules provide Class I area protection in two ways
  - Class I PSD Increment
  - Air Quality Related Values (AQRV)
- All PSD projects for facilities that propose to locate generally within 100 kilometers of a Class I area must conduct a Class I area impact analysis. In addition, PSD projects for facilities proposing to locate at a distance greater than 100 kilometers that are large enough that they may have an impact on a Class I area, must conduct a Class I area impact analysis.

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## Conduct "Significance Analysis" Class I Areas

- Compare results to the Modeling Significance Levels or SILs

| Pollutant | Annual SIL (µg/m³) | 24-hour SIL (µg/m³) | 8-hour SIL (µg/m³) | 3-hour SIL (µg/m³) | 1-hour SIL (µg/m³) |
|---|---|---|---|---|---|
| $PM_{2.5}$ | 0.05 | 0.27 | ----- | ----- | ----- |
| $PM_{10}$ | 0.16 | 0.32 | ----- | ----- | ----- |
| $SO_2$ | 0.08 | 0.2 | ----- | 1 | ----- |
| $NO_2$ | 0.1 | ----- | ----- | ----- | ----- |

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## Class I PSD Increment Analysis

- Compare to the PSD Increment thresholds

| Pollutant | Annual ($\mu g/m^3$) | 24-hour ($\mu g/m^3$) | 3-hour ($\mu g/m^3$) |
|---|---|---|---|
| $PM_{10}$ | | | |
| Class I | 4 | 8 | |
| Class II | 17 | 30 | |
| | | | ----- |
| $PM_{2.5}$ | | | |
| Class I | 1 | 2 | |
| Class II | 4 | 9 | |
| $SO_2$ | | | |
| Class I | 2 | 5 | 25 |
| Class II | 20 | 91 | 512 |
| $NO_2$ | | | |
| Class I | 2.5 | ----- | ----- |
| Class II | 25 | | |

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## Class I Area Increment Analysis

- AERMOD model to assess Class I impacts ≤ 50 km away from the new/modified plant. Modeling approach the same as discussed in Chapter 7
- For Class I > 50km
  - EPA removed CALPUFF's "preferred" status in the revised Appendix W. Other Lagrangian models are available
  - CALPUFF can still be used for screening analyses, but refined increment analyses require alternative model approval
    - Screening approaches can be applied using methods discussed in Handout 7-L for long-range modeling (distances greater than 50 km)
  - Most common approach is to use AERMOD as screening model with 50 km ring of receptors
- Local (on-site) meteorological data may be required (particularly in complex terrain or if Class I area very near source)

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## Primary PM2.5 – Long-range modeled impacts (Handout 7-L)

**Table 1**. Maximum daily average and maximum annual average primary $PM_{2.5}$ impacts at 100, 200, and 300 km from modeled hypothetical source.

| Emission Rate (tpy) | Distance from source (km) | Highest Daily Average Concentration (µg/m³) - tall stack | Highest Daily Average Concentration (µg/m³) - surface release | Highest Annual Average Concentration (µg/m³) - tall stack | Highest Annual Average Concentration (µg/m³) - surface release |
|---|---|---|---|---|---|
| 100 | 300 | 0.0117 | 0.0123 | 0.0008 | 0.0009 |
| 100 | 200 | 0.0223 | 0.0212 | 0.0016 | 0.0015 |
| 100 | 100 | 0.0537 | 0.0445 | 0.0070 | 0.0049 |
| 150 | 300 | 0.0180 | 0.0184 | 0.0012 | 0.0013 |
| 150 | 200 | 0.0328 | 0.0311 | 0.0024 | 0.0022 |
| 150 | 100 | 0.0807 | 0.0632 | 0.0102 | 0.0073 |
| 500 | 300 | 0.0610 | 0.0625 | 0.0044 | 0.0045 |
| 500 | 200 | 0.1167 | 0.1095 | 0.0087 | 0.0078 |
| 500 | 100 | 0.2717 | 0.2536 | 0.0379 | 0.0238 |
| 1000 | 300 | 0.1186 | 0.1217 | 0.0087 | 0.0089 |
| 1000 | 200 | 0.2300 | 0.2161 | 0.0175 | 0.0157 |
| 1000 | 100 | 0.5445 | 0.5009 | 0.0731 | 0.0477 |

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## Class I Increment Analysis

- Compare initial model results against the Class I Significance Impact Limits (SIL) - If less than, no further modeling required
- If exceeds Class I SIL, model inventory of sources – “nearby” sources in proximity to the Class I area
- Compare inventory results to Increment
  - Can use “cause or contribute” analysis:
    If new source/modification is less than SIL during exceedance event, project does not contribute
    (increment exceedances allowed in this case)

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## Class I Area Air Quality Related Value (AQRV)

- Definition of AQRV - A resource, as identified by the FLM for one or more Federal areas, that may be adversely affected by a change in air quality. (i.e. affects on flora, fauna, water, visibility, cultural, archeological and paleontological artifacts)
- See General Policy for Managing AQRVs in Class I Areas (Handout 8-E)

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## Class I Area AQRV Authority

- 1977 Clean Air Act Amendments
  - Federal Land Managers (FLMs) have the affirmative responsibility of protecting Class I areas from adverse affects of cumulative air pollution
  - FLMs are comprised of delegated personnel from the Forest Service (FS), National Park Service (NPS), and the Fish and Wildlife Service (FWS)

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## Class I Area AQRV Screening

- Analyses of Class I AQRV are typically required if:
  - Calculate the value of Q/D (Q emissions in TPY, D is the distance to the Class I area in Kilometers) – If ratio is less than 10, no AQRV assessment unless the source is less than 50 Kilometers from the Class I area.
  - Generally, the location of the source is less than 100 kilometers from the closest edge of the nearest Class I Area – smaller sources may be exempted from AQRV assessments based on Q/D criteria – larger sources beyond 100 kilometers must be evaluated against the Q/D criteria
  - Guidance on model input data parameters are updated from time to time (see Handout 8-F)

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## Class I Area AQRV – FLAG Process

- The recognized need for more consistency among agencies in identifying and evaluating AQRVs resulted in the establishment of an interagency workgroup in April, 1997 - Federal Land Managers Air Quality Related Values Work Group (FLAG)
- Includes input from NPS, FS, FWS, BLM, USGS, and NACAA representatives
- Revised Phase I Report issued in 2010
  - www.nps.gov/subjects/air/permitresources.htm
- The 2017 changes to Appendix W do not have a direct impact on FLMs (FLAG). But, Appendix W dictates EPA Class I Increment modeling techniques overall (approved/preferred models, etc.)

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# Class I Area AQRV – FLAG Process

- Focus of FLAG
  - Define sensitive AQRVs
  - Criteria for adverse impacts
  - Standard methods for PSD air quality analyses
  - Terrestrial effects of ozone
  - Aquatic and terrestrial effects of wet and dry pollutant deposition
  - Visibility
  - Process and policy issues

Refer to Summary: FLM AQRV Workgroup – 2010 FLAG

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# FLM AQRV Workgroup – 2010 FLAG

In October 2010, revised guidance was issued for assessing the impacts of new and modified sources of air pollution on Air Quality Related Values (AQRV) in Class I areas, consisting of visibility (including plume impairment and regional haze), ozone effects, and nitrogen and sulfur deposition. This guidance, which was issued in draft form on July 8, 2008, makes technical revisions to the previous guidance issued in December 2000. The revised guidance addresses key regulatory updates affecting air resource management and how Class I area impacts are assessed. These regulatory developments included EPA's promulgated revisions to Appendix W of 40 Code of Federal Regulations (40 CFR) Part 51 (*Guidelines on Air Quality Models*) in which CALPUFF was adopted as the preferred long range transport model and EPA's 2005 Best Available Retrofit Technology (BART) guidelines for the Regional Haze Rule. In addition, agencies have redefined their assessments of AQRVs.

## Background

The Clean Air Act Amendments of 1977 gave Federal Land Managers (FLMs) an "affirmative responsibility" to protect the natural and cultural resources of Class I areas from the adverse impacts of air pollution. Class I areas are afforded special protection under the Clean Air Act and are defined as certain national parks (over 6,000 acres), wilderness areas (over 5,000 acres), national memorial parks (over 5,000 acres), and international parks that were in existence on August 7, 1977. The Federal Land Managers' Air Quality Related Values Workroup (FLAG) was formed to provide a consistent and objective approach for evaluating air pollution effects on AQRVs and to provide a consistent methodology for State permitting authorities and permit applicants to assess the impacts of new and existing sources on AQRVs, primarily those in Federal Class I areas, but in some instances, in Class II areas. FLAG members include representatives from the National Park Service (NPS), in cooperation with the U.S. Fish and Wildlife Service (FWS) and the U.S. Department of Agriculture Forest Service (FS).

## Revised Guidance

The revised guidelines, The Federal Land Managers AQRV Workgroup (FLAG) Phase I Report – Revised (FLAG 2010) make specific technical revisions while retaining the background material and general information provided in the Phase I document issued in 2000. The 2010 guidance incorporates recent scientific studies and methodologies for conducting visibility analyses based on knowledge developed through implementation of the Regional Haze Rule. Key elements of the new guidance include the following:

### *Initial Screening Criteria for Requiring AQRV Analyses for Sources Greater than 50 km from a Class I Area*

The most substantial change to the guidelines is the setting of a threshold ratio of emissions distance, below which AQRV review is not required for new or modified sources located greater than 50 km from a Class I area. Specifically, if:

Q (tpy)/d (km) < 10, no AQRV analysis is required

Q is the combined emissions increase from a source of sulfur dioxide ($SO_2$), oxides of nitrogen ($NO_x$), particulate matter less than 10 microns ($PM_{10}$), and sulfuric acid mist ($H_2SO_4$) in tons per year (tpy)

based on 24-hour maximum allowable emissions (which are annualized) and d is the nearest distance to a Class I area in kilometers (km) from the source. This approach is limited to sources that operate year round. Emissions from sources that operate intermittently or seasonally must be adjusted to account for year round operation if the applicant uses the Q/d Initial Screening approach.

***First Level Screening Model***

FLAG 2000 included a Screening option (CALPUFF "Lite") whereby applicants could use meteorological data from a single station as an initial analysis. This approach is no longer recommended as a first step for Class I area modeling. Instead, applicants should use the CALPUFF Modeling System with a minimum of three years of gridded meteorological data.

***Model Settings***

A number of recommended model settings were updated in FLAG 2010 including but not limited to the following:

- *Background Visibility Conditions* - The threshold for an adverse impact is relative to the "natural" background. FLAG 2010 provides updated background values for all Class I areas based on annual average natural conditions and 20% best natural conditions. Unless otherwise recommended by the FLM or permitting agency, FLAG 2010 prefers the use of the annual average natural background values.
- *Relative Humidity Adjustment Factors* - The relative humidity adjustment factors impact the sulfate and nitrate components of the visibility extinction coefficient, i.e., as water droplets are added, the scattering of light is enhanced. FLAG 2010 recommends the use of monthly average relative humidity adjustment factors versus hourly factors. The latter reduces potential "spikes" in visibility impairment due to short-term weather events.
- *Visibility Assessment Criteria* - The previous 2000 guidance compared the highest daily visibility change to the adverse impact threshold (5% extinction change). FLAG 2010 uses the 98th percentile of the daily values over a year, allowing for seven days per year to be above the threshold before additional review of impacts is required.
- *Refined Analyses for Visibility* - FLAG 2010 allows for additional refined analyses to be conducted using fundamental aerosol and visibility theory to assess impacts when an adverse impact is predicted using the standard prescribed methods. These analyses are to be conducted in close consultation with the reviewing authority.
- *Deposition Analysis Thresholds* - FLAG 2010 provides specific nitrogen and sulfur deposition analysis thresholds (DATs) that are recommended as screening level values, below which impacts are deemed negligible. These values were not included in the 2000 FLAG document, but instead were defined in a separate NPS memo. This update in FLAG 2010 consolidates the guidance into a single document.

As PSD Class I modeling undergoes another transition with the final FLAG 2010 guidelines, affected permit applicants must be aware of the new guidelines and familiar with the extensive modeling requirements that accompany them.

## Class I Area AQRV – FLAG Policies and Procedures

- What does the applicant need to do?
  - The applicant is expected to perform the necessary analyses and to provide the information needed by the FLM to consider whether adverse impacts to the AQRVs are anticipated
  - First step is to complete a "Q/d" screening analysis

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## Class I Area AQRV – FLAG Policies and Procedures

- Land managers will consider a source locating greater than 50 km from a Class I area to have negligible impacts with respect to Class I AQRVs if its total $SO_2$, NOx, $PM_{10}$, and $H_2SO_4$ annual emissions (in tons per year, based on 24-hour maximum allowable emissions), divided by the distance (in km) from the Class I area **(Q/D) is 10 or less.**
- The Agencies would not request any further Class I AQRV impact analyses from such sources.

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## Class I Area AQRV – FLAG Policies and Procedures

- What does the FLM need to do?
  - The FLM interprets the results of the analyses and assesses the extent to which the impacts affect AQRVs
  - The FLM will consider the magnitude, frequency, duration, location, timing and cumulative effects
- FLM guidance in dealing with the details of any particular modeling assessment is inherently case-by-case

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## Class I Area AQRV – FLAG Policies and Procedures

- Possible outcomes:
  - No increment violation and no adverse impact to AQRVs - permit will be recommended for approval (BACT level may still be scrutinized by FLM)
  - No increment violation, but uncertainty regarding impact to AQRVs - FLM may ask for permit conditions that require post-construction monitoring, additional controls or process changes

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## Class I Area AQRV – FLAG Policies and Procedures

- Possible outcomes:
  - Increment violation (not from the new or modified source), but no adverse impact to AQRVs - FLM will certify no adverse impact and request the permitting authority to revise the SIP to eliminate the increment violation
  - Final determination, the source will cause an adverse impact on at least one AQRV - FLM may ask for permit conditions including: required emission offsets, post-construction monitoring, “reopener” clauses requiring a new analysis in the future, and lower emission limits

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## Class I Area AQRV – FLAG Policies and Procedures

- A preliminary assessment is often made by the FLM to allow the applicant to modify its permit application to avoid an adverse impact determination – this is common.
- For large projects (several hundred TPY), the AQRV assessment can be the limiting factor for overall emissions at the new or modified site

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## Class I Area AQRV – Evaluating Visibility Impacts

- Plume Impairment (Plume Visibility Analysis)
  - ~<50 km distant from Class I area
  - VISCREEN Model (levels 1 and 2)
  - PLUVUE II Model (normally not needed)
- Uniform Haze Impairment (Regional Haze Analysis)
  - >50 km distant from Class I area
  - Typically will use the CALPUFF Model (still recommended under FLAG guidance)

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## Class I Area AQRV – Regional Haze Analysis

- Regional haze is a reduction in the visual range caused by an increase in natural and anthropogenic pollutant levels (> 50 km from source)
- Sulfur, Nitrogen, and Carbon containing species (sulfates, nitrates, and "SOA") are formed in the atmosphere as micron size and smaller particles
- These particles scatter light efficiently
- Key terms related to regional haze
  (terms are mathematically related)
  - Visual range
  - Extinction coefficient or change (bext)
- Each Class I Area has a specified natural visual range against which visibility changes are assessed

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## Class I Area AQRV – Example Reference Values for Extinction Coefficient ($b_{ext}$)

- Extinction Coefficient Background Values
  - Great Smoky Mountains = 21.4 Inverse Megameters
  - Grand Canyon = 15.5 Inverse Megameters
- Visual Range (km) = $3912/b_{ext}$ ($Mm^{-1}$)
  - Great Smoky Mountains – 113 miles
  - Grand Canyon – 157 miles
- Haze Index (HI) = $10\ln(b_{ext}/10)$ (in units of dv)

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## Class I Area AQRV – Regional Haze Analysis

- CALPUFF is used to model emissions of $NO_X$, $SO_2$, speciated PM, and their chemical transformation during transport – Typically, 24-hour maximum emissions are modeled (since the visibility impact is being evaluated on a 24-hour basis). If "permitted" rate is 1-hour (max), must use it.
- The new emission source (or modification) is modeled by itself first
  - If the single-source contribution to extinction change is less than 5% (of the reference value), it is unlikely the FLM will object – 5% change is applied to the 98% percentile value at each receptor – applicant gets 7 "freebie" days per year of analysis
  - If the single-source contribution to extinction change is more than 5%, it is likely the FLM will ask for a "refined" analysis

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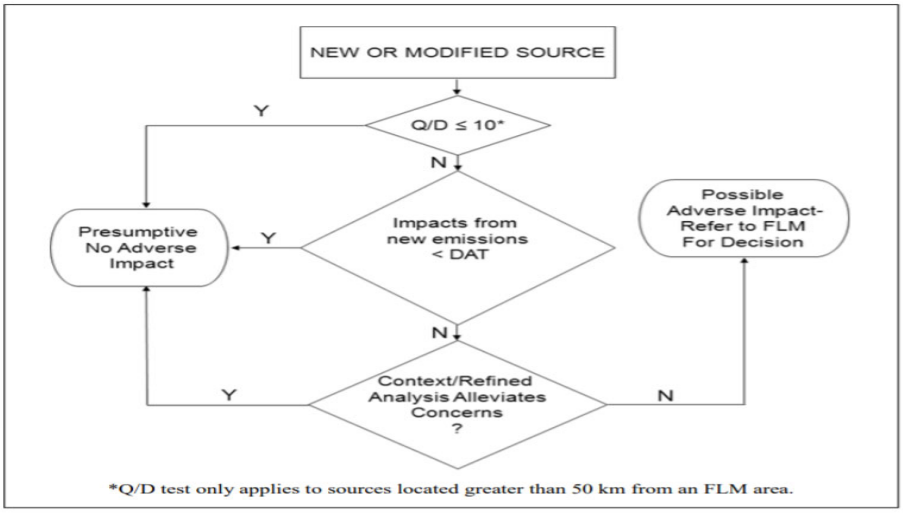
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## Class I Area AQRV – Deposition Analysis

- CALPUFF used to predict dry and wet deposition total N and S using CALPOST postprocessor
- Impacts are typically reported to the FLM for assessment on an area-by-area basis against Sulfur and Nitrogen Deposition Analysis Threshold (DAT)
  - East of Mississippi River, DAT = 0.01 kg/ha/yr S or N
  - West of Mississippi River, DAT = 0.005 kg/ha/yr S or N
  - See - **Guidance on Nitrogen and Sulfur Deposition Analysis Thresholds**

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## Class I Area AQRV – Deposition Analysis




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## Ozone Impacts

- Not typically addressed by PSD applicants
- For more AQRV/Ozone information see: Ozone Injury To Forests Across the Northeast and North Central United States, 1994-2010 – (https://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs103.pdf)

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## Class I Area AQRV – Haze Case Study

- New Plant (dominated by combustion sources)
  - PM - 7.8 lb/hr (plant-wide)
  - $SO_2$ - 8.9 lb/hr (plant-wide)
  - $NO_x$ - 65 lb/hr (plant-wide)
- ~60 km from a Class I area
- CALPUFF modeling predicted four days over 10% ($Db_{ext}$) and 13 days over 5% ($Db_{ext}$) over a five year period
- BUT… With FLAG 2010

Q = 81.7 lb/hr = 358 tpy

d = 60 km

Q/d = 5.97 < 10 = No AQRV modeling triggered

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# Class I Area AQRV – Haze Case Study

- Conclusion
  - Q/d screening analysis reduces the number of projects that trigger AQRV modeling.
  - If required to model, a relatively small power plant operating within 100 km of a Class I area may predict adverse impacts such that emissions need to be reduced

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# Chapter 9

Nonattainment Area NSR

## Nonattainment Areas

- Nonattainment areas are areas where modeled or monitored violations of the National Ambient Air Quality Standards exist
- Attainment and nonattainment designations are made by the USEPA and are published in 40 CFR Part 81

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## Nonattainment Area Designations

- Governed by Clean Air Act Title I, Part D
- Primary focus of Title I, Part D
  - Ozone - Precursors
    - VOCs
    - Nitrogen Oxides
  - $PM_{10}$ Particulate Matter
  - $PM_{2.5}$ Particulate Matter
    - Direct Emissions
    - Sulfur Dioxide and Nitrogen Oxides - Precursors

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## CAA Title I, Part D

- Subpart 1 - CAA Sections 171 to 179B
- Includes
  - Section 171 – Definitions (includes definition of LAER)
  - Section 172 - Nonattainment Plan Provisions (in general)
  - Section 173 – Permit Requirements

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## CAA Section 172

- Classifications and Attainment Dates
  - EPA has the authority to classify designated nonattainment areas based on severity and availability/feasibility of air pollution control measures.
  - Upon designation by EPA of an area, the nonattainment SIP is due no more than 3 years later.

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## CAA Section 172 (cont.)

- Plan provisions include:
  - Reasonably Available Control Technology (RACT) for existing sources
  - “Reasonable Further Progress” in reducing emissions in the area
  - Inventory of emissions
  - NSR permitting program (as prescribed in Section 173)
  - Provisions to comply with CAA Section 110(a)(2) pertaining to fees, source monitoring, ambient monitoring, modeling, plan revisions, etc.

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## CAA Section 173

- Provides the criteria for authorizing new permits to construct – These elements will be discussed in more detail later in this chapter
- Nature of required Offsets
  - Generally must come from the same NA area
  - Emissions reductions as a result of area requirements (RACT, etc.) are not available as offsets

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## CAA Title I, Part D

- Subpart 2 - Additional Provisions for Ozone Nonattainment Areas
  - Provides for area classifications (moderate, serious, etc.) for ozone NA areas
  - Provides for SIP submittal schedules and deadlines for attainment of standards
  - Provides for minimum control measures based on area classification and fees/sanctions for failure to attain standards
  - Determination of whether NOx is considered a precursor to ozone

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## CAA Title I, Part D

- Subpart 3 – Additional provisions for Carbon Monoxide
  - Moderate NA areas
  - Serious NA areas
  - SIP requirements and deadlines for moderate and serious areas

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## CAA Title I, Part D

- Subpart 4 – Additional Provisions for PM Nonattainment Areas
  - Moderate NA areas
  - Serious NA areas
  - SIP requirements and deadlines for moderate and serious areas
  - RACM and BACM guidance – BACM documents written in 1992
  - January 4, 2013 – NRDC and Sierra Club v. EPA (US Court of Appeals – DC District) – Court remanded 2007 and 2008 fine particulate implementation rules. EPA must regulate $PM_{2.5}$ under the Clean Air Act, Title I, Part D, Subpart 4 (not Subpart 1) – Impacts the implementation of the 1997 (annual and 24-hour), 2006 (24-hour), 2012 (annual), and 2024 (annual) PM standards.

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## CAA Title I, Part D

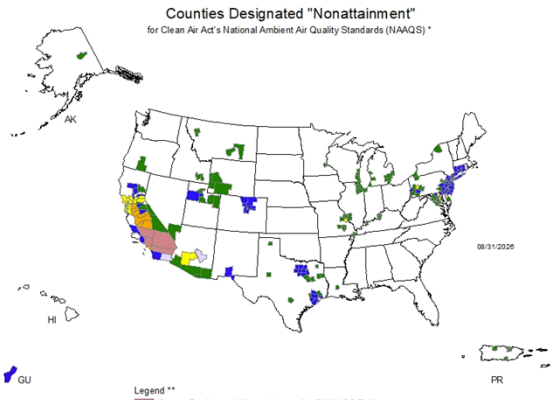
- Subpart 5 – Additional provisions for Sulfur Dioxide, Nitrogen Dioxide, and Lead
  - Plan submittal deadlines
  - Attainment date deadlines

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# Where are the nonattainment areas?

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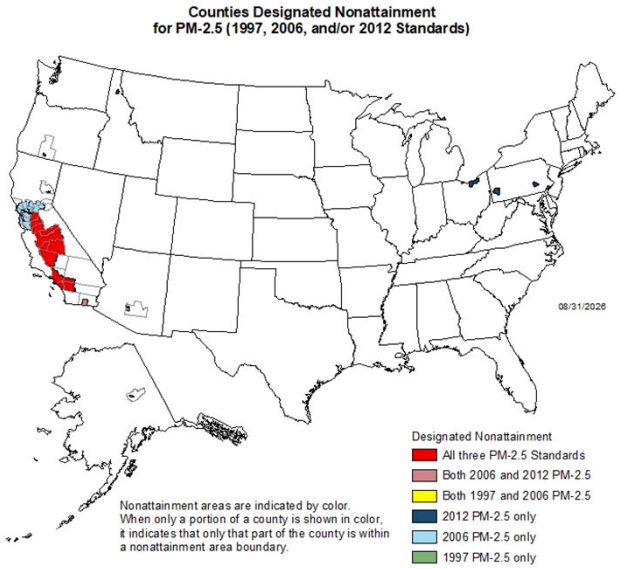
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* The National Ambient Air Quality Standards (NAAQS) are health standards for Carbon Monoxide, Lead (1978 and 2008), Nitrogen Dioxide, 8-hour Ozone (2008), Particulate Matter (PM-10 and PM-2.5 (1997, 2006 and 2012), and Sulfur Dioxide.(1971 and 2010)

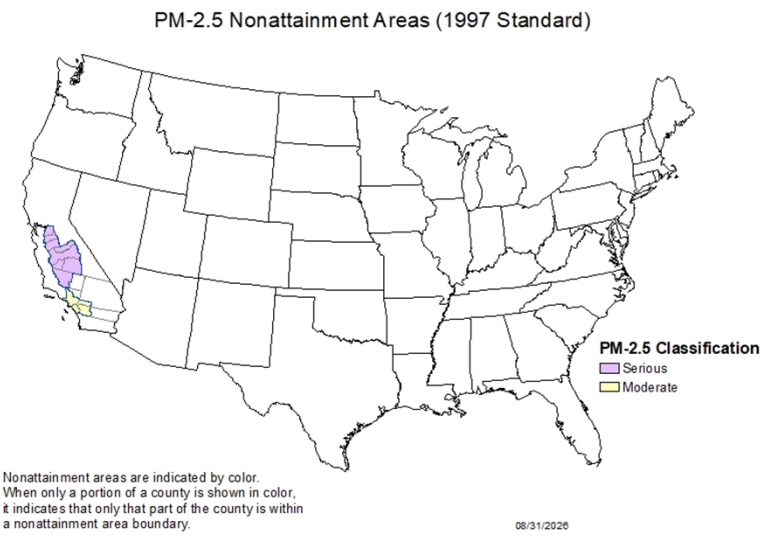
** Included in the counts are counties designated for NAAQS and revised NAAQS pollutants. Revoked 1-hour (1979) and 8-hour Ozone (1997) are excluded. Partial counties, those with part of the county designated nonattainment and part attainment, are shown as full counties on the map.

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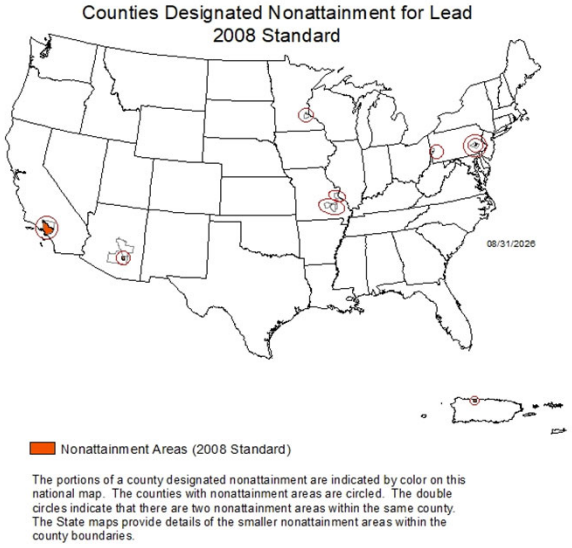



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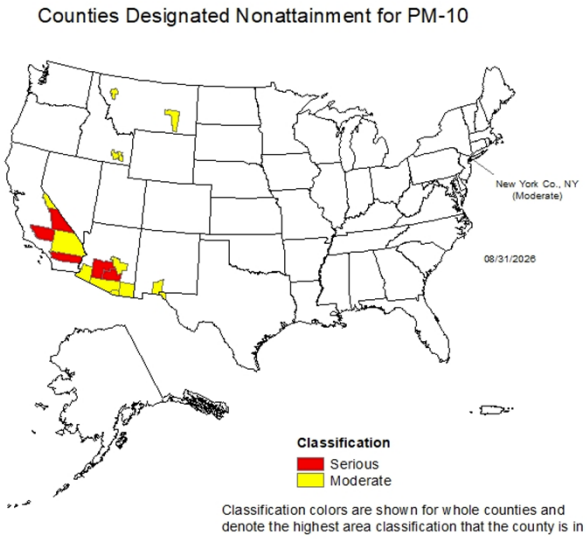



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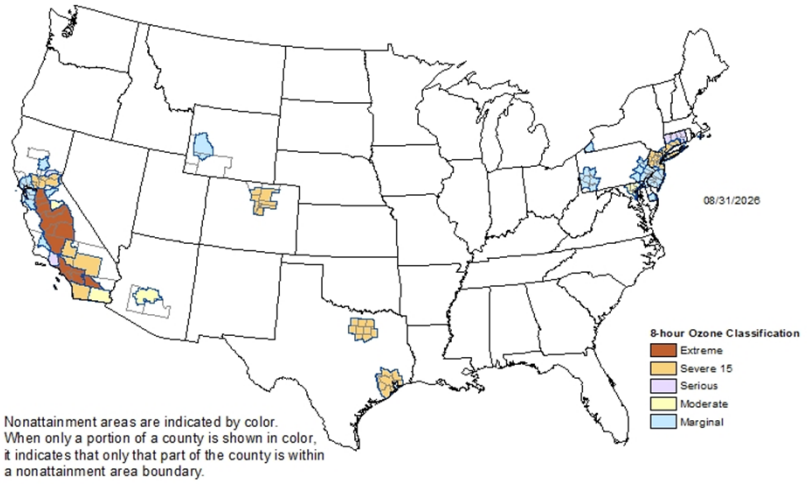



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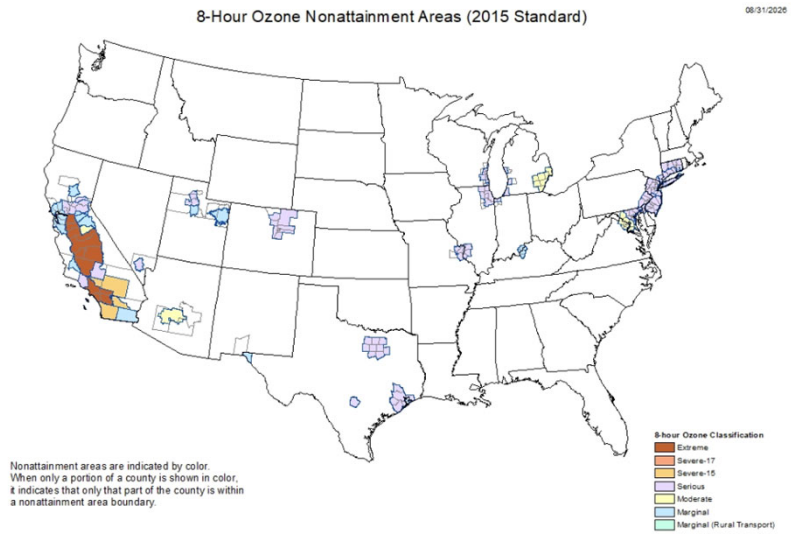



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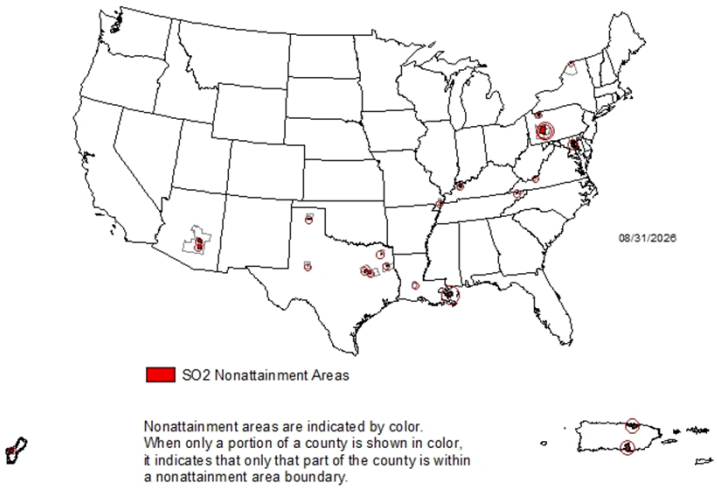

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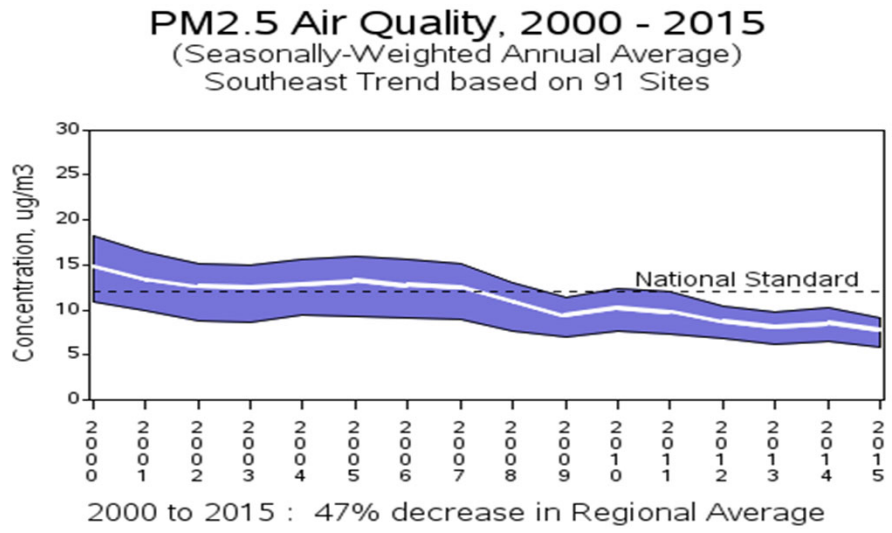

For the Ozone-8Hr (2015) Louisville, KY-IN nonattainment area, the Ohio portion was redesignated on July 5, 2022. The Kentucky portion has not been redesignated.
The Kentucky portion of the Louisville area was reclassified from Marginal to Moderate on November 7, 2022.
The entire area is not considered in maintenance until all states in a multi-state area are redesignated.

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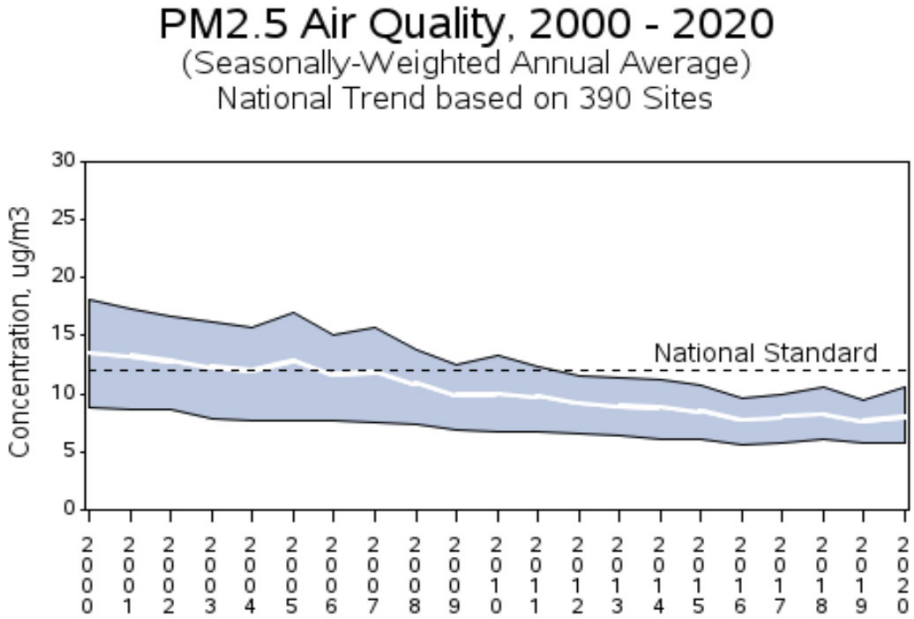



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# Nonattainment Area NSR Regulations

## Basis for SIP Development (In Theory)

- Title 40 Code of Federal Regulations
  - Part 50 (Define the NAAQS)
  - Part 51 (Tell states how to write SIPs)
  - Part 52 (Indicate approval of SIPs)
  - Part 81 (Nonattainment designations)

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## Interface of Part 51 and 52

- Part 51 – Primary focus is SIPs. How and when SIPs are required and what they need to include
  - 40 CFR 51.165 – Permit Requirements: State Implementation Plan and Tribal Implementation Plan provisions satisfying sections 172(c)(5) and 173 of the Act
  - 40 CFR 51 Appendix S – Nonattainment NSR Interpretative Guidance on Offsets (NA-NSR)
  - Subpart X – Provisions for implementation of 8-hour Ozone NAAQS (1997 standard)
  - Subpart Z – Provisions for implementation of $PM_{2.5}$ NAAQS
  - Subpart AA - Provisions for Implementation of the 2008 Ozone National Ambient Air Quality Standards
  - Subpart BB - Data Requirements for Characterizing Air Quality for the Primary $SO_2$ NAAQS
  - Subpart CC - Provisions for Implementation of the 2015 Ozone National Ambient Air Quality Standards (Proposed)

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## Interface of Part 51 and 52

- Part 52 – Indicates which elements of state SIPs have been approved (by state/jurisdiction)
  - Federal NA-NSR Rule: 40 CFR 52.24 which references 40 CFR 51 Appendix S
    - "For an area designated as nonattainment after July 1, 1979, the Emission Offset Interpretative Ruling, 40 CFR part 51, Appendix S shall govern permits to construct and operate applied for during the period between the date of designation as nonattainment and the date the NSR permit program meeting the requirements of part D is approved."
    - "The Emission Offset Interpretative Ruling, 40 CFR part 51, Appendix S, shall also govern permits to construct and operate applied for in any area designated under section 107(d) of the CAA as attainment or unclassifiable for ozone that is located in an ozone transport region prior to the date the NSR permitting program meeting the requirements of part D is approved."
    - Minnesota Regulation 7007.4000 to 7007.4030 apply to persons who propose to construct a major stationary source or major modification in a nonattainment area and to persons who propose to construct a major stationary source or major modification in a designated attainment or unclassifiable area with emissions that would cause or contribute to a violation of a national ambient air quality standard in a nonattainment area. Regulation largely references 40 CFR Appendix S.

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## SIPS for Nonattainment Areas- Special Requirements

- Section 172(c) of the CAA requires the following for nonattainment areas:
  - Reasonably Available Control Technology (RACT) for existing sources
  - "Reasonable Further Progress" in reducing emissions in the area
  - NSR permitting program

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## $PM_{2.5}$ Infrastructure SIPs (1 of 2)

- The Clean Air Act directs States to address basic SIP requirements to implement, maintain, and enforce the NAAQS. Under CAA sections 110(a)(1) and (2), states are required to have State implementation plans that provide the necessary air quality management infrastructure that provides for the implementation, maintenance, and enforcement of the NAAQS.
- After the EPA promulgates a new or revised NAAQS, States are required to make a new SIP submission to establish that they meet the necessary structural requirements for such new or revised NAAQS or make changes to do so.
- States are required to make these infrastructure SIP submissions within three years after the effective date of a new or revised primary standard.

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## $PM_{2.5}$ Infrastructure SIPs (2 of 2)

- States are required to submit nonattainment plan SIP submissions to provide for attainment and maintenance of a revised primary annual $PM_{2.5}$ NAAQS within 18 months from the effective date of nonattainment area designations as required under CAA section 189(a)(2)(B).
- States must implement any measures required to address interstate transport obligations as expeditiously as practicable and no later than the next statutory attainment date --- as expeditiously as practicable, but no later than the end of the sixth calendar year following nonattainment area designations.
- The EPA's SIP Requirements Rule for implementing the $PM_{2.5}$ NAAQS (81 FR 58010 - $PM_{2.5}$ SIP Requirements Rule – Appendix R1) provides guidance and establishes additional regulatory requirements for States regarding development of attainment plans for nonattainment areas for the 1997, 2006, and 2012 revisions of the $PM_{2.5}$ NAAQS.
- The guidance and regulations in the SIP Requirements Rule also apply to any States for which the EPA promulgates nonattainment area designations for the new (2024) revised primary annual $PM_{2.5}$ NAAQS.

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## Area Designations – CAA Section 107(d)

- Section 107(d)(1) of the CAA states that, "By such date as the Administrator may reasonably require, but not later than 1 year after promulgation of a new or revised national ambient air quality standard for any pollutant under Section 109, the Governor of each State shall submit to the Administrator a list of all areas (or portions thereof) in the State" and make recommendations for whether the EPA should designate those areas as nonattainment, attainment, or unclassifiable.
- The CAA provides the EPA with discretion to require States to submit their designations recommendations within a reasonable amount of time not exceeding 1 *additional* year. Section 107(d)(1)(A) of the CAA also states that "the Administrator may not require the Governor to submit the required list sooner than 120 days after promulgating a new or revised national ambient air quality standard."
- Section 107(d)(1)(B)(i) further provides, "Upon promulgation or revision of a NAAQS, the Administrator shall promulgate the designations of all areas (or portions thereof) … as expeditiously as practicable, but in no case later than *2 years* from the date of promulgation. Such period may be extended for up to one year in the event the Administrator has insufficient information to promulgate the designations."

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## State Submissions – Nonattainment Areas (NA-NSR)

- States with designated nonattainment areas for the revised primary annual $PM_{2.5}$ NAAQS are required to make SIP submissions to meet nonattainment plan requirements within 18 months from the effective date of designations.
- States that have existing NA-NSR program requirements that cannot be interpreted to apply at the time of designation to the revised primary annual $PM_{2.5}$ NAAQS may, in the interim, issue permits in accordance with the applicable nonattainment permitting requirements contained in 40 CFR part 51, appendix S, which would apply to the revised primary annual $PM_{2.5}$ NAAQS upon its effective date.
- See 73FR 28321, 28340 (See Appendix R2 - May 16, 2008)

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## Clean Air Act Title I, Part D – 40 CFR 51 Appendix S

- Part D of title I of the CAA includes preconstruction review and permitting requirements applicable to new major stationary sources and major modifications located in areas designated nonattainment for a pollutant for which the EPA has established a NAAQS (i.e., a criteria pollutant).
- The relevant part D requirements are typically referred to as the nonattainment NSR (NA-NSR) program. The EPA's regulations for the NA-NSR program are contained in 40 CFR 51.165, 52.24, and part 51, appendix S.
- The EPA has developed minimum program requirements for a NA-NSR program that is approvable in a SIP, and those requirements are contained in 40 CFR 51.165.
- 40 CFR part 51, Appendix S, contains requirements constituting an interim NA-NSR program. This interim program enables NA-NSR permitting in nonattainment areas by States that lack a SIP-approved NA-NSR permitting program during the time between the date of the relevant designation and the date that the EPA approves into the SIP a NA-NSR program.

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## 2008/2016 $PM_{2.5}$ Implementation Rules (1/2)

- Preamble to 5/16/08 rule included a lengthy discussion on $PM_{2.5}$ science (See Appendix R2)
  - Primary / direct particles
  - Secondary / formed particles
- Result was regulation of precursors of $PM_{2.5}$
  - Similar to VOC and $NO_x$ for ozone nonattainment

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## 2008/2016 $PM_{2.5}$ Implementation Rules (2/2)

- Precursors
  - $PM_{2.5}$ may be emitted directly or formed in the atmosphere by transformations of gaseous emissions such as $SO_X$, $NO_X$, VOC, and ammonia
- Primary Particles - emitted directly as
  - Solid – e.g., elemental carbon from a diesel engine
  - Liquid – e.g., condensable organic particles from a gasoline engine
- Secondary Particles
  - Form in atmosphere – sulfates / nitrates

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## $PM_{2.5}$ Precursor Timing for NA-NSR (1 of 2)

- For any area that was designated nonattainment for $PM_{2.5}$ on or before April 15, 2015,
  - VOC and Ammonia shall be regulated as precursors to $PM_{2.5}$ beginning on April 15, 2017, with respect to any permit issued for $PM_{2.5}$, UNLESS the following conditions are met:
    - The state submits a SIP for the Administrator's review containing the state's preconstruction review provisions for $PM_{2.5}$ consistent with § 51.165 and a complete NA-NSR precursor demonstration consistent with § 51.1006(a)(3); and such SIP is determined to be complete by the Administrator or deemed to be complete by operation of law in accordance with section 110(k)(1)(B) of the Act by April 15, 2017.
    - If these conditions are met, the precursor(s) addressed by the NA-NSR precursor demonstration (Volatile organic compounds, Ammonia, or both) shall NOT be regulated as a precursor to $PM_{2.5}$ in such area.

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## $PM_{2.5}$ Precursor Timing for NA-NSR (2 of 2)

- For any area that is designated nonattainment for $PM_{2.5}$ after April 15, 2015, and was not already designated nonattainment for $PM_{2.5}$ on or immediately prior to such date,
  - VOC and Ammonia shall be regulated as precursors to $PM_{2.5}$ under this Ruling beginning 24 months from the date of designation as nonattainment for $PM_{2.5}$ with respect to any permit issued for $PM_{2.5}$, unless the following conditions are met:
    - The state submits a SIP for the Administrator's review which contains the state's preconstruction review provisions for $PM_{2.5}$ consistent with § 51.165 and a complete NA-NSR precursor demonstration consistent with § 51.1006(a)(3); and such SIP is determined to be complete by the Administrator or deemed to be complete by operation of law in accordance with section 110(k)(1)(B) of the Act by the date 24 months from the date of designation.
    - If these conditions are met, the precursor(s) addressed by the NA-NSR precursor demonstration (Volatile organic compounds, Ammonia, or both) shall NOT be regulated as a precursor to $PM_{2.5}$ in such area.

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## $PM_{2.5}$ Precursors - NA-NSR

- Example: On July 18, 2018, EPA finalized the approval of Ohio's plan to exclude VOC and Ammonia as $PM_{2.5}$ precursors from the state NA-NSR rule
  - See: 83FR 33844
- May 30, 2019 – EPA issued guidance for fine particulate matter ($PM_{2.5}$) precursor demonstrations (Handout 7-I)

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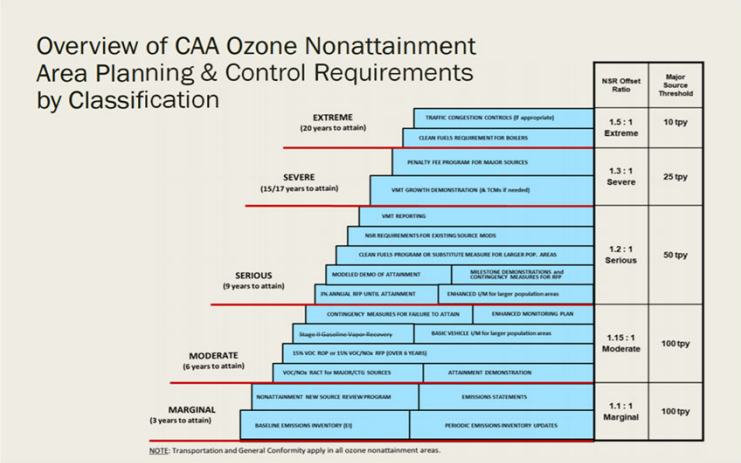
## 2015 Ozone NAAQS Implementation

- June 4, 2018 (83FR 25845) - Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards
- December 6, 2018 (83FR 62998) – EPA finalized NA area and OTR implementation requirements for the 2015 Ozone NAAQS
  - Basically an update to the 2008 Ozone NAAQS Implementation Rule
  - Addresses attainment demonstrations, RFP and associated milestone demonstrations, RACT, RACM, major NNSR, etc.
  - EPA intends to revoke 2008 ozone NAAQS in separate rulemaking
- See Handout 9-G and 9-J

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# 2015 Ozone NAAQS Implementation




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# 2015 Ozone NAAQS Implementation

## SIP submission deadlines

**Maximum timeframe associated with each element (from effective date of designation):**

Emission inventories and emission statement SIPs are due no later than **2 years** (August 3, 2020; Sep. 24, 2020 for San Antonio).

RACT SIPs for Moderate and higher areas, and all states in the Ozone Transport Region (OTR), are due no later than **2 years** (August 3, 2020).

15% RFP (6-year rate-of-progress/RFP) SIPs for Moderate and higher areas are due no later than **3 years** (August 3, 2021).

NNSR SIPs are due no later than **3 years** (August 3, 2021; Sep. 24, 2021 for San Antonio).

Attainment plan with RACM and attainment demonstration SIPs are due no later than **3 years** (Moderate) or **4 years** (Serious and higher) (August 3, 2021 or August 3, 2022).

RFP SIPs showing an average of 3% reduction in emissions per year after the initial 6-year period for Serious and higher areas are due no later than **4 years** (August 3, 2022).

Vehicle I/M program SIP, where applicable, due no later than an area's attainment demonstration deadline (may be satisfied with a written certification statement, where appropriate).

Stationary source penalty fee program SIPs (CAA section 185) are due for Severe and Extreme areas no later than **10 years** (August 3, 2028).

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# Nonattainment New Source Review Applicability

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## NA-NSR - Stationary “Source” Definition

- Same as PSD (40 CFR 52.21)
- All of the pollutant-emitting activities which:
  - belong to the same SIC major group (or “support activity”), and
  - are located on one or more contiguous or adjacent properties, and
  - are under common control
- See 40 CFR 51 Appendix S II. (A)(1) + (2).
- Review EPA letters and memos -Handouts 2-A, 2-A1, 2-A2, 2-A3, 2-A4, 2-A5, 2-A6, 2-A7, 2-A8, 2-A9, 2-A10, 2-A11, 2-A12, 2-A13, 2-A14, 2-A15, 2-A16, 2-A17, 2-A18, 2-A19, 2-A20, 2-A21, 2-A22, and 2-A23

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## Major Source Definition – Nonattainment NSR

- Major Source: potential emissions > 100 tpy (or less depending on classification of area)
  - "Major" status is determined on a pollutant-by-pollutant basis
    - A source can be major for a nonattainment pollutant and minor for attainment pollutants and vice versa
- Fugitive emissions are included or excluded based on the same criteria (industry type) as PSD – See long pending EPA proposal concerning fugitive emissions – 87FR 62322.

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## Major Source Definition – Nonattainment NSR

- Ozone nonattainment areas
  - Marginal - 100 tpy
  - Moderate - 100 tpy
  - Serious - 50 tpy
  - Severe - 25 tpy
  - Extreme - 10 tpy
    - Note: (may apply to both $NO_x$ and VOC's)

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## Major Source Definition – Nonattainment NSR

- $PM_{10}$ nonattainment areas
  - Serious – 70 tpy
  - Moderate – 100 tpy
- CO nonattainment areas
  - Serious – 50 tpy
  - Moderate – 100 tpy

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## Major Source Definition – Nonattainment NSR - $PM_{2.5}$

- $PM_{2.5}$ nonattainment areas
  - Serious – 70 tpy
  - Moderate – 100 tpy
- Thresholds applicable to each $PM_{2.5}$ precursor (as applicable)
- See 40 CFR 51 Appendix S II. (A)(4)(i)(a)(7) and (8)

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## Source Classification for Nonattainment NSR- Pollutant Dependent

- To be an existing major source under nonattainment NSR, potential to emit must exceed major source threshold for the nonattainment pollutant
  - For $PM_{2.5}$ nonattainment areas, being major for PM2.5 is separate than being major for NOx or any of the other precursors
  - Major source determinations are done on a pollutant-by-pollutant basis

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## Nonattainment NSR Applicability - Modifications

- Similar PSD applicability criteria apply:
  - "Actual-to-Potential" and "BAE to PAE" applicability criteria for new and modified emission units, respectively
  - "Netting" is applied in a similar (but not always exactly the same) manner – SIP dependent specifications
  - RMRR and other exclusions apply…
  - See 40 CFR 51 Appendix S II. (A)(5) + (6) + (24) + (30)

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## Nonattainment NSR Applicability - Modifications

- Major modification means any physical change in or change in the method of operation of a major stationary source that would result in:
  - A significant emissions increase of a regulated NSR pollutant); and
  - A significant net emissions increase of that pollutant from the major stationary source.
  - See 40 CFR Appendix S II. (A)(5)(i)
- The NA contemporaneous period is defined in the SIPs and is typically the same as PSD (40 CFR 52.21) – See 40 CFR 51 Appendix S II. (A)(6)(ii)
- Exclusions apply – Similar to PSD - See 40 CFR 51 Appendix S II. (A)(5)(iii)

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## Nonattainment NSR Applicability - PSD vs. NA-NSR

- The NA contemporaneous period is defined in the SIP and is typically the same as PSD (see discussion in Chapter 3)
- Significant emissions increase (SER) thresholds are lower than equivalent PSD SERs in serious, severe, and extreme NA areas (25 tpy or less)
- In serious and severe areas, minor modifications must be aggregated and compared to the SER. In PSD, aggregating (or netting) is not addressed unless a modification (project) would be a major modification by itself.
  - EPA's May 3, 2024, proposal (Handout 5-GG) makes this requirement clear.
  - EPA is proposing to eliminate any consideration of project decreases for sites located in extreme non-attainment areas.
  - July 16, 2025 - the agency officially withdrew the proposed rule
  - EPA's 2020 Project Emissions Accounting rule is under litigation (see discussion in Chapter 5).

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# Major Source Thresholds Examples

Example Applicability for area designed moderate nonattainment for both ozone and $PM_{2.5}$

(Assume this site is one of the 28 listed PSD source categories)

| Source PTE (tons/year) | | | | |
|---|---|---|---|---|
| $PM_{2.5}$ (Direct) | $SO_2$ | $NO_x$ | | Major Source Status |
| 125 | 12 | 30 | | Major PSD source (due to PM)<br>Major source of $PM_{2.5}$- NANSR |
| 60 | 140 | 30 | | Major PSD source (due to $SO_2$)<br>Major source of $SO_2$ – NA-NSR<br>Not Major source of $PM_{2.5}$ |
| 25 | 12 | 140 | | Major PSD source (due to $NO_x$)<br>Major source of $NO_x$ - NA-NSR<br>Not Major source of $PM_{2.5}$ |

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# Federal Nonattainment NSR Major Modification Thresholds (SER)

- $SO_2$ 40 tpy
- $NO_x$ 40 tpy
- CO 100 tpy (50 tpy in Serious NA areas)
- $PM_{10}$ 15 tpy
- $PM_{2.5}$ 10 tpy
  - VOC (as a $PM_{2.5}$ precursor) - 40 tpy
  - $SO_2$ (as a $PM_{2.5}$ precursor) - 40 tpy
  - $NO_x$ (as a $PM_{2.5}$ precursor) - 40 tpy
  - $NH_3$ (as a $PM_{2.5}$ precursor) – TBD (state level)
- Pb 0.6 tpy

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## Federal Nonattainment NSR Major Modification Thresholds (SER)

- Ozone ($NO_x$ and VOC as precursors)
  - Marginal - 40 tpy
  - Moderate - 40 tpy
  - Serious - 25 tpy, aggregated over 5 years
  - Severe - 25 tpy, aggregated over 5 years
  - Extreme - any increase
  - Northeast Ozone Transport Region - 40 tpy

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# General Nonattainment Area Permitting Requirements

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## Nonattainment Area Permitting Requirements

- Four main obligations
  - Lowest Achievable Emission Rate (LAER)
  - All major sources in state must be in compliance with all applicable emission limitations and standards
  - Analysis of alternative sites, sizes, and production processes, and environmental control techniques
  - Emission offsets

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## Lowest Achievable Emission Rate (LAER)

Most stringent emission limitation
contained in **any** SIP or achieved in practice

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## LAER Process

- Determine what the most stringent SIP limit is for emission unit in question (anywhere in country)
  - Disqualify SIP limits for which no emission units in source category could meet
- Verify no units have achieved more stringent emission limits
- Evaluate new or emerging technologies for application
- See Handout 9-O

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## LAER is NOT a Technology

- LAER is the emission rate that can be achieved by any or all of the following:
  - Add-on control technology
  - Process changes
  - Changes in raw materials
- In certain circumstances, LAER may be a work practice

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## Cost is Not a Factor in LAER Determinations

- Applicant can not use economic, energy, or other environmental factors to disqualify a process/technology
  - Exception: “No plant in industry could bear costs of such technology”
  - "If the cost of a given control strategy is so great that a new major source could not be built or operated, then such a control would not be achievable and could not be required by the Administrator."

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## EPA Guidance on LAER

- According to EPA, the greatest certainty for a proposed LAER limit exists when that limit is actually being achieved by a source. A SIP limit, even if it has not yet been applied to a source, should be considered initially to be the product of careful investigation and, therefore, achievable.
- A SIP limit's credibility diminishes if:
  - a) no sources exist to which it applies;
  - b) it is generally acknowledged that sources are unable to comply with the limit, and the State is in the process of changing the limit; or
  - c) the State has relaxed the original SIP limit.
- Case-by-case evaluations need to be made in these situations to determine the SIP limit's credibility.
- The same logic applies to SIP limits to which sources are subject but with which they are not in compliance. Noncompliance by a source with a SIP limit, even if it is the only source subject to that specific limit, does not automatically constitute a demonstration that that limit is unachievable. The specific reasons for noncompliance must be determined, and the ability of the source to comply assessed.
- See Handout 9-O

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## Substituting BACT for LAER

- If source-wide PTE > 100 tpy, LAER can be avoided if the source can internally offset at a 1.3 to 1 ratio (applicable in Serious and Severe Ozone NA Areas)
  - Example Rule Language – "Major stationary sources with a PTE of greater than or equal to 100 tpy of an applicable nonattainment pollutant can substitute BACT for LAER, if the project increases are offset with internal offsets at a ratio of at least 1.3 to 1. Internal offsets used in this manner can also be applied to satisfy the offset requirement."
- If source-wide PTE < 100 tpy, many state SIPs automatically allow substitution of BACT for LAER (applicable in Serious and Severe Ozone NA Areas)
  - Example Rule Language - "The proposed facility shall comply with the lowest achievable emission rate (LAER)….for the nonattainment pollutants for which the facility is a new major source or major modification….except for existing major stationary sources that have a potential to emit (PTE) of less than 100 tpy of the applicable nonattainment pollutant. For these sources, best available control technology (BACT) can be substituted for LAER. LAER shall otherwise be applied to each new "facility" and to each "existing facility" at which the net emissions increase will occur as a result of a physical change or change in method of operation of the unit. "

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## Example LAER Permit – Simple Cycle Gas Fired Turbine - SCAQMD

- Simple Cycle natural gas fired turbine with Intercooler and water injection
- The City of Riverside Public Utilities Department operates the Riverside Energy Resource Center facility which operates this gas turbine which produces electrical power for the city.
- The equipment is at a "Peaker" plant to support California Independent System Operator (CAISO) during periods of high electricity demand.
  - Heat input: 490 MMBTU/hr
  - Gas turbine is equipped with SCR and Oxidation catalyst.
- Limits:
  - NOx: 2.3 PPMV (1-hour) 15% Oxygen
  - CO: 4 PPMV (1-hour) 15% Oxygen

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## Example LAER Permit – Hot Oil Heaters - TCEQ

- Hot Oil Heaters:
  - Located at a natural gas liquids fractionator plan – Houston/Galveston ozone NA area
  - Permit issued 2/5/21
  - Two new process heaters will be used in fractionation Train 10 to provide heat for the process.
  - The heaters will be fired with low-sulfur natural gas and have a high heating value (HHV) design capacity (gross) of 161.17 MMBtu/hr each.
  - They will have ultralow $NO_x$ (nitrogen oxides) burners and Selective Catalytic Reduction (SCR) systems to achieve a maximum NOx emission rate of 0.005 lb $NO_x$ /MMBtu with maximum ammonia slip of 7 ppmv.

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## Example LAER Permit – Hot Oil Heaters - TCEQ

- Hot Oil Heaters - LAER Requirements (VOC and NOx):
  - Use heaters designed for optimal combustion efficiency using natural gas as fuel.
  - Use good combustion, operating and maintenance practices.
  - Equip the heaters with ultra-low $NO_x$ burners (ULNB) and selective catalytic reduction (SCR) systems with ammonia feeds. The ULNB with SCR system will achieve a maximum 0.005 lb NOx/MMBtu with maximum ammonia slip of 7 ppmv on a dry basis.
  - Have fuel flow meters for each heater to measure fuel gas usage and CEMS that monitor the CO, $NO_x$, $NH_3$ and O2 emissions from each heater.

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## Example LAER Permit – Waste Heat Boilers - TCEQ

- A control technology review was conducted with control requirements established as follows:
  - Modified sources of VOC emissions were subject to LAER, and the modified source of other air contaminants are subject to minor NSR BACT.
  - LAER was determined through a review of SIP requirements in Texas and in other states in addition to EPA's RACT/BACT/LAER Clearinghouse (RBLC).
  - Minor NSR BACT was determined through a review of recently-issued Texas permits for new and modified sources of the same type ("three-tier process").
  - Waste Heat Boiler VOC for Nonattainment Review Based on the engineering studies conducted and the stack concentration of the Waste Heat Boiler having 15% O2, gas-fired simple cycle gas turbines are the best type of combustion sources to compare the Waste Heat Boiler.
  - A RBLC query indicated that for gas-fired simple cycle gas turbines have ranges from 1.2 ppmvd to 5 ppmvd of VOC at 15% O2 and the most stringent control was good combustion practices and oxidation catalyst.

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## Example LAER Permit – Waste Heat Boilers - TCEQ

- Furthermore, an RBLC search of similar processes yielded that Flint Hills Resources Houston (FHR) Chemical LLC (RN102576063, TCEQ Permit No. 18999) had a similar facility that was permitted. The RBLC database for the FHR permit indicated that the WHB stack has an exhaust concentration 1.6 ppmvd at 15% O2 (2.3 ppmvd at 15% O2 hourly) with the controls being good combustion practices and an oxidation catalyst.
- The proposed VOC emissions from the WHB Stack is 2.4 ppmvd of VOC at 15% O2 for both hourly (equivalent to 18.76 lb/hr) and annually with the controls being good combustion practices and two oxidation catalyst beds.
- Given that the Enterprise differs from the FHR process due to the Enterprise unit being 1.5 times larger than FHR, Enterprise employs 10 larger reactors compared to FHR's 7 reactors, the maximum firing rate of all the sources routed to the Enterprise WHB is 1.2 times larger than the FHR WHB and that Enterprise employs two oxidation catalyst beds in comparison to the FHR's one, Enterprise's WHB satisfies the VOC LAER requirements.
- Permit issued in 2021.

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## Example LAER Permit - Process Heaters - TCEQ

- Process Heaters
  - The PDH unit includes four process heaters with design heat rates ranging from 126–202 MMBtu/hr. These heaters will be fired by natural gas and/or process gas.
  - A NOX limit equivalent to 5 ppmvd (3% O2 basis) has been identified as LAER for this category of source.
  - This limit has been identified in Bay Area Air Quality Management District (BAAQMD) regulations (Rule 9-7, Limit 307.6), South Coast Air Quality Management District (SCAQMD), as well as in recently-issued permits for the state of Texas.
  - To meet this $NO_x$ emission limit, the associated ammonia slip limit is 10 ppmvd @3% O2 per the regulation of BAAQMD.
  - Permit was issued in 2019.

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## State-Wide Compliance Determination

- All other major sources in state owned by the NA-NSR applicant must be in compliance or on schedule for compliance with all state & federal emission limitations & standards

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## Alternatives Analysis

- NA-NSR applicant must consider alternatives to executing project in nonattainment area (See Handout 9-A and Handout 9-T)
  - sites
  - size
  - production processes
  - control techniques
- Do benefits SIGNIFICANTLY outweigh the environmental and social costs of the project?
- In some areas, this can be the biggest hurdle to nonattainment NSR permitting

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## Emission Offsets (1 of 4)

- Clean Air Act, Section 173 requires that emission increases be offset with actual reductions in same area of equal or greater amount (Emission Offsets = Emission Reduction Credits or ERC)
- Amount of offset depends on severity of nonattainment problem
  - Marginal 1.1:1
  - Moderate 1.15:1
  - Serious 1.2:1
  - Severe 1.3:1
  - Extreme 1.5:1
  - Ozone Transport Region 1.15:1

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## Emission Offsets (2 of 4)

- ERC qualifiers
  - Generally the same pollutant (unless a precursor and the SIP allows for inter-pollutant offsets*)
  - Generally, must come from the same nonattainment area
    - Can use nearby nonattainment area of equal or higher classification if that area contributes to nonattainment where subject facility is located
    - Some states have reciprocity agreements (e.g., NY-PA for $NO_X$ and VOCs)
    - $PM_{2.5}$ precursors may come from more distant locations although EPA guidance on this matter is slow in coming

*DC Circuit told EPA in 2021 they cannot allow inter-precursor offset trading – specifically with respect to NOx and VOC

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## Emission Offsets (3 of 4)

- Emission reductions through offsets must be in effect by the time the new source or modification commences OPERATION
- Emission reductions required by other regulatory programs are not creditable as offsets
  - Incidental reductions beyond those required ARE creditable

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## Emission Offsets (4 of 4)

- Mass Emissions Cap and Trade (MECT) allowances may be used to satisfy emission offset requirements for facilities subject to Chapter 117 requirements
  - Heaters, boilers, etc.
- Highly Reactive Volatile Organic Compound (HECT) allowances may be used to satisfy emission offset requirements for facilities subject to Chapter 115 requirements
  - Vent gas streams, flares, & cooling towers
- Discrete Emission Reduction Credits (DERC) generated from temporary emission reductions from point, area, and mobile sources may be used to satisfy emission offset requirements on an annual basis. DERCs offset an annual offset requirement rather than offsetting in perpetuity

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## Location of offsets – 40 CFR Appendix S IV. (D)

- ***Location of offsetting emissions.*** The owner or operator of a new or modified major stationary source may comply with any offset requirement in effect under this Ruling for increased emissions of any air pollutant only by obtaining emissions reductions of such air pollutant from the same source or other sources in the same nonattainment area, except that the reviewing authority may allow the owner or operator of a source to obtain such emissions reductions in another nonattainment area if the conditions under paragraphs IV.D.1 and 2 of this Ruling are met.
- 1. The other area has an equal or higher nonattainment classification than the area in which the source is located.
- 2. Emissions from such other area contribute to a violation of the national ambient air quality standard in the nonattainment area in which the source is located.

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## Emission Offsets – Reform Needed?

- The costs and availability of offsets have been highly variable. Some causes that have been noted:
  - Nonattainment areas are often geographically constrained (or rural) resulting in too few large sources available to supply offsets
  - Economic growth patterns resulting in short supply in certain high growth areas
    - Trend for TX projects migrating to attainment areas
  - Increasingly stringent underlying SIP regulations resulting in little "surplus" emissions available to register offsets

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## Emission Offsets – Reform Needed?

- Some offset reforms have been postulated:
  - Allow for sources nearby (but outside) adjacent nonattainment areas to register offsets
  - Establish a new emissions fee system to replace, or as an alternative to, the NA-NSR offset requirement. The costs may be high, but availability issues would subside.
  - Establish local offset "set-aside" programs for new sources to tap into

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## Registering ERC

- Process is specific to nonattainment area
  - Generally application submitted to agency
  - Fees for application processing and for use/transfer of credit
- There are often discounting policies imposed by SIP for offsets not applied to a new/modified source (results in all or partial loss of value over time if not used)

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## ERC Criteria

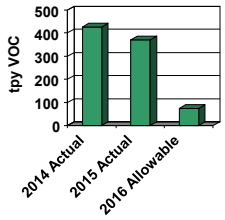
- Emission Reduction Credits (ERC) must be…
  - Real
  - Permanent
  - Quantifiable
  - Enforceable
  - Surplus
- Generally, SIPs will also impose a date before which credits are not available
  - Related to Reasonable Further Progress goals

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## Example: Creating ERCs (1 of 2)

- Installation of VOC controls which are not required by regulation
- 2014 and 2015 are two most recent years of representative operations




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## Example: Creating ERCs (2 of 2)

- Creditable reductions:
  - \+ Average of 2014/2015 emissions
  - \- Allowable emissions after controls
  - = Creditable Reductions
- For this example:
  - \+ [(426+375)/2] tons/year VOC
  - \- 75 tons/year VOC
  - = 325.5 tons/year VOC of Creditable Reductions

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# Inter-pollutant Trading for Offsets

- Relevant for NA-NSR offsets only, cannot be used in netting
- $PM_{2.5}$ implementation rule technically allows regional inter-pollutant trading of $PM_{2.5}$ and its precursors
  - Case-by-case trading for individual permits prohibited; must use trading ratios pre-established in SIP (or some multi-state program)
  - See Handouts 9-G, 9-H, 9-R, and 9-S
  - Use of ratios is technically allowed, but:
    - Will create inconsistencies across country
    - Technical demonstration to USEPA required
  - No $NO_x$ to $SO_2$ trading ratio suggested, but states are allowed to propose
    - USEPA's data suggests this may be a bad idea
- In 2021, the DC Circuit Court ruled against inter-precursor trading for ozone ($NO_x$ for VOC and vice versa) – See Handout 9-U

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# The New Ground-Level Ozone NAAQS and its Implications for Air Quality Permitting

On October 1, 2015, the U.S. EPA strengthened the National Ambient Air Quality Standard (NAAQS) for ground-level ozone by lowering the standard from a value of 75 parts per billion (ppb) to 70 ppb. The revised standard was established based on extensive scientific evidence obtained by EPA about ozone's effects on public health and welfare.

Based on current monitoring networks, EPA projects that the majority of the U.S. will meet the revised standard by 2025. To do so, however, states will need to work closely with EPA to finalize area designations and implement control measures to comply with the lowered standard through rulemaking.

## Background

For each criteria pollutant, Sections 108 and 109 of the Clean Air Act (CAA) require EPA to set a primary standard that protects public health with "an adequate margin of safety" and a secondary standard that protects public welfare from "any known or anticipated adverse effects." The CAA also requires periodic review of the science upon which the standards are based and review of the standards themselves. Ozone, the primary component of smog, is one of the regulated "criteria pollutants" under the NAAQS program.

The previous ozone NAAQS of 75 ppb was established in 2008. In 2010, EPA proposed to strengthen the NAAQS for ground-level ozone to a level within the range of 60-70 ppb. In September 2011, President Obama issued a statement requesting EPA withdraw the proposed ozone NAAQS to reduce regulatory burdens and regulatory uncertainty during the period of economic recovery. In April 2014, the U.S. District Court (Northern District of California) ordered EPA to review and issue a final ozone standard by October 1, 2015, a court-mandated deadline.

## The Revised Ozone NAAQS

The 2015 final rule sets both primary and secondary 8-hour ozone NAAQS at 70 ppb. In setting the primary ozone standard, EPA examined the body of scientific evidence on ozone and health, including new clinical studies. These studies provided evidence of health effects in adults, determining that ozone can be harmful to healthy adults at 72 ppb. EPA also reviewed results of analyses of exposure to ozone and looked at how different levels of the standard would reduce risk. Advice from the Clean Air Scientific Advisory Committee (CASAC) and public comments on the November 2014 proposal were also considered. For the establishment of the secondary (welfare) ozone standard, EPA took into consideration new studies which add to evidence that repeated exposure to ozone reduces the growth of plants and trees and has other harmful

vegetative effects. Areas will meet the standards if the fourth-highest daily maximum 8-hour ozone concentration per year, averaged over three years, does not exceed 70 ppb. The new standard will cause parts of the country that are currently in attainment with the 2008 ozone NAAQS to be reclassified as non-attainment with the revised ozone NAAQS. Figures 1 and 2 demonstrate that revising the ozone NAAQS from 75 ppb down to 70 ppb increases the total number of counties violating the new standard from 28 to 241 as of October 2015.

Figure 1: Current Compliance Status for 2008 Ground-Level Ozone NAAQS

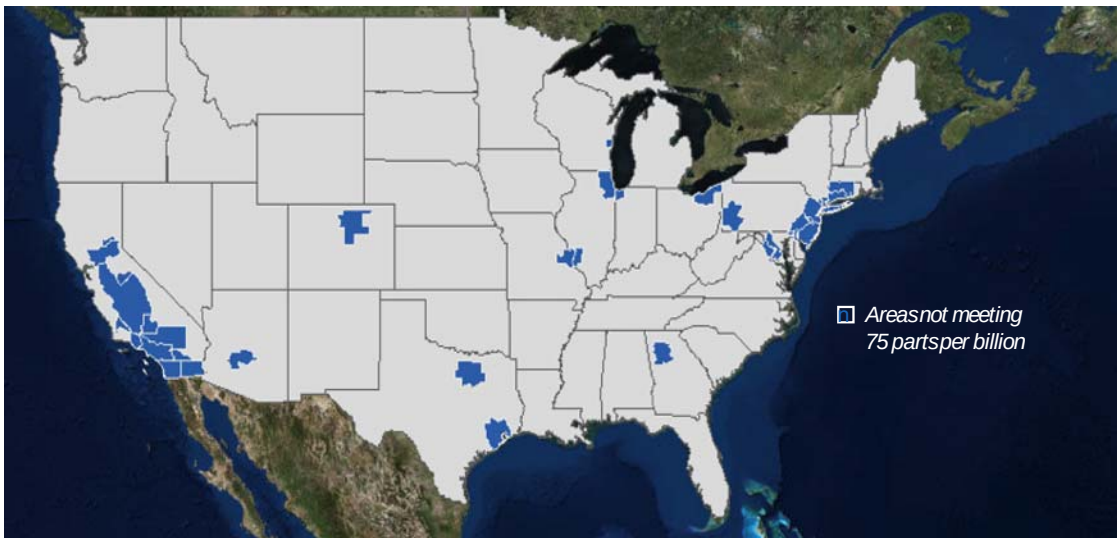
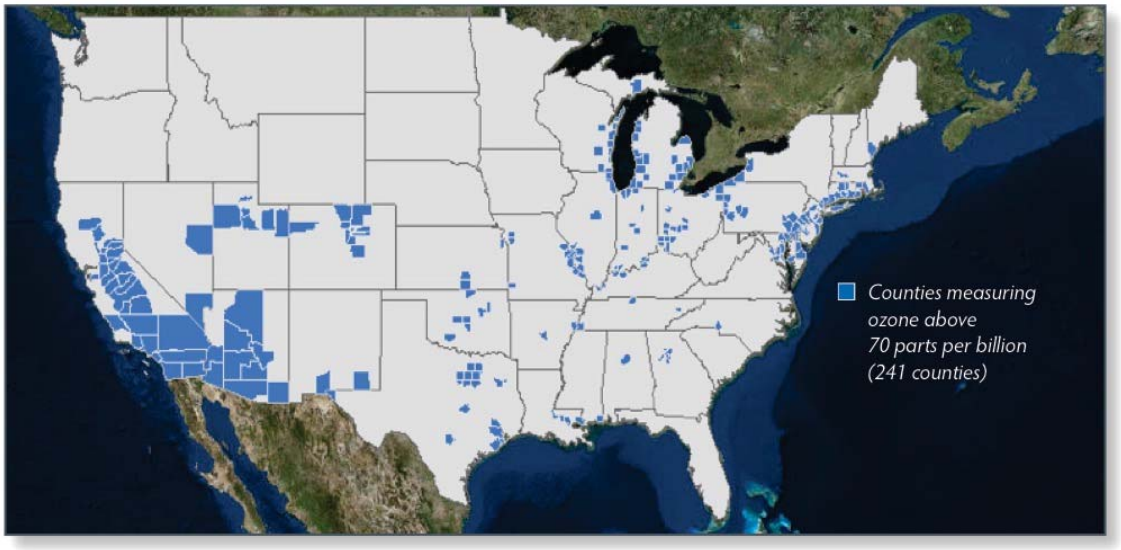



**Figure 2: Projected Non-Attainment Areas for Revised Ground-Level Ozone NAAQS[1]**




[1] Ozone map from USEPA website (http://www3.epa.gov/ozonepollution/maps.html). Note that nonattainment area projections in Figure 2 are based on 2012-2014 data. Many of the areas shown may not be nonattainment based on more recent data (2013-2015, 2014-2016), which are the data on which the initial determinations will be based.

[1] *Ozone map from USEPA website. Note that nonattainment area projections in Figure 2 are based on 2012-2014 data. Many of the areas shown may not be nonattainment based on more recent data (2013-2015, 2014-2016), which are the data on which the initial determinations will be based.*

As part of the revised ozone standard, EPA also updated the current Air Quality Index (AQI), a number used by government agencies to communicate to the public how polluted the air currently is or how polluted it is forecasted to be. A comparison of AQI under the 2008 and revised ozone NAAQS is provided in Figure 3, where the revised primary NAAQS now equals 100 on the index.

Figure 3: Updated Air Quality Index

| AQI Category | Index Values | Breakpoints in the 2008 AQI (ppb, 8-hour average) | Updated Breakpoints (ppb, 8-hour average) |
|---|---|---|---|
| Good | 0 - 50 | 0 - 59 | 0 - 54 |
| Moderate | 51 - 100 | 60 - 75 | 55 - 70 |
| Unhealthy for Sensitive Groups | 101 - 150 | 76 - 95 | 71 - 85 |
| Unhealthy | 151 - 200 | 96 - 115 | 86 - 105 |
| Very Unhealthy | 201 - 300 | 116 - 374 | 106 - 200 |
| Hazardous | 301 - 500 | 375 to the Significant Harm Level* | 201 to the Significant Harm Level* |

**The Significant Harm Level for ozone is 600 ppb, two-hour average*

Other changes made by EPA as part of the revised ozone rulemaking include the following:

- Addition of an Appendix U to 40 CFR Part 50 detailing data selection, handling, and reporting requirements for ozone NAAQS
- Revision of ambient monitoring requirements for ozone monitoring
- Addition of a grandfathering provision to the Prevention of Significant Deterioration (PSD) permitting program, exempting pending permits from the revised ozone NAAQS when they are fully promulgated

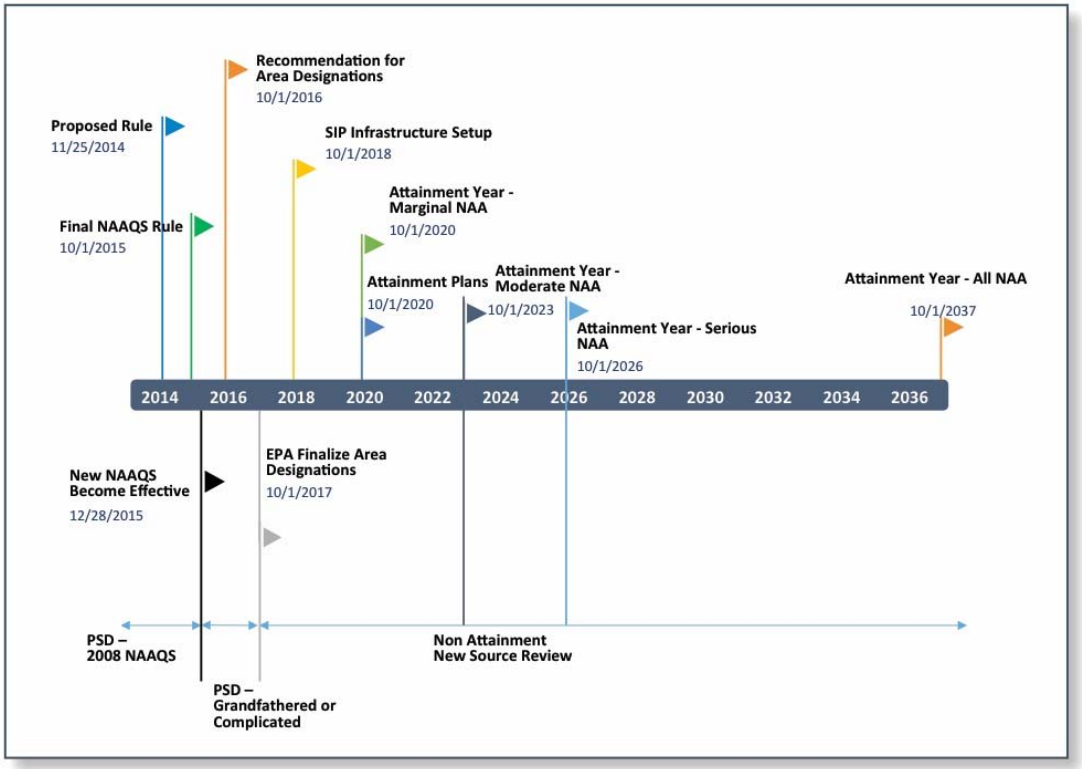
As part of the final rule, EPA has outlined initial steps the agency will take to help states implement the revised standards, including the anticipated area designation schedule targeted for late 2017. All states with nonattainment areas (NAAs) must develop emission inventories and implement a preconstruction permitting program designed to provide additional air quality safeguards for those areas. States with nonattainment areas classified as “Moderate” or higher must develop state implementation plans (SIPs) to ensure reasonable further progress (RFP) toward attaining the standard. The SIPs must detail the state’s intended efforts to meet the

NAAQS by describing the targets, plans, and control strategies for each area designated as nonattainment. In developing SIPs and the control strategies proposed for nonattainment areas, states will need to consider various parameters such as monitoring data, emissions inventories, and photochemical modeling in order to determine the degree of emission reduction necessary for NAAQS attainment. Emissions inventories must also be developed for various types of sources in the affected areas to facilitate the investigation of control strategies. Upon completion, the SIPs must be submitted to EPA for review and approval. Upon final SIP approval, the states will commence rulemaking to promulgate and adopt the proposed rules intended to achieve the required reductions of $NO_X$ and/or VOCs (ozone precursors).

States also must adopt reasonably available control technology (RACT) standards for certain types of emission sources in the nonattainment area to implement the proposed control strategies and achieve the required reductions in $NO_X$ and/or VOC as determined by the SIPs. Each state may choose to develop its own RACT requirements on a case-by-case basis. For certain source categories, states may also decide to use Maximum Achievable Control Technology (MACT) standards to establish the RACT level of control.

EPA's projections indicate that the vast majority of U.S. counties will meet the new ozone standards by 2025, with the deadline for all nonattainment areas to meet the primary (health) standard being 2037. Figure 4 illustrates the expected designation and compliance schedule for the revised ozone NAAQS.

Figure 4: Expected Ozone NAAQS Designation/Compliance Schedule



# Implications of the Revised Ozone NAAQS

**Impact on Major Source Thresholds**

The lowering of the ozone NAAQS will affect the definition of a "major stationary source." Table 1 summarizes the new major source thresholds and major modification thresholds for ozone precursors ($NO_X$ and VOC), based on the classification of the nonattainment area. Note that EPA has not yet released the thresholds for the classification categories for the revised ozone NAAQS, and has indicated the thresholds will be established as part of future implementation guidance/rulemaking.

**NNSR Permitting Implications**

For areas that are reclassified as non-attainment for ozone, the process of acquiring proper authorization to construct new major sources of air pollutants or make significant modifications to existing major sources will become more difficult. This is mainly because the pertinent permitting program for new non-attainment areas changes from PSD or minor New Source Review (NSR) to Non-Attainment New Source Review (NNSR). Under the more stringent NNSR program, new or modified sources must offset emission increases of ozone precursors (often at a ratio greater than 1:1) by identifying and acquiring emission reductions from other existing sources in the non-attainment area. Finding available offsets in newly designated non-attainment areas could pose a challenge. The cost for emission credits in existing non-attainment areas that are reclassified to a more stringent nonattainment designation is also expected to increase.

**Table 1: Major Source/Major Modification Emission Thresholds**

| Nonattainment Classification | Major Source Threshold (tpy) | Major Modification Threshold (tpy) |
|---|---|---|
| Marginal | 100 | 40 |
| Moderate | 100 | 40 |
| Serious | 50 | 25 |
| Severe | 25 | 25 |
| Extreme | 10 | 10 |

New or modified sources must also install more expensive control technologies as part of the project to satisfy regulatory requirements, i.e., Lowest Achievable Emission Rate (LAER) will replace Best Available Control Technology (BACT), which can significantly increase the capital cost of the project as LAER does not consider the cost effectiveness of the control requirement. In addition, some states may require the applicant to operate Continuous Emission Monitors (CEMS) and/or monitor certain parameters of the control devices to guarantee that the devices are operating optimally and achieving the required emission reductions. An extended

permitting timeline would also be expected and should be taken into consideration for planning purposes.

## California's Ozone Dilemma

California faces unique challenges with regard to attaining the new standard. The terrain and climate make many areas of the state conducive to ozone formation. Despite aggressive regulatory and non-regulatory programs already in place to control mobile-source emissions, freight movement and transportation remain the biggest contributors to high levels of $NO_x$ in California's ambient air. As a result, the South Coast and San Joaquin Valley areas still remain "Extreme" nonattainment for 1979, 1997, and 2008 ozone standards. Both the state and EPA recognize that transformational changes will most likely be needed in order to meet the attainment deadline set by the new standard.

A lower major source threshold could also trigger Title V permitting requirements for current minor NSR sites. The significance threshold for NNSR permitting may also be reduced, and a higher emission offset ratio may be required for projects that do trigger NNSR review.

**Modeling for Ozone Impacts**

While ozone has typically not been the focus of PSD permitting in the past, with only general qualitative assessments of ozone impacts completed as part of the PSD permitting analysis, EPA has recently been developing additional tools and guidance for advanced assessment of ozone impacts, potentially including air dispersion modeling. EPA has provided, as part of a separate recently finalized rulemaking in January 2017 (40 CFR Part 51, Appendix W, the Guideline on Air Quality Models), new guidance for ozone impact assessments. It is strongly recommended that owners/operators with a PSD permit application currently under review, or who will be submitting one soon to a permitting regulatory authority, ensure clear understanding of the expectations of the permitting authority in relation to any ozone impact assessment. Several pieces of guidance required for the implementation of modeling for ozone impacts as part of PSD project are still in draft form, but are expected to be finalized in the 2nd quarter of 2017.

**Implementation of the 2015 Ozone NAAQS: Proposed Nonattainment Area Classification and SIP Requirements Rule**

The referenced rulemaking was published in the Federal Register on November 17th, 2016. The three main components of the proposed Rule included non-attainment area classifications and timing of attainment dates, options for how to revoke the 2008 ozone NAAQS, and SIP requirements for States with nonattainment areas. The proposed non-attainment area classification thresholds and attainment dates are as follows.

| Area class | | Percent above 1-hr ozone NAAQS | 8-hour ozone design values (ppm) | | Proposed attainment date (years after designation) |
|---|---|---|---|---|---|
| | | | 2008 NAAQS (0.075 ppm) | 2015 NAAQS (0.070 ppm) *(proposed)* | |
| Marginal | From<br>up to [1] | 0.833<br>15 | 0.076<br>0.086 | 0.071<br>0.081 | 3 |
| Moderate | From<br>up to [1] | 15<br>33.333 | 0.086<br>0.100 | 0.081<br>0.093 | 6 |
| Serious | From<br>up to [1] | 33.333<br>50 | 0.100<br>0.113 | 0.093<br>0.105 | 9 |
| Severe-15 | From<br>up to [1] | 50<br>58.333 | 0.113<br>0.119 | 0.105<br>0.111 | 15 |
| Severe-17 | From<br>up to [1] | 58.333<br>133.333 | 0.119<br>0.175 | 0.111<br>0.163 | 17 |
| Extreme | Equal to or above | 133.333 | 0.175 | 0.163 | 20 |

**Note 1:** But not including.

The comment period for the proposed rulemaking was extended, but officially ended on February 13, 2017.

## Conclusions

With the implementation of the revised ground-level ozone NAAQS, areas which previously demonstrated attainment for the 2008 standard may be re-designated as non-attainment for the new standard. Due to the changes in the ozone attainment designations for counties within a state, each state must develop plans to address the achievement of attainment in these areas. Industries located in these areas must be aware of the implications of these re-designations with regard to RACT, NSR permitting, and Title V permitting, and begin to plan accordingly. Failure to consider these re-designations may result in significant costs to a site, which may have been otherwise avoided. Any permitting project involving ozone precursors should be executed with extra care before the initial state attainment designations are made, and permit applicants will benefit from maintaining a close dialogue with the agency of concern throughout the permitting project.






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