

## Air Quality Planning Curriculum

*Goal:* To help state, local, and tribal air professionals build their knowledge base and capacity to conduct air quality planning in compliance with Clean Air Act (CAA) requirements. The curriculum focuses on implementation of National Ambient Air Quality Standards (NAAQS) via State/Tribal Implementation Plans (SIPs/TIPs) as well as Regional Haze requirements.

*Audience:* The primary audience is state, local, and tribal air professionals. This curriculum is also helpful to EPA staff. The curriculum presumes that students will have taken some, or all, of the courses in the Air Pollution Basics curriculum before taking the courses under the Air Quality Planning curriculum.

*Learning Objectives:* Learning objectives in this curriculum follow Bloom's Taxonomy.<sup>1</sup> Learning objectives for the "foundational" level courses are focused on helping students remember and understand key concepts. The "intermediate" level is intended to help students apply and analyze concepts, and the "advanced" level is aimed at helping students create and evaluate key concepts as well as master the curriculum.

### Foundational

- Describe NAAQS implementation (in general)
  - Timeline for implementation requirements
  - Roles of states, tribes, local air agencies and EPA
  - Area designations
  - State/tribal implementation plans (SIPs/TIPs)
  - Redesignation
- Describe the requirements and process to designate areas as attainment, nonattainment, or attainment/unclassifiable following promulgation of a new or revised NAAQS
  - CAA requirements
  - Summary of factors considered to determine area boundaries
  - Use of monitoring data for determining area designations (modeling can also be used for SO<sub>2</sub> only)
    - Weight of evidence including air quality modeling for defining area boundaries
  - Federal/state/tribal relationship in area designations
    - Tribal policy for designation as a separate area
    - EPA guidance for state and tribal area designation recommendations
  - Design values and the role they play in designations
  - Classifications
  - Exceptional events
  - Steps and timeframes leading to final designation decision
    - Initial state recommendations, 120-day letter process, Federal Register publication, notice and comment, final designations (promulgation and effective date)

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<sup>1</sup> Bloom, B. M., Englehart, E., Furst, E. H., Hill, W., & Krathwohl, D. (1956). *Taxonomy of educational objectives: The classification of educational goals*. New York: McKay.

- Review the current designations via the electronic Code of Federal Regulations (CFR) or Greenbook website
- Describe the role of each state to develop a state implementation plan (SIP)
  - SIP requirements under CAA section 110
    - Infrastructure SIPs (sections 110(a)(2)(A)-(M))
    - Interstate transport (section 110(a)(2)(D))
  - SIP requirements in EPA regulations (40 CFR part 51)
    - SIP submissions and public notice, opportunity for comment and hearing
    - Completeness criteria for SIPs
  - Nonattainment SIPs for certain states
  - Source-specific SIPs and other SIPs not related to nonattainment
  - Regional Haze SIPs (all states)
    - Basis in CAA sections 169A and 169B; to remedy visibility impairment in Class I national parks and wilderness areas
    - Reasonable progress goals
      - IMPROVE monitoring network for Class I areas
      - Metrics: visual range, deciview, inverse megameters
    - In general, SIP update every 10 years and progress reports every 5 years
- Describe the role of the EPA to take actions related to SIPs (required by CAA section 110(k), (l), (m))
  - Federal Register proposal, comment, response, finalization
  - Deadlines for action on SIP submissions (section 110(k))
    - Completeness determination
      - Generally made within 6 months of state submission
      - EPA final action required within 18 months of state submission
    - Generally identify types of actions (full and partial approval, conditional approval, disapproval, etc.)
      - Notice and comment rulemaking (APA and Federal Register)
      - Makes state law federally enforceable (CFR)
    - Federal Implementation Plans (FIPs), SIP calls, and corrections
  - Anti-backsliding and savings clauses (sections 110(l) and (n))
  - Sanctions (section (m))
    - Role of court decisions on EPA approval/disapproval actions
- Provide contextual information as it relates to Tribal Implementation Plans
  - Elective process
- Provide contextual information regarding the Tribal Authority Rule
  - Treatment as a State (TAS)
- Locate information about SIPs/TIPs (such as the current SIP-approved regulations, source-specific requirements and plans for a state)

- Regulations.gov - how to find a docket and read EPA's technical support documents for previous actions in order to inform future submittals
- Govinfo.gov - how to find FR notices by number, search for FR notices by content, and refer to the latest eCFR
- EPA website resources related to SIPs
- EPA State Plan Electronic Collaboration System (SPeCS) and Regional Office SIP compilations
- Identify sources of ambient air quality data
  - Overview of state, tribal, and national monitoring networks
    - Pollutants monitored
    - State development of monitoring plans; EPA review
    - General process for state certification of data each year
  - Where you can get data on the EPA website
    - AirData
    - AirTrends
    - AQS
    - AirNOW
- Outline the nonattainment area SIP/TIP development process
  - Overview of SIP/TIP submittal by state/tribe (including due dates)
    - SIP/TIP development timelines
    - Tribal Treatment as a State (TAS) status
    - State plan submissions made through electronic data system (SPeCS)
    - Public dashboard
  - EPA review process
    - Timelines and consequences for late/incomplete action (finding of failure to submit, finding of failure to act, sanctions and FIPs)
- Describe the contents of nonattainment area SIPs/TIPs
  - General SIP/TIP components
    - State develops enforceable rules or permit conditions as needed, following state requirements
  - Nonattainment area emission inventories for SIPs/TIPs
    - CAA requirements for nonattainment area emission inventory
    - Description of pollutants covered
    - Definition of point, area, mobile sources
  - Attainment demonstration modelling
    - Applicability to nonattainment areas for each of the NAAQS pollutants
  - Control measures for nonattainment SIPs (RACT/RACM)
    - CAA requirements for nonattainment area control measures
      - Attain by applicable attainment date/as expeditiously as practicable
      - SIP credit (permanent, surplus, Federally enforceable, etc.)
    - Process for evaluating technological and economic feasibility of control measure

- What is control techniques guidance (CTG) for ozone, and for which source sectors have CTGs been developed?
  - Reasonable Further Progress (RFP)/Rate of Progress (ROP) Plans
    - CAA requirements
    - Annual incremental reductions
    - Baseline year
  - General conformity and transportation conformity
    - CAA basis
    - Determine how to implement state transportation plans after promulgation of a new or revised NAAQS
  - Contingency measures
    - CAA basis
    - Applying contingency measures
  - Use of electronic data systems for state plan submissions
  - Importance of early engagement
- Review completeness requirements for plans
- Describe redesignation from nonattainment to attainment, and maintenance plan requirements
  - Basis in CAA (section 175A)
  - Clean data determinations (CDD)
    - Difference between making a CDD and a full redesignation
    - Regulatory result of CDD compared to regulatory result of full redesignation
    - Some requirements are suspended as the result of a CDD (vary by NAAQS) and others are not (e.g., emissions inventory, nonattainment NSR elements)
  - Requirements to be met for an area to be re-designated from nonattainment to attainment
  - Requirements for an approvable maintenance plan, including contingency measures
  - Differences in process for tribes (e.g., TAS approval, etc.)
- Define Prevention of Significant Deterioration (PSD) permitting program
  - CAA and regulatory requirements
  - Major source and major modification
  - Classifications and area reclassification
  - Increments and ceilings
  - Definition of regulated NSR pollutant
  - Greenhouse gases and how they are treated in PSD
  - Best Available Control Technology (BACT)
  - Air quality modeling to ensure source is not exceeding PSD increment
  - Air quality modeling to ensure source is not causing or contributing to a NAAQS violation
  - Visibility and PSD
- Summarize nonattainment NSR (NNSR) CAA requirements and when they are triggered
  - Identify NNSR requirements in EPA regulations
  - Describe major source, major modification, minor source

- Discuss basic principles of lowest achievable emission rates (LAER) and emission offsets
- Overview of tribal NSR
- Define minor NSR program/tribal minor NSR
  - Basis in CAA (section 110(a)(2)(C)) and EPA regulations (40 CFR 51.160 through 164)
  - Understand public participation requirements
  - Understand requirement that new and modified stationary sources must not interfere with attainment and maintenance of the NAAQS

### Intermediate

- Define technical factors, tools, and resources used in the designation process
  - Technical factors considered by EPA and states in process
    - Role of design values in designations
    - Evaluation of monitor representativeness in an airshed
    - Air quality data, emissions, meteorology, geography/topography, jurisdictional boundaries
    - Tools and resources for evaluating factors
  - Consideration of exceptional events
    - What types of events qualify?
    - Flagging and concurrence process
    - Exceptional events rule and guidance documents
- Explain the purpose of routine SIP rule revisions and updates
  - Submit for purposes of SIP strengthening
  - Submit to keep state and SIP-approved rules consistent and up to date with Federal requirements
- Evaluate completeness of plan submissions
  - Review of purpose and minimum criteria for determining completeness by EPA for SIP submissions (Appendix V to 40 CFR Part 51)
  - EPA completeness determination/complete by operation of law
- Outline infrastructure SIP requirements
  - Overview of individual subsections— e.g. A, B, C (except interstate transport subsection (D), which is covered separately)
  - Overview of multi-pollutant infrastructure SIP guidance
- Define attainment demonstrations
  - Overview of modeling guidance and air quality modeling typically used for attainment demonstrations for different NAAQS
    - Dispersion models for CO, lead, NO<sub>2</sub>, and SO<sub>2</sub>
    - Regional photochemical models for ozone and PM<sub>2.5</sub>
    - Developing modeling protocols
    - Emission rates/control measures within the SIP and used in final attainment modeling must reflect enforceable rules and/or permit conditions

- Analyze emission inventories (especially for nonattainment areas)
  - Ways that nonattainment area inventory can improve upon state-level inventory data
  - Describe how EPA emission factors are developed
  - Methods for projecting emissions into the future (as needed for redesignations and/or ozone, PM2.5 and Regional Haze SIPs)
  - Relationship of emission inventory base year and reasonable further progress baseline year for ozone, PM2.5, and regional haze
- Evaluate air quality planning issues specific to multijurisdictional nonattainment areas
- Evaluate control measures and their cost effectiveness
  - Resources for identifying control measures and evaluating cost effectiveness
    - Menu of Control Measures
    - RACT/BACT/LAER Clearinghouse
    - Other sources of information
  - Role of RACM in attainment demonstrations
  - Enforceability of and enforceable mechanisms for control measures
  - For ozone, describe:
    - Control measures required for each classification
    - Ozone Transport Region (OTR) requirements
- Describe requirements that relate to emissions during periods of startup, shutdown and malfunction
  - Director's discretion
  - Excess emissions
- Define conformity requirements
  - General conformity
    - What qualifies as an applicable Federal project?
    - What are 'de minimis' levels by precursor and NAAQS?
    - What is the process for a typical project?
  - Transportation conformity
    - Conformity budget
    - Regional emissions analysis
    - Conformity lapse
    - Conformity freeze
- Describe requirements for ROP/RFP plans
  - Specific requirements for ozone ROP and RFP for other NAAQS
  - Quantitative milestones for PM10 and PM2.5
  - Milestone compliance demonstration requirements for ozone and consequences for failing to achieve RFP
- Define contingency measure requirements

- Defined as measures that can be implemented expeditiously but that are not included in the measures relied on to demonstrate attainment by the attainment date
  - Examples of past practice: what types of “triggers” have states included in SIPs
  - When can states rely on measures that are already being implemented (“early triggered”) as contingency measures (e.g., each year mobile emissions reductions are realized due to fleet turnover)
  - Jurisdictional differences in treatment of early-triggered contingency measures (i.e., not allowed in 9th Circuit due to *Bahr* decision)
- Define the requirements for redesignation to attainment and maintenance plans
    - Analyses and policies for demonstrating maintenance: based either on air quality modeling or projected emissions
    - Initial maintenance plan covers 10 years after date of redesignation
    - Available guidance
    - Limited maintenance plan policies
    - Second maintenance plans are due 8 years after initial maintenance plans are approved
  - Describe the use of Clean Data Determinations (CDDs) to suspend requirements before an eventual action to formally redesignate
  - Analyze possible scenarios that might lead to a Federal Implementation Plan
  - Describe the technical aspects of interstate transport analysis
    - EPA’s four step interstate transport framework
    - NOx SIP call, CAIR, CSAPR, CSAPR Update, CSAPR Closeout
      - Note that CSAPR Closeout was remanded to EPA Sept. 2019 and Closeout vacated
    - Overview of technical (modeling and cost) analyses of EPA transport rules
    - NSR and visibility interstate transport requirements
    - Ozone Transport Region (OTR) and requirements
    - Implications of international transport
  - Explain how Regional Haze SIPs are evaluated
    - Elements of a Regional Haze SIP (BART, long term strategy, reasonable progress)
    - Differences between first and second planning periods after rule revision

### Advanced

- Prepare (states/tribes) and evaluate (EPA) state/tribal recommendations for area designations
- Prepare Infrastructure SIP submittal
- Describe special topics related to interstate transport
  - Overview of most recent guidance, most recent court decisions framing policy
  - Most recent technical analyses showing interstate contributions for ozone (examples from technical analyses)

- Section 176A and Section 126 petitions for interstate transport
- Transport regions and international border areas (Section 179B)
- Use different sources of air quality data to conduct analyses
  - Analyses to understand sources of pollution (PM<sub>2.5</sub> speciation, VOC speciation, semi-volatiles)
  - Special purpose monitoring
  - Use of satellite data and other emerging sources
  - Supplemental data from low cost air sensors
- Analyze exceptional events; overview of rule and current guidance
  - Eligibility of the event
  - Required elements of an exceptional events demonstration
  - Exceptional events basic process
  - Implementation tools and resources
- Conduct nonattainment NSR (NNSR) analyses: LAER and emission offsets
  - Focus on LAER analysis and identifying the most stringent emission limitation in practice for a type of source
  - Case study on state “bank” for offsets
- Prepare an attainment demonstration for a nonattainment SIP
  - Prepare a modeling protocol for an attainment demonstration (e.g., lead, SO<sub>2</sub>, ozone, PM<sub>2.5</sub>)
  - Description of air quality modeling attainment tests and guidance (modeling process, details of attainment tests, post-processing software, weight of evidence)
  - Resources available for assistance
    - Guidance and advice – SCRAM/Model Clearinghouse
    - Assistance with preparing demonstration – multijurisdictional organizations, state guidance, EPA Regional Office modelers, etc.
- Research and develop information to ensure a SIP revision does not interfere with any applicable requirement concerning attainment, RFP, or other CAA requirements
  - Addressing CAA section 110(I)
  - Submitting a demonstration to support a SIP revision
- Compile emission inventories (especially for nonattainment areas)
  - Overview of nonattainment area emission inventory vs. statewide emission inventory
  - Overview of control measures and emission reduction assumptions; need to understand level of control before control measures are applied
  - PM condensable emissions
  - VOCs and semi volatile organic emissions
  - Use models for mobile source emissions and power sector
- Analyze and plan control measures for SIPs (i.e. RACT/RACM)



- Compare RACT/RACM, BACT/BACM, MSM
  - RACT analysis approvability issues (sector- and source-specific)
  - Case studies, including different state examples, some of which may have requirements that are more stringent than EPA's
- Interpret and apply special CAA provisions
    - Consideration of international transport of air criteria pollutants (CAA section 179B) – prospective and retrospective
    - PM precursor demonstrations, i.e., showing that a PM10/PM2.5 precursor has insignificant contribution in an area
    - Rural transport (CAA section 182(h))
    - Economic incentive programs
    - Ozone transport region
- Interpret and apply general and transportation conformity requirements
    - General conformity case studies
    - Transportation conformity:
      - Hot spots
      - Isolated rural areas
      - Topics related to MOVES model for estimating future transportation emissions
- Formulate redesignation and maintenance plans
    - Limited maintenance plan policies
    - Requirements for first and second 10-year maintenance plans
    - Redesignation under revoked standards
- Prepare a Clean Data Determination (CDD) request
- Interpret and apply Regional Haze requirements
    - Specific elements and issues in plans for second planning period
      - Details on each step in the Regional Haze SIP process (e.g., ambient data analysis, source selection, four factor analysis, etc.)