BMPs for Dispersion Modeling

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Why Model?
- Michigan Air Pollution Control Rule 207(c)
  - The equipment for which the permit is sought will violate an applicable requirement of the clean air act, including any of the following: …
    (iii) The requirements of prevention of significant deterioration of air quality
    (iv) The requirements of nonattainment new source review

When Model?
- You are a major OR minor source
- Emissions submitted do not demonstrate protection of Air Quality standards
- Examples:
  - Poor dispersion
  - Close proximity to sensitive groups
  - Potential existing problems in the area

When Model?
- Identify impacts from the construction or modification of facilities that are seeking a permit to install/operate air emission sources.
- AQD Policy and Procedure AQD-22 (March 3, 2015)

Modeling and Permits
- Some permit applications should have modeling done.

What is modeling and how is it done?
- Determine Impacts from Emissions
  - Will it meet all rules and regulations?
  - Will it cause a health hazard?

Measuring Impacts:
- High Cost Measuring Impacts: Pre-Permit
- Measuring Impacts: Where?
- Monitor Impacts:
  - Specific Spot
  - Specific Spot
  - Other Areas
  - Can AQ Models Help With These?

Air Quality Models are Computer Simulations of Atmospheric Transport and Dispersion
- Virtual Monitors for Entire Area
- Predicting Magnitude & Location
- Basic Modeling Elements:
  - Stack Parameters
  - Stack Obstruction
  - Building Wake Effect
  - Meteorology
  - Terrain Features
    - Coning

Other Considerations
- Ambient Air
- Receptor spacing
- Background Concentration
- Other Nearby Sources
- Secondary Pollutants
- Air Toxics
- Additional Modeling Issues

Ambient Air: Where do you Model?
- "the portion of the atmosphere, external to buildings, to which the public has general access"
- Receptor (Virtual Monitors) Spacing
  - o Area and Spacing Sufficient to Identify the Location and Magnitude of the Highest Ambient Impact

Total National Ambient Air Quality Standard (NAAQS) Impact
- Your Facility PTE + Nearby Sources PTE + Background = Total NAAQS

Also Consider:
- Secondary Pollutants: O_3
  - o Formation of ground-level ozone
- Secondary Pollutants: $PM_{2.5}$
- Air Toxics

Create an Input file for the model
- Model Predictions Pass: Permit Process Continues!
- Model Predictions Fail: Then what?!?!?
- Model Predictions Fail: Reduced Impact Strategies

Modeling Software:
- Steady state plume dispersion model for assessment of pollutant concentrations from a variety of sources;
- Simulates transport and dispersion from multiple points, area, and volume sources;
- Employs hourly sequential meteorological data to estimate concentrations for averaging times ranging from one hour to one year.
- AERMOD: EPA Preferred Model
- Also Can Use:
  - o BEE-LINE Software - $1,350
  - o Breeze Software - $1,495
  - o Lakes Environmental - $1,599