

Modeling NO₂ for the 1-hour Standard

Emmett Malone, Modeling and Emission Inventory Supervisor

Presented to

Rocky Mountain Environmental, Health, & Safety Peer Group

10/25/2018



COLORADO

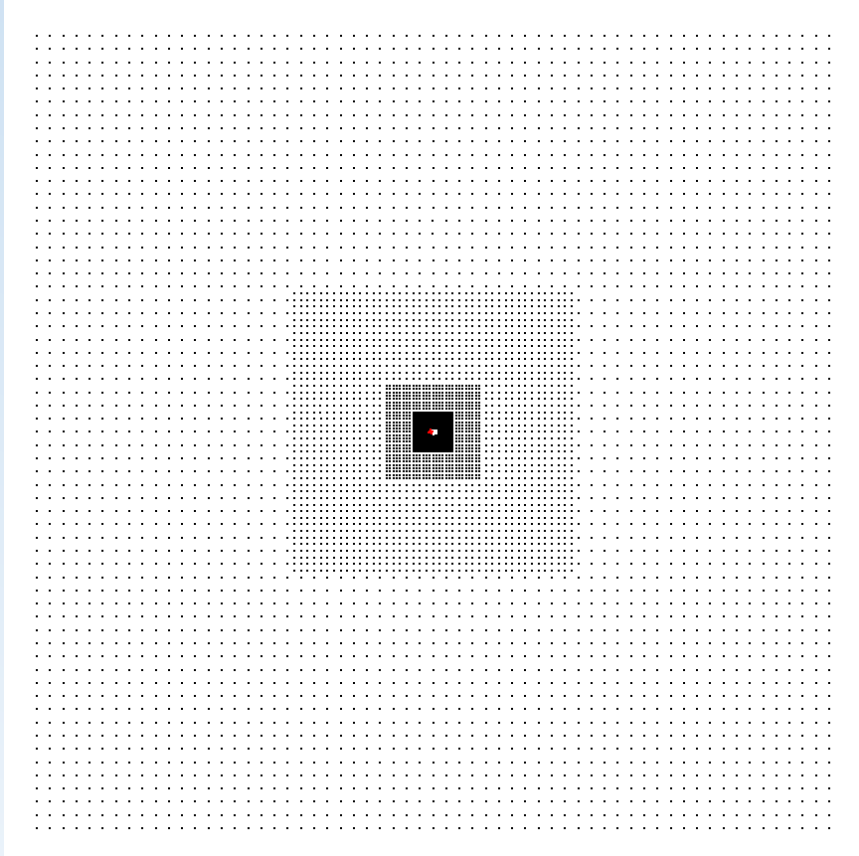
Air Pollution Control Division

Department of Public Health & Environment

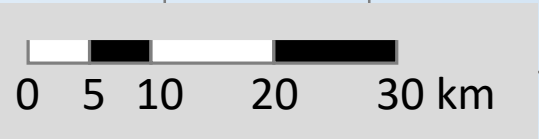
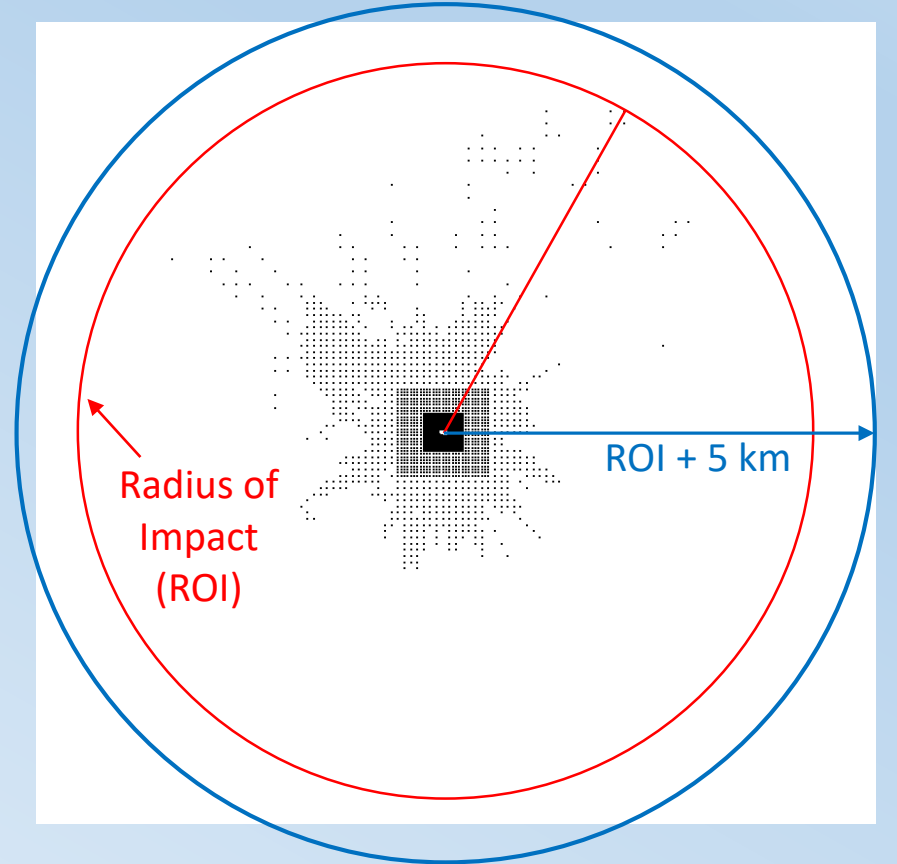
Modeling Steps (Simple case)

- Model all new and/or modified sources
 - Use standard receptor grid (50m fence line, 100m to 1km, 250m to 3km, 500m to 10km and 1,000m beyond 10km)
 - 20km is recommended first guess
- Determine what receptors are significant
 - 7.5 $\mu\text{g}/\text{m}^3$ or higher

Full Receptor Grid
Significant Impact Analysis



Significant Receptor Grid
Cumulative Impact Analysis



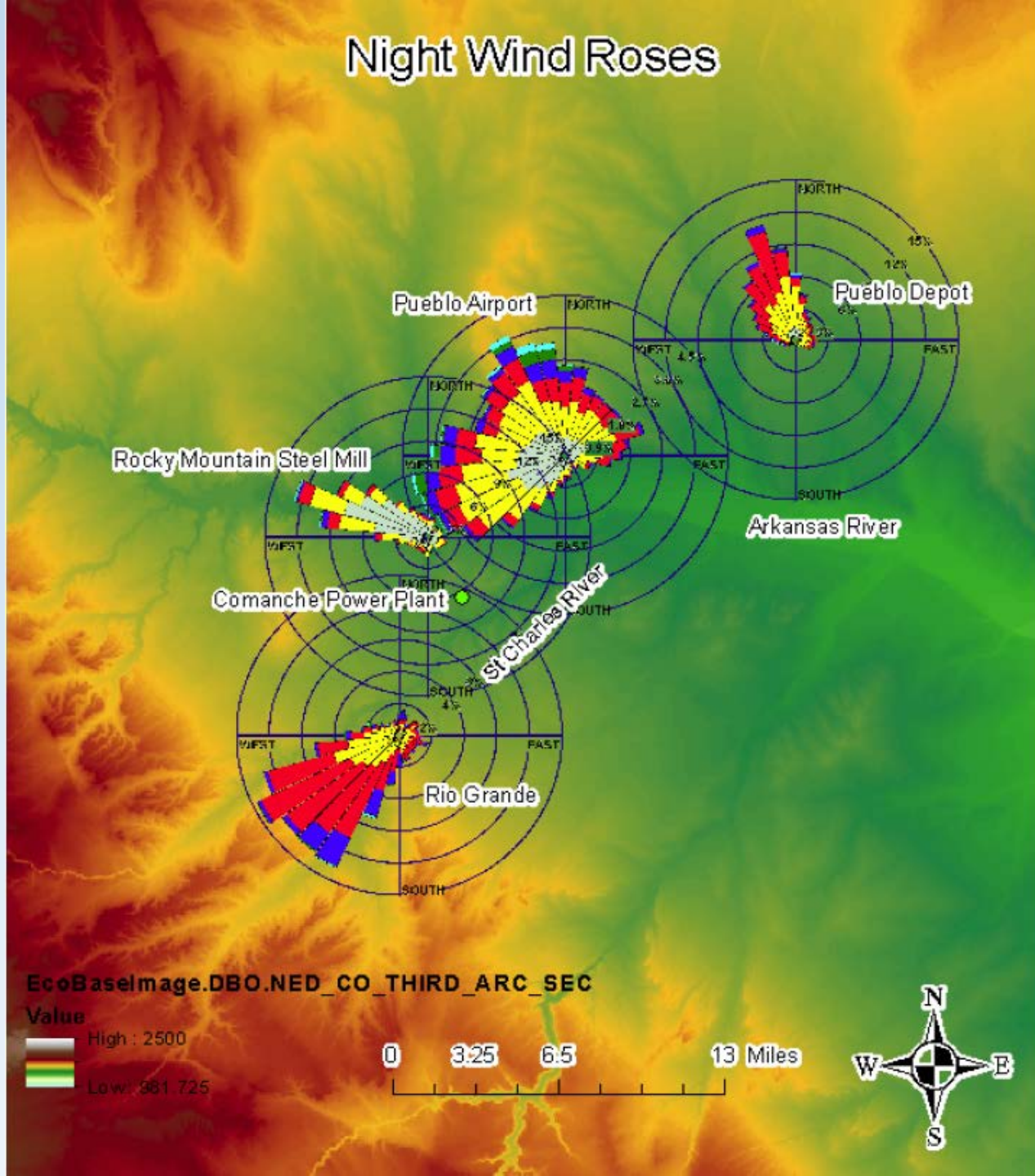
- Cumulative Impact Analysis
 - Model significant receptors with all site sources and nearby sources
 - Nearby sources should go 5km past furthest significant receptors
- Determine if there are any hotspots
 - Refine grid for hotspots to 100m
- Do a contribution analysis (exceedances may occur when the source is not significant)

- If there are exceedance(s) where the source has significant impacts, next steps:

- **Work with Permit Modeler**

- OLM
 - Ozone hourly profile by season
 - NO₂ hourly profile by season
- Refine nearby sources
- Rearrange the source configuration
- Lower emissions (permit condition)
- Collect on-site meteorology (H1H vs H8H)

Night Wind Roses



EcoBaselImage.DBO.NED_CO_THIRD_ARC_SEC

Value

High : 2500

Low : 981.725

0 3.25 6.5 13 Miles



Thoughts

- Once again work with your permit modeler and permit engineer
 - Have a Protocol
- If you have a new way to do something, **Great** but it has to be
 - Documented
 - Defensible
 - Did I say Documented?
 - Stack tests
 - Manufacturer's data
 - Did I say Defensible?
 - Scientifically sound
 - 2 meteorological sets N to S and E to W winds for one source

- Monitoring is done for population
 - Most NO₂ background data from urban areas
 - Can Industry get together and place monitor(s) where development is occurring?
 - This would help with the number of nearby sources needing to be modeled
- Meteorological Data
 - On-site data
 - H8H vs H1H
 - Mesoscale Model Interface (MMIF)
 - 1 to 5 years out

- APENS
 - Fill out the stack/emission parameters
 - Emissions if actuals are lower than PTE enter actuals
- Track your emissions so Table 8-2 in Appendix W can be used
- Don't be changing the layout/equipment once the modeling is submitted
 - Modeling has to be representative of actual conditions
 - If changes are made the modeling is no longer representative
 - It just slows things down and frustrates both applicant and reviewer

General Thoughts

- We do not have an agenda
 - Just want compliance demonstration to be within EPA regs/guidance/methods and defensible to EPA and others who may litigate
- Talk with Permit Modeling Lead
 - Rosendo Majano
 - 303 692 3115
 - rosendo.majano@state.co.us
- On-site meteorological data
- Better monitoring sites

- Good site layout (from a dispersion standpoint)
 - Sources in middle of plant site
 - Layout does not have multiple plumes becoming one plume
- **Provide a Good application**
 - If things are missing or poorly done it makes us look harder for the next missing or poorly done item
 - Use the Colorado Modeling Guideline for Air Quality Permits
 - Use the Completeness Checklist for Modeling Submittals
 - <https://www.colorado.gov/airquality/permits.aspx#a>
- Let the review process work

Questions?



Contact Information:

Emmett.Malone@state.co.us