

Notes of October 8, 2015, Call of the AERMOD Model Evaluation Workgroup

The AERMOD Model Evaluation Workgroup (WG) conducted a conference call on October 8, 2015. Following are notes that track the agenda for the call.

1. Welcome, Introductions, and Agenda Review (John Bunyak)

Call participants were:

- John Bunyak—Consultant to WESTAR
- Tom Moore—WESTAR
- Chris Owen—EPA, OAQPS
- James Thurman—EPA. OAQPS
- Roger Brode, EPA--OAQPS
- Rebecca Matichuk—EPA, Region 8
- Mary Uhl—BLM
- Craig Nicholls—BLM
- Tom Coulter—BLM
- Theresa Alexander—BLM
- Bret Anderson—USFS
- Deanna Huff—Alaska DEC
- Tom Turner—Alaska DEC
- Doris Jung, Colorado DPHE
- Darla Potter—Wyoming DEQ
- Nathan Henschel—Wyoming DEQ
- Clint Bowman—Washington Dept. of Ecology
- Cathe Kaliz—API
- Doug Blewitt—Consultant to API
- Tom Damiana—AECOM
- Ralph Morris—Environ
- Clint Tillerson—Amec Foster Wheeler
- Alison Cooke—BP
- Dana Wood—BP
- Brad Thomas--ConocoPhillips

2. Updates (John Bunyak)

- Outreach: On our last call, we talked about contacting other agencies to see if we could get their members to participate on the Workgroup. John reached out to the National Association of Clean Air Agencies to recruit their members to participate on the WG. He made a presentation to its Emissions and Modeling Committee and briefed them on the Drill Rig Study. John also reached out to the Association of Air Pollution Control Agencies and offered to make a similar presentation to its Modeling and Energy Committees. We are wait to hear back from them.
- Study Management Team (SMT) Decision regarding API Funding: As mentioned previously, API provided some additional funding for the drill rig study. The SMT decided to use that funding to get some contractor help in performing a detailed review of the AK dataset. (Note: Amec Foster Wheeler performed a cursory review of the AK data under a separate contract with WESTAR and did not find any major problems with the data.) The

SMT chose Amec to do the detailed review and reformatting of the AK dataset. That data review is now underway.

- ADEC Review of AK Study CEMS data: Deanna Huff mentioned that ADEC is still waiting on a secondary review of the CEMS data and it should be ready in a week or two. Deanna said that she would send a copy of the report to the Workgroup when it is available.

3. Summary of Amec detailed review of Alaska data (Clint Tillerson)

Clint discussed his ongoing review of the AK dataset. This work includes six tasks:

1. Calculate hourly mass emission rates and emission velocities: using the CEM data, Amec will calculate the hourly mass emission rates and actual exit velocities for all sources using EPA's Method 19.
2. Perform Data Analyses on the Kuparuk Data: Amec will correlate the monitoring periods with the various locations of the drill rig at different well sites and calculate the distance between the well sites and downwind monitor for the different well locations; correlate emission data with the ambient data; and further evaluate the ambient data for those hours when the rig was powered by diesel fuel and line power.
3. Format hourly Kuparuk data for AERMOD Model Evaluation: Amec will reformat the hourly emissions and meteorological data for future use in the evaluation of AERMOD.
4. Research upper air data, surface characteristics and building downwash: Amec will research the availability of upper air data required to process the 1-hour meteorological dataset using AERMET; evaluate surface roughness characteristics; and explore methods for characterizing the influence of building downwash effects from the drill rig.
5. Construct a modeling database: Amec will incorporate all of the Kuparuk data for those hours when the drill rig was powered by diesel fuel into a single Microsoft Excel file.
6. Report: Amec will generate a short report that documents its approach and assumptions for each task, any modifications it made to the data, and present its findings and results.

4. Proposal regarding various Workgroup Teams (Chris Owen and Doug Blewitt)

Chris and Doug discussed their outline for the various workgroup teams. There would be four teams:

1. Ambient data analysis team
2. Dispersion modeling analysis team (NO_x/CO/SO₂ focused)
3. NO₂ modeling analysis team (NO_x chemistry focused)
4. Model/monitor data evaluation team

Specific tasks under each team are provided in the full outline included below. Note that this list of tasks is meant to provide some structure for the teams, but not meant to be comprehensive. Each team can refine its work based on their experience and knowledge.

5. Discussion/Team Commitments (All)

There was some good discussion and questions regarding the teams proposal. Rebecca asked if the SMT has given any thought to priorities for the teams. Doug said that the SMT wants to provide the basic framework for the teams, and then get the teams formed and have them come back with a proposal for specific tasks and a timeline to complete its work. Doug also suggested that the teams identify any additional resources that it will need to complete its work.

Clint Bowman asked about the timeline for completing this work. Chris and Doug said that they were thinking about a 6+-month timeframe to complete the work. It will take lots of time, thought, and analysis to move this forward. Chris said that he would be very involved with the various teams and provide coordination between the teams and the SMT.

Regarding volunteers, the following folks have offered to participate on the teams thus far:

- Dispersion Modeling Analysis Team:
 - James Thurman
 - Rebecca Matichuk
 - Tom Coulter
- Model/Monitor evaluation team
 - Clint Bowman

6. Action Items

Action items identified during the call were:

- John will send out a message to the full Workgroup mailing list and ask for commitments to join a team.
- Deanna will provide the report on ADEC's secondary review of the Kuparuk CEMS data to the Workgroup when it is available.

7. Next Call (???)

John suggested that we hold off on scheduling our next general Workgroup call until we get the Teams established and functional and have something specific to discuss. John also said that once the teams get organized, future routine calls would be limited to those folks actually working on the teams, with broader participation calls held less frequently.

Drill Rig NO_x Study, Model Evaluation Workgroup Teams October 7, 2015

Joint CO and AK teams would be formed to process the datasets for the two field studies.

Each team would have a chairperson responsible for setting up meetings, coordinating between other teams, and communicating with the Study Management Team.

Team would be responsible for establishing goals, timelines, and final products.

The following present study teams and suggested research topics.

Ambient data analysis team

- Evaluate wind direction alignment from source to monitors to known azimuth
- Identify potential influence from mobile source emissions, no impacts, and rig-only impacts
- Review ambient ozone data and evaluate ozone scavenging
- Classify periods for observation of plume centerline and plume half width were identified; and
- Evaluate plume characteristics (e.g., plume width, variation in NO₂/NO_x ratio across plume width, crosswind integrated concentrations)
- Characterize NO/NO₂ speciation based on emissions, meteorological and background data
- Need to correlate emission data with the ambient data and determine a subset of ambient measurements when the drill rigs were being powered by diesel as opposed to line power

Dispersion modeling analysis team (NO_x/CO/SO₂ focused)

- Calculate hourly mass emission rates and emission velocities
- Evaluate downwash parameters for BPIP and sensitivity analyses
- Evaluate surface roughness approaches and impacts
- Distance between source and monitor changed as new wells were drilled
- Comparisons of cross-wind integrated concentrations
- Sensitivity of upper air data

NO₂ modeling analysis team (NO_x chemistry focused)

- Evaluate monitor predictions to monitoring data pairing approaches
- Evaluate sensitivities to ozone, NO₂/NO_x ISR inputs
- Evaluate different NO₂ options (PVMRM, OLM, etc.)
 - Comparison of observed NO₂/NO_x ratios and NO₂ concentrations
 - Estimate the amount of conversion
 - Estimate role of diffusion vs dispersion on reaction rates and relationship to distance from source to receptor

Model/monitor data evaluation team

- Establish pollutant evaluation and meteorological test matrix
 - Pollutants of interest NO_x, NO₂ and possibly CO and or SO₂ (AK database only)
 - Define models to be included in evaluation
- Establish model evaluation and statistical protocol
 - Define statistical approach to be used
 - Define pairing of data (how monitor and modeled data are sorted for comparison)
 - Consider the relationship between dispersion (NO_x) and chemistry (NO₂) in model evaluation (introduction of compensating errors)
 - Develop model evaluation diagnostics
 - Develop model sensitivity evaluations for conditions beyond the experimental data
- Develop conclusions and recommendations