Air Management Study Group
Quarterly Meeting Agenda

• Opening remarks & agenda review
• Hiring update
• Proposed guidance, rules and legislative update
• ACE rule
• Member updates
• 2020 Goals and vision for DNR
• Ozone topics
• Air quality monitoring
• Inspection/Compliance consistency
• 2020 Priority topics
Hiring Update

Gail Good
Air Program Director
Proposed Guidance and Rules
Legislative Update

Kristin Hart
Permits and Stationary Source Modeling Section Chief

David Bizot
Air Quality Planning and Standards Section Chief
## Proposed DNR Guidance

<table>
<thead>
<tr>
<th>DNR Guidance in Drafting Phase</th>
<th>Description</th>
<th>Target Date</th>
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<tbody>
<tr>
<td>None</td>
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<tr>
<td>DNR Guidance in Public Comment</td>
<td>Description</td>
<td>Date Posted</td>
</tr>
<tr>
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</tr>
<tr>
<td>Finalized DNR Guidance</td>
<td>Location</td>
<td>Final Date</td>
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# Proposed DNR Rules

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<tr>
<th>Proposed DNR rule</th>
<th>Description</th>
<th>Phase</th>
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</thead>
<tbody>
<tr>
<td><strong>AM-24-12b Air Permit Streamlining Rule Part 2</strong></td>
<td>Changes to improve operational efficiency and to simplify the permitting processes administered under chs. NR 406 and 407, while remaining consistent with the federal Clean Air Act (CAA).</td>
<td>Signed by governor, in leg review</td>
</tr>
<tr>
<td><strong>AM-20-18 VOC RACT</strong></td>
<td>Updates two RACT rules in ch. NR 422 to meet current EPA Guidelines for Miscellaneous Metal and Plastic Parts Coatings, and Miscellaneous Industrial Adhesives.</td>
<td>Rule drafting</td>
</tr>
<tr>
<td><strong>AM-10-19 2015 Ozone NAAQS</strong></td>
<td>Incorporates the 2015 ozone NAAQS into state rule. Scope statement approved by NRB in June 2019.</td>
<td>Rule drafting</td>
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## Proposed EPA Rules/Guidance

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<th>Proposed EPA rule/guidance</th>
<th>Docket</th>
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<tbody>
<tr>
<td>Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine Standards</td>
<td>EPA-HQ-OAR-2019-0055</td>
<td>2/20/2020</td>
</tr>
<tr>
<td>2008 Ozone National Ambient Air Quality Standards; Wisconsin; Determination of Attainment by the Attainment Date for Inland Sheboygan; Reclassification of Shoreline Sheboygan</td>
<td>EPA-R05-OAR-2019-0518</td>
<td>3/6/2020</td>
</tr>
<tr>
<td>Draft Guidance for Ozone and Fine Particulate Matter Permit Modeling</td>
<td>None. Email: <a href="mailto:bridgers.george@epa.gov">bridgers.george@epa.gov</a></td>
<td>3/27/2020</td>
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## Finalized EPA Rules/Guidance

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<tr>
<td>Air Plan Approval; Wisconsin; Title V Operation Permit Program</td>
<td>84 FR 67200</td>
<td>12/9/2019</td>
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**Wisconsin Department of Natural Resources**

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## State Draft and Final Legislation

<table>
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<th>Draft legislation</th>
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Affordable Clean Energy (ACE) Rule Implementation Update

David Bizot
ACE Rule Implementation


- During this period, the program developed an implementation approach to the ACE Rule state plan due in July 2022

- ACE Rule affects 13 units at 7 facilities
  - Genoa power plant shutting down by end of 2021.
Elements to Wisconsin’s ACE Rule State Plan

Together comprise ACE state plan submittal

Akin to attainment plan or other Section 110 SIP. Includes information such as:
- Purpose
- Description of how submittal meets rule requirements
- Approach/methodology used
- Assumptions made
- Unit-by-unit summary info
- Public participation
- Conclusions

Appendices to main plan document.
Each permit:
- Sets the unit-specific standards of performance
- Includes permanent and enforceable conditions, compliance plan, etc.
Elements to Wisconsin’s ACE Rule State Plan

Akin to attainment plan or other Section 110 SIP. Includes information such as:
- Purpose
- Description of how submittal meets rule requirements
- Approach/methodology used
- Assumptions made
- Unit-by-unit summary info
- Public participation
- Conclusions

DNR develops, w/public review prior to submittal

Appendices to main plan document. Each permit:
- Sets the unit-specific standards of performance
- Includes permanent and enforceable conditions, compliance plan, etc.

Standard application & issuance process
Why this approach?

• Takes advantage of existing, recognized processes, from approaching the program with an application, through public review and issuance of permits.

• Includes sources submitting an application that proposes emission rates, conditions and operational parameters and provides an evaluation that justifies the proposed conditions.

• Recognizes that ACE rule requires a detailed knowledge of specific units that the utilities themselves are best suited to initially analyze.

• Offers the most flexibility to utilities in terms of addressing future changes they may want to see, through the existing permit revision procedures.

• Supports completion of state plan by the ACE rule’s deadline.

• EPA has indicated this approach is an option and is likely approvable.
# Implementation schedule

<table>
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<tr>
<th>Date</th>
<th>Milestone</th>
<th>Who</th>
<th>Comment</th>
</tr>
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<tbody>
<tr>
<td>Feb 2020</td>
<td>Public meeting</td>
<td>DNR + sources</td>
<td>Review implementation process</td>
</tr>
<tr>
<td>Periodically/ as needed</td>
<td>Public meetings/discussions with sources</td>
<td>DNR + sources</td>
<td>To give updates and address permit application questions</td>
</tr>
<tr>
<td>Apr 2021</td>
<td>Permit applications due</td>
<td>Sources</td>
<td>Early applications are encouraged</td>
</tr>
<tr>
<td>Feb 2022</td>
<td>All permits issued by DNR</td>
<td>DNR</td>
<td></td>
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<tr>
<td>Mar 2022</td>
<td>Release draft plan document for public comment</td>
<td>DNR</td>
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<tr>
<td>Jul 2022</td>
<td>Submit state plan</td>
<td>DNR</td>
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<tr>
<td>Jul 2024</td>
<td>Compliance schedule for affected EGUs begins</td>
<td>Sources</td>
<td>24 months after plan submittal</td>
</tr>
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</table>
ACE Rule Implementation

- Developing a website to post latest information – coming this spring

- Engaging other states on their processes
Member Updates
EPA Region V update

Frank Acevedo
EPA
Federal litigation update

Todd Palmer
Michael Best & Friedrich LLP
Member Updates
2020 Goals and vision for DNR

Darsi Foss
Environmental Management Division Director

Bart Sponseller
Environmental Management Division Deputy Director
Ozone Update

Brad Pierce
UW Madison Space Science and Engineering Center Director

Katie Praedel
Air Monitoring Section Chief

David Bizot
Air Quality Planning and Standards Section Chief
Ozone Formation Along Wisconsin’s Lake Michigan Shore

1. Lake Michigan Ozone Transport

2. 2017 Lake Michigan Ozone Study – R. Bradley Pierce

3. Enhanced Ozone Monitoring and data analysis - Katie Praedel and David Bizot
Ozone Formation Along Wisconsin’s Lake Michigan Shore

1. Lake Michigan Ozone Transport

2. 2017 Lake Michigan Ozone Study – R. Bradley Pierce

3. Enhanced Ozone Monitoring and data analysis - Katie Praedel and David Bizot
During May and June 2017, federal and state agencies, universities, and other partners are measuring air quality over Lake Michigan. With these measurements, scientists hope to learn more about how ozone forms and where it is transported so that we can improve air quality models.
4th highest value of daily 8-hour maximum ozone values are averaged over 3 years to derive the design value, which is the metric that is compared to the National Ambient Air Quality Standards (NAAQS) and determines attainment or nonattainment.

From Donna Kenski (LADCO)
Lake Michigan and Ozone Formation

- **Land breeze** blows ozone precursor compounds from rush hour over lake.
- The boundary layer height is low due to cold water chilling the air above.
- The pollutants are concentrated near the surface where ozone forms.
- An afternoon *lake breeze* transports the ozone back onto land.

February 17, 2020

LMOS White Paper: http://www.ladco.org/
Satellite image of Lake Michigan showing Lake Breeze Front
Satellite image of Lake Michigan showing Lake Breeze Front
Summary of measurements made during the LMOS 2017 field campaign

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GeoTASO (Geostationary Trace gas and Aerosol Sensor Optimization) is a NASA airborne hyperspectral mapping instrument that is being used as an airborne testbed for future high-resolution trace-gas observations from geostationary sensors such as TEMPO.

The Electric Power Research Institute (EPRI) provided funding for Scientific Aviation Flights during LMOS.
Scientific Aviation (SA) provided in situ profiling of O$_3$, NO$_2$, CO$_2$, CH$_4$, altitude, T, RH, winds, and pressure.

NO$_2$ differential slant columns (DSCs) were retrieved from GeoTASO spectra via Differential Optical Absorption Spectroscopy (DOAS).
GeoTASO NO2 columns and Scientific Aviation NO2 profiles show large differences between weekend and weekday NO2 abundances. LMOS measurements provide constraints on emissions from commuter traffic (Analysis by Laura Judd, NASA/LaRC)
Lakeshore ozone during LMOS 2017

LMOS 2017 - Sheboygan Ozone

LMOS 2017 - Chiwaukee, Kenosha WT and Zion

June 02, 2017 MDA8

MDA8 = Maximum Daily 8 hour Average

(Angie Dickens, WDNR)
June 2\textsuperscript{nd} (Friday)
NO\textsubscript{2} concentrations

(Angie Dickens, WDNR)
High-NO$_2$ by Milwaukee

June 2 SA flight - Milwaukee NO$_2$ <600 m altitude

Times are in CST not CDT
High-NO$_2$ by Milwaukee

June 2 SA flight - Milwaukee NO$_2$ <600 m altitude

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Ground based UV/visible grating spectrometers (Pandorases) column NO2 measurements during LMOS 2017

Pandora NO2 column measurements show high values at Zion, Grafton, and Sheboygan on June 2, 2017

(Luke Valin, EPA)
Ground based UV/visible grating spectrometers (Pandoras) column NO2 measurements during LMOS 2017

Pandora NO2 column measurements show high values at Zion, Grafton, and Sheboygan on June 2, 2017

(Luke Valin, EPA)
High-resolution (3km) Chicago/Milwaukee NOx emission trajectories

Transport of Chicago/Milwaukee emissions turns North in late afternoon (well defined Lake Breeze)

21Z June 02, 2017 (4:00pm)
The North American Model (NAM) meteorology drives the Environmental Protection Agency’s (EPA) Community Multiscale Air Quality Model (CMAQ) National Weather Service NAM-CMAQ ozone forecasts during LMOS 2017 (http://airquality.weather.gov/)

During LMOS 2017 NAM-CMAQ underestimates the occurrence of high ozone (>60ppbv) during Southerly and Southwesterly flow at Sheboygan, KA.

The North American Model (NAM) meteorology drives the Environmental Protection Agency’s (EPA) Community Multiscale Air Quality Model (CMAQ)
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June 2\textsuperscript{nd} (Friday)
MDA8 Ozone

Deep Lake Breeze at northern & southern sites
A master mechanism chemical trajectory model, constrained measurements from LMOS 2017, EPA ground-station data, the EPA NEI 2014 emissions, and NOAA meteorological data was developed to understand the NO$_x$-VOC sensitivity of coastal high O$_3$ events.
Trajectories of modeled O$_3$ and NO$_x$ (colored circles) ending at the Zion site at 17:00 CDT.

June 2nd (Friday)

Comparison of modeled (colored dots) and half-hour average measurements (lines) of NO$_x^*$, O$_3$, HNO$_3$, and H$_2$O$_2$ mixing ratios at Zion, IL.
Increase in O3 from 8:00-17:00 along trajectory on 2 June 2017

- Isopleths in ΔO3 were generated by varying NOx and anthropogenic VOC emissions relative to the base case where ENOx and EVOC = 1.

- The dashed contour corresponds to measured Δ[O3] during this period.

- The model base case ΔO3 suggests that O3 formation is in a VOC-sensitive regime.
Outcomes/Benefits of LMOS 2017

LMOS 2017 measurements provide critical observations for evaluating a new generation of air quality models attempting to better simulate ozone episodes in the region. Over the long term, the information collected is expected to result in:

- Improved modeled ozone forecasts for this region, which states and EPA use to meet state and federal Clean Air Act requirements.

- Better understanding of the lakeshore gradient in ozone concentrations, which could influence how EPA addresses future regional ozone issues.

- Improved knowledge of how emissions influence ozone formation in the region.

NASA LaRC data archive at https://www-air.larc.nasa.gov/cgi-bin/ArcView/lmos
Ozone Formation Along Wisconsin’s Lake Michigan Shore

1. Lake Michigan Ozone Transport

2. 2017 Lake Michigan Ozone Study – R. Bradley Pierce

3. Enhanced Ozone Monitoring and data analysis - Katie Praedel and David Bizot
Enhanced Ozone Monitoring in WI

- **2008 Ozone NAAQS**: Non-attainment areas classified at moderate and above are required to submit an Enhanced Ozone Monitoring (EOM) Plan by Oct 2019.

- **EOM**: Long-term, experimental study utilizing numerous monitoring strategies targeted to better understand the unique lakeshore precursors that lead to ozone creation.
Big Questions?

• What is the ratio of the precursors being converted into Ozone (O3) over the lake?

• What is the chemical composition of the Volatile Organic Compounds (VOCs) found in O3 precursors?

• How can the data be used to improve regulatory meteorological and photochemical models that are used in State Implementation Plans to estimate future O3 values?
Long Term EOM Plan: 3 Phases

- **Phase 1** (2019): Deploy Mobile Air Monitoring Lab (MAML) at multiple O3 lakeshore sites

- **Phase 2** (2020-2021): Phase 1 + Ceilometer, Pandora, Vertical Column O3 measurements on Water Tower

- **Phase 3** (2022-?): Phase 1 +2 + Formaldehyde, Hydrocarbon, Biogenic VOCs, Monitoring from Lighthouses, and Ships
Mobile Air Monitoring Lab (MAML)

Phase 1 EOM:

- **MAML** placed at Grafton and Chiwaukee lakeshore sites

- **Criteria Parameters**
  - Measured:
    - PM2.5
    - O3
    - CO
    - NO2

- **VOC Event sampling**
  - 18 events in 2019

2018

8-Hour Ozone DVs in ppb

- Data Incomplete
- ≤ 65
- 66 - 70
- 71 - 75
- ≥ 76

2008 Ozone NAAQS: 75 ppb
2015 Ozone NAAQS: 70 ppb

Statistical areas shown as dark lines
Phase 2 EOM:

- **MAML** being placed at in Sheboygan – lakeshore
- **Chiwaukee Site Upgrade**
  - Existing parameters (PM2.5, O3)
  - Additional parameters
    - VOC event sampling
      - Two sites instead of one and increasing capacity
    - Pandora (NO2 in the vertical column)
    - UW research instruments
- **Kenosha Water Tower**
  - Comparable ozone measurements using two instruments with inlets at regulatory height and ~100 feet
Future of Wisconsin EOM and BEYOND

- Learning Experience
- Continually Evolving
- Collaboration with Externals
Ozone-related Data Analysis

- Data from DNR EOM measurements, LMOS2017, and historical records are in a state of constant analysis in support of program policy objectives.

- Current staff work includes looking at precursor trends since the 1990s to determine if NOx and VOC ratios have changed over time, reviewing met buoy data to see how overwater data relates to monitored ozone values, and assessing 2019 EOM VOC samples for trends.

- Recently funded through LADCO two projects (Timothy Bertram/Brad Pierce and Charlie Blanchard) to review current NOx/VOC sensitivity.

- Program is adding a full-time data analyst and developing more rigorous plans to analyze, archive and make available ozone-related data.
Ozone Nonattainment Areas Update

David Bizot
### Ozone NAA redesignation requests

<table>
<thead>
<tr>
<th>Area</th>
<th>NAAQS</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door County (partial)</td>
<td>2015</td>
<td>Submitted to EPA on Jan. 27</td>
</tr>
<tr>
<td>Kenosha County (partial)</td>
<td>2008</td>
<td>Submitted to EPA on Jan. 26</td>
</tr>
<tr>
<td>Shoreline Sheboygan County</td>
<td>2008</td>
<td>Submitted to EPA on Feb. 11</td>
</tr>
</tbody>
</table>

Areas are meeting applicable NAAQS based on certified 2017-19 data
Ozone NAA redesignation requests

• The program is in close coordination with EPA on these requests (e.g., discussing weekly and more often as needed).

• All requests must complete federal notice and comment rulemaking before they are final/effective.

• Program collaborating with EPA to ensure all Clean Air Act requirements for redesignation are met.

• Agencies are working together to explore available efficiencies.
Air quality modeling

John Roth
Stationary Source Modeling Policy Coordinator
Modeling Policy Update

Since Aug 2016 (Last Report to AMSG)

- U.S.EPA released DRAFT PM$_{2.5}$/O$_3$ SIL
  - (WDNR commented 30SEP2016)
- WDNR proposed time-varying backgrounds for 1-hour SO$_2$/NO$_2$ in Sep 2016
- WDNR finalized backgrounds 19DEC2016

Calendar Year 2017

- Guideline on Air Quality Models finalized Jan 2017
- U.S.EPA released MERPs guidance in Jan 2017
- Developed 1-hour NO$_2$ approach - DRAFT released Aug 2017, with Wisconsin Modeling Guidelines
Modeling Policy Update

Calendar Year 2018
• Wisconsin Modeling Guidelines with 1-hour NO$_2$ approach finalized March 2018
• U.S.EPA released SIL for PM$_{2.5}$/O$_3$ in April 2018
• U.S.EPA released draft ambient air policy
  – (DNR commented 05DEC2018)

Calendar Year 2019
• U.S.EPA finalized ambient air policy Dec 2019
Background Concentrations

• Modeling in comparison to NAAQS includes background concentration
• Derived from ambient monitoring data
• In 2007, a workgroup identified background concentrations as an issue for modeling
• By 2008, the current methodology was defined and used with 2001-2006 data
Background Concentrations

• In 2014, PM$_{2.5}$ updated; In 2017, NO$_2$ and SO$_2$
  • As part of 2017 update, began planning for 2021

• In 2021, after census data released, all backgrounds will be updated to 2018-2020 data with revised geographic regions
• Ambient air is defined to be where the general public has access
• 1980 exclusion to ambient air for land owned or controlled by the source where access is precluded by a fence or physical barriers
• 2019 exclusion to ambient air is for land owned or controlled by the source where the source employs measures, that may include physical barriers, that are effective in precluding access by the general public
Ambient Air Policy

• Wisconsin receptor placement already excludes conveyors, material piles, trailer parking, and areas not accessible to public
• 2019 exclusion provides additional support for existing practice, especially for PSD projects
• Example of receptor placement
Ambient Air Example

- Property Line – Pink
- Structures – Purple
- Receptors – Black Dots
- Red Stacks
- Dashed Grid 50m
Inspection and compliance consistency

Maria Hill
Compliance, Enforcement and Emission Inventory Section Chief
Compliance Assistance

• Courtesy calls
• Partial compliance evaluations for more complex facilities
• Electronic reporting and e-Signature
• Automated response notifications
Compliance
Consistency

• New inspection report
• Regular in-person meetings/training for compliance staff
• Weekly statewide discussions about all enforcement actions (includes all regional supervisors, legal, the field operations director, the compliance policy coordinator, the section chief and the inspectors with new noncompliance issues)
2020 Priority Topics

Gail Good
2020 Priority topics

• Emerging federal regulation
  – Emerging contaminants (PFAS)
  – New source review reform
  – Long term planning at the federal level
  – ACE Rule

• Ongoing efforts
  – 2008/2015 ozone NAAQS implementation
  – SIP submittals and redesignation requests
  – Regional haze
  – Permit streamlining and other rulemaking

• Opportunities
  – Transparency in information (data, digitization)
  – Other states organizations