# MELD Meeting Minutes

2025 NADP Spring Meeting
Virtual
Wednesday, May 7, 2025, at 2pm-4 pm EST

Co-chairs: David Schmeltz & Connor Olson
Secretary: *Vacant (Please, contact C. Olson if you would like to volunteer)*

## Objectives

1. Present Hg updates from the NADP program office
2. Discuss proposed network optimization changes to mercury programs
3. Share latest news on Minamata Convention-related activities
4. Provide updates and discuss passive sampling efforts
5. Share recent related work on Hg science or findings (Round Robin)

## Key Takeaways

1. **NADP Program Office Updates**: MDN bags have been stalled on the producer's end. It is unclear when they will become available. Trends in network site number are relatively unchanged.
2. **Network Optimization Proposals**: Mercury related proposals include 1) Cessation of MeHg analysis in leaf litter samples from MLN; 2) Cessation of speciation for AMNet measurement; and 3) Alter MDN sampling from 1-week collections to 2-week.
3. **Minamata Updates**: Plan to have draft reports for review before COP-6 (November 2025). COP-7 has been moved forward from November 2027 to June 2027.
4. **Passive Hg Pilot Network**: Systems deployed in December of 2024 at 8 sites. First quarter samples have now been collected, with data release expected soon.
5. **Interagency US Mercury Monitoring:** A proposal for a dashboard system was presented. Data archiving will move forward to ensure accessibility in the future. If you have mercury monitoring data, please contact Connor Olson.
6. **Hg instrumentation available:** Winston Luke will be transferring remaining Tekran instruments to University of Wisconsin. Contact Winston.luke@noaa.gov if interested.

## Meeting Notes

### Hg Program Office Report

***David Gay, WSLH***

#### *MDN*

- Summary: currently 75 active sites. 3 sites closed recently (SC03, AK02, PA13), 1 opened (NE97), and 5 sites are interested in starting.
- 2024 data have arrived at the program office through January, 2025.

#### *AMNet*

- Summary: currently 8 active sites. Half currently collect speciated data.
- 2024 data have arrived at the program office through January, 2025.
- NOAA loaning out analyzers (Tekran 2537 and associated equipment).

### *MLN*

- Summary: currently 26 active sites. 4 sites closed, 3 opened (MT05, UT13, WA14).
- 2024 data will be reported soon.

### *General*

- Currently in the 4$^{th}$ of 5-year period increase in MDN network cost (2% yr$^{-1}$). Cost will total $10,268 for July, 2025 to June, 2026.
- Data maps will likely be available in June, much early than normal.
- Order of Teflon bags has been placed and paid for. We are waiting on delivery from manufacturer.
- Methylmercury data in precipitation (1996 – 2023) is close to being uploaded and available online.
- Muge Yassar will be defending dissertation and will have three papers resulting from her work on dry deposition modelling. These papers will be of use for dry deposition calculations.

## Proposed Network Changes

***David Gay, WSLH***

### *Recommendations from subcommittee*

- Remove speciation system and monitor GEM/TGM only using Tekran 2537.
    - Savings will come from data review and publication to the website
    - Publication by J. Gačnik indicates pyrolyzers should be used in front of detector on Tekran 2537 for measuring TGM (https://doi.org/10.1016/j.aca.2024.342956).
- Stop measuring MeHg in leaf litter from MLN.
    - Concentrations are low and fairly consistent (see recent synthesis, https://doi.org/10.1016/j.atmosenv.2025.121097).
    - No firm estimate of cost savings, but it will save considerable effort and will save labor cost.
- Switch MDN to two-week sample collection.
    - Concerns for overflow from high precipitation event.
    - Savings are estimated by David Gay at 30 – 40% over 52-week sampling.

### *Discussion of Proposals*

- What is the timeline for adopting changes?
    - Committee has not made recommendation on timeline yet.
    - Could changes have different timelines?
        - Vid Grande noted that quickly switching AMNet away from speciation might catch site operators off guard. Vid suggests waiting until the end of the year.
- Will tests be conducted to determine the comparability of two-week sampling to one-week sampling?
    - Tests have been conducted in the past and will likely be conducting in the future.

## Regional drivers of Hg loadings informed by spatially and temporally dense observations

***Eric Roy, MIT***

### *Observation of patterns in northeastern AMNET sites*

- Seasonal variation is observed across AMNet sites in New York and Vermont. Urban sites are high with similar baseline, while rural sites are generally lower. All sites seem to converge on a similar concentration.
- This convergence occurs at midday and is apparent when examining variations in concentrations over diel cycles.
- Eric argues that this convergence cannot be sufficiently explained by advection or other fluxes, and that this patter is instead indicative of free tropospheric mercury.

### *Modeling of diel patterns using GEOS-Chem*

- GEOS-Chem is unable to recreate diel cycles of mercury concentrations across the northeast.
    - Higher resolution with nested-grid model does not help.
- A box model approach is used to assess the boundary layer fluxes needed to recreate the observed diel patterns.
    - A tropospheric flux and upwind flux into the "box" are assumed; the pattern is then recreated by adjusting the "residual flux" within the box.
- If we allow the tropospheric and upwind flux to vary, a solution space for residual flux can be analytically determined.
    - Currently, GEOS-Chem's regional flux is reasonable, but the tropospheric concentration is lower than the calculated solution space to recreate diel patterns for the rural site.
    - For the urban sites, both free tropospheric concentrations and upwind concentrations are currently too low in GEOS-Chem.
- By examining all sites, the diel patterns suggest that sites are either exporters or importers, depending on whether they tend to decrease or increase as the boundary layer grows.

### *Audience Questions*

- Mae Gustin raised three questions/points
    - How was boundary layer height established for the region? Are you sure you're getting mixing with free tropospheric air?
        - Observations of boundary layer height were based on a 10-year record from aircraft (see method paper, **https://doi.org/10.1029/2018JD029529).**
    - Mae noted that they see similar patterns as the urban site (decreases in concentration midday), which they attribute to oxidation, which is not being captured by instrumentation.
    - Mae suggested that increases in midday concentrations at forested sites could be from re-emission of deposited mercury.
        - Eric pointed to work done in the northeast suggesting that soils are effective sinks of mercury (e.g., https://doi.org/10.1073/pnas.2105477118) and that boundary layer mixing is needed to explain diel patterns (https://doi.org/10.1016/j.chemosphere.2023.140113).

## Minamata Updates

*Terry Keating, EPA*

### *2nd OESG In-Person Meeting*

- Occurred on 16 - 21 March, 2025 in Minamata, Japan.
- 44 people in attendance and 27 countries represented.
- Meeting was focused on moving forward the writing of the OESG report.
- Sessions focused on multi-compartment Hg modeling, identifying cross media case studies, and establishing schedules for OESG products.

### *OESG Products and Timeline*

- The overall process is supposed to be done by COP-7.
- COP-7 has been moved from November 2027 to June 2027. Everything is now shifted earlier.
- Target for a draft report is prior to COP6, which takes place this November.
- Immediate next step will be to release a data availability summary, which will list the data that has been collected and inform parties of its use.
- Sandy Steffan asks anyone with long-term data (outside of NADP data) to please contact her for OESG purposes.

## Update on NADP's passive Hg pilot network

***Kristi Morris, NPS***

### *Overview*

- Using Tekran MerPAS sampler, 90-day samples (or 4 sample periods per year)
- 4 individual samplers and 2 trip blanks
- Pilot test: 3 samples and 1 blank from Tekran; and 1 sampler and 1 blank from WSLH
- Schedule: First set of samples were deployed on Dec. 31, 2024 and were collected the first week of April, 2025.
- Cost: $1000 per sample set of 4. 4 times per year = $4000 per year per site.

### *Sites*

- Nez Pierce (ID07)
- Makah Tribe near Olympic NP, Zion NP (WA03)
- Confederated Tribes of the Umatilla (MDN WA04)
- La Posta Tribe (E. San Diego; CA93)
- AMNet site NY06 (NYDEC; NY06)
- Choctaw Nation (OK24)
- Great Smoky Mountain NP (TN11)
- Zion NP (UTXX)

### *Next Steps*

- EPA/NPS/NOAA/PO: Develop fact sheet for distribution to interested sites.
- WSLH: determine if lab can re-pack samplers in-house, using Tekran parts and purchased activated charcoal for cost savings. Determine if network can operate with 1 sampler (like AMoN) and intermittent trip blanks).
    - Sandy noted that the global passive network refills their samplers and they have not had issues.

- Jim Renfro asked about when the first quarter data would be made available. Christa Dahman said data is in review and that following finishing touches on the generated report, the data will be released (soon).

## Tools for Mapping Integrated Mercury Monitoring Data

*Connor Olson, CU Boulder & Harvard University*

- Current efforts are being made to compile mercury monitoring data from across the U.S.
  - Goals include identifying gaps in monitoring records
  - Identifying areas with substantial overlap for attribution study
- Can we develop a tool to help navigate the compiled data that can be useful for the public
  - Tool should be:
    - Easy to use.
    - Allow for identifying overlapping data.
    - Allow for easy export of data.
    - Batch released to minimize workload.
- A protype was presented including a map of NADP datasets, which could be selected by map bounds. Selected data was presented as timeseries in real-time. Data could then be exported to CSV or PDF.
  - Tool is available to anyone interested.
  - Data may be unavailable moving forward; archiving should be priority.

## Round Robin

- Sandy Steffan: Updates on the global passive Hg sampling network. Around 100 sites are now part of the program. Data from the global passive network and two others are being compiled for data analysis. Gaps still exist in South America, Africa, and parts of Asia. A paper is expected in the next couple months. Some funding now exists for developing countries from the U.N.
- Winston Luke: Winston has surplus equipment available. Functional, but older, trace gas analyzers are available (mainly Thermo Fisher) for criteria pollutants. Winston will hopefully also have dozens of portable 2B ozone analyzers. Four or five Tekrans still available, being sent to the University of Wisconsin.
- Connor Olson: Two new ES&T mercury papers recently published: Jane et al. 2025 (https://doi.org/10.1021/acs.est.5c01032) and Geyman et al. 2025 (https://doi.org/10.1021/acs.est.4c13434).

## Meeting Agenda (May 7th, 2pm-4pm EST)

**2:00 pm**: Welcome *(David Schmeltz and Connor Olson)*
**2:15 pm**: NADP's Hg Program Updates and Proposed Changes *(David Gay)*
**2:35 pm**: Proposed Network Change Discussion/Q&A *(All)*
**2:45 pm**: Regional Drivers of Hg Loadings Informed by Spatially and Temporally Dense Observations *(Eric Roy)*
**3:00 pm**: Minamata Convention/OESG Updates *(Terry Keating)*
**3:15 pm**: Passive Mercury Pilot Network Updates *(Kristi Morris)*
**3:25 pm**: Tools for Mapping Integrated Mercury Monitoring Data *(Connor Olson)*

**3:35 pm**: Round Robin *(All)*
**3:50 pm**: ADJOURN