White Paper on Overwater Dispersion Modeling

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Goal

Replace the Offshore and Coastal Dispersion (OCD) model with AERMOD as the EPA’s preferred model for offshore sources.
Motivation

- OCD has been the EPA’s preferred model for estimating near-field impacts from overwater sources for almost 30 years, adapted from MPTER model
  - Includes platform downwash
  - Includes shoreline/coastal fumigation
  - Separate over land and overwater marine boundary layers
- **OCD Approved in 1988 (OCD3) - Last science updates in 1989 (OCD4)**
- AERMOD formulation is based on more advanced science
- AERMOD post-processing updated and consistent with form of the NAAQS
- Tools available to process prognostic data for input to AERMOD (e.g., MMIF)
- Evaluation and research to improve the science in AERMOD is ongoing by a broad community
Necessary Science Updates to AERMOD

- **Platform Downwash**
  - AERMOD needs to be updated to account for downwash effects that are unique to offshore platforms which are raised, often open lattice structures.
  - PRIME downwash algorithms in AERMOD were designed for solid, rectangular, ground-based buildings.

- **Shoreline/Coastal Fumigation**
  - AERMOD needs to be updated to include shoreline/coastal fumigation
  - AERMOD accepts only one set of boundary layer meteorology for the entire modeling domain.

- **Marine Boundary Layer Parameterization**
  - Boundary layer parameterization in AERMOD is land-based
  - A different parameterization scheme is needed to better represent the marine boundary layer in AERMOD (e.g., sea surface temperature)
Current and Planned Initiatives

• Collaboration with Other Federal Agencies
  - Establishment of an Overwater Team under the Interagency Workgroup on Air Quality Modeling (IWAQM) that provides collaboration with the Dept. of Interior’s (DIO)’s Bureau of Ocean and Energy Management (BOEM) specifically for overwater modeling issues.

• Platform Downwash
  - AQMG is regularly communicating with ORD researchers and will leverage current and future work by ORD focused on downwash.
  - PRIME2 committee, formed by AWMA, is looking at platform downwash and ways in which the PRIME algorithm could potentially be updated to better represent platform downwash. We look forward to receipt of formal recommendations that may also be leveraged.
Current and Planned Initiatives (cont.)

- **Shoreline/Coastal Fumigation**
  - AQMG will review current fumigation models, including older screening algorithms in AERSCREEN and SCREEN3, and the Shoreline Dispersion Model (SDM), along with more recent published research.
  - In collaboration with other federal agencies and the broader scientific community, EPA will identify a recommended formulation update and determine a path for inclusion into AERMOD.

- **Marine Boundary Layer**
  - AERCOARE was developed as a preprocessor for overwater meteorological data as a counterpart to AERMET to better characterize the marine boundary layer for offshore sources.
  - EPA will conduct additional testing and evaluation of AERCOARE and consider incorporating the COARE algorithms into AERMET.