ARB Ship Black Carbon Emission Testing

Ryan Huft, P.E.
Air Resources Engineer
Black Carbon (BC) Emission Testing on Auxiliary Engine with a scrubber
- Emission testing conducted by UCR
- Found Micro Soot Sensor* (MSS) and Photoacoustic Extinctionmeter** (PAX) most effective at calculating BC Emissions

Data establishes preliminary data on control effectiveness of scrubbing systems

*AVL MSS based on photoacoustic principle
**PAX based on photoacoustic + scattering principle
Future Ship Emissions Testing Goals

- Confirm and validate initial BC testing
- Continue work to identify most effective BC measurement system
- Evaluate additional scrubber technologies, engine types, and fuel types
- Open to collaboration with other stakeholders
Future Potential Ship Emissions Testing

- Potential Vessel Types
  - Additional scrubber testing (BELCO, Wartsilla, etc.)
  - Tier 1 or Tier 2 main engine testing
  - LNG

- Potential Fuels to Test
  - 0.1% S Intermediate Fuel
  - HFO (1% and 3.5% S)
  - Distillate (0.1% S)

- Black Carbon Testing Methods
  - Micro Soot Sensor (MSS)
  - Photoacoustic Extintiometer (PAX)
  - AVL Smoke Meter
ARB Information

- Link to ARB Ship Testing Results:
  - [http://www.arb.ca.gov/ports/marinevess/ogv/ogvreports.htm](http://www.arb.ca.gov/ports/marinevess/ogv/ogvreports.htm)

- Contact Information:
  - Ryan Huft, [rhuft@arb.ca.gov](mailto:rhuft@arb.ca.gov), (916) 327–5784