



Black Carbon, Arctic Climate & the International Maritime Organization



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Black Carbon, Arctic Climate & the International Maritime Organization (IMO)



- IMO – a United Nations organization.
- Focuses on maritime safety and marine environmental protection.
- Primary int'l conventions:
 - Safety of Life at Sea (SOLAS);
 - Int'l Convention for the Prevention of Pollution from Ships (MARPOL 73/78)



International Maritime Organization



- Six Annexes under MARPOL 73/78
 - Annex I – Prevention of pollution by oil
 - Annex II – Control of pollution by NLS in bulk
 - Annex III – Prevention of pollution by harmful substances carried by sea in packaged form
 - Annex IV – Prevention of pollution by sewage from ships
 - Annex V – Prevention of pollution by garbage from ships
 - Annex VI – Prevention of air pollution from ships



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- Established a work item at the Marine Environment Protection Committee (MEPC) to consider the impact of Black Carbon emissions on the Arctic from int'l shipping.
- PPR, a technical sub-committee, tasked by MEPC to consider issues regarding Black Carbon:
 - Develop a definition;
 - Consider measurement methods & identify the most appropriate;
 - Investigate appropriate control measures.



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- Status of PPR Sub-Committee work:
- Efforts to date have been thru an IMO-established correspondence group focusing on:
 - development of technical definition as a basis for future measurement methods
 - consider measurement methods and identify most appropriate measurement method taking into account development of technical definition
 - identifying possible control measures



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- Status of PPR Sub-Committee work :
 - Black Carbon from international shipping is formed by incomplete combustion of hydrocarbon fuels, and is the most effective component of particulate matter (PM), by mass, at absorbing solar energy.
 - General consensus that technical definition and measurement methods are directly connected.



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- Status of PPR Sub-Committee work :
 - Group favors an approach for measurement of Black Carbon that focuses on the light-absorbing, and thus climate-affecting properties of Black Carbon, especially those that most strongly affect the Arctic region.
 - Some technologies or measures have previously been applied to reduction of particulate matter or other pollutants, and the capacity to reduce Black Carbon is speculative or qualitative at best.



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- Status of PPR Sub-Committee work :
 - 3 Possible Technical Definitions being considered:
 - Black Carbon as elemental carbon (EC);
 - Black Carbon as equivalent black carbon (eBC);
 - Black Carbon as refractory black carbon (rBC).
 - All three presented to PPR for further discussion.



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- Status of PPR Sub-Committee work :
 - Potential measurement methods being considered:
 - Laser Incandescence
 - Multi-Angle Absorption Photometry
 - Photo-Acoustic Spectroscopy
 - Filter Smoke Number
 - Thermal-Optical Reflectance or Transmittance



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- Status of PPR Sub-Committee work :
 - Criteria for selecting most appropriate measurement method:
 - commercial availability & applicable fuel type
 - direct vs. indirect measurements
 - applicable test conditions (test bed vs. field)
 - incremental cost & practicability
 - proven ability to measure EC, eBC, or rBC



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- Status of PPR Sub-Committee work :
 - Working Group at next PPR session to be established:
 - further consider possible technical definitions and measurement methods;
 - hopefully discuss sample treatment and testing protocol.



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- Relationship w/ the IMO Polar Code:
 - Proposal from E-NGOs that the developing IMO Polar Code include provisions recognizing the importance of mitigating BC emissions, notwithstanding the work at PPR.
 - MEPC determined to await the outcome of PPR work on BC before considering further.



Contact Information



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THANK YOU

