

Review of agenda

Dan Rutherford, Ph.D.

Bryan Comer

CCAC Black Carbon Workshop
Utrecht, Netherlands
16 to 17 September 2015

The logo for the International Council on Clean Transportation (icct). It features the lowercase letters 'icct' in a bold, dark blue font. The letter 'i' has a small blue circle above it. Below the letters, the full name 'THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION' is written in a smaller, blue, all-caps font.

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Agenda summary – Day one

Time	Activity	Details
9:30-9:45 am	Welcome Remarks and Review of Agenda	
9:45-10:00 am	Summary of Previous Workshop/Background	Project background, IMO context
10:00-11:15 am	Session 1: Current Testing Efforts	Engine/vessel, instruments, and results
11:15-11:30 am	Break	
11:30-12:45 pm	Session 2: Sampling and Measurement Protocols	Protocols and reporting parameters (existing/proposed)
12:45-1:30 pm	Lunch	Boxed lunch with option to eat in the botanical gardens
1:30-2:15 pm	Presentation by ICCT Marine Black Carbon Emissions Testing Project Awardees	- Proposed engines/vessels, fuel types, and protocols
2:15-3:45 pm	Breakout Groups (concurrent)	Goal: identify areas of consensus and Day 2 questions
	1) Testing Protocols & Reporting	Set up, temp, dilution, probe, pre-treatment etc.
	2) Instrumentation	Instrumentation approaches for aligned testing
	3) Emission Factors	What EFs are needed for a refined global inventory?
3:45-4:00 pm	Break	
4:00-5:00 pm	Groups Report Out	Identify larger questions or issues needing more input
5:15 pm	Shuttle from TNO to Hotel Mitland	
7:00-10:00 pm	Group Dinner	Transportation provided to/from hotel (shuttle departs hotel 6:30 pm)

Agenda summary – Day two

Time	Activity	Details
9:15-9:30 am	Recap of Day 1	Brief review of consensus points/open questions
9:30-10:30 am	Testing Protocols & Reporting Discussion	Outcome: Agreement on protocol to measure BC and report the results under aligned emissions testing
10:30-10:45 am	Break	
10:45-11:45 am	Instrumentation Discussion	Outcome: Agreement on (types of) instruments that should be used to measure BC under aligned emissions testing
11:45-12:30 pm	Lunch	Buffet courtesy of TNO
12:30-1:30 pm	Emission Factors Discussion	Outcome: Agree on prioritized EF measurements (speed, load, fuel, etc.) to inform an updated marine BC global inventory for the CCAC project
1:30-1:45 pm	Break	
1:45-2:30 pm	BC Emissions Testing Process Start-to-Finish Discussion	Outcome: Agree on a complete BC emissions testing process based on the three discussion sessions
2:30-2:45 pm	Discussion of Next Steps	
2:45-3:00 pm	Summary and Closing Remarks	
3:00 pm	Adjourn	
3:15 pm	Shuttle from TNO to Hotel Mitland	

Workshop background

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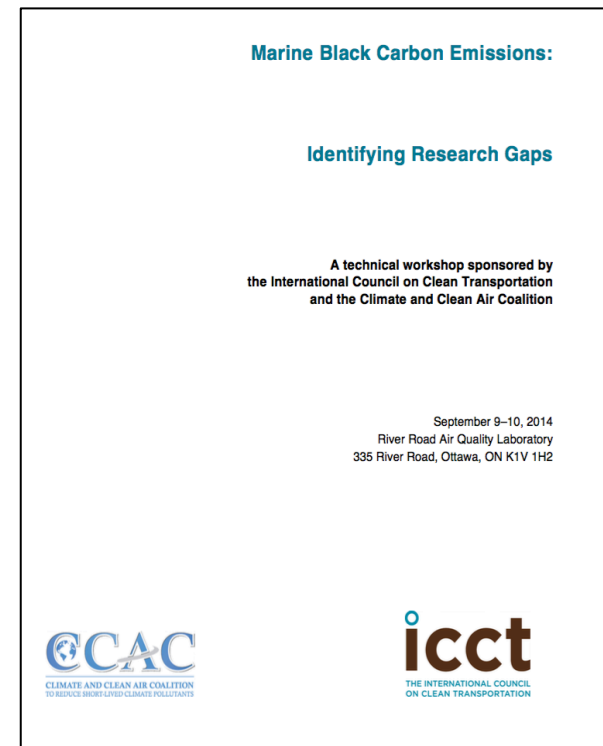
Workshop overview

- Part of a two year CCAC funded project to develop a refined global marine black carbon inventory and to better characterize control strategies for ships
- Project arranged around three workshops:
 1. 9/2014: Kickoff workshop in Ottawa
 2. This workshop: Sampling, reporting, and measurement approaches for emissions testing
 3. Q3 2016 workshop: Present results, including work on control strategy evaluation (location TBD)
- Workshop goal
 - Discuss sampling/reporting protocols and instrumentation suitable for aligned research on black carbon emissions, along with emission factors needed for a refined global inventory
 - Review proposed emissions testing by UCR-led research consortium
 - If needed, identify changes to maximize relevance of the research

Summary and outcomes of first workshop

- Held 9 and 10 Sept. 2014, at River Road Air Quality Laboratory in Ottawa
- Key outcomes
 - Recommended use of Bond et al. 2013 definition for marine BC
 - Identified priority control strategies for investigation – fuel switching, scrubbers, slow steaming, and filters (where appropriate)
 - Brainstormed near-term research priorities
 1. Review of existing emission factors
 2. Discussion and research on diagnostics (i.e. measurement protocols and sample pre-treatment)
 3. Consideration of the merits of on-board measurement, test bench analyses, and plume studies research
- Workshop report submitted by Canada as INF paper to PPR-2, contributing to acceptance of Bond et al. 2013 definition

Informed drafting of ICCT/MARAD RFP for emissions testing



<http://www.theicct.org/events/marine-black-carbon-emissions-identifying-research-gaps>

IMO policy background

Year	Meeting	Outcomes
2011	MEPC 62	Tasked BLG 16 (now PPR) with a work plan to: <ol style="list-style-type: none"> 1. Develop a definition 2. Consider measurement methods; and, 3. Identify and collate possible control measures.
2012	BLG 16	<ul style="list-style-type: none"> • Established BC correspondence group
2013	BLG 17	<ul style="list-style-type: none"> • High level policy definition proposed • Discussed measurement methods and control measures
2014	PPR-1	<ul style="list-style-type: none"> • Recommended that MEPC choose one of two technical definitions (eBC and LAC) linked to specific instruments
2014	MEPC 67	<ul style="list-style-type: none"> • Declined to choose one definition • Retasked PPR-2 to develop a technical definition
2015	PPR-2	<ul style="list-style-type: none"> • Agreed on a measurement method neutral definition of BC • Noted a need for studies to enable a comparison of measurement methods and a protocol for data collection
2015	MEPC 68	<ul style="list-style-type: none"> • Adopted recommended definition • Invited governments and observers to submit proposals/ information on BC data collection protocols to PPR 3.
2016	PPR-3	<ul style="list-style-type: none"> • <i>Discussion of protocols for voluntary data collection</i>

Summary

- Thank you for your participation – we're excited to have you all here!
- Thanks as well to our co-sponsors:
 - Workshop: TNO and the Dutch Ministry of Infrastructure and Environment
 - Emissions testing: MARAD
- Next up: Session 1: Current testing efforts (10:00 ~ 11:15 a.m.)

Breakout session overviews

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Breakout session 1: Testing protocols and reporting

- Discuss factors to include in an appropriate BC emissions reporting protocol
- Prioritize factors to investigate to develop a standardized BC test protocol, including:
 1. Probe installation location
 2. Instrument calibration
 3. Probe characteristics
 4. Sample line characteristics
 5. Measurement instrument cell characteristics
 6. Sampling time
 7. Sampling operating condition
 8. Engine operating condition
 9. Distinction between engine sizes/speeds deemed to be necessary
 10. Fuel type, fuel sulfur content, fuel oil consumption, lube oil specifications, and cylinder lube oil feed rate
 11. Operating conditions including engine speed and load

Breakout session 2: Instrumentation

- Identify instruments that may be included and evaluated in the upcoming marine BC emissions testing campaign led by UCR;
- Identify research needs to enable cross comparison of results obtained by different instruments; and
- Discuss performance criteria for instruments suitable for aligned future research on marine BC emissions.

Breakout session 3: Emission factors

- Identify the marine BC emission factors that are most needed for a refined global marine BC emissions inventory, including:
 - Vessel-type-specific BC EFs
 - Fuel-type-specific BC EFs
 - Engine speed/load-specific BC EFs
 - Exhaust gas aftertreatment-specific BC EFs
 - Others?