INTERNATIONAL MARITIME ORGANIZATION

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MARINE ENVIRONMENT PROTECTION COMMITTEE
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MEPC 59/INF.10/Corr.1
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PREVENTION OF AIR POLLUTION FROM SHIPS

Second IMO GHG Study 2009

Update of the 2000 IMO GHG Study

Final report covering Phase 1 and Phase 2

Corrigendum

1 On page 7, chapter 1 of the annex to document MEPC 59/INF.10, containing the conclusion of the executive summary, the third bullet point is replaced by the following:

- "Mid-range emissions scenarios show that by 2050, in the absence of regulations, carbon dioxide emissions from international shipping may grow by a factor of 2 to 3 (compared to the emissions in 2007) as a result of the growth in shipping."

2 In table 1-1 (page 10), table 3-7 (page 41), table 3-11 (page 49), and table 5-3 (page 76), the figures for total CO_2 shipping emissions in 2007 have been rounded to the value of 1050.

3 On page 140 of the annex, table 7-18 has been replaced by:

"**Table 7-18 – Estimated NO_x emission factor by emission standard and engine type (kg/tonne of fuel)**

	Tier 0	Tier I	Tier II	Tier III
SSD[6]	90	78	66	18
MSD[7]	60	51	41	12
LNG[8]	6	6	6	6

"

and the following footnotes have been added:

"[6] SSD: slow-speed diesel engines
[7] MSD: medium-speed diesel engines
[8] LNG: all engines using LNG as fuel".

4 On page 141 of the annex, the caption of figure 7-5 has been changed to:

"**Future SO_x emission factors used in scenarios. The future limit of 3.50% in 2012 on global sulphur content is not expected to influence the average emission factor**".

5 On page 144 of the annex, the following sentence has been added at the end of paragraph 7-57:

"For international shipping, the base scenarios indicate CO_2 emission growth in the range of 220% - 310% for the period 2007 - 2050. For total shipping, CO_2 emission growth is estimated to about 230% - 350% in the same period."

6 On page 144 of the annex, table 7-23 has been replaced by the following:

"**Table 7-23 – Emissions of CO_2 (million tonnes/year) from <u>international</u> shipping**

	2020			2050		
	Base	**High**	**Low**	**Base**	**High**	**Low**
A1FI	1058	1440	770	2648	7228	692
A1B	1057	1447	770	2681	7344	693
A1T	1058	1447	770	2668	7341	688
A2	982	1275	740	2194	5426	637
B1	959	1252	734	2104	5081	616
B2	925	1160	719	1903	4407	588

"

7 On page 145 of the annex, table 7-25 has been replaced by the following:

"**Table 7-25 – Scenarios for emissions (million tonnes/year) from <u>total</u> shipping in 2020**

	A1B	**A1F**	**A1T**	**A2**	**B1**	**B2**
NO_2	25.1	25.1	24.6	23.3	22.3	21.5
SO_2	3.8	3.8	3.7	3.5	3.4	3.2
PM	0.7	0.7	0.7	0.7	0.6	0.6
CO	3.0	3.0	3.0	2.8	2.8	2.7
NMVOC	1.0	1.0	1.0	0.9	0.9	0.9
CO_2	1294	1293	1294	1188	1167	1114
CH_4	0.12	0.12	0.12	0.11	0.11	0.11
N_2O	0.03	0.03	0.03	0.03	0.03	0.03

"

8 On page 145 in table 7-26, NO_x has been replaced by NO_2 and SO_x has been replaced by SO_2.

9 On page 159 of the annex, table 8-3 has been replaced by the following:

"**Table 8-3 – Fuel consumption and ship emissions in 2007, as used in the model calculations. All units are teragrams per year**

Fuel use	CO_2	NO_x	SO_x	SO_4 (primary)	NMVOC*	CH_4*	BC	POM	N_2O	CO
333	1050	24.5	14.6	0.87	0.80	0.10	0.12	0.29	0.027	1.80

* Not including tanker loading."

10 On page 239, paragraph A2.73, is replaced by:

"A2.73 Classification into three main groups, as shown in figure A2-6, is adopted in order to illustrate the efficiency of representative propeller groups versus ship speed (in knots). As can be seen from the figure, the most efficient type of propeller is a well-designed fixed-pitch (helical) propeller. However, for other reasons, alternative propulsion devices need to be considered. For instance, controllable-pitch (CP) propellers, although less efficient then fixed-pitched propellers, may be selected if the ship in question needs to satisfy the requirements of rapidly reversing thrust or efficient operation in significantly different environmental conditions. On the other hand, for ships with demands for high manoeuvrability, propellers with a vertical axis may represent a preferable choice. Propeller maintenance and upgrades are options for existing ships, and consist mainly of polishing the propeller, installing a new propeller, and optimizing the pitch of CP propellers."

11 On page 243 of the annex, the caption of figure A2-6 has been changed to:

"**Approximate efficiency of propulsive devices [31]**"

12 On page 245 of the annex, the last sentence of paragraph A2.106 has been deleted:

"Combining SCR with SO_x scrubbing is presently not feasible."

13 Throughout the annex to document MEPC 59/INF.10, citations and references to "Fearnresearch" have been replaced by "Fearnleys".